# ENVIRONMENTAL MANAGEMENT PLAN – EMP REPORT

**FOR**

# "MANUFACTURING AND MARKETING OF OTC MEDICINES & COSMETICS"

**Plot No. D-5, Mingaladon Industrial Park, Mingaladon Township, Yangon Region, Myanmar.**

***PROPONENT***


**Rohto-Mentholatum (Myanmar) Co., Ltd.**
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**July, 2022**

# ENVIRONMENTAL MANAGEMENT PLAN – EMP REPORT

**FOR**

**“MANUFACTURING AND MARKETING OF OTC MEDICINES & COSMETICS”**

# Report Review Form

| Report Title: Environmental Management Plan-EMP Report for "Rohto -Mentholatum (Myanmar) Co., Ltd. | |
|---|---|
| **Report Version: 00 Version** | |
| **Proponent:**<br>**Rohto-Mentholatum (Myanmar) Co., Ltd.**<br>Plot No. D-5, Mingaladon Industrial Park, Mingaladon Township,<br>Yangon Region, Myanmar.<br>Ph: 01– 546304, 09- 798458487<br>E-mail: info@rohto.com.mm<br>Website: www.rohto.com.mm | **Prepared by:**<br>**Green Myanmar Environmental Services Company Limited**<br>No. 115, Kanaung Min Thar Gyi Road,<br>Hlaing Thar Yar Industrial City, Industrial Zone (1), Hlaing Thar Yar Township,<br>Yangon Region, Myanmar.<br>Tel: +959-897 978 296<br>Email: gmescompany@gmail.com,<br>info@gmes-mm.com<br>Website: www.gmes-mm.com<br>Facebook: Green Myanmar Environmental Services Co., Ltd. |

| | |
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| **Approved Date:18/8/2022** | **Signature:** |

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# DOCUMENT CERTIFICATION AND COMMITMENT

Green Myanmar Environmental Services Company Limited has prepared this Environmental Management Plan (EMP) report for Manufacturing and Marketing of OTC Medicines and Cosmetics

I, the undersigned, (Authorized Person of Rohto-Mentholatum (Myanmar) Co., Ltd.) as proponent of this project, certify that the particulars in this report are correct, true to the best of my knowledge and do hereby solemnly affirm to:

- Ensure the legal and other obligations are incorporated in designs, procedures and project controls,
- Communicate legal and other requirements to personnel and contractors accountable for compliance,
- Ensure all relevant legal and other requirements and associated documentation (e.g., licenses, permits, approval applications) are readily available on site to company personnel and consultants,
- Comply with all Myanmar laws, rules and regulations, including Clauses 14 and 15 of the Environmental Conservation Law (2012),
- Conduct a compliance audit at least annually and ensure there is a process in place to monitor on-going compliance with all legal and other requirements,
- Follow according to the Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP),
- Submit the monitoring report prescribed in the schedule of the Environmental Management Plan to the Ministry every (6) month,
- Follow company's OHS policies,
- Implement CSR,
- Commit to minimize the impact of its activities on the environment during operation phase and decommissioning phase,
- Commit that the project will always comply fully with the commitments, mitigation measures, and plans in the EMP.

Signature : ------------------------------------------------------- 20/8/22

Name : Naing Aye

Factory Manager

Designation : -------------------------------------------------------

Rohto-Mentholatum (Myanamr) Co., Ltd.

Rohto-Mentholatum (Myanmar) Co., Ltd. Common Seal

Date: 20-08-2022

# ACKNOWLEDGEMENT AND COMMITMENT

An Environmental Management Plan (EMP) which includes Environmental Monitoring Plan is a procedure that identifies, describes, evaluates and develops means of mitigating potential impacts of a proposed activity on the environment.

This EMP report was prepared using information from the following sources: review of selected literature, reports, and advisories; meetings with several interested parties; personal visitation with several persons; the experience of the EMP team; and other information solicited from baseline data and stakeholders. And we strongly commit that this report was prepared in compliance with Myanmar Environmental Laws and Regulations.

The EMP team is grateful to the project proponent – **Rohto-Mentholatum (Myanmar) Co., Ltd.** – for commissioning us to conduct this Environmental Management Plan report in respect of the proposed project. We would like to further acknowledge with great appreciation all those neighbors who participated in the public consultation process for their cooperation throughout the exercise.

We further acknowledge the support, either direct or indirect, from the various parties who assisted the EMP team towards the successful completion of this report.

Signature : -----------------------------------------------------------

Name : **U Kyaw Soe Win**

Designation : **Managing Director**

Green Myanmar Environmental Services Co., Ltd.
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Date: ......18./.08./.2022...

# ABBREVIATIONS

| | |
|---|---|
| Co., Ltd. | Company Limited |
| CSR | Corporate Social Responsibility |
| CEMPs | Construction and Closing Environmental Management Plans |
| DISI | Directorate of Industrial Supervision and Inspection |
| DICA | Directorate of Investment and Company Administration |
| DI | Directorate of Industry |
| E | East |
| ECC | Environment Compliance Certificate |
| ECD | Environmental Conservation Department |
| EIA | Environmental Impact Assessment |
| EMP | Environmental Management Plan |
| EmoP | Environmental Monitoring Plan |
| GMES | Green Myanmar Environmental Services |
| HIE-1 | Heavy Industries Enterprise-1 |
| HIE-2 | Heavy Industries Enterprise-2 |
| HIE-3 | Heavy Industries Enterprise-3 |
| HRT | Hydraulic Retention Time |
| HSE | Health Safety and Environment |
| MSDS | Material Safety Data Sheet |
| MOECAF | Ministry of Environmental Conservation and Forestry |
| MONREC | Ministry of Natural Resources and Environmental Conservation |
| MIC | Myanmar Investment Commission |
| N | North |
| OHS | Occupational Health and Safety |
| OTC | Over The Counter |
| PPE | Personal Protective Equipment |
| Qty | Quantity |
| SDS | Safety Data Sheet |
| SS | Suspended Solid |
| WWTP | Wastewater Treatment Plant |

***Units***

| | |
|---|---|
| dB (A) | A-weighted system (the decibel values of sounds at low frequencies) |

| | |
|---|---|
| deg C | degree centigrade |
| Dia | diameter |
| D | depth |
| H | height |
| ha | hector |
| Hp | house power |
| Kg | kilogram |
| km/hr | kilometer per hour |
| l/min | liter per minute |
| lb | pound |
| m | meter |
| mg/ $m^3$ | milligram per cubic meter |
| mm | millimeter |
| $m^2$ | square meter |
| $m^3$/day | cubic meter per day |
| $m^3$/hr | cubic meter per hour |
| $m^3$/ min | cubic meter per minute |
| $m^3$/s | cubic meter per second |
| dB | decibel |
| ˚C | degree Celsius |
| ˚F | degree Fahrenheit |
| gpm | gallons per minute |
| hr | hour |
| kV | kilo volt |
| kW | kilo watt |
| kg | kilogram |
| lit | liter |
| mg/L | milligram per liter |
| l/s | liter per second |
| Mg | manganese |
| mg/$Nm^2$ | milligram per newton meter square |
| m | meter |
| MMK | Myanmar kyats |
| ppb | part per billion |
| ppm | part per million |

| | |
|---|---|
| PM | particulate matter |
| $PM_{10}$ | particulate matter 10 micrometer or less in diameter |
| $PM_{2.5}$ | particulate matter 2.5 micrometer or less in diameter |
| pH | potential of hydrogen ions |
| QC | quality control |
| Qty | quantity |
| Sq km | square kilometer |
| Sr. No. | serial number |
| ton/yr | ton per year |
| $\mu g/m^3$ | micro gram per cubic meter |
| USD | United States dollar |
| W | watt |
| W | width |

***<u>Symbols of Element</u>***

| | |
|---|---|
| Al | Aluminum |
| As | Arsenic |
| BOD | Biological Oxygen Demand |
| COD | Chemical Oxygen Demand |
| $CO_2$ | Carbon Dioxide |
| CO | Carbon Monoxide |
| CN | Chloride Cyanide |
| $NO_2$ | Nitrogen Dioxide |
| NO | Nitrogen Oxide |
| $O_2$ | Oxygen |
| $SO_2$ | Sulfur Dioxide |
| TDS | Total Dissolved Solids |
| TSS | Total Suspended Solids |
| TVOC | Total Volatile Organic Compound |

# EXECUTIVE SUMMARY

## Introduction

### *Background*

Rohto Pharmaceutical Co., Ltd. was established since 1899 in Japan and carried out manufacturing and marketing of OTC medicines & cosmetics. Moreover, sub companies and factories were established at at many countries around the world. Rohto-Mentholatum (Myanmar) Company Limited is a 100% foreign owned investment by 98% from Rohto Pharmaceutical Company Limited Incorporated in Japan and 2% from Rohto-Mentholatum (Vietnam) Company Limited Incorporated in Vietnam.

The factory was operated with manufacturing of OTC medicines and cosmetics since 2013 for packaging process. From 2022, facial wash cleanser compounding process will be operated.

Table (1): Salient Features of the Project

| No. | Salient Features | Description/Quantities |
|---|---|---|
| 1. | **Project Proponent** | Rohto-Mentholatum Myanmar Co., Ltd. |
| 2. | **Project Address** | Plot No. D-5, Mingaladon Industrial Park, Corner of No.3 Highway Road and Khayebin Road, Mingaladon Township, Yangon Region, Myanmar. |
| 3. | **Type of Business** | Manufacturing and Marketing of OTC Medicines and Cosmetics |
| 4. | **Total Land Area** | 10,004 $m^2$ |
| 5. | **Contact Person**<br>**Designation**<br>**Contact Details**<br>**Mobile Phone:**<br>**Email:** | U Naing Aye<br>Factory Manager<br>Plot D-5, Mingalardon Industrial Park.<br>+959 5149886<br>naingaye@rohto.com.mm |
| 6. | **Type of Land** | Industrial Land |
| 7. | **Nearest Highway Road** | No.3 Highway Road |
| 8. | **Total Amount of Investment** | USD 12.438 Million |
| 9. | **Land Acquisition** | Lease Land |
| 10. | **Lessor** | MIP (Mingalardon Industrial Park Co., Ltd.) |
| 11. | **Annual Working Day** | About 285 days |
| 12. | **Employees** | Male – 10, Female – 18<br>Total – 28 persons (June 2022) |
| 13. | **Operation Time** | 7:30 a.m. - 3:20 p.m. (7:20 hours/day)<br>Lunch Time: 00:30 min<br>Over Time: Base on Production Process Situation |

Table (2): List of EMP Studying Team

| No. | Title of Post | Terms of Reference | Nominee, Organization & Transitional Consultant Registration Number |
|---|---|---|---|
| **Main EMP Working Team** | | | |
| 1. | Team Leader | ▪ Overall management of EMP | Engr. U Kyaw Soe Win |

| | | | |
|---|---|---|---|
| | | operation<br>▪ Work plan<br>• Technical meeting & workshop<br>• Document reviewing and process flow studying<br>• Lead and facilitation of public consultation<br>• Data compilation & analysis<br>• Coordination with stakeholders | Managing Director<br>Green Myanmar Environmental Services Co., Ltd.<br>Experience in IEE processing<br><br>No.0019 |
| 2. | Environmental Consultant | • Advise on the design of EMP<br>• Develop term of reference for duty and responsibility among IEE team<br>• Advise on the environmental baseline<br>• Advise on the field survey<br>• Facilitate technical analysis<br>• Streamline the Environmental Management Plan (EMP) | Engr. Daw Khin Swe Aye<br>Former Lecturer,<br>Chemical Engineering Dept., YTU<br><br>No.0021 |
| 3. | Field Supervisor | • Develop operational checklist for Environmental Study<br>• In charge for preliminary field visit<br>• Establish field operational office for field survey<br>• Supervise field survey<br>• Finalize checking for report and report formatting | U Kyi Han Bo<br>B.E - Aerospace Fuel and Propellant Engineer<br>Myanmar Aerospace Engineering University,<br>Quality Engineer and Senior Environmental Experts |
| 4. | Public Coordinator | • Assist in stakeholder meeting<br>• Assist in public consultation meeting<br>• Preparation for public consultation meeting | U Aung Kyaw Than<br>B.E (Chemical) |
| **Supporting Team for EMP Studying** | | | |
| 5. | Consultant (Air Quality Management) | • Give advice on collecting field data for air quality<br>• Assist on air quality control system<br>• Give advice on air pollution evaluate and mitigation<br>• Give advice for data processing, computing, projection, modeling and analysis<br>• Give advice in report preparation | Engr. U Sein Thaung Oo<br>Chairman<br>Green Myanmar Environmental Services Co., Ltd.<br>Professional Engineer<br><br>No.0023 |
| 6. | Wastewater Management Consultant | • Collecting field data for industrial and municipal wastewater<br>• Assist in laboratory testing | Engr. Daw Tin May Soe<br>Consultant<br>Green Myanmar Environmental Services Co., |

| | | | |
|---|---|---|---|
| | | • Data processing, computing, projection, modeling and analysis<br>• Assist in report preparation | Ltd.<br><br>Retired Professor and Head Chemical Engineering Department, Mandalay Technological University. (Experience in environmental toxicology and pollution control)<br><br>No.0028 |
| 7. | Consultant for Laboratory Analysis | • Advise on data processing and laboratory testing and prepare instruction for laboratory testing<br>• Check the result of environmental laboratory testing<br>• Compare the laboratory result and verification | U Myo Myint<br>Consultant<br>Green Myanmar Environmental Services Co., Ltd.<br><br>Retired Former Factory Manager, Ministry of Industry (1)<br><br>No.0026 |
| 8. | Consultant on Energy Saving Management and Chemical Risk Assessment & Hazardous Chemical Management | ▪ Advise on energy saving management<br>▪ Advise on the risk assessment preparation<br>▪ Develop terms of reference for duty and responsibility among EMP team<br>▪ Advise on the environmental baseline<br>• Advise on the field survey | Daw Kyaw Kyaw Win<br>Director (Retired)<br>Myanma Petrochemical Enterprise<br>Ministry of Electrical and Energy |
| 9. | Social Operation and Field Coordinator | • Develop operational checklist for social survey<br>• Facilitate technical meeting and record keeping<br>• Assist in data mining and secondary data collection and coordinate with local authority and communities for village level meeting | U Khin Aung<br>Consultant<br>Green Myanmar Environmental Services Co., Ltd.<br><br>No.0025 |
| 10. | Consultant (Environmental Quality Management) | • Assist in preparation of guideline for environmental sampling of air and water quality<br>• Monitor the sample collection<br>• Register and inspect the sample collected<br>• Assist in report preparation for environmental baseline | Daw Khin Shwe Htay<br>Former Lecturer,<br>Chemical Engineering Dept., YTU<br>Environmental Engineer<br><br>No.0022 |

| | | | |
|---|---|---|---|
| 11. | Junior Environmental Experts | • Environmental and social survey<br>• Data collection<br>• Document reviewing<br>• Process studying<br>• Preparation of impact evaluation and assessment, and management plan<br>• Report preparing and formatting | Daw Hnin Htet Htet Hlaing<br>B.E - Port and Harbor<br>Myanmar Maritime University<br><br>Daw Aye Thuzar Hein<br>B.E (Chemical Engineering) |
| 12. | Environmental Monitoring Team | • Environmental baseline measuring<br>• Data analysis<br>• Coordinate for public consultation meeting<br>• Environmental baseline report preparing and formatting | U Aung Ko Min<br>B.E (Chemical)<br>(Monitoring Technician)<br><br>U Thi Ha Zaw<br>(Assistant Monitoring Technician) |
| 13. | Laboratory Experts | • Water sampling and laboratory testing<br>• Preparation for water & wastewater sampling<br>• Preparation for laboratory testing<br>• Laboratory testing<br>• Reporting for laboratory result | U Thet Min Paing<br>B.E (Chemical Engineering) |

## Policy, Legal and Institutional Framework

***Existing Myanmar Laws Relevant to Project***

A shortlist of existing Myanmar laws that Rohto-Mentholatum committed to follow for the proposed development project are described below.

- The National Environmental Policy (1994)
- The Environmental Conservation Law (2012) and the Environmental Conservation rules
- The EIA Procedure (2015)
- The National Environmental Quality (Emission) Guideline (2015)
- The Prevention of Hazardous from Chemicals and Related Substances Law (2013) & The Prevention of Hazardous from Chemicals and Related Substances Rules (2016)
- The Export and Import Law (2012)
- Occupational Health and Safety Law, (2019)
- The Worker's Compensation Act (1923)
- The Labor Organization Law (2012)
- The Labor Dispute Settlement Law (2012, Amendment in 2016)
- The Natural Disaster Management Law (2013)

# Project Description

### *Project Location and its Area*

Rohto-Mentholatum (Myanmar) Factory is located at Plot No. D-5, Mingaladon Industrial Park, Corner of No.3 Highway Road and Khayebin Road, Mingaladon Township, Yangon Region, Myanmar (See Figure 3.1). The geographical coordinates of the project site are as follows:

Latitude : 16˚ 56′ 23″ N

Longitude : 96˚ 9′ 15.38″ E

The area occupied is 10,004 $m^2$. The major land use of the area consists mainly of industry. The Rohto Factory is surrounded by:

North - TI Garment
East - Tashin Garment
South - Sunflower Lace (2)
West - Wedtex

## Types of Products and Production Capacity

### *Types of Medicines Products and Production Capacity (Yearly)*

| No. | Brand | Items | Unit | Weight | Unit | Qty |
|---|---|---|---|---|---|---|
| 1 | Medicines | V-Rohto 13ml | ml | 15,606,669 | pcs | 1,200,513 |
| 2 | | V-Rohto Cool 12 ml | ml | 3,990,660 | pcs | 332,555 |
| 3 | | V-Rohto Vitamin 13 ml | ml | 1,039,948 | pcs | 79,996 |
| 4 | | Deep Heat Rub Plus 30g | g | 330,000 | pcs | 11,000 |
| 5 | | Medical Cream 18g | g | 271,548 | pcs | 15,086 |
| 6 | | Remos IB 10g | g | 65,150 | pcs | 6,515 |
| 7 | | OXY 5 10g | g | 230,000 | pcs | 23,000 |
| 8 | | OXY 10 10g | g | 115,990 | pcs | 11,599 |
| **Yearly Total Balance** | | | | | | 1,680,264 |

***Types of Cosmetic Products and Packing Capacity (Yearly)***

| No. | Brand | Items | Unit | Qty | Unit | Weight |
|---|---|---|---|---|---|---|
| 1 | Acnes | Creamy Wash 20 g | Pcs | 43,330 | g | 866,600 |
| 2 | | Creamy Wash 50g | Pcs | 195,728 | g | 9,786,400 |
| 3 | | Creamy Wash 100g | Pcs | 141,189 | g | 14,118,900 |
| 4 | | Soothing Toner 90ml | Pcs | 49,576 | ml | 4,461,840 |
| 5 | | Sealing Gel 9g | Pcs | 91,574 | g | 824,166 |
| 6 | | Sealing Gel 18g | Pcs | 41,845 | g | 753,210 |
| 7 | | Foaming Wash 150ml | Pcs | 2,170 | g | 325,500 |
| 8 | | Oil Remover Films | Pcs | 10,197 | g | 134,600.40 |
| 9 | | Scar Care 12g | Pcs | 17,086 | g | 205,032 |
| 10 | | C 10 15ml | Pcs | 10,403 | ml | 156,045 |
| 11 | | Vitamin Cream 40g | Pcs | 54,537 | g | 2,181,480 |
| 12 | | Vitamin Cleanser 50g | Pcs | 127,019 | g | 6,350,950 |
| 13 | | Vitamin Cleanser 100g | Pcs | 81,900 | g | 8,190,000 |
| 14 | | Pure White Cream 50g | Pcs | 6,686 | g | 334,300 |
| 15 | | Pure White Wash 50g | Pcs | 9,488 | g | 474,400 |
| 16 | | Pure White Wash 100g | Pcs | 19,515 | g | 1,951,500 |
| 17 | | Oil Control Cleanser 50g | Pcs | 16,106 | g | 805,300 |
| 18 | | Oil Control Cleanser 100g | Pcs | 16,642 | g | 1,664,200 |
| 19 | LipIce | Sheer Color Strawberry 2.4 g | Pcs | 6,321 | g | 15,170.40 |
| 20 | | Sheer Color Natural | Pcs | 4,741 | g | 11,378.40 |
| 21 | | Sheer Color Honey | Pcs | 7,915 | g | 18,996.0 |
| 22 | | Sheer Color Q Choco Mint 2.4g | Pcs | 1,360 | g | 3,264.0 |
| 23 | | Colourless Apple | Pcs | 1,915 | g | 8,234.50 |
| 24 | | Colourless Strawberry | Pcs | 1,913 | g | 8,225.90 |
| 25 | | Colourless Lemon 4.3g | Pcs | 1,339 | g | 5,757.70 |
| 26 | | LipIce Sheer Color Fruit Juice Cherry 4g | Pcs | 3,036 | g | 12,144 |
| 27 | | LipIce Sheer Color Fruit Juice Strawberry | Pcs | 3,035 | g | 12,140 |
| 28 | | LipIce Sheer Color Fruit Juice Berry | Pcs | 3,032 | g | 12,128 |
| 29 | | LipIce Sheer Color Fruit Juice Orange | Pcs | 3,028 | g | 12,112 |
| 30 | | LipIce Sheer Color POP Pink 2.4g | Pcs | 3,036 | g | 7,286.40 |
| 31 | | LipIce Sheer Color POP Orange | Pcs | 3,037 | g | 7,288.80 |
| 32 | | LipIce Sheer Color POP Rose | Pcs | 3,037 | g | 7,288.80 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 33 | | LipIce Sheer Color POP Red | Pcs | 2,653 | g | 6,367.20 |
| 34 | | LipIce Water Lip Citrus Pure Joy 4.3g | Pcs | 1,764 | g | 7,585.20 |
| 35 | | LipIce Water Lip Citrus Herb | Pcs | 1,762 | g | 7,576.60 |
| 36 | Sunplay | Out Going | Pcs | 9,406 | g | 282,180 |
| 37 | | Super Block 30g | Pcs | 7,645 | g | 229,350 |
| 38 | | Super Block 70g | Pcs | 6,176 | g | 432,320 |
| 39 | | Baby Mild 30g | Pcs | 7,379 | g | 221,370 |
| 40 | | Whtening UV-30g | Pcs | 13,048 | g | 391,440 |
| 41 | | Whtening UV-70g | Pcs | 3,812 | g | 266,840 |
| 42 | | Sunplay Skin Aqua Clear White 25g | Pcs | 1,546 | g | 38,650 |
| 43 | | Sunplay Skin Aqua Clear White 55g | Pcs | 1,656 | g | 91,080 |
| 44 | | Sunplay Skin Aqua Silky White Gel 30g | Pcs | 4,780 | g | 143,400 |
| 45 | | Sunplay Skin Aqua Silky White Gel 70g | Pcs | 6,146 | g | 430,220 |
| 46 | | Sunplay Skin Aqua UV Tone Up Essence | Pcs | 3,167 | g | 158,350 |
| 47 | Other Consumer Products | Scar Z | Pcs | 15,268 | g | 183,216 |
| 48 | | Remos IR 60ml | Pcs | 48,965 | ml | 2,937,900 |
| 49 | | Remos IR 150ml | Pcs | 3,492 | ml | 523,800 |
| 50 | | Remos IR Cream Lemon Grass | Pcs | 11,646 | g | 815,220 |
| 51 | | Selsun Shampoo 50 ml | Pcs | 35,395 | ml | 1,769,750 |
| 52 | | Selsun Shampoo 100 ml | Pcs | 26,508 | ml | 2,650,800 |
| 53 | HADA LABO Series | Advanced Nourish Hyaluron Cleanser 80g | Pcs | 8,085 | g | 646,800 |
| 54 | | Advanced Nourish Hyaluron Lotion 100ml (for normal skin) | Pcs | 3,644 | ml | 364,400 |
| 55 | | Advanced Nourish Hyaluron Lotion 100ml (for oil skin) | Pcs | 3,774 | ml | 377,400 |
| 56 | | Advanced Nourish Hyaluron Cream 50g | Pcs | 9,106 | g | 455,300 |
| 57 | | Perfect White Arbutin Cleanser 80g | Pcs | 1,993 | g | 159,440 |
| 58 | | Perfect White Arbutin Lotion 100ml | Pcs | 5,277 | ml | 527,700 |
| 59 | | Perfect White Arbutin Milk 90ml | Pcs | 4,357 | ml | 392,130 |

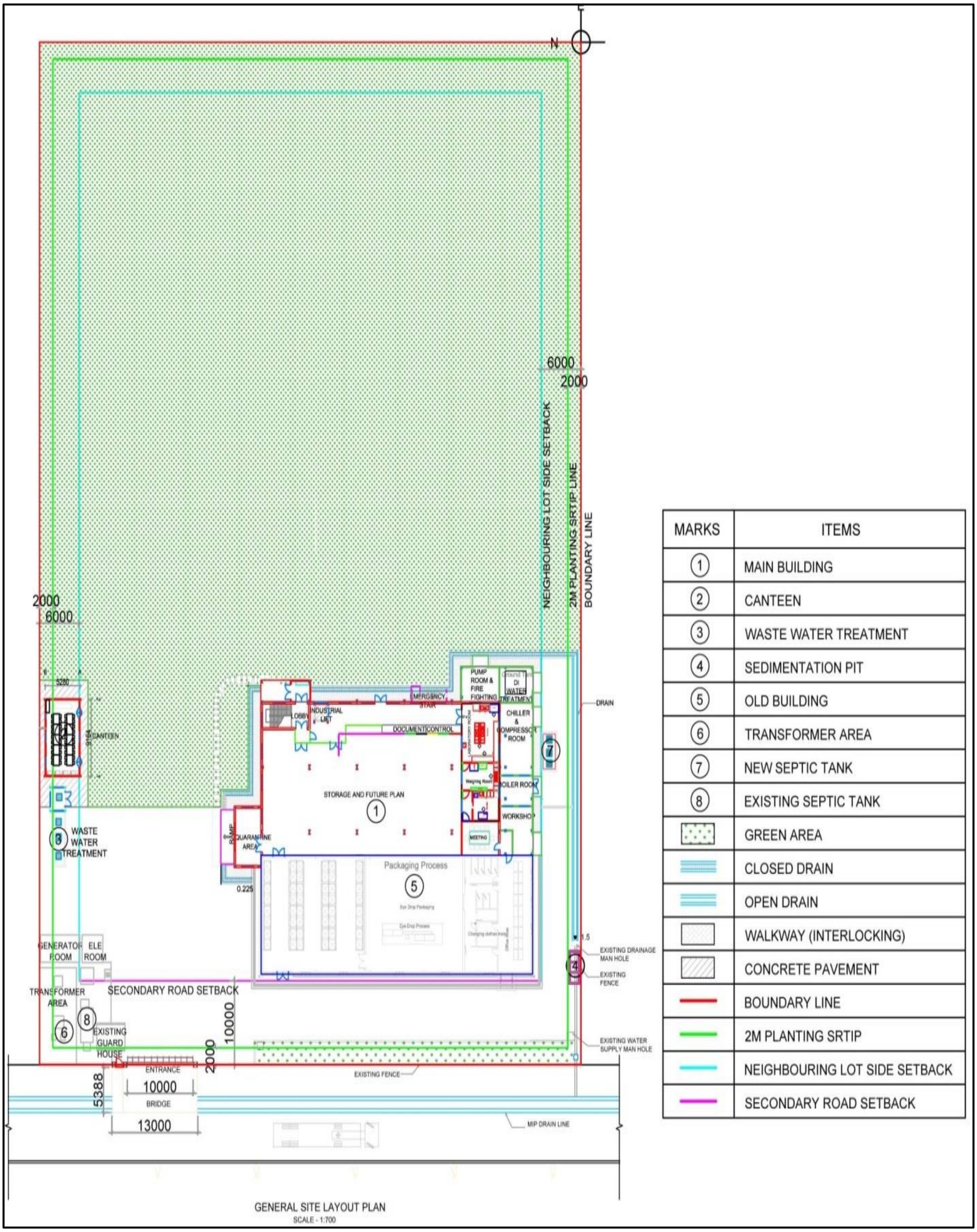
| | | | | | | |
|---|---|---|---|---|---|---|
| 60 | | Perfect White Arbutin Essence 30g | Pcs | 3,016 | g | 90,480 |
| 61 | | Perfect White Arbutin Cream 50g | Pcs | 8,283 | g | 414,150 |
| 62 | | Pro Anti Aging Collagen Plus Cleanser 80g | Pcs | 5,000 | g | 400,000 |
| 63 | | Pro Anti Aging Collagen Plus Lotion 100ml | Pcs | 4,458 | ml | 445,800 |
| 64 | | Pro Anti Aging Collagen Plus Cream 50g | Pcs | 4,310 | g | 215,500 |
| 65 | | Pro Anti Aging Collagen Plus Essence 30g | Pcs | 2,540 | g | 76,200 |
| 66 | | HDLB Advanced Nourish Trial set (Hyaluron Cleanser 25g + Hyaluron Lotion 40ml) | Pcs | 3,409 | | |
| 67 | | HDLB Perfect White Trial set (Arbutin Cleanser 25g + Arbutin Lotion 40ml) | Pcs | 3,936 | | |
| Total Balance | | | | 1,265,138 | | |

Figure (2): Photos of Distributed Products

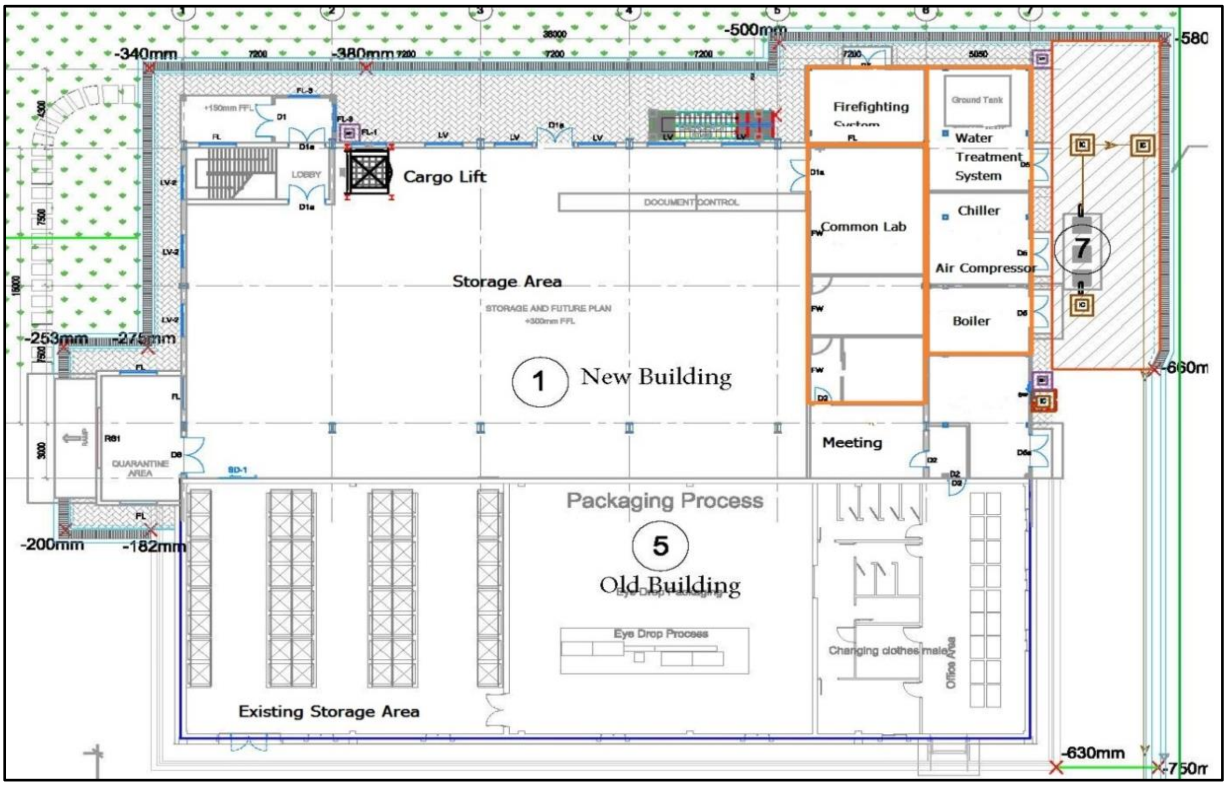
**Layout Plan of the Factory**

The Layout Plan of the project site shows the land use of Rohto factory. There are factory building, auxiliary area such as canteen, generator & electrical building and security gate. Factory building will be a two stories building. On the ground floor of the factory

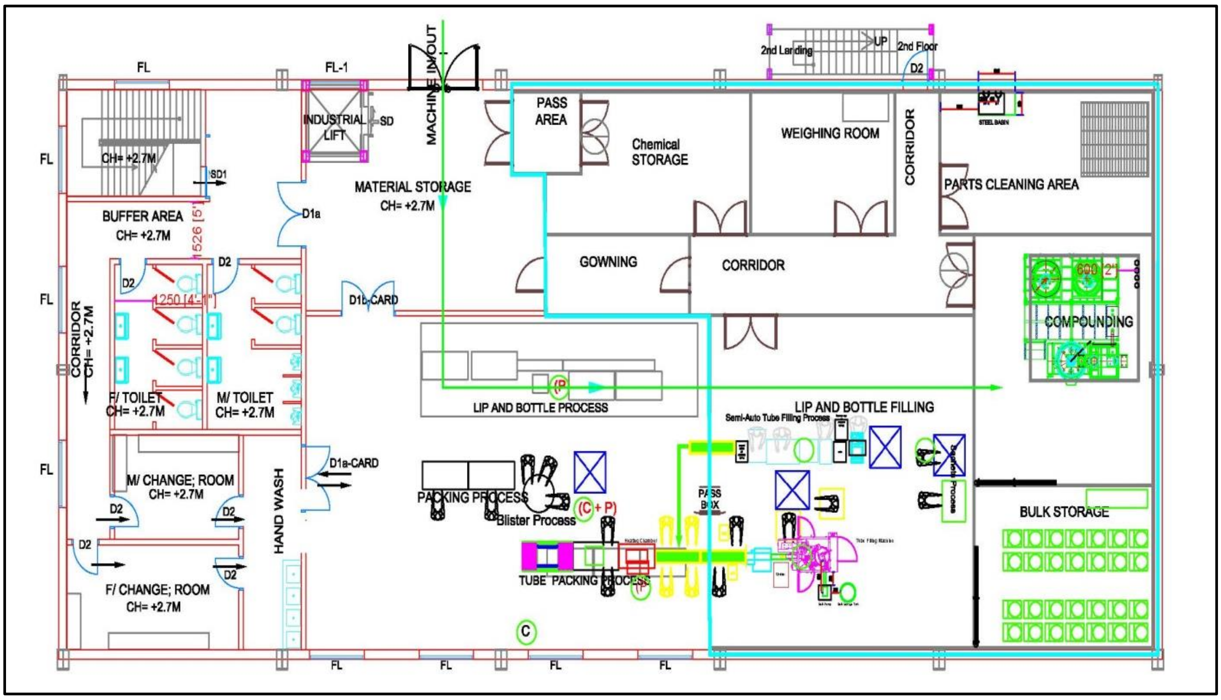
building are packing and filling area, office, chemicals store, boiler room, compressor room, maintenance office and firefighting pump room. The second floor is main production area and temporary store area. Building Layout, 1st Floor, 2nd Layout and Drainage Layout are as shown in the following Figures.




**Building Layout Plan**



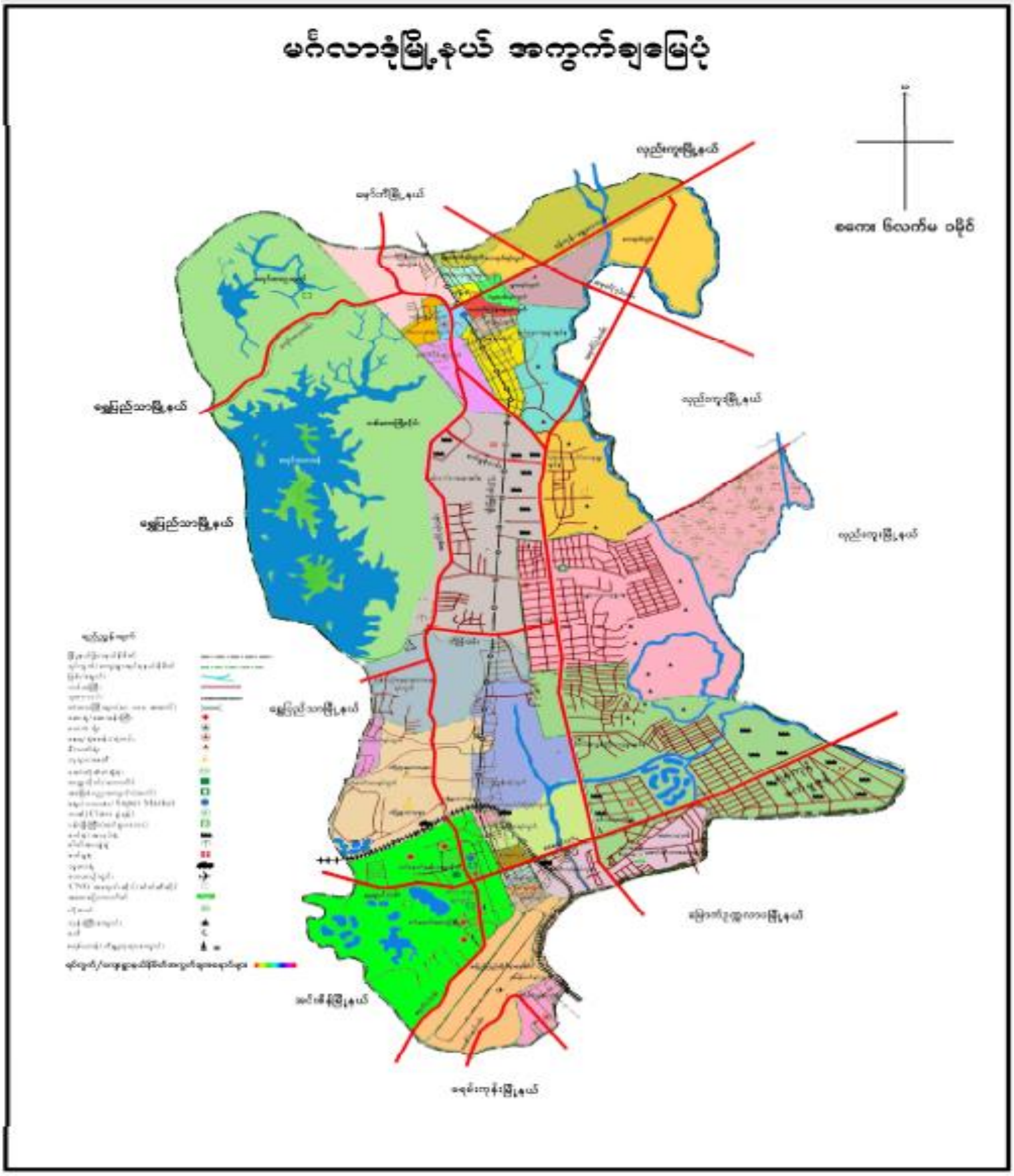

**First Floor**




**Second Floor**

## Environmental Baseline Study

The project is situated in the Mingalardon Industrial Park (MIP), Mingalardon Township, Yangon Region. Therefore, Environmental conditions and Social conditions are referenced from the regional information handbooks of Mingalardon Township (2019, September).




*Source: Township Profile, Mingalardon Township (2019, September)*

Table (3): Environmental and Social Conditions

| Type | Description |
|---|---|
| **Geographical Features** | |
| Area | Mingaladon Township is part of Yangon Region Northern District. Between 17 ° 02'N and 17 ° 04'N. It is located between 96 ° 08'E and 96 ° 15'E.<br>It covers an area of 41.69 square miles.<br>It is 3.61 miles long from east to west and 11.55 miles long from south to north. |

| | |
|---|---|
| Boundaries | It is bordered by Hlegu Township (Northern District) to the east of Mingaladon Township. In the south by Mayangone Township (Western District); To the north by Hmawbi Township; It borders Hlegu Township (Northern District) |
| Topography | Ngweya Tan Mountain range to the west of Minglardon Township and running from south to north. To the west is the Hlawkarlakeat the border of Shwepyithar Twonship and the rest is plain. |
| Hydrology | Mingalardon Township has few rivers and the Balar creek is about 12 miles from North-South. It flows about 8 miles from west to east. The water level is about 12 feet in the rainy season and 3 feet in the summer making. It impossible for boats/ ship to travels. |
| Sea Level | Mingalardon Township is located at an average height of 100 feet above sea level. |
| **Climate and Natural Environment** | |
| Climate | Mingaladon Township has a hot and humid climate with a maximum temperature of (39 ° C) and a minimum temperature of (15.5 ° C). Until the end of September 2019, the maximum summer temperature (38 ° C) and the lowest winter temperature (15.8 ° C). |
| Natural plants | Pyin Ka Toe, Thit Mar, Dhani and Mangrove trees are planted in the Mingalardon Township. |
| Flora, Fauna, and Biodiversity | There is no wildlife in MingalardonTownship. |
| Natural Environment | Forest reserve for environmental conservation activities. It is maintained by rope forests. |
| Emergency Risk | One fire accident occurred in Mingalardon Township in 2018-2019. |
| **Social Environment** | |
| Population | In 2019 September, there are about 263,798 in Mingalardon Township and 149,897 people live in urban area and 113,901 in rural. |
| Ethnicity | Most of the people who live in Mingalardon townships are Bamar, followed by Kayin, Rakhine, and Indian people lived in Mingalardon. |
| Religion | In Mingalardon, Buddha (251,156), Christian (3,339), Hindu (3,132) and other (4,071) |
| Local Economy and Livelihood | Mingaladon Township is located in Yangon Region and is an economically important township. Yangon Industrial Zone Mingaladon Industrial Zone and Pyinmabin Industrial Zone are situated in the Mingalardon township and have 110 factories and are an industrial base township.<br>The Mingalardon Township is situated Yangon-Pyay Road and No.3 Highway Road. Therefore, transportation is better. |
| Education Sector | In Mingalardon, there are 9 B.E.H.S, 3 sub B.E.H.S, 7 B.E.M.S, 6 sub B.E.M.S, 25 B.H.P.S, 2 Post Primary School, 24 Pre-primary school. |
| Hospitals and Health Services | There are 5 hospitals, 11private pharmaceuticals shop, 5 rural health care centers, and 26 sub health care center. The most occurrence diseases are liver and abdominal disease. |
| Sport Sector | One football playground, one tennis ground and one garden are situated in Mingalardon Township |

| | |
|---|---|
| Cultural Heritage/ Assets | There is no cultural heritage site designated by the United Nations Educational, Scientific and Cultural Organization (UNESCO) or the Myanmar government. |

**Environmental Quality Measuring**

**Air Quality Measuring**

Green Myanmar Environmental Services Co., Ltd will monitored ambient air and noise level measure at 27.5.2020 to 28.5.2020. Air quality was measured three points. Ambient air quality measuring was carried out 24 hr measuring in the factory premise. And workplace air quality was measured one hour for each point. Measuring results are compard with Myanmar National Environmental Quality (Emission) Guidelines-2015.

***(1) Measuring Results of Ambient Air Quality Baseline Data (AMP-1)***

| No. | Parameters | Result | Unit | Measuring Avg. Period | | NEQG Value | Avg. Period | Remark |
|---|---|---|---|---|---|---|---|---|
| 1 | Nitrogen Dioxide | 101.8 | µg/m³ | 24 | hours | 200µg/m³ | 1-hour | 28/5/2021 1:54-2:54 (Peak Hour) |
| 2 | Sulphur Dioxide | 0 | µg/m³ | 24 | hours | 20 µg/m³ | 24-hours | |
| 3 | Particulate matter $PM_{10}$ | 18.87 | µg/m³ | 24 | hours | 50 µg/m³ | 24-hours | |
| 4 | Particulate matter $PM_{2.5}$ | 8.56 | µg/m³ | 24 | hours | 25 µg/m³ | 24-hours | |
| 5 | Ozone | 81.98 | µg/m³ | 24 | hours | 100µg/m³ | 8-hour daily Maximum | 5/27/2021 9:54 - 17:54 |
| 6 | Ammonia | 0 | ppm | 24 | hours | NG | - | |
| 7 | Carbon Dioxide | 367.44 | ppm | 24 | hours | NG | - | |
| 8 | Carbon Monoxide | 0 | ppm | 24 | hours | NG | - | |
| 9 | Volatile Organic Compound | 0 | ppb | 24 | hours | NG | - | |
| 10 | Oxygen | 21 | % | 24 | hours | NG | - | |

**Note- NEQG-National Environmental Quality (Emission) Guideline*

According to the above table, Nitrogen Dioxide, Sulphur Dioxide, Particulate matter $PM_{10}$ and $PM_{2.5}$, Ozone) parameters of the ambient air quality are within the National Environmental Quality (Emission) Guidelines.

***(2) Indoor Air Quality Measuring Results***

| Monitoring Point | Description | Parameters | Unit | Monitoring Duration | Workplace air Monitoring Result | NEQG |
|---|---|---|---|---|---|---|
| IAMP-1 | Production Area | $PM_{10}$ | [µg/m³] | 1Hour | 36 | 50 |
| | | $PM_{2.5}$ | [µg/m³] | 1Hour | 12 | 25 |
| | | VOC | ppm | 1Hour | 0 | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| IAMP-2 | Warehouse | $PM_{10}$ | [µg/m$^3$] | 1Hour | 28 | 50 |
| | | $PM_{2.5}$ | [µg/m$^3$] | 1Hour | 24 | 25 |
| | | VOC | ppm | 1Hour | 0 | - |

***Note- NEQG-National Environmental Quality (Emission) Guideline**

According to the **Error! Reference source not found.**table, most of the particulate atters ($PM_{10}$ and $PM_{2.5}$) were accepted within the National Environmental Quality (Emission) Guidelines.

**Noise Level**

Noise surveys have been conducted at the project site in order to know the baseline noise level. Noise level measuring was also done at the same sampling points used for air quality monitoring. Measuring is carrying out 1 hr into the 8 hr of the working period. Measuring results are as shown in the following.

| Location | Parameter | Unit | Measuring Period | Results |
|---|---|---|---|---|
| Factory Premises | Noise Level | dBA | 24 hr | Day - 68 |
| | | | | Night - 54 |
| Packing Area | Noise Level | dBA | 1 hr | 70.2 |
| Warehouse | Noise Level | dBA | 1 hr | 62.1 |

The factory are located in industrial park, the observed values are compared with the guidelines for industrial area. The observed values of the ambient noise levels for daytime and night time are within the limit of Guidelines. Therefore, the human and the environment cannot be affected by the noise. The factory are located in industrial park, the observed values are compared with the OHS Guideline. The observed values of the Indoor Noise level for daytime and night-time are within the limit of Guidelines. Therefore, Noise level value was within the acceptable conditions.

**Water Quality Measuring**

In order to monitor the water quality, there was two sampling in the factory. The water samples were tested at GMES laboratory. The results are presented in the following tables.

***(1) Results of Drain Water***

| No. | Parameters | Unit | Analysis Value | Minimum Measurement Range of Method | NEQG - General Application |
|---|---|---|---|---|---|
| 1. | 5-day Biochemical Oxygen | mg/l | ND | **30** | **50** |
| 2. | Ammonia | mg/l | 0.34 | **0.01** | **10** |
| 3. | Arsenic | mg/l | 0 | **0.005** | **0.1** |
| 4. | Chemical Oxygen Demand | mg/l | ND | **30** | **250** |
| 5. | Chromium (Hexavalent) | mg/l | 0.11 | **0.02** | **0.1** |
| 6. | Chromium (Total) | mg/l | 0.16 | **0.02** | **0.5** |
| 7. | Copper | mg/l | ND | **0.5** | **0.5** |

| | | | | | |
|---|---|---|---|---|---|
| 8. | Cyanide (Total) | mg/l | ND | **0.01** | **1** |
| 9. | Iron | mg/l | 0.1 | **0.1** | **3.5** |
| 10. | Nickel | mg/l | ND | **0.2** | **0.5** |
| 11. | Oil and Grease | mg/l | ND | **5** | **10** |
| 12. | pH | - | 7.58 | **0.1** | **6~9** |
| 13. | Phenol | mg/l | 0.22 | **0.1** | **0.5** |
| 14. | Sulfide | mg/l | ND | **0.04** | **1** |
| 15. | Temperature | ˙C | 27 | **1** | **<35** |
| 16. | Total Phosphorus | mg/l | 0.14 | **0.02** | **2** |
| 17. | Total Suspended Solids | mg/l | 24 | **1** | **50** |
| 18. | Zinc | mg/l | ND | **0.02** | **2** |

According to the lab result, pH values (inside drain water quality of the Factory) are higher than the guideline values. The other parameters are within the limits.

***(2) Results of Drinking Water***

| No. | Parameters | Unit | Analysis Value | Minimum Measurement Range of Methods | Drinking Water Standards | | |
|---|---|---|---|---|---|---|---|
| | | | | | WHO (2011) | EPA (Spring 2012) | Indian Specification (IS:10500,2012) |
| 1. | Aluminum | mg/l | 0.09 | **0.01** | **0.2** | **0.2** | **0.03** |
| 2. | Arsenic | mg/l | 0 | **0.005** | **0.01** | **0.01** | **0.01** |
| 3. | Chloride | mg/l | 14 | **5** | **250** | **250** | **250** |
| 4. | Copper | mg/l | ND | **0.5** | **2** | **1** | **0.05** |
| 5. | Cyanide | mg/l | ND | **0.01** | **0.07** | **0.2** | **0.05** |
| 6. | Manganese | mg/l | ND | **0.2** | **0.4** | **0.05** | **0.1** |
| 7. | pH | - | 7.4 | **0.1** | **6.5~8.5** | **6.5~8.5** | **6.5~8.5** |
| 8. | Sulfate | mg/l | 4.2 | **2** | **250** | **250** | **200** |
| 9. | Total Alkalinity as $CaCO_3$ | mg/l | 68 | **5** | **-** | **-** | **200** |
| 10. | Total Dissolved Solids | mg/l | 260 | **1** | **600** | **500** | **500** |
| 11. | Total Hardness as $CaCO_3$ | mg/l | 61 | **5** | **500** | **-** | **200** |
| 12. | Total Iron | mg/l | 0.1 | **0.1** | **0.3** | **0.3** | **0.3** |
| 13. | Turbidity | NTU | 6.7 | **0.01** | **5** | **-** | **1** |

According to the lab result, turbidity are higher than the WHO drinking water standards, it is found that these parameters are within the standards after treatment expect the turbidity values.

***Soil Quality Measuring***

In order to monitor the soil quality, soil samples both of the factory premises was taken and tested at GMES laboratory. The analysis results of the parameters are presented in the Table

***Results of Soil Quality***

| No. | Parameters | Unit | Analysis Value | Minimum Measurement Range of Methods |
|---|---|---|---|---|
| 1. | Aluminum | mg/kg soil | 0.1 | **0.05 mg/kg soil** |
| 2. | Arsenic | mg/kg soil | 0 | **0.025 mg/kg soil** |
| 3. | Chloride | g/kg soil | 0.67 | **0.025 mg/kg soil** |
| 4. | Copper | mg/kg soil | ND | **2.5 mg/kg soil** |
| 5. | Cyanide | mg/kg soil | ND | **0.05 mg/kg soil** |
| 6. | Extractable Acidity | cmol/kg soil | 4.25 | **0.25 cmol/kg soil** |
| 7. | Manganese | mg/kg soil | 1.85 | **1 mg/kg soil** |
| 8. | P - Alkalinity | mmol/l extract | 0 | **0.2 mmol/l extract** |
| 9. | pH | - | 6.42 | **0.1** |
| 10. | Total Alkalinity | mmol/l extract | 3.1 | **0.2 mmol/l extract** |
| 11. | Total Iron | mg/kg soil | 0.5 | **0.5 mg/kg soil** |

## Manufacturing Procedure in Rohto-Mentholatum (Myanmar) Co., Ltd

The following figure shows the main procedure to produce the finished goods in Rohto-Mentholatum (Myanmar) Co., Ltd. There are two type of manufacturing process in the factory. The first one is packing with different type of tube, box, etc. and distributing of the imported products. The next process is fully production of facial wash cream production. The facial cream production steps are as shown in the following.

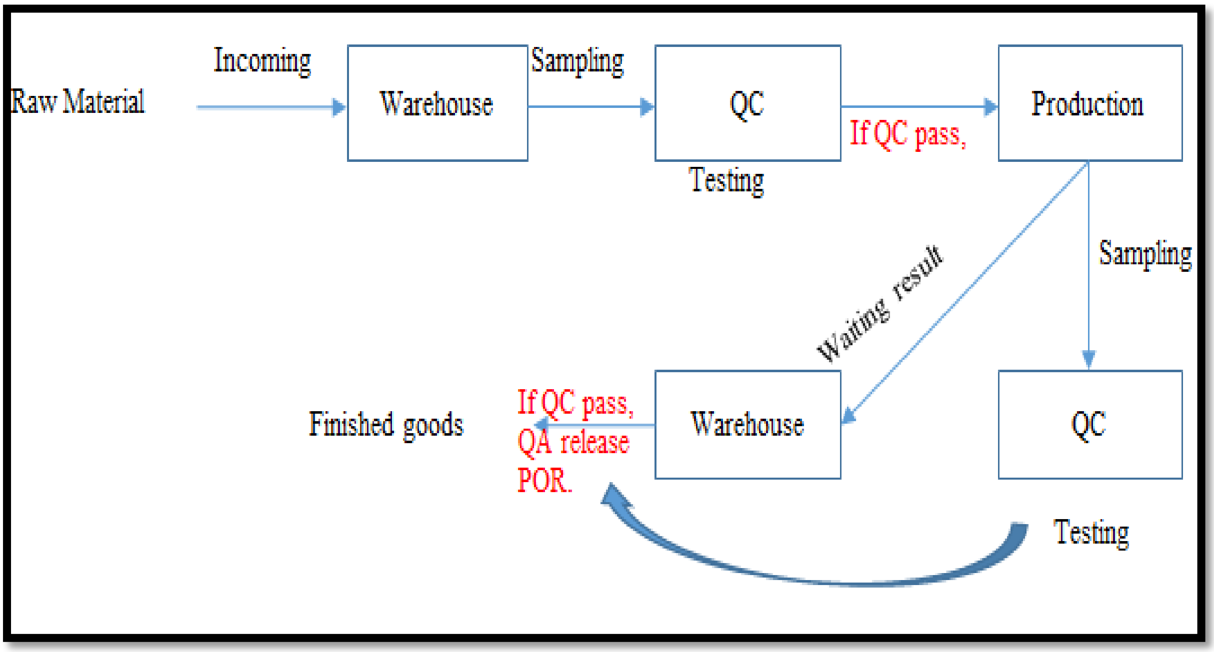



Figure (4): General Production Procedure of Rohto-Mentholatu (Myanmar) Co., Ltd

**Manufacturing Process of Facial Wash Cream**

In general, the manufacturing of facial wash cream is a series of unit operations using batch processes. There are few or no chemical reactions; the operations are mostly mechanical. The manufacture involves the preparing and weighing of raw materials, mixing, dispersing, thinning, and adjusting, filling of containers, warehousing and transportation.

***(1) Pre- Dispersion***

- The production of begins by mixing hot water and powder in a high-speed mixer. During this operation, water and powders are also added.

***(2) Dispersion, Grinding and Mixing***

- Following the mixing operation, additional solvent (such as glycol) is input to the mixer for the dispersion.

***(3) Adjusting/Tinting***

- Next, the concentrate is transferred to mixing tank where tints, glycol (usually blend of solvents) and balance additives are added. Then adjust the color and viscosity of completed mill base dispersions. This sample will be compared to the desired standard. Various combinations of powder, solvent and additives are added to the material to meet the requirements.

***(4) Filtering***

- Upon reaching the required consistency, the cream is filtered to remove any non-dispersed pigment.

***(5) Quality Control***

- Quality checks are carried out for consistency, viscosity, color, etc., and other specified properties before batch is approved for packing. Quality control acceptance batch will be stored in the cleaning room about 24 hr. After this period, packaging step will be started.

***(6) Packaging***

- The finished product (QC acceptance) is then transferred to the packaging machine. The products paste will be filled into the different types of tubes. And then, the end of tube will be closed by pressing with heat. After the tube filling, these tubes were putted into plastic bags and putted into the small paper box. Finally, these small boxes were putted in the cartoon boxes and stored at the warehouse before delivery.

## Anticipated Adverse Environmental Impacts and Mitigation Measures

The significant of anticipated adverse impacts will be investigated by using following number calculation.

| Attribute | Weight |
|---|---|
| **Probability** | |
| Improbable | 1 |
| Probable | 2 |
| Highly Probable | 4 |
| Definite | 5 |

| **Duration** | |
|---|---|
| Short term | 1 |
| Medium term | 3 |
| Long term | 4 |
| Permanent | 5 |
| **Scale** | |
| Site | 1 |
| Local | 2 |
| Regional | 3 |
| **Magnitude/ Severity** | |
| Low | 2 |
| Medium | 6 |
| High | 8 |

***Significance***

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required.

**Significance (S) = (Duration (D) + Scale (S) + Magnitude (M)) x Probability (P)**

| Attribute | Weight |
|---|---|
| Negligible | < 20 |
| Low | < 40 |
| Moderate | < 60 |
| High | > 60 |

The study tackles in detail all the environmental aspects, elements, impacts and the mitigation, safeguards and risk elimination measures that should be followed or carried out in order to protect the workers, the clients and the environmental elements and keep them all safe and secure.

The proposed project envisages setting up of administrative office, rest room, toilets, septic tank, associated auxiliary facilities, etc. The construction or pre-operational activities require mobilization of construction material and equipment. The construction activities are expected to last for eighteen months. The summary of adverse environmental impacts during construction and operation phases, significant of impacts and proposed mitigation measures are as shown in following.

***Summary of Adverse Environmental Impacts and Mitigation Measures***

| Impacts | Sources | Components | Impact Significant (D+S+M)xP=S | Mitigation Measures | Residual Impact (D+S+M)xP=S |
|---|---|---|---|---|---|
| **Operation Phase** | | | | | |
| Impacts on Air Quality | Manufacturing process | VOC, PM | (4+1+6)x5 = 55 (Moderate) | **Mitigation Measures for Emission from Manufacturing Process**<br>To reduce odor and volatile emissions to prevent environmental nuisance:<br>• Maintain adequate ventilation and hygiene to reduce the generation of odor.<br>• Control any exhaust emissions from vehicles to prevent objectionable odors / fumes off-site.<br>• Maintain good housekeeping and cleaning practices.<br>• Use mechanical ventilation systems and activated carbon filters or scrubbers to prevent the release of any uncontrolled and objectionable odors from buildings or rooms.<br>• Volatile liquids (solvents or oil) must be stored in a covered container and kept cool to prevent evaporation into the environment.<br>• Regularly maintain any emission control equipment such as bag filter as per manufacturers' instructions.<br>• Immediately replace or repair any emission control equipment that is blocked, frayed, leaking or not functioning within specifications. Spare bags and filters must be kept on-site.<br>To maintain dust emission<br>• Control dust generation so that particles do not move off-site. Dusts may also contain hazardous materials and contaminate air, soil and waters. | (4+2+2)x2 = 14 (Negligible) |
| | Auxiliary Diesel Engine, Boiler and Vehicles | CO, $CO_2$, $SO_2$, $NO_x$, PM | (1+2+2)x5 = 25 (Low) | | (1+1+2)x2 = 8 (Negligible) |
| | Wastewater Treatment Plant | VOC, Odor | (4+1+6)x4 = 44 (Moderate) | | (4+1+2)x2 = 14 (Negligible) |
| | Fugutive Source (Storage Area and Cleaning Proccess) | VOC, Odor and PM | (4+1+6)x5 = 55 (Moderate) | | (4+1+2)x2 = 14 (Negligible) |

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| | | | | • Immediately clean up material spilt on traffic areas before vehicle movement can move it.<br>• Regularly collect and place in a sealed bag any floor sweepings (including spectator areas), dust, powder waste or absorbent clean up materials, before disposing in a covered waste bin.<br>• Use wet/dry vacuum cleaners with dust filters for general cleaning of the factory floors instead of sweeping and hosing with water.<br>• To minimize dust emissions and potential contaminants from exposed surfaces<br>**Mitigation Measures for Emission from Auxiliary Diesel Generator, Boiler and Vehicles**<br>• Regular check and maintenance the D.G, boiler & Vehicles and use premium grade diesel to reduce the gas pollution.<br>• And D.G is only used for temporary electricity back such as the emergency lighting, fire pump running and CCTV if the electricity temporary off.<br>• Boiler will be regularly meintenacne and checking and testing the gases emission.<br>• Boiler should be equipped gases control equipement such as water sprinklier.<br>**Mitigation Measures for Emission from Wastewater Treatment Plant**<br>• Operate the wastewater treatment plant to meet applicable national requirements and internationally accepted guidelines;<br>• Where necessary, consider alternate aeration technologies or process configurations to reduce volatilization.<br>• The design and operation of the selected wastewater | |

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| | | | | treatment technologies should avoid uncontrolled air emissions of volatile chemicals from wastewaters.<br>**Control System for Fugitive Emission of the Project**<br>• Storage of all solvents / liquid chemicals/ oil/ fuel will be in drums only Hence storage area will not be a source of fugitive emission.<br>• Fugitive emission due to traffic movement will be controlled by providing paved internal roads, regular cleaning of internal roads, proper maintenance of vehicles, etc. | |
| Impact of Noise Level | Manufacturing process | Noise level, dB (A) | (4+2+2)x5 = 40 (Moderate) | • A high standard of maintenance will be practiced for plant machinery and equipment, which helps to avert potential noise problems.<br>• All preventive measures such as regular operation and maintenance of pumps, motors, and compressor should be carried out and enclosures will be provided to abate noise levels at source.<br>• Compliance with noise control norms will be given due importance at the time of purchase of various equipment and it will be mentioned while placing the purchase orders and guarantee for noise standards will be sought from suppliers.<br>• Toconstruct sound proof wall for boiler room<br>• All the noise generating equipment will be designed / operated to ensure that noise level does not exceed 70 dB (A) at plant boundary as per the requirement of NEQG Standard.<br>• Noise monitoring will be done on yearly basis to evaluate the noise level in premises and near the equipment.<br>• And D.G is used the emergency fire pump running and CCTV if the electricity temporary off. | (4+1+2)x2 = 14 (Negligible) |
| | Auxiliary Diesel Engine and Boiler | Noise level, dB (A) | (1+2+6)x5 = 45 (Moderate) | | (1+2+2)x4 = 20 (Low) |

<table>
<tr><td></td><td></td><td></td><td></td><td><ul><li>And then monitoring must carry out with NEQG standard.</li></ul></td><td></td></tr>
<tr><td rowspan="3">Impacts on Water Quality</td><td>Storm Water</td><td>TSS, metals, petroleum hydrocarbons, Polycyclic Aromatic Hydrocarbons, coliform, etc.</td><td>(4+2+6)x5 = 60 (Moderate)</td><td rowspan="3"><ul><li>An appropriate water management system is used, including, for example, sustainable drainage systems for receiving site runoff to reduce the impact of runoff on nearby water courses of retaining cannel;</li><li>Hazardous or potentially polluting materials (such as fuel, oil or chemicals used or produced by the process) are sited on an impervious base away from water, properly bundled and kept locked when unattended;</li><li>Separate containment and drainage provided for site runoff, loading/unloading and processing areas (the latter in particular may need specialized treatment before release);</li><li>Oil interceptors or drip trays are used in vehicle parking areas, and are inspected and cleaned regularly;</li><li>A risk assessment is carried out for each substance to be used, produced or stored on site, and the appropriate containment measures installed; and</li><li>An Emergency Plan is formulated and tested through exercises to ensure that procedures to prevent or mitigate impacts due to accidents or spillages are in place and operate effectively.</li><li>Where storm water treatment is deemed necessary to protect the quality of receiving water bodies, priority should be given to managing and treating the first flush of storm water runoff where the majority of potential contaminants tend to be present;</li><li>When water quality criteria allow, storm water should be managed as a resource for meeting water needs at the facility;</li><li>Sludge from storm water catchments or collection and</li></ul></td><td>(1+1+6)x2 =16 (Negligible)</td></tr>
<tr><td>Industrial Wastewater</td><td>BOD, COD, TDS, TSS, Oil and Grease</td><td>(4+2+6)x5 = 60 (Moderate)</td><td>(1+1+6)x2 =16 (Negligible)</td></tr>
<tr><td>Sewage Water</td><td>Ground and Surface Water</td><td>(4+2+6)x12 = 24 (Low)</td><td>(1+1+6)x1 =8 (Negligible)</td></tr>
</table>

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| | | | | treatment systems may contain elevated levels of pollutants and should be disposed in compliance with ECD or zone management committee's regulatory requirements, in the absence of which disposal has to be consistent with protection of public health and safety, and conservation and long-term sustainability of water and land resources.<br>• And then monitoring must carry out with NEQG standard. | |
| Impact of Land Contamination | Manufacturing process | Soil and ground water pollution | (3+2+6)x2 = 26 (Low) | Contamination of land should be avoided by preventing or controlling the release of hazardous materials, hazardous wastes, or oil to the environment.<br>• appropriate designs for buildings/structures on site;<br>• appropriate screening for visual impacts;<br>• effective stabilization of altered landforms so as to minimize soil erosion and the potential for water pollution from suspended solids;<br>• adequate bunding or containment measures are installed throughout the site, particularly in chemical storage and transfer areas, to minimize risk of soil contamination;<br>• use of drip trays under stationary machinery to prevent oil and grease contaminating soil and groundwater<br>Concrete flooring will be over laid with epoxy flooring which is a non-porous self-leveling material which will prevent any spillage from penetrating the floor surface. factory had covered concrete floor. | (1+1+2)x2 = 8 (Negligible) |
| | Storage areas | Soil and ground water pollution | (3+2+6)x2 = 26 (Low) | | (1+1+2)x2 = 8 (Negligible) |
| Impacts of Waste Disposal | Hazardous Wastes | Water and soil pollution | (4+2+6)x5 = 60 (Moderate) | ***Collection***<br>Hazardous wastes or non-hazardous waste are collected by using about 200 Lit Mild Steel Bins which are arrange with different color for the different type of wastes collection.<br>***Storage*** | (1+1+2)x4 = 16 (Negligible) |

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| | Non-Hazardous Wastes | Water and soil pollution | (4+2+6)x5 = 60 (Moderate) | Above stated solid wastes will be stored separately in the "Solid Waste Storage Area" within the factory premises. All wastes, hazardous or not, must be contained to prevent it from blowing away and from leaching into surface or groundwater.<br>- **On-Site Hazardous Waste Storage**<br>Hazardous waste must be in containers or tanks clearly labeled with the words "Hazardous Waste". Volumes and time limits for storing hazardous waste on-site vary by generator category.<br>- **On-Site Nonhazardous Waste Storage**<br>Non-hazardous waste needs to be removed from on-site at regular intervals to prevent release to the environment, and to avoid additional permit requirements. Nonhazardous waste and unused product must be contained to prevent discharge to the air, or runoff to surrounding land or water.<br>***Disposal***<br>Hazardous waste will be handed over to agencies authorized by ECD or Zone Mangemnt Team monthly such as DOWA/ YCDC. Nonhazardous waste will be handed over to solid waste collection agencies authorized by ECD or Zone Management Committee monthly such as YCDC | (1+1+2)x4 = 16 (Negligible) |
| | Domestic Wastes | Water and soil pollution | (4+2+6)x5 = 60 (Moderate) | | (1+1+2)x4 = 16 (Negligible) |
| Impact of Chemicals Transportation, Storage, Using, Handling and Disposing | Transportation | Spillage and explosion | (3+3+2)x2 = 16 (Negligible) | • Hazardous chemicals must be stored and transported carefully according to specific regulatory requirements covered by transport legislation, and work health and safety (WHS) legislation.<br>• avoid transporting with food, water or other reactive chemicals<br>• follow the separation and segregation rules for transporting mixed classes of hazardous chemicals (those classified as dangerous goods) | (1+3+2)x2 = 12 (Negligible) |
| | Manufacturing process | OHS for Handling and Using, VOC, PM | (5+1+8)x4 = 56 (Moderate) | | (3+1+2)x4 = 24 (Low) |
| | Storage Area | OHS for Handling, VOC, PM, | (5+1+8)x4 = 56 (Moderate) | | (3+1+2)x4 = 24 (Low) |

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| | | Soil contamination, explosion | | • secure hazardous chemicals on the vehicle so they can't move or fall<br>• keep a record of the chemicals you are carrying<br>• separate foodstuffs from chemicals<br>• make sure you have the required signs and equipment for the vehicle<br>• make sure the driver of the vehicle has the correct license and is trained in emergency procedures<br>• To carry the chemicals with authorized cargo company and to follow the transportation instruction stated in MSDS.<br>• To take care of loading and unloading.<br>• Provide the Personal Protective Equipment (PPE) such as glass, gloves and carbon filter mask for chemicals handling workers and production workers and also provide training and other awareness programs.<br>• Install the adequate ventilation systems.<br>• Install dust collector with activated carbon systems<br>• Factory coated concrete floor to protect leakage and spillage all around the Factory Area.<br>• Installed effective own WWTP<br>• Need permit from authorized committee to storage or transport chemicals by air, sea, inland waterways, road or rail.<br>• Store raw materials separately according to explosion hazardous (EH) level and install effective firefighting system such as overheard automatic water sprinkler, smoke detector and self standalone type fire extinguisher with powder or foam.<br>• Observe according to the material safety data sheet (MSDS). | |
| | Disposal | Soil contamination, VOC, PM | (5+1+8)x4 = 56 (Moderate) | | (3+1+6)x4 = 40 (Moderate) |
| Impact on | Manufacturing | Occupational | (5+1+8)x4 = 56 | **Materials handling** | (3+1+6) x2 = 20 |

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| Occupational Health and Safety | process & storage | Health and Safety | (Moderate) | • Precautions include engineering/ergonomic controls such as materials handling aids (rollers, jacks and platforms) and mechanical equipment (conveyors, hoists and fork-lift trucks), non-skid floors, personal protective equipment (PPE) such as safety shoes and proper training in manual lifting and other materials handling techniques.<br>**Chemical hazards**<br>• Install effective exhaust ventilation to prevent air contamination<br>• Install effective exhaust ventilation to prevent air contamination; if necessary, use respiratory protection.<br>• Protect the skin of the hands (with chemical-resistant gloves) when contact with solvents and chemicals; use soaps for cleaning the skin of the hands, at the end of the work.<br>• Get medical aid if skin rashes develop; consult an allergy specialist on how to deal with sensitivity to solvents, chemicals, etc.<br>• Install eye washer at every nearest chemical using area and first aid room.<br>• Install effective firefighting equipment such as extinguisher, alarm system, hose wheel and hydrant at everywhere, pump house and fire alarm control panel.<br>**Physical Agents**<br>• Precautions include vibration isolators and other engineering controls, replacing noisy equipment, good equipment maintenance, isolation of noise source and a hearing conservation program where excessive noise is present.<br>**Accident**<br>• First aid equipment should be available at the site. A number of the permanent personnel on the site should | (Low) |
| | In the lacquer preparation | Exposure to high temp. & heat-stress | (5+1+8)x4 = 56 (Moderate) | | (3+1+6) x2 = 20 (Low) |
| | Grinding and mixing, | Chemicals | (5+1+8)x4 = 56 (Moderate) | | (3+1+6) x2 = 20 (Low) |
| | Solvent storage and handling | Fire | (5+1+8)x4 = 56 (Moderate) | | (3+1+6) x2 = 20 (Low) |
| | Pigments /dyes storage area | Dust Explosion | (5+1+8)x4 = 56 (Moderate) | | (3+1+6) x2 = 20 (Low) |

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| | | | | have the skills necessary to use the equipment.<br>• Factory has separately arranged walking way and production area with yellow line. | |
| Impact on Community Health and Safety | Manufacturing process | Community Health and Safety | (3+1+6)x1 = 10 (Negligible) | Traffic safety should be promoted by all project personnel during displacement to and from the workplace, and during operation of project equipment on private or public roads. The following measures must implement to-<br>• Emphasize the safety aspects among drivers;<br>• Improve the driving skills and requiring licensing of drivers;<br>• Adopt the limits for trip duration and arranging driver rosters to avoid overtiredness;<br>• Avoid dangerous routes and times of day to reduce the risk of accidents;<br>• Use the speed control devices (governors) on trucks, and remote monitoring of driver actions. (if possible and needed)<br>• To carry the chemicals with authorized cargo company and to follow the transportation instruction stated in MSDS. | (1+1+2)x1 = 4 (Negligible) |
| | Transportation vehicle | Community Health and Safety | (3+3+6)x2 = 24 (Low) | | (1+3+2)x2 = 12 (Negligible) |
| Impact of Energy Consumption | Manufacturing Process | High electricity consumption | (4+3+6)x5 = 65 (High) | ***Conservation of Electricity***<br>There are several methods that can be employed to help conserve electricity and these include:<br>• Install energy and water meters to measure and control consumption throughout the facility;<br>• Implementing good housekeeping measures such as turning off equipment and lights when not in use;<br>• Use LED lights and/ or lower wattage lamps;<br>• Using more efficient equipment when replacing old equipment (such as motors and heating units);<br>• Installation of inverter | (4+2+6)x2 = 24 (Low) |
| | D.G Set | Diesel fuel consumption | (4+3+2)x5 = 45 (Moderate) | | (4+2+2)x2 = 16 (Negligible) |

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| | | | | • Installation of timers and thermostats to control heating and cooling; and<br>• Preventative maintenance of operational processes and pipes so as to improve efficiency and minimize losses.<br>***Minimizing Diesel Fuel Consumption***<br>Minimizing of diesel fuel consumption can also reduce the emission of gases, solid waste and as well as operation cost. Diesel fuel consumption can be reduced by the use of high efficiency diesel generator sets. | |
| Impact of Water Consumption | Manufacturing Process | High water consumption | (4+3+2)x4 = 36 (Moderate) | ***Reducing Process Water Used***<br>The several production modifications that may be employed to reduce water consumption are as follows.<br>• allow the storage level of recovered water tanks to fluctuate, thereby using storage capacity and maintaining full tanks may be lead to overflow and waste;<br>• recover water from process stages and reuse where possible;<br>• installation, monitoring and control of water meters at various sections of the operation;<br>• stopping water flow during breaks;<br>• installation of flow control valves and an automatic valve to interrupt the water supply when there is production stoppage;<br>• All staff should be trained and made aware of water conservation practices, and a management system implemented to continue to review and improve water consumption.<br>***Reducing Clean in Place (CIP) Water Used***<br>Washing of equipment is a significant use of water. Methods for optimizing CIP may include:<br>• use a closed system for cleaning operations; | (3+2+2)x4 = 28 (Low) |
| | Drinking and other | High water consumption | (4+3+2)x2 = 18 (Negligible) | | (1+2+2)x2 = 10 (Negligible) |

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| | | | | • use low-volume high-pressure washers, or use equipment for mixing water jet and a compressed air stream which will reduce water consumption by 50-75% when compared to a low-pressure system;<br>• controlling the rinsing water flow, which is often higher than specified or may vary due to pressure fluctuations in the water supply system;<br>• Optimize cleaning-in-place (CIP) plants and procedures to avoid unnecessary losses of water and cleaning chemicals (e.g. by saving water from the last rinse for use as the first rinsing water in the next CIP cycle). | |
| Emergency Risk | Plant Site | Flood Risk | (1+2+2) x1 = 5 (Negligible) | • Regular training and exercises for all staff regarding firefighting and other emergency response.<br>• The propose project is designed in compliance with relevant rules and regulations for emergency risk of fire. And then, emergency exits, fire hydrants and extinguisher boxes in a certain distance are considered in design of those facilities.<br>• To check firefighting equipment regularly.<br>• To prevent major accidents related to the fires and explosions at the facility, Fire Safety Master Plan identifying major fire risks, applicable codes, standards and regulations, and mitigation measures should be prepared by a suitably qualified professional. This Master Plan should include fire prevention, detection and alarm systems, compartment plan, fire suppression and control, emergency response plan, and operation and maintenance plan. | (1+1+2) x1 = 4 (Negligible) |
| | | Fire Risk | (1+2+6) x4= 36 (Low) | | (1+2+2) x2 = 8 (Negligible) |
| | | Earthquake Risk | (1+2+2) x1 = 5 (Negligible) | | (1+1+2) x1 = 4 (Negligible) |
| | | | | | |
| **Closing Phase** | | | | | |
| Impacts on Air Quality | Plant site | TSP, PM | (1+1+6)x5 = 40 (Moderate) | **Generation of Dust (TSP & PM)**<br>The following dust control measures are recommended | (1+1+6)x4 = 32 (Low) |

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| | | | | during the construction phase of the project:<br>***Site Boundary and Entrance***<br>• Vehicle washing facilities including a high pressure water jet shall be provided at every discernible or designated vehicle exit point; and<br>• The area at which vehicle washing takes place and the section of the road between the washing facilities and the exit point shall be paved with concrete, bituminous or hard core material.<br>***Loading, unloading or transfer of dusty materials***<br>• All dusty materials should be sprayed with water immediately prior to any loading or transfer operation so as to maintain the dusty material wetting.<br>***Debris Handling***<br>• Any debris should be covered entirely by impervious sheeting or stored in a debris collection area sheltered on the top and the three sides.<br>• Before debris is dumped into a truck, water should be sprayed so that it remains wet when it is dumped.<br>***Site Clearance***<br>• All demolished items shall be covered by impervious sheeting or placed in an area sheltered on the top and the three sides within a day of demolition. | |
| | Vehicles, heavy machine and diesel generator running | $NO_x$, $SO_2$, CO, $CO_2$, PM | (1+1+2)x5 = 20 (Low) | **Generation of Gases and Particulates**<br>***Vehicles and D.G Set Running***<br>• All vehicles have their engines turned off while parked on the site or unnecessary conditions.<br>• Regularly check and well-maintained the engine of vehicles and other machines.<br>• Use fuel oil with low sulfur content. | (1+1+2)x2 = 8 (Negligible) |
| Impacts of Noise | Closing activities such | Noise | (1+2+6)x5 = 45 (Moderate) | ***Mitigation at Working Time***<br>(1) Limiting site construction activities/ closing activities to | (1+2+6)x4 = 36 (Low) |

| | | | | | |
|---|---|---|---|---|---|
| | as wall and floor destroying | | | the working hours (7:00 am to 4:00 pm) and noisy activities to morning hours (8:00 am to 12:00 am). | |
| | Vehicles Movements, heavy machine and diesel generator running | Noise | (1+2+2)x5 = 25 (Low) | (2) Whenever feasible, schedule different noisy activities (e.g., blasting and earthmoving) to occur at the same time, since additional sources of noise generally do not add a significant amount of noise.<br>***(3)*** Avoid nighttime activities.<br>***Mitigation at the Source***<br>(1) Usage of quiet, properly maintained equipment or machinery in good condition.<br>(2) All noisy machines and equipment should be fitted with noise muffler or silencers.<br>(3) Sensitization of truck drivers to switch off vehicle engines while offloading materials avoid running of vehicle engines or hooting especially.<br>***Mitigation along the Path***<br>(1) Install temporary noise barrier - a 2 m high temporary wall or pile of excavated material between noisy activities and noise-sensitive receivers during construction work.<br>(2) Provide adequate PPE such as ear muffs, ear plugs etc. to workers at all activities/ locations. | (1+2+2)x4 = 20 (Low) |
| Impact of Vibration | Closing activities such as wall, floor destroying, heavy machine and diesel generator running | Vibration | (1+1+2)x5 = 20 (Low) | ***Mitigation at Design Consideration***<br>(1) Route heavily loaded trucks away from residential streets, if possible. Select streets with fewest homes, if no alternatives are available.<br>(2) Operate earthmoving equipment on the construction/ closing lot as far away from vibration-sensitive sites as possible.<br>***Mitigation at Operation Sequences***<br>(1) Earthmoving and ground-impacting operations so as not to occur in the same time period. Unlike noise, the total vibration level produced could be significantly less when | (1+1+2)x4 = 16 (Negligible) |

| | | | | | |
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| | | | | each vibration source operates separately.<br>(2) Avoid nighttime activities. People are more aware of vibration in their homes during the nighttime hours.<br>***Mitigation by using Alternative Methods***<br>(1) Avoid impact pile driving where possible in vibration-sensitive areas. Drilled piles or the use of a sonic or vibratory pile driver causes vibration levels where the geological conditions permit their use.<br>(2) Avoid vibratory rollers and packers near sensitive areas. | |
| Impacts on Surface Water Quality | Wastewater dispose from Closing work Temporary Septic Tank, Chemical and Oil/Lubricant storage area due to leakage and spillage | suspended sediments, metals, petroleum hydrocarbons, Polycyclic Aromatic Hydrocarbons, coliform, etc. | (1+2+6)x5 = 45 (Moderate) | Muddy water that is generated as a result of closing activities will be managed through site contractor. As a part of the contract it will be mandatory for the contractor to ensure that any dewatering/ discharge or other activity that has the potential to impact storm water is approved prior to commencement of closing activities. It will be ensured that dewatering/ discharges will be collected, as possible, and utilized for dust suppression to reduce the need for other water.<br>The contractor must ensure potential pollutant sources including material stockpiles, oil or chemical loading/ unloading and storage areas, fuelling tanks, and equipment maintenance, washing and storage areas are properly managed to prevent discharge into the storm water system. Stockpiles must be protected by use of silt fencing, covers, or other appropriate containment to prevent the migration of sediment into the storm water system.<br>Oil and chemical storage, as well as fuel tanks, must be properly contained to prevent the migration of contaminants into the storm water. Equipment will be routinely inspected for leaks and any spills shall be properly cleaned so as not to impact the storm water. Any unplanned discharge events or spills must be reported according to the | (1+2+2)x4 = 20 (Low) |

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| | | | | monitoring plan and the contractor will do the cleanup, disposal and notification events.<br>Discharging sanitary waste to the ground is prohibited, and therefore suitable facilities or portable toilets will be provided. | |
| Impact on Contamination of Soil and Ground Water | Wastewater dispose from Closing work, Temporary Septic Tank, Chemical and Oil/Lubricant storage area due to leakage and spillage Closing Activities | Soil | (1+2+6)x5 = 45 (Moderate) | Maintain all vehicles and machinery to prevent spill of fuel oil and hydraulic oil. Avoid washing down oil spill with water because this will only help percolate oil underground. Soak oil spill and then dispose the soak at approved disposal site. Pave vehicles and cranes parks and collect run off; bund the fuel depot to prevent spreading of spilled oil.<br>For disposal of domestic wastewater construct a small septic tank together with soak pit to collect the sewage. | (1+2+2)x4 = 20 (Low) |
| | | Ground water | (1+2+2)x5 = 20 (Low) | | (1+2+2)x2 = 10 (Negligible) |
| Impact of Waste Disposal | Temporary Septic Tank, Waste Disposal Yard, Waste such as trim waste, plastic bags | Waste disposal | (1+2+6)x5 = 45 (Moderate) | All unused or surplus building materials can be sold to other who needs it. The large majority of debris can be also put up for sale since most can be reused or recovered. Even left over broken bricks, gravel, sand etc. can be sold and then structure steel frame and roof material from closing work. Avoid open burning of debris. Discipline workers for good house-keeping practice; demand the building contractor to do this and ask him to take responsibility for the conducts of his construction workers.<br>Best practices for waste disposal are to store the waste in the designated area, to strict the schedule of disposing solid waste, to use the solid waste in the land level adjustments in the landfill area, to provide the facilities for proper handling and storage of construction materials, and to use the durable, long-lasting materials that will not need to be replaced as | (1+2+6)x2 =18 (Moderate) |

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| | | | | often, to purchase of perishable construction materials such as paints incrementally, to use the building materials that have minimal packaging and also to use the materials containing recycled content. And then, contractor must do the following activities<br>Waste stored in designated area.<br>• Strict schedule of disposing the water.<br>• Can be used in the land level adjustments in the landfill area.<br>• All wastes must disposed belong to ECD or Zone Management Committee's regulation.<br>The construction contractor has been carries out solid waste collecting at every morning 8:30 to 10:00 and temporary disposed designed area. Finally, temporary stored wastes are disposed to Yangon city development committee every week. | |
| Impact on Occupational Health and Safety | Closing activities such as wall and floor destroying, material cutting, Heavy machine running, Chemical handling | Occupational Health and Safety, Accident | (1+1+8)x4 = 40 (Moderate) | ***Air Pollution Affect***<br>• Providing the PPE<br>• Water spraying, to reduce speed of vehicles and machines running for the reducing the particulates matters<br>• Air Quality measuring<br>• Regular maintenance of vehicles and machines<br>***Noise and Vibration Affect***<br>• Providing the PPE<br>• Providing the shift working system for worker working near the noisy<br>• Noise and Vibration measuring<br>• Regular maintenance of vehicles and machines<br>• D.G set will be placed with the Sound proof wall<br>• Vibrated machines will be placed with solid concrete | (1+1+6)x2 = 16 (Negligible) |

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| | | | | foundation.<br>***Protection the Working Area Accident***<br>• Providing the First Aid, medicines and training<br>• Providing the PPE and Giving the PPE using training<br>• Assigning the Safety Officer who systematically implement OHS plan to protect the OHS for workers.<br>• Providing the emergency contact phone number<br>• Designation the speed limit for vehicles and machines<br>• Installing the eyes washer for contacting the hazardous materials.<br>• Providing the safety sign and give training for the worker for understanding this sign purposes.<br>***Protecting infectious Diseases***<br>• Systematically cleaning for Toilets and septic tanks and regular disposing to City Development Committee<br>• Systematically disposing the food waste at designated area, designated waste disposal yard, covering the waste bin and regularly disposing City Development Committee<br>• Providing the dinning area and give instruction to eat the designated area<br>• Providing the medical check-up and appropriate medicals for worker to protect infectious diseases | |
| Impact on Community Health and Safety | Decommission material transport vehicles come and go | Community Health and Safety, Accident | (1+3+6)x4 = 40 (Moderate) | ***Air Pollution Affect***<br>• Water spraying the project site<br>• Raw material transportation is systematically covering,<br>• Water spraying the vehicles wheel before leave from the project site<br>• Regular maintenance of vehicles and machines | (1+3+2)x2 = 12 (Negligible) |

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| | | | | ***Noise and Vibration Affect***<br>• Avoiding the noisy work activities at night time<br>• Noise and Vibration measuring<br>• Regular maintenance of vehicles and machines<br>• D.G set will be placed with the Sound proof wall<br>• Vibrated machines will be placed with solid concrete foundation.<br>***Protection the Working Area Accident***<br>• Providing the First Aid, medicines and training at nearest local resident.<br>• Providing the emergency contact phone number at nearest local resident.<br>• Designation the speed limit for vehicles and machines<br>• Inspection the driver license have or not and drivers are driving the car types according to their licenses types.<br>• Avoiding transportation of construction and closing materials at the traffic peak hours and school starting and ending times.<br>***Protecting infectious Diseases***<br>• Systematically cleaning for Toilets and septic tanks and regular disposing to Yangon City Development Committee<br>• Avoiding the waste disposal at nearest villages waste disposal yard and regularly disposing Yangon City Development Committee<br>• Providing the dinning area and give instruction to eat the designated area<br>• Providing the medical check-up and appropriate medicals for worker to protect infectious diseases | |

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| Emergency Risk | Closings site | Flood Risk | (1+2+2)x1 = 5 (Negligible) | • Regular training and exercises for site staff regarding firefighting and other emergency response.<br>• The propose project is designed in compliance with relevant rules and regulations for emergency risk of fire. And then, emergency exits, fire hydrants and extinguisher boxes in a certain distance are considered in design of those facilities.<br>• To check firefighting equipment daily. | (1+1+2)x1 =4 (Negligible) |
| | | Fire Risk | (1+2+6)x2 = 18 (Negligible) | | (1+1+2)x2 = 4 (Negligible) |
| | | Earthquake Risk | (1+2+2)x1 = 5 (Negligible) | | (1+1+2)x1 =4 (Negligible) |

## Environmental Management Plan

| Environmental Component | Location | Management Plan |
|---|---|---|
| **Operation Phase** | | |
| **Air** | | |
| Dust Emission | Storage Area, Mixing and weighting, Production line, Dust collector, Collection Pipeline | • Install good ventilation system and dust emission system<br>• Regular checking of dust collector<br>• Regular maintenance of dust collector<br>• Regular checking of dust collection pipeline<br>• Careful handling and weighing of the powder |
| Gaseous & VOC Emission | Boiler Stack, Dust and VOCcontrol equipment, exhaust, Ventilator, collection pipeline | • Regular checking of emission stack and monitoring according to schedule<br>• Regular checking of filter and replace the filter<br>• Regular maintenance the collection system and ventilation system<br>• Regular checking of connecting pipeline |
| Odor | Storage Area, WWTP, Production Area, Waste Disposal | • Covering the collection pond and waste collection bin<br>• Check and maintain the ventilation system<br>• Provide PPE |
| **Wastewater and Water** | | |
| Wastewater | WWTP | • Wastewater from the factory must be directed to the own wastewater treatment plant and treated wastewater will be discharged to Zone's WWTP.<br>• Oil/water separators, skimmers or other methods should be employed to minimize oil contaminated storm water discharge.<br>• No discharge of untreated wastewater outside the plant and check inlet and outlet of own WWTP.<br>• Regular maintenance of the own WWTP |
| Ground water | Site Premise | • No extraction of ground water<br>• However, record the water consumption regularly. |
| Storm water | Strom water drain outlet | • Separate drainage system for storm water.<br>• Provide and install screen at the storm drain outlets to restrict the movement of solid waste into the storm drain system while allowing the storm water to enter.<br>• The screen should be cleaned and/or replaced as necessary.<br>• Whenever possible, storm water should be diverted away from materials manufacturing, storage and other areas of potential storm water contaminants. |
| Sewage Waste | Septic tank | • Regular checking of septic tank |

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| | | • Dispose the authorize agency. |
| **Noise & Vibration** | | |
| Noise & vibration from machineries (such as D.G set) and operation | Diesel generator | • Regular checking and maintenance of the D.G<br>• Should install the sound proof wall |
| | Production Area | • Regular checking and maintenance of the production equipments |
| **Land Contamination** | | |
| Accidental spillage and Leakage of oil,fuel and other chemicals | Chemical storage and oil storage area and fuel storage area | • Drip pans and drum storage platforms should be used to hold containers of fluids that are used at the facility.<br>• Cloths should be placed underneath the drip pans and drum storage platforms to catch and soak up slop spillage.<br>• Once the task is completed, the pans and platforms should be immediately cleaned and stored in a designated and easily accessible location.<br>• The cloths should be stored with the drip pans.<br>• Each drip pan should be used to contain only one type of fluid while in use and prior to cleaning.<br>• This will avoid the accidental mixing of incompatible fluids (i.e., acids, and caustics).<br>• Residues and cleaning waters from drip pans must be properly placed in designated containment tanks for storage prior to ultimate disposal or disposed of in an approved oil/water separator as pretreatment.<br>• Ultimate disposal should be in compliance with Zone Committee or ECD requirements.<br>• It is the responsibility of the supervisor and environmental supervisor to ensure that employees and contractors use drip pans and drum storage platforms. |
| **Waste Disposal** | | |
| Hazardous Waste<br>• Storage<br>• Cleaning<br>• Disposal | Disposal Yard, Cleaning Area | • On-Site Hazardous Waste Storage<br>All waste, hazardous or not, must be contained to prevent it from blowing away and from leaching into surface or groundwater. Hazardous waste must be in containers or tanks clearly labeled with the words "Hazardous Waste". Volumes and time limits for storing hazardous waste on-site vary by generation category.<br>• Cleaning and Drying of Hazardous Waste<br>Cleaning and drying of inorganic pigments bags and drums allow them to be disposed as hazardous wastes.<br>• Disposal |

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| | | Hazardous waste must be disposed at permitted waste facility such as DOWA/ YCDC.<br>• Record amount of waste regularly. |
| Non-hazardous Waste<br>• Storage<br>• Cleaning<br>• Disposal | Disposal Yard, Cleaning Area | • Ensure the waste is nonhazardous<br>• On-Site Nonhazardous Waste Management.<br>Management methods may include tarping, shrouding, berming, and all other BMPs, while storing on-site. The objective is containment.<br>• On-site Nonhazardous Waste Storage.<br>Non-hazardous waste needs to be removed from on-site at regular intervals to prevent release to the environment, and to avoid additional permit requirements. Nonhazardous waste and unused product must be contained to prevent discharge to the air, or runoff to surrounding land or water.<br>• Disposal<br>Non-hazardous waste disposed at permitted waste facility such as Yangon City Development Committee.<br>• Record amount of waste regularly. |
| **Other** | | |
| Occupational Health and Safety | Plant Premises | • Ensure necessary facilities are provided according to Factories Act.<br>• Regular medical checkup for workers.<br>• Give the OHS training for new workers regularly.<br>• Record the accident and injuries. |
| Community Health and Safety | Local | • Regular maintenance of the vehicles<br>• To remind the driver for controlling the high speed driving.<br>• Transportation of raw material must be done according to the MSDS transportation procedure.<br>• Record the accident and injuries. |
| Social Consideration | Plant Premise and Local | • Provide CSR fund regularly<br>• Creation of Job Opportunities<br>• Regular conducting of employee social welfare program. |
| Risk Assessment | Plant premises | • Regular training and exercises for all staff regarding firefighting and other emergency response.<br>• The propose project is designed in compliance with relevant rules and regulations for emergency risk of fire. And then, emergency exits, fire hydrants and extinguisher boxes in a certain distance are considered in design of those facilities. |

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| | | • To check fire-fighting equipment daily. |
| Training and Education | Employee | • Management should provide all employees with regularly scheduled Best Management Practices seminars and discussions relating to pollutants and pollution prevention.<br>• The training should emphasize procedures, BMP techniques and supervisory responsibility and accountability.<br>• Subcontracting firms should be strongly encouraged to participate in the BMP training program.<br>• New employees should be made aware of BMPs on the first day of work and be regularly reminded of them. |
| | | |
| **Closing Phase** | | |
| **Air** | | |
| Dust Generation | Closing site and road (in front of the site) | Spraying of water wherever required |
| Gaseous Emission from working vehicles | Heavy machineries and D.G set | Ensure checking of vehicular emission and obtaining pollution under control |
| **Water and Wastewater** | | |
| Ground Water | Closing site | No extraction of groundwater |
| Surface water sources | Closing site | • No disposal of any wastewater outside the plant and the retaining channel.<br>• Regular checking of septic tank<br>• Dispose the authorize agency such as YCDC. |
| Drinking Water Requirement | Closing site | Arrange purified drinking water |
| Wastewater from Workers' camp | Closing site | • Ensure proper sanitation and drainage. No direct wastewater discharge in water bodies or the retaining channel.<br>• The sanitation wastewater should be disposed to the authorize agency. |
| **Noise & Vibration** | | |
| Noise & vibration from machineries and construction activities | Closing activities, Heavy machines and D.G set | • Ensure machineries meeting noise and vibration level standards<br>• Checking the machineries performance regularly |
| **Land** | | |
| Land Development | Closing site | • Preserve the excavated topsoil to be used for green-belt development |
| **Waste Disposal** | | |
| Hazardous Waste such as thinner, oil, and chemical | Disposal Yard | • All waste, hazardous or not, must be contained to prevent it from blowing away and from leaching into surface or groundwater.<br>• Hazardous waste must be in containers or tanks |

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| | | clearly labeled with the words "Hazardous Waste", volumes and time limits for storing hazardous waste on-site vary by generator category.<br>• Cleaning and drying of inorganic pigments bags and drums have to be disposed as hazardous wastes.<br>• Hazardous waste disposed at permitted waste facility such as DOWA/ YCDC.<br>• Record amount of waste regularly. |
| Nonhazardous waste such as construction waste, plastic | Disposal Yard | • Non-hazardous waste needs to be removed from on-site at regular intervals to prevent release to the environment, and to avoid penalty.<br>• Nonhazardous waste must be contained to prevent discharge to the air, or runoff to surrounding land or water.<br>• Nonhazardous waste will be recycled to the authorized solid waste manufacturing company<br>• Record amount of waste regularly. |
| **Others** | | |
| Occupational Health and Safety | Closing site | • Ensure necessary facilities according to Factories Act<br>• Record the accident and injuries |
| Community Health and Safety | Local | • Ensure necessary facilities<br>• To remind the driver for controlling the high speed driving.<br>• Record the accident and injuries. |
| Social Consideration | Local | • Creation of job opportunities. |
| Emergency Risk | Closing site | • Maintain all safety Provisions<br>• Make tool box meeting daily<br>• Check PPE |

***Chemical Hazardous and its Preventative Plan***

| Chemical Hazards | Preventative Plan |
|---|---|
| • Exposure to vapors of solvents, paints, and related coating can cause irritation and demerge to eyes and mucous membranes, to the respiratory and digestive tracts, and to the skin. Exposure to organic substances may damage the nervous system | • Install effective exhaust ventilation to prevent air contamination if necessary, use odor neutralizing chemicals.<br>• Install effective exhaust ventilation to prevent air contamination; if necessary, use respiratory protection. |
| • exposure to VOC in storage areas and/or during the cleaning of the manufacturing installations | • Install effective exhaust ventilation to prevent air contamination if necessary, use odor neutralizing chemicals. |
| • Exposure to various components of paints may cause irritation of eyes and the respiratory tract. | • Install effective exhaust ventilation to prevent air contamination; if necessary, use respiratory protection. |
| • Skin exposure through contact with solvents and various components of paints | • Protect the skin of the hands and eyes with chemical-resistant gloves and glasses respectively |

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| can cause dermatitis. Hazard of dermatitis or eczema when working with pigments that contain chrome and cobalt. | when in contact with solvents and chemicals; use soaps for cleaning the skin of the hands, at the end of the work. |
| • Exposure to pigment dust during grinding and mixing, while preparing the paints. | • Install effective exhaust ventilation to prevent air contamination; if necessary, use respiratory protection. |
| • Exposure to organic substances may cause allergic reactions such as irritation of the respiratory tract and of eyes and skin. | • Install effective exhaust ventilation to prevent air contamination and heat stress; if necessary, use odor neutralizing chemicals.<br>• Install effective exhaust ventilation to prevent air contamination; if necessary, use respiratory protection<br>• Protect the skin of the hands and eyes with chemical-resistant gloves and glasses respectively when in contact with solvents and chemicals; use soaps for cleaning the skin of the hands, at the end of the work.<br>• Get medical aid if skin rashes develop; consult an allergy specialist on how to deal with sensitivity to solvents, chemicals, etc. |

## Environmental Monitoring Plan

Environmental Monitoring Plan of Operation and Closing phase are as shown in the following table. The following plan of operation phase is submitting twice a year to the ECD along operation phase.

| Environmental Parameters | Monitoring Item | Location | Frequency | Responsibilities |
|---|---|---|---|---|
| **Closing Phase** | | | | |
| Air quality | • Recorded TSP, Particulate<br>• Recorded the machineries maintenance<br>• Recorded dust emission activities<br>• Recorded traffic | Closing site | Monthly | Construction Contractor |
| Soil quality | • Chemical and toxic material emission/ leakage status from storage area<br>• Other possible leakage of chemicals due to the vehicular movement and bitumen mixing | Closing site | Monthly | Construction Contractor |
| Water quality | Checking temporary septic tank and disposed system, temporary drain | Closing site | Monthly | Construction Contractor |

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| Water Use | Daily amount of water use | Closing site | Daily Observation | Construction Contractor |
| Noise and Vibration | Intensity measurement | Closing site | Monthly | Construction Contractor |
| Waste Disposal | • Recorded disposal amount of solid wastes and sewage of the workers<br>• Checking the waste storage area | Areas around workers quarters | Daily Observation | Construction Contractor |
| | • Recorded disposal amount of construction wastes, compliance with the disposal requirements<br>• Separate hazardous and No-hazardous<br>• Checking the waste storage area | Closing site | Weekly | Construction Contractor |
| Employment | Number of people employed | Closing site | Monthly | Construction Contractor |
| Other Social Considerations | CSR activities record | Monitoring team | Monthly | Construction Contractor |
| Occupational Health and Safety | • Safety activities, Record of accident and OHS training and activities,<br>• Record of worker argument and conflict | Workers | Monthly | Safety Supervisor |
| Community Health and Safety | • Record of accident on record<br>• Recorded of training for driver and worker | Local residents | Upon conditions | Safety Supervisor |
| Emergency risk | • Accident record, safety, and its response plan,<br>• Training | Closing site | Monthly | Safety Supervisor |
| | | | | |
| **Operation Phase** | | | | |
| Air Quality | Particulate matter, TVOC, CO, $CO_2$, $NO_2$, $SO_2$ | Ambient air | Bi-annual | Factory Manager and HSE officer |

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| | Particulate matters, TVOC | Processing area such as mixing area, WWTP, storage area, Exhaust stack | Bi-annual | Factory Manager and HSE officer |
| | Stack Emission Gases | Boiler and Generator Stack | Bi-annual | Factory Manager and HSE officer |
| Wastewater Quality | pH, oil & grease, suspended solid, BOD, COD, color and Temperature, | Surface sources (drains), EQ tank, sedimentation tanks, oil/ water separators, effluent, inlet and outlet of WWTP | Monthly (basic 7 parameters) | Factory Manager and HSE officer |
| | Recorded of Treated water quality of NGQG General Parameters | Outlet of WWTP | Bi-annually | Factory Manager and HSE officer |
| Waste Disposal | • Recorded disposal amount of plastic, drum, paper box, sludge from WWTP<br>• Check collection system<br>• Check storage<br>• Separation of waste type (Hazardous & No-hazardous) | Plant premises | Monthly | Factory Manager and HSE officer |
| Soil Contamination | Spill and leakage of oil, chemical and fuel, wastewater treatment area | Plant premises, chemical storage area, fuel storage area, generator room, | Monthly | Factory Manager and HSE officer |
| Noise and Vibration | Noise & Vibration level | Plant premises, workplaces area | Bi-annually and upon complaint | Factory Manager and HSE officer |
| Odor | Inspection of ventilation condition | Factory and storage buildings | Monthly | Factory Manager and HSE officer |

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| Hazardous and Chemical Substance | • Record of type hazardous/ chemical substance<br>• Check and record handling and using<br>• Check storage area<br>• Check disposal system<br>• Record of the using amount | Factory and storage buildings | Monthly | Factory Manager and HSE officer |
| Greening Plan | Record of gardening area condition | Plant premises | Bi-annually | Factory Manager and HSE officer |
| Landscape | Record of landscape condition | Plant premises | Bi-annually | Factory Manager and HSE officer |
| Local Water Use | • Quality check Temp, pH, Oil & grease, SS, COD, BOD<br>• Record usage of water consumption | Inspection Pit | Monthly | Factory Manager and HSE officer |
| Occupational Health and Safety | • Record of accident and record of occupation/ safety training,<br>• Check PPE and safety plan<br>• Record complaints from workers | Plant premises | Occasionally weekly and as occasionally monthly | HSE officer |
| | • Each employee medical checkup record.<br>• Medical checkup plan | Plant premises | Annually | HSE officer |
| Machineries Maintenance | • WWTP<br>• Dust and VOC control equipment and their related equipment such as pumps, pipeline, filters<br>• D.G set and Chiller and Air Con<br>• Transportation vehicles such as loader, forklift and other<br>• Recorded the maintenance activities<br>• Recorded the machineries using time | Plant premise and all working area | Monthly and necessary time | Factory Manager and maintenance employee |
| Community Health and Safety | • Record of accident<br>• Record of complaints from communities | Local residents | Occasionally | HSE officer |

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| | • Training record for drivers and security | | | |
| Other Social Considerations | • Record CSR plan<br>• Record local employment status | Monitoring team | Annually | HR Manger |
| Emergency Risks | • Record of emergency case of accident and its response plan<br>• Check the Hazardous chemical handling and its management<br>• Check fire safety facilities<br>• Firefighting Training | Plant premise | As occasionally monthly | HSE officer |
| Transboundary or Global issues | Activity Implement | Plant premise | Annually | All responsible person |

## Corporate Social Responsibilities

CSR budget will be based on the profitability or financial performance of the company and is allotted as some % of the annual profit. According to the financial policy of the company, the company will use for it.

The company should allocate the following activities for CSR budget.

- Scholarship Program for Education and Knowledge Sharing Program
- Social Welfare
- Vocational Training for Job Opportunities
- Health and Safety Sector
- Road and Infrastructural sector
- Environmental Management and Monitoring Program

## Public Consultation and Information Disclosure

Public consultations are designed to provide a real understanding of industry issues and the aim is to make the public aware of the environmental impact of industrial operations and the increase in job opportunities caused by industry. By participating in the consultation process with anyone affected by the proposed project, the business community will be able to resolve any issues that may arise in advance.

### *Methodology and Approach*

Green Myanmar Environmental Services Co., Ltd. has meeted with the relevant government organizations and the vicinity of the factory

### *Consultation Meeting with the Relevant Authorized Organization and the Vicinity of Factory*

For the reporting of EMP, the purpose of consultation meeting is to inform and request comments about of the project to the neighbouring factory and industrial zone committee. There were 16 persons attended to the meeting, responsible person of Industry

Zone Management Committee of Responsible person from the vicinity of the factory, responsible persons of the factory and third party organization. Meeting was carried out the Industries Zone Management Committee Office, Mingalardone Industry Park, Mingalardone Township, Yangon Region at 16.10.2021. There were received 6 comments in the meeting. The facts of consultation meeting were shown in the following table. The attendance lists are attached in Appendix (11) and also suggestion sheets in Appendix (12).

Table (4): Summary of Discussion in the Meeting

| No. | Participants | Explanations/ Responses of Factory |
|---|---|---|
| 1 | **Daw Nyo Lin Htet –** Deputy Officer Yangon Region (North district), Environmental Conservation Department<br>• An environmental team must be formed at the factory.<br>• There should be providing Trainings Program and the environmental awareness to the workers by the team.<br>• For more information on environmental conservation, please visit the Department of Environmental Conservation's website and social media pages.<br>• The guidelines set by the Department of Environmental Conservation should be followed.<br>• Emphasis should be placed on health care for employees working in the factory.<br>• It is recommended that the required business licenses for the factory business be submitted to the relevant department for approval. | **U Kyaw Soe Win-** Managing Director (Green Myanmar Environmental Services Co., Ltd)<br>• There were need to hire skilled staff such as Pollution Control Manager or Safety Officer in their factories.<br>• These employees need to take care of the occupational safety and environmental protection of the employees in the relevant factories.<br>• Participants were also encouraged to submit comments on the suggestion letter if they did not wish to do so in person. |

Table (5): Description of Suggestion Letter from the Meeting

| No. | Comments |
|---|---|
| 1 | U Aung Thu<br>• Good environmental management arrangements. |
| 2 | Daw May Myo Shwe<br>• It is good to run no plastic programs and CSR activities. |
| 3 | U Thet Myo Htike<br>• In the future plan, the waste water treatment system should be regularly maintained as there will be mixing process and cleaning process in the production of facial wash products. |

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| 4 | Daw Zin Mar Hlaing<br>• No comments |
| 5 | Ma May Chan Khaing<br>• Follow to the laws and regulations issued by the government. |
| 6 | Daw Nyo Lin Htet<br>• There should be described to the staff health planning in the CSR process of the EMP report<br>• Disseminate environmental awareness to staff and access to environmental awareness on the Environmental Conservation Department - Yangon Region Facebook. |

***Action Plan on Comments***

The following responses from the factory to public comments are shown in the following Table below. The Rohto-Mentholatum (Myanmar) Co., Ltd.'s Action Plan on Recommendations is set out in Appendix (14) of the EMP Report.

Table (6): Summary of Comments in the Public Consultation Meeting

| No. | Comments | Action Plan on Feedback |
|---|---|---|
| 1 | • An environmental team must be formed at the factory.<br>• There should be providing Trainings Program and the environmental awareness to the workers by the team. | • Educating factory workers about environmental issues. Trainings are being provided. |
| | • For more information on environmental conservation, please visit the Department of Environmental Conservation's website and social media pages.<br>• The guidelines set by the Department of Environmental Conservation should be followed. | • We are following the guidelines set by the Environmental Conservation Department. |
| | • Emphasis should be placed on health care for employees working in the factory. | • We have been providing care in conjunction with local clinics and social welfare clinics for the health of the staff working in the factory. |
| | • It is recommended that the required business licenses for the factory business be submitted to the relevant department stores for approval. | • Business licenses required for the factory business, depending on the township; By region It is being submitted to the relevant departments for permission and is being implemented. |
| 2 | • Good environmental management arrangements. | • True |
| 3 | • It is good to run no plastic programs and CSR activities. | • Our company provides CSR activities; No plastic programs are being implemented. |
| 4 | • In the future plan, the waste water | • Waste water treatment system is being |

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| | treatment system should be regularly maintained as there will be mixing process and cleaning process in the production of facial wash products. | implemented and detailed procedures and guidelines will be developed and followed to prevent environmental damage when producing facial wash products. |
| 5 | • Follow to the laws and regulations issued by the government. | • Comply with government laws and regulations. |
| 6 | • There should be described to the staff health planning in the CSR process of the EMP report<br>• Disseminate environmental awareness to staff and access to environmental awareness on the Environmental Conservation Department - Yangon Region Facebook. | • We will follow.<br>• Employees will be encouraged to share this information. We will also visit the Environmental Conservation Department - Yangon Region Facebook. |

## Conclusion

According to the impact evaluation, all of the impacts are localized. Based on the evaluation of the significance of impacts, these are the summary of findings.

For ***operational phase***, most of the activities and their impacts could result moderate and minor risks, except fire hazard. Although the final plastic product poses a little danger, the raw plastic materials are highly flammable and high risk of fire.

But after implementation of mitigation measures, the residual risk of fire is low and it would be acceptable. For ***decommissioning phase***, the only concern is noise pollution and it could pose as major risk. But after implementing the mitigation measures, the residual impact will likely to be low risk and it would be acceptable.

### *Recommendation*

This is recommendation that:

- All appropriate environmental management measures detailed in this report, together with any other environmental management commitments should be implemented throughout the entire life of the factory.
- Solid wastes (waste food) & liquid wastes need to dispose according to rules and regulation.
- Workers should be provided proper training & it should be ensured that workers use PPE during plant operation.

The proponent is devoted to implement and follow Environmental Management Plan and Monitoring Plan is approved by the relevant authorities. The implementation of the EMP will be followed by annual environmental review and necessary corrective action. As a result of this, the implementation of the proposed project could not deteriorate the environment in any ways.

# အကျဉ်းချုပ်အစီရင်ခံစာ

## နိဒါန်း

### နောက်ခံသမိုင်းကြောင်း

ရိုဟ်တို ဆေးဝါး ကုမ္ပဏီလီမိတက် [Rohto Pharmeaceutical Co., Ltd. ] သည် ဂျပန်နိုင်ငံတွင် ၁၈၉၉ ခုနှစ် စတင်၍ အလှကုန်ပစ္စည်းများ နှင့် အခြားသောဆေးဝါး နှင့် ပတ်သတ်သည့်ပစ္စည်းများကို ထုတ်လုပ်ဖြန့်ဖြူး ရောင်းချခြင်းကို လုပ်ကိုင်ခဲ့ပါသည်။ ထို့နောက် ကမ္ဘာ့နိုင်ငံအတော်များများတွင် ကုမ္ပဏီခွဲများ နှင့် စက်ရုံခွဲများ ဖွင့်လှစ်၍ ထုတ်လုပ်တင်ပို့ရောင်းချခဲ့ပါသည်။ ယခု မြန်မာနိုင်ငံတွင် ရှိသော ရိုဟ်တို-မန်သိုလက်သန် (မြန်မာ) ကုမ္ပဏီလီမိတက် [Rohto-Mentholatum (Myanmar) Co., Ltd.] ကို ဂျပန်နိုင်ငံရှိ Rohto Pharmeaceutical Co., Ltd. မှ ၉၈% နှင့် ဗီယက်နမ် နိုင်ငံရှိ Rohto-Mentholatum (Vietnam) Co., Ltd. မှ ၂ % ဖက်စပ် ရင်းနှီးမြှုပ်နှံမှုဖြစ်ပါသည်။

ဆေးဘက်ဝင် အလှကုန်ပစ္စည်းများထုတ်လုပ်ခြင်း နှင့် ဖြန့်ဖြူးရောင်းချခြင်းလုပ်ငန်း စက်ရုံဖြစ်ပြီး ၂၀၁၃ ခုနှစ်မှ စတင်၍ ထုတ်ပိုးရောင်းချခြင်းလုပ်ငန်းကို စီးပွားဖြစ်စတင်လည်ပတ်ခဲ့ပါသည်။ ၂၀၂၂ ခုနှစ်နောက်ပိုင်းတွင် မျက်နှာသန့်စင်ခရင်များထပ်မံ ထုတ်လုပ်၍ ဖြန့်ဖြူးရောင်းချရန်စီမံဆောင်ရွက်လျှက်ရှိပါသည်။

ဇယား (၁)။ စီမံကိန်းဆိုင်ရာအချက်အလက်များ

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| ၁ | **စီမံကိန်းအမည်** | ရိုဟ်တို-မန်သိုလက်သန် (မြန်မာ) ကုမ္ပဏီလီမိတက် [Rohto-Mentholatum (Myanmar) Co., Ltd.] |
| ၂ | **စီမံကိန်းလိပ်စာ** | အမှတ် ဒီ-၅၊ မင်္ဂလာဒုံစက်မှုဥယျာဉ်, အမှတ် (၃) လမ်းမကြီး နှင့် ခရေပင်လမ်း ထောင့်မင်္ဂလာဒုံမြို့နယ်၊ ရန်ကုန်တိုင်းဒေသကြီး၊ ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော် |
| ၃ | **လုပ်ငန်းအမျိုးအစား** | ဆေးဘက်ဝင်အလှကုန်ပစ္စည်းများထုတ်လုပ်ခြင်း နှင့် ဖြန့်ဖြူးရောင်းချခြင်းလုပ်ငန်း |
| ၄ | **စီမံကိန်းဧရိယာ** | ၁၀၀၀၄ စတုရန်းမီတာ |
| ၅ | **ဆက်သွယ်ရန်ပုဂ္ဂိုလ်** | အမည်။ ဦးနိုင်အေး<br>ရာထူး။ စက်ရုံမန်နေဂျာ<br>ဖုန်း။ ၀၉၅၁၄၉၈၈၆<br>အီးမေးလ်။ naingaye@rohto.com.mm |
| ၆ | **စီမံကိန်းမြေ** | စက်မှုမြေ |
| ၇ | **အနီးစပ်ဆုံးအမြန်လမ်း** | အမှတ်(၃)လမ်းမကြီး |
| ၈ | **စုစုပေါင်းရင်းနှီးမြှုပ်နှံမှုပမာဏ** | ၁၂.၄၃၈ မီလီယမ် ဒေါ်လာ |
| ၉ | **မြေရရှိမှု အခြေအနေ** | ငှားရမ်းသည့်မြေ |
| ၁၀ | **မြေငှားရမ်းသူ** | မင်္ဂလာဒုံစက်မှုဥယျာဉ် |
| ၁၁ | **တစ်နှစ်အလုပ်လုပ်ရက်** | ရက်ပေါင်း ၂၈၅ ခန့် |
| ၁၂ | **ဝန်ထမ်းဦးရေ** | အမျိုးသား - ၁၀ ဦး၊ အမျိုးသမီး - ၁၈ ဦး<br>စုစုပေါင်း - ၂၈ ဦး (ဇွန်လ ၂၀၂၂) |
| ၁၃ | **အလုပ်ချိန်** | နံနက် ၇:၃၀ - ညနေ ၃:၂၀<br>ထမင်းစားချိန် - မိနစ် ၃၀ ပေးပါသည်။<br>အချိန်ပို - ကုန်ချောထုတ်လုပ်မှုအခြေအနေအပေါ်မူတည်ပါသည်။ |

ဇယား (၂)။ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုဆိုင်ရာလေ့လာဆန်းစစ်ခြင်းအဖွဲ့

| စဉ် | လုပ်ငန်းတာဝန် | သတ်မှတ်တာဝန်နှင့် လုပ်ပိုင်ခွင့် | အမည်၊ ရာထူး၊ နှင့် ကြားကာလ မှတ်ပုံတင်အမှတ် |
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| **အဓိက EMP ဆောင်ရွက်သည့် အဖွဲ့** | | | |
| ၁ | ပတ်ဝန်းကျင်စီမံခန့်ခန့်မှု ဆောင်ရွက်ရေးအဖွဲ့ ခေါင်းဆောင် | ▪ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် ပုံစံထုတ် ဒီဇိုင်းရေးဆွဲခြင်း<br>▪ နည်းပညာပိုင်းဆိုင်ရာ အစည်းအဝေးများ နှင့် တွေ့ဆုံဆွေးနွေးရှင်းလင်းခြင်း<br>▪ စီမံကိန်းနှင့်သက်ဆိုင်သူများထံမှ အကြံ ဉာဏ်များ ရယူဆန်းစစ်ခြင်း<br>▪ ကိန်းဂဏန်းအချက်အလက်များစုစည်းခြင်း နှင့် ခွဲခြားဆန်းစစ်ခြင်း<br>▪ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် အစီရင် ခံစာရေးသားပြုစုရန် ပံ့ပိုးခြင်း | Engr. ဦးကျော်စိုးဝင်း<br>အုပ်ချုပ်မှုဒါရိုက်တာ<br>စိမ်းလန်းမြန်မာပတ်ဝန်းကျင်ဆိုင်ရာ ဝန်ဆောင်မှုလုပ်ငန်းကုမ္ပဏီလီမိတက်။<br><br>No.0019 |
| ၂ | ပတ်ဝန်းကျင်ဆိုင်ရာ အကြံပေး | ▪ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် ပုံစံ ထုတ်လုပ်ရန်နှင့် ရေးဆွဲမည့်လူပုဂ္ဂိုလ်များ၏ သတ်မှတ်တာဝန် နှင့် လုပ်ပိုင်ခွင့်များ ဖွံ့ဖြိုးတိုးတက်စေရန် အကြံပေးခြင်း<br>▪ ပတ်ဝန်းကျင်အခြေခံအချက်အလက်များ ကွင်းဆင်းတိုင်းတာမှုများ ပြုလုပ်ရာတွင် အကြံပေးခြင်း<br>▪ ရရှိလာသည့်ကိန်းဂဏန်းအချက်အလက်များ၊ ဓာတ်ခွဲရလဒ်များကို အကြံပေးပြုစုစေခြင်း<br>▪ နည်းပညာပိုင်းဆိုင်ရာ ခွဲခြမ်းလေ့လာခြင်း နှင့် ပြီးပြည့်စုံသောအစီရင်ခံစာ ရေးသားပြုစု နိုင်ရန် အကြံပေးခြင်း | Engr. ဒေါ်ခင်ဆွေအေး<br>အကြံပေး<br>စိမ်းလန်းမြန်မာပတ်ဝန်းကျင်ဆိုင်ရာ ဝန်ဆောင် မှုလုပ်ငန်းကုမ္ပဏီလီမိတက်။<br><br>ကထိက(ငြိမ်း)<br>ဓာတုအင်ဂျင်နီယာဌာန၊<br>ရန်ကုန်နည်းပညာတက္ကသိုလ်။<br><br>No.0021 |
| ၃ | ကွင်းဆင်းလေ့လာ ဆောင်ရွက် သည့်အဖွဲ့ကြီးကြပ် ရေးခေါင်းဆောင် | ▪ ပတ်ဝန်းကျင်ဆိုင်ရာအကြောင်းအရာများ လေ့လာမည့် စစ်ဆေးရေးအချက်အလက် များ ပြင်ဆင်ခြင်း<br>▪ အကြိုကွင်းဆင်းလေ့လာစစ်ဆေးခြင်း<br>▪ ကွင်းဆင်လေ့လာမှုကို ကြီးကြပ်ခြင်း<br>▪ အစီရင်ခံစာစစ်ဆေးခြင်းနှင့် ပြင်ဆင်ခြင်း | ဦးကြည်ဟန်ဘို<br>B.E (Aerospace Fuel and Propellant Engineer)<br>စီနီယာပတ်ဝန်းကျင် ထိန်းသိမ်းရေး ကျွမ်းကျင် ပညာရှင် နှင့် အရည်အသွေး စစ်ဆေးခြင်း အင်ဂျင်နီယာ<br>စိမ်းလန်းမြန်မာပတ်ဝန်းကျင်ဆိုင်ရာ ဝန်ဆောင်မှုလုပ်ငန်းကုမ္ပဏီလီမိတက်။ |
| ၄ | လူထုဆက်ဆံရေး | ▪ စီမံကိန်းနှင့်ပတ်သက်၍ ဌာနဆိုင်ရာ တာဝန်ရှိသူများ နှင့် သွားရောက်တွေ့ဆုံခြင်း<br>▪ စာရွက်စာတမ်းများပြင်ဆင်ခြင်းနှင့်လိုက်လံဖိတ်ကြားခြင်း<br>▪ လူထုတွေ့ဆုံပွဲများအတွက် လိုအပ်သော စာရွက်စာတမ်းများပြင်ဆင်ခြင်း<br>▪ လူထုတွေ့ဆုံပွဲများတွင် အကြံပြုချက် များရယူခြင်း | ဦးအောင်ကျော်သန်း<br>B.E (Chemical)<br>စိမ်းလန်းမြန်မာပတ်ဝန်းကျင်ဆိုင်ရာ ဝန်ဆောင်မှုလုပ်ငန်းကုမ္ပဏီလီမိတက်။ |
| **အထောက်အပံ့အဖွဲ့** | | | |
| ၅ | လေထုအရည်အသွေး စီမံခန့်ခွဲမှုအကြံပေး | ▪ လေထုအရည်အသွေးတိုင်းတာရန် နည်း ပညာပိုင်းဆိုင်ရာများ အကြံပေးခြင်း<br>▪ လေထုညစ်ညမ်းမှုအတွက်ဆန်းစစ်ခြင်းနှင့် ကုစားမှုနည်းလမ်းများအကြံပေးခြင်း<br>▪ လေထုအရည်အသွေးတိုင်းတာရရှိမှုရ လဒ်များ | Engr. ဦးစိန်သောင်းဦး<br>ဥက္ကဋ္ဌ<br>စိမ်းလန်းမြန်မာပတ်ဝန်းကျင်ဆိုင်ရာ ဝန်ဆောင်မှုလုပ်ငန်းကုမ္ပဏီလီမိတက်။ |

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| | | အပေါ် အခြေခံကာ တွက်ချက ခြင်း၊ ဆန်းစစ်ခြင်း နှင့် အစီရင်ခံစာပြင်ဆင် မှု တွင် အကြံပေးခြင်း | No.0023 |
| ၇ | စွန့်ပစ်ရည်စီမံခန့်ခွဲမှု အကြံပေး | ▪ စက်မှုလုပ်ငန်းနှင့် မြူနီစီပယ်စွန့်ပစ်ပစ္စည်း များနှင့် ပတ်သက်၍ အကြံဉာဏ်ပေးခြင်း<br>▪ ကိန်းဂဏန်းအချက်အလက်များကို စီစဉ်ခြင်း၊ တွက်ချက်ခြင်း၊ကောက်ချက်ချခြင်း၊ပုံစံပြုဆန်းစစ်ခြင်းများ တွင် အကြံပေးခြင်း<br>▪ ဓာတ်ခွဲစမ်းသပ်မှုများကို အစီရင်ခံစာရေးသားပြုစု ရာ တွင် အကြံပေးခြင်း | Engr. ဒေါ်တင်မေစိုး<br>အကြံပေး<br>စိမ်းလန်းမြန်မာပတ်ဝန်းကျင်ဆိုင်ရာ ဝန်ဆောင်မှုလုပ်ငန်းကုမ္ပဏီလီမိတက်။<br><br>ပါမောက္ခ (ငြိမ်း)<br>ဓာတုအင်ဂျင်နီယာဌာန၊<br>မန္တလေးနည်းပညာတက္ကသိုလ်။<br>No.0028 |
| ၈ | ရေနှင့်စွန့်ပစ်ရည်ဓာတ်ခွဲ စမ်းသပ်ခြင်းအကြံပေး | ▪ ရေနှင့်စွန့်ပစ်ရည်နမူနာကောက်ယူခြင်း၊ ကိုင်တွယ် ခြင်းနှင့် စမ်းသပ်ခြင်းများတွင် အကြံပေးခြင်း<br>▪ ဓာတ်ခွဲခန်းရလဒ်များကိုစစ်ဆေးခြင်း<br>▪ ဓာတ်ခွဲခန်းရလဒ်များကို သတ်မှတ်စံနှုန်း များနှင့် နှိုင်းယှဉ်ခြင်းနှင့် ကောက်ချက်ချခြင်း | ဦးမျိုးမြင့်<br>စက်ရုံမှူး (ငြိမ်း)<br>အမှတ် (၁) စက်မှုဝန်ကြီးဌာန။<br><br>No.0026 |
| ၉ | နည်းပညာပိုင်းဆိုင်ရာ မန်နေဂျာ | ▪ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် ပြင်ဆင်မှုအတွက် အကြံပေးခြင်း<br>▪ နည်းပညာပိုင်းဆိုင်ရာအစည်းဝေးများ နှင့် အလုပ် ရုံဆွေးနွေးပွဲများကိုအကြံပေးခြင်း<br>▪ စီမံခန့်ခွဲမှုအစီအစဉ်အရစောင့်ကြည့်လေ့လာမှုပြု လုပ်သင့်သည့်အချက်များ အပေါ်အကြံ ပေးခြင်း<br>▪ လူထုတွေ့ဆုံပွဲများအတွက်အကြံပေးခြင်း<br>▪ အရည်အသွေးစစ်ဆေးမှုဆိုင်ရာနည်းပညာ အကြံပေးခြင်း<br>▪ အချက်အလက်များစုစည်းမှု နှင့် စီစစ်မှုဆိုင်ရာ လုပ်ငန်းများအတွက် အကြံပေးခြင်း | ဒေါ်ကျော့ကျော့ဖင်း<br>နည်းပညာအကြံပေး<br>စိမ်းလန်းမြန်မာပတ်ဝန်းကျင်ဆိုင်ရာ ဝန်ဆောင်မှုလုပ်ငန်းကုမ္ပဏီလီမိတက်။<br><br>ညွှန်ကြားရေးမှူး(ငြိမ်း)<br>မြန်မာ့ရေနံဓာတုဗေဒလုပ်ငန်း,<br>လျှပ်စစ်နှင့်စွမ်းအင်ဝန်ကြီးဌာန |
| ၁၀ | လူမှုပတ်ဝန်းကျင်ထိခိုက်မှု ကွင်းဆင်းလေ့လာရေး ခေါင်းဆောင် | ▪ ပတ်ဝန်းကျင်ဆိုင်ရာအချက်အလက်များ ကောက် ယူရန် Check list ပြင်ဆင်ခြင်း<br>▪ နည်းပညာဖလှယ်ခြင်းနှင့်အချက်အလက် စုဆောင်း ခြင်း<br>▪ ဒေသဆိုင်ရာအချက်အလက်များ စုဆောင်း ခြင်း၊ ဒေသခံများနှင့် ဆွေးနွေးတိုင်ပင်မှုများ ပြုလုပ်ခြင်း | ဦးခင်အောင်<br>အထွေထွေမန်နေဂျာ<br>စိမ်းလန်းမြန်မာပတ်ဝန်းကျင်ဆိုင်ရာ ဝန်ဆောင်မှုလုပ်ငန်းကုမ္ပဏီလီမိတက်။<br><br>No.0025 |
| ၁၁ | ပတ်ဝန်းကျင်ဆိုင်ရာအရည် အသွေးစီမံခန့်ခွဲမှုအကြံပေး | ▪ ပတ်ဝန်းကျင်ဆိုင်ရာ လေနှင့်ရေနမူနာများ ကောက် ယူဆန်းစစ်ခြင်း၊ လမ်းညွှန်ချက်များ ကြိုတင်ပြင်ဆင် နိုင်ရန် အကြံပေးကူညီခြင်း<br>▪ နမူနာကောက်ယူသည့် ပစ္စည်းများကို စစ်ဆေးခြင်း နှင့် မှတ်တမ်းရေးသွင်းရန် အကြံပေးခြင်း<br>▪ ဓာတ်ခွဲခန်းနည်းစနစ်များ ကြိုတင်ပြင်ဆင် နိုင်ရန် အကြံပေးခြင်း | ဒေါ်ခင်ရွှေငွေ<br>အကြံပေး<br>စိမ်းလန်းမြန်မာပတ်ဝန်းကျင်ဆိုင်ရာ ဝန်ဆောင်မှုလုပ်ငန်းကုမ္ပဏီလီမိတက်။<br><br>ကထိက(ငြိမ်း)<br>ဓာတုအင်ဂျင်နီယာဌာန၊<br>ရန်ကုန်နည်းပညာတက္ကသိုလ်။<br><br>ပတ်ဝန်းကျင်အင်ဂျင်နီယာပညာရပ်ဆိုင်ရာ မဟာဘွဲ့ (စက်ာပူ)။<br>No.0022 |
| ၁၂ | ပတ်ဝန်းကျင်ဆိုင်ရာအရည် အသွေး စောင့်ကြည့်တိုင်း | ▪ ပတ်ဝန်းကျင်ဆိုင်ရာ အခြေခံအချက် အလက် ကောက်ယူခြင်း | ဦးအောင်ကိုမင်း<br>B.E (Chemical) |

| | | | |
|---|---|---|---|
| | တာခြင်းအဖွဲ့ | ▪ လေ၊အသံနှင့်တုန်ခါမှု အရည်အသွေးတိုင်း တာခြင်း နှင့် အချက်အလက်များ တွက်ချက် ခြင်း<br>▪ အခြေခံအချက်အလက်ကောက်ယူသော မြေပုံများ ထုတ်ခြင်း<br>▪ အခြေခံအချက်အလက်ဆိုင်ရာအစီရင်ခံစာ ပြင်ဆင် ပြုစုခြင်း | (တိုင်းတာရေးကျွမ်းကျင်ပညာရှင်)<br><br>ဦးသီဟဇော်<br>B.Sc (Physis)<br>(လက်ထောက်ကျွမ်းကျင်ပညာရှင်)<br>စိမ်းလန်းမြန်မာပတ်ဝန်းကျင်ဆိုင်ရာ ဝန်ဆောင်မှုလုပ်ငန်းကုမ္ပဏီလီမိတက်။ |
| ၁၃ | ဓာတ်ခွဲစမ်းသပ်မှု ကျွမ်းကျင် ပညာရှင်များ | ▪ စွန့်ပစ်ရည်နမူနာကောက်ယူရန် ကြိုတင် ပြင်ဆင် ခြင်း<br>▪ ဓာတ်ခွဲခန်းစမ်းသပ်နိုင်ရန် ကြိုတင်ပြင်ဆင်ခြင်း<br>▪ ဓာတ်ခွဲစမ်းသပ်ခြင်း<br>▪ ဓာတ်ခွဲစမ်းသပ်ခြင်းမှရရှိသောရလာဒ်များကို စုစည်းတင်ပြခြင်း | ဦးသက်မင်းပိုင်<br>B.E (Chemical)<br>(ဓာတ်ခွဲခန်းကျွမ်းကျင်)<br><br>စိမ်းလန်းမြန်မာပတ်ဝန်းကျင်ဆိုင်ရာ ဝန်ဆောင်မှုလုပ်ငန်းကုမ္ပဏီလီမိတက်။ |

**မူဝါဒ ၊ ဥပဒေနှင့် ဖွဲ့စည်းမှုဆိုင်ရာမူဘောင်များ**

***စီမံကိန်းနှင့် ဆက်နွယ်နေသည့် မြန်မာ့ဥပဒေများ***

အဆိုပြုစီမံကိန်းမှ လိုက်နာလျက်ရှိသည့် မြန်မာ့ဥပဒေများကိုအောက်ပါအတိုင်းအနှစ်ချုပ်တင်ပြအပ်ပါသ ည်။

- အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ မူဝါဒ(၁၉၉၄)
- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဥပဒေ (၂၀၁၂) နှင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနည်းဥပဒေ (၂၀၁၄)
- ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း (၂၀၁၅)
- အမျိုးသား ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ
- ဓါတုပစ္စည်းနှင့် ဆက်စပ်ပစ္စည်းများ အန္တရာယ်မှ ကာကွယ်တားဆီးရေး ဥပဒေ (၂၀၁၃) နှင့် ဓါတုပစ္စည်းနှင့် ဆက်စပ်ပစ္စည်းများ အန္တရာယ်မှ ကာကွယ်တားဆီးရေး နည်းဥပဒေ (၂၀၁၆)
- ပို့ကုန်သွင်းကုန် ဥပဒေ (၂၀၁၂)
- လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး ဥပဒေ(၂၀၁၇)
- အလုပ်သမားလျော်ကြေးငွေ အက်ဥပဒေ (၁၉၂၃)
- အလုပ်သမားအဖွဲ့အစည်းဥပဒေ (၂၀၁၂)
- အလုပ်သမားရေးရာ အငြင်းပွားမှု ဖြေရှင်းရေးဥပဒေ (၂၀၁၂ ၊ ဖြည့်စွက် ၂၀၁၆)
- သဘာဝဘေးအန္တရာယ်စီမံခန့်ခွဲမှု ဥပဒေ (၂၀၁၃)

**စီမံကိန်းအကြောင်းအရာဖော်ပြချက်**

**စီမံကိန်းတည်နေရာ နှင့် ၎င်း၏အကျယ်အဝန်း**

စက်ရုံ သည် အမှတ် ဒီ-၅၊ မင်္ဂလာဒုံစက်မှုဥယျာဉ်, အမှတ် (၃) လမ်းမကြီး နှင့် ခရေပင်လမ်းထောင့် မင်္ဂလာဒုံမြို့နယ်၊ ရန်ကုန်တိုင်း ဒေသကြီး၊ ပြည်ထောင်စု သမ္မတမြန်မာနိုင်ငံတော် တွင်တည်ရှိပါသည်။ ပထဝီဂင် အညွှန်းကိန်းအရစီမံကိန်းသည်-

မြောက်လတ္တီတွဒ် - ၁၆° ၅၆' ၂၃" N

ရှေ့လောင်ဂျီတွဒ် - ၉၆° ၉' ၁၅.၃၈" E တွင်တည်ရှိပါသည်။

စီမံကိန်းမြေဧရိယာသည် ၁၀၀၀၄ စတုရန်းမီတာကျယ်ဂန်းပါသည်။ အောက်ပါဖော်ပြထားသောပုံ တွင် စီမံကိန်းတည်နေရာ ကိုဖော်ပြထားပါသည်။ စက်ရုံ၏ ပတ်ဂန်းကျင်အရပ်လေးမျက်နှာမှာအောက်ပါအတိုင်းဖြစ်ပါသည်။

- မြောက်ဘက် - တီအိုင် အထည်ချုပ်စက်ရုံ
- အနောက်ဘက် - ဂက်ဒက်ဒ်

- တောင်ဘက် - ဆန်းဖလားဝါး လေ့စ်အမှတ် (၂)
- အရှေ့ဘက်နေရာ - တာရှင်းအထည်ချုပ်စက်ရုံ

## ထုတ်လုပ်ဖြန့်ဖြူးနေသော ကုန်ပစ္စည်းများ

*ထုတ်လုပ်သောဆေးဖက်ဝင်ပစ္စည်း နှင့် ထုတ်လုပ်မှုပမာဏ (နှစ်စဉ်)*

| စဉ် | ကုန်ပစ္စည်းအမည် | အမျိုးအစား | ယူနစ် | အလေးချိန်ပမာဏ | ယူနစ် | အရည်အတွက် |
|---|---|---|---|---|---|---|
| ၁ | Medicines | V-Rohto 13ml | ml | 15,606,669 | pcs | 1,200,513 |
| ၂ | | V-Rohto Cool 12 ml | ml | 3,990,660 | pcs | 332,555 |
| ၃ | | V-Rohto Vitamin 13 ml | ml | 1,039,948 | pcs | 79,996 |
| ၄ | | Deep Heat Rub Plus 30g | g | 330,000 | pcs | 11,000 |
| ၅ | | Medical Cream 18g | g | 271,548 | pcs | 15,086 |
| ၆ | | Remos IB 10g | g | 65,150 | pcs | 6,515 |
| ၇ | | OXY 5 10g | g | 230,000 | pcs | 23,000 |
| ၈ | | OXY 10 10g | g | 115,990 | pcs | 11,599 |
| စုစုပေါင်း | | | | | | 1,680,264 |

*ထုတ်လုပ်သောအလှကုန်ပစ္စည်း နှင့် ထုတ်ပိုးရောင်းချမှုပမာဏ (နှစ်စဉ်)*

| စဉ် | ကုန်ပစ္စည်းအမည် | အမျိုးအစား | ယူနစ် | အရည်အတွက် | ယူနစ် | အလေးချိန်ပမာဏ |
|---|---|---|---|---|---|---|
| ၁ | Acnes | Creamy Wash 20 g | Pcs | 43,330 | g | 866,600 |
| ၂ | | Creamy Wash 50g | Pcs | 195,728 | g | 9,786,400 |
| ၃ | | Creamy Wash 100g | Pcs | 141,189 | g | 14,118,900 |
| ၄ | | Soothing Toner 90ml | Pcs | 49,576 | ml | 4,461,840 |
| ၅ | | Sealing Gel 9g | Pcs | 91,574 | g | 824,166 |
| ၆ | | Sealing Gel 18g | Pcs | 41,845 | g | 753,210 |

| | | | | | | |
|---|---|---|---|---|---|---|
| ၇ | | Foaming Wash 150ml | Pcs | 2,170 | g | 325,500 |
| ၈ | | Oil Remover Films | Pcs | 10,197 | g | 134,600.40 |
| ၉ | | Scar Care 12g | Pcs | 17,086 | g | 205,032 |
| ၁၀ | | C 10 15ml | Pcs | 10,403 | ml | 156,045 |
| ၁၁ | | Vitamin Cream 40g | Pcs | 54,537 | g | 2,181,480 |
| ၁၂ | | Vitamin Cleanser 50g | Pcs | 127,019 | g | 6,350,950 |
| ၁၃ | | Vitamin Cleanser 100g | Pcs | 81,900 | g | 8,190,000 |
| ၁၄ | | Pure White Cream 50g | Pcs | 6,686 | g | 334,300 |
| ၁၅ | | Pure White Wash 50g | Pcs | 9,488 | g | 474,400 |
| ၁၆ | | Pure White Wash 100g | Pcs | 19,515 | g | 1,951,500 |
| ၁၇ | | Oil Control Cleanser 50g | Pcs | 16,106 | g | 805,300 |
| ၁၈ | | Oil Control Cleanser 100g | Pcs | 16,642 | g | 1,664,200 |
| ၁၉ | LipIce | Sheer Color Strawberry 2.4 g | Pcs | 6,321 | g | 15,170.40 |
| ၂၀ | | Sheer Color Natural | Pcs | 4,741 | g | 11,378.40 |
| ၂၁ | | Sheer Color Honey | Pcs | 7,915 | g | 18,996.0 |
| ၂၂ | | Sheer Color Q Choco Mint 2.4g | Pcs | 1,360 | g | 3,264.0 |
| ၂၃ | | Colourless Apple | Pcs | 1,915 | g | 8,234.50 |
| ၂၄ | | Colourless Strawberry | Pcs | 1,913 | g | 8,225.90 |
| ၂၅ | | Colourless Lemon 4.3g | Pcs | 1,339 | g | 5,757.70 |
| ၂၆ | | LipIce Sheer Color Fruit Juice Cherry 4g | Pcs | 3,036 | g | 12,144 |
| ၂၇ | | LipIce Sheer Color Fruit Juice Strawberry | Pcs | 3,035 | g | 12,140 |
| ၂၈ | | LipIce Sheer Color Fruit Juice Berry | Pcs | 3,032 | g | 12,128 |
| ၂၉ | | LipIce Sheer Color Fruit Juice Orange | Pcs | 3,028 | g | 12,112 |
| ၃၀ | | LipIce Sheer Color POP Pink 2.4g | Pcs | 3,036 | g | 7,286.40 |
| ၃၁ | | LipIce Sheer Color POP Orange | Pcs | 3,037 | g | 7,288.80 |
| ၃၂ | | LipIce Sheer Color POP Rose | Pcs | 3,037 | g | 7,288.80 |
| ၃၃ | | LipIce Sheer Color POP Red | Pcs | 2,653 | g | 6,367.20 |
| ၃၄ | | LipIce Water Lip Citrus Pure Joy 4.3g | Pcs | 1,764 | g | 7,585.20 |

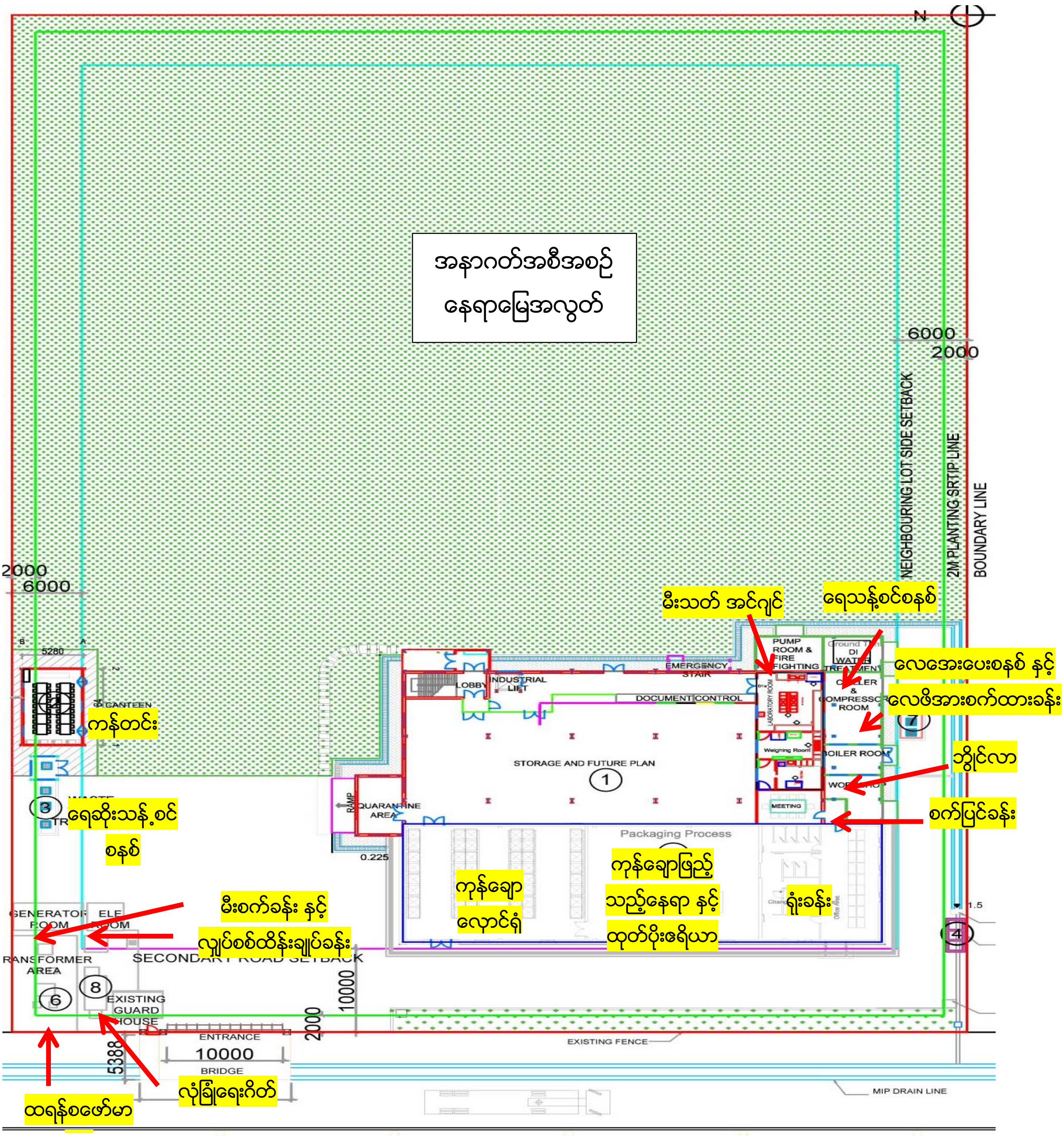
| | | | | | | |
|---|---|---|---|---|---|---|
| ၃၅ | | LipIce Water Lip Citrus Herb | Pcs | 1,762 | g | 7,576.60 |
| ၃၆ | Sunplay | Out Going | Pcs | 9,406 | g | 282,180 |
| ၃၇ | | Super Block 30g | Pcs | 7,645 | g | 229,350 |
| ၃၈ | | Super Block 70g | Pcs | 6,176 | g | 432,320 |
| ၃၉ | | Baby Mild 30g | Pcs | 7,379 | g | 221,370 |
| ၄၀ | | Whtening UV-30g | Pcs | 13,048 | g | 391,440 |
| ၄၁ | | Whtening UV-70g | Pcs | 3,812 | g | 266,840 |
| ၄၂ | | Sunplay Skin Aqua Clear White 25g | Pcs | 1,546 | g | 38,650 |
| ၄၃ | | Sunplay Skin Aqua Clear White 55g | Pcs | 1,656 | g | 91,080 |
| ၄၄ | | Sunplay Skin Aqua Silky White Gel 30g | Pcs | 4,780 | g | 143,400 |
| ၄၅ | | Sunplay Skin Aqua Silky White Gel 70g | Pcs | 6,146 | g | 430,220 |
| ၄၆ | | Sunplay Skin Aqua UV Tone Up Essence | Pcs | 3,167 | g | 158,350 |
| ၄၇ | Other Consumer Products | Scar Z | Pcs | 15,268 | g | 183,216 |
| ၄၈ | | Remos IR 60ml | Pcs | 48,965 | ml | 2,937,900 |
| ၄၉ | | Remos IR 150ml | Pcs | 3,492 | ml | 523,800 |
| ၅၀ | | Remos IR Cream Lemon Grass | Pcs | 11,646 | g | 815,220 |
| ၅၁ | | Selsun Shampoo 50 ml | Pcs | 35,395 | ml | 1,769,750 |
| ၅၂ | | Selsun Shampoo 100 ml | Pcs | 26,508 | ml | 2,650,800 |
| ၅၃ | HADA LABO Series | Advanced Nourish Hyaluron Cleanser 80g | Pcs | 8,085 | g | 646,800 |
| ၅၄ | | Advanced Nourish Hyaluron Lotion 100ml (for normal skin) | Pcs | 3,644 | ml | 364,400 |
| ၅၅ | | Advanced Nourish Hyaluron Lotion 100ml (for oil skin) | Pcs | 3,774 | ml | 377,400 |
| ၅၆ | | Advanced Nourish Hyaluron Cream 50g | Pcs | 9,106 | g | 455,300 |
| ၅၇ | | Perfect White Arbutin Cleanser 80g | Pcs | 1,993 | g | 159,440 |
| ၅၈ | | Perfect White Arbutin Lotion 100ml | Pcs | 5,277 | ml | 527,700 |
| ၅၉ | | Perfect White Arbutin | Pcs | 4,357 | ml | 392,130 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | Milk 90ml | | | | |
| ၆၀ | | Perfect White Arbutin Essence 30g | Pcs | 3,016 | g | 90,480 |
| ၆၁ | | Perfect White Arbutin Cream 50g | Pcs | 8,283 | g | 414,150 |
| ၆၂ | | Pro Anti Aging Collagen Plus Cleanser 80g | Pcs | 5,000 | g | 400,000 |
| ၆၃ | | Pro Anti Aging Collagen Plus Lotion 100ml | Pcs | 4,458 | ml | 445,800 |
| ၆၄ | | Pro Anti Aging Collagen Plus Cream 50g | Pcs | 4,310 | g | 215,500 |
| ၆၅ | | Pro Anti Aging Collagen Plus Essence 30g | Pcs | 2,540 | g | 76,200 |
| ၆၆ | | HDLB Advanced Nourish Trial set (Hyaluron Cleanser 25g + Hyaluron Lotion 40ml) | Pcs | 3,409 | | |
| ၆၇ | | HDLB Perfect White Trial set (Arbutin Cleanser 25g + Arbutin Lotion 40ml) | Pcs | 3,936 | | |
| စုစုပေါင်း | | | | 1,265,138 | | |

ပုံ (၁)။ ဖြန့်ဖြူးရောင်းချနေသော ကုန်ချောပစ္စည်းအချို့၏ ပုံ

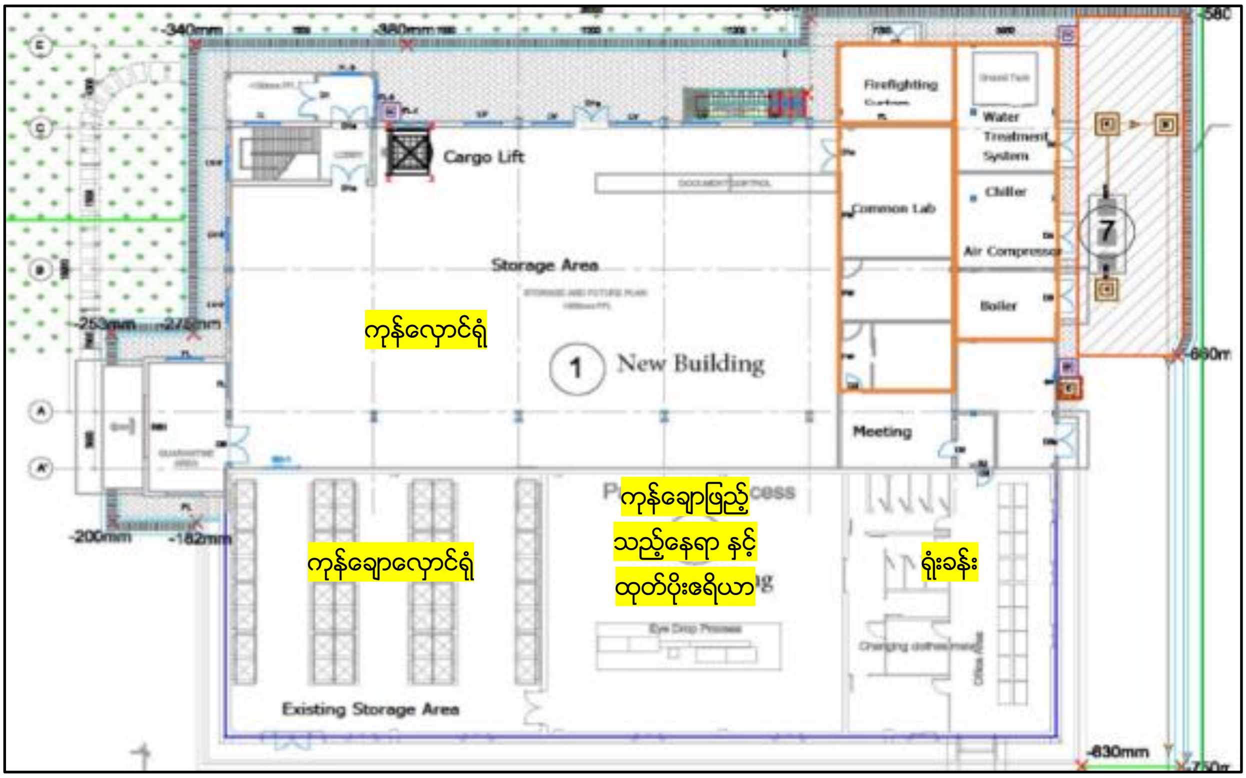
**စက်ရုံနေရာချထားမှုပုံစံ**

အောက်ပါပုံတွင် စက်ရုံနေရာချထားမှုပုံစံကို တွေ့နိုင်ပါသည်။ ခရင်ထုတ်လုပ်သည့်အဆောက်အဦးသည် ၂ ထပ်အဆောက်အဦဖြစ်ပြီး အောက်ထပ်တွင် ကုန်သိုလှောင်ရုံထားရှိပြီး ဒုတိယထပ်တွင် ကုန်ထုတ်လုပ်သည့်စက်တန်းရှိပါသည်။

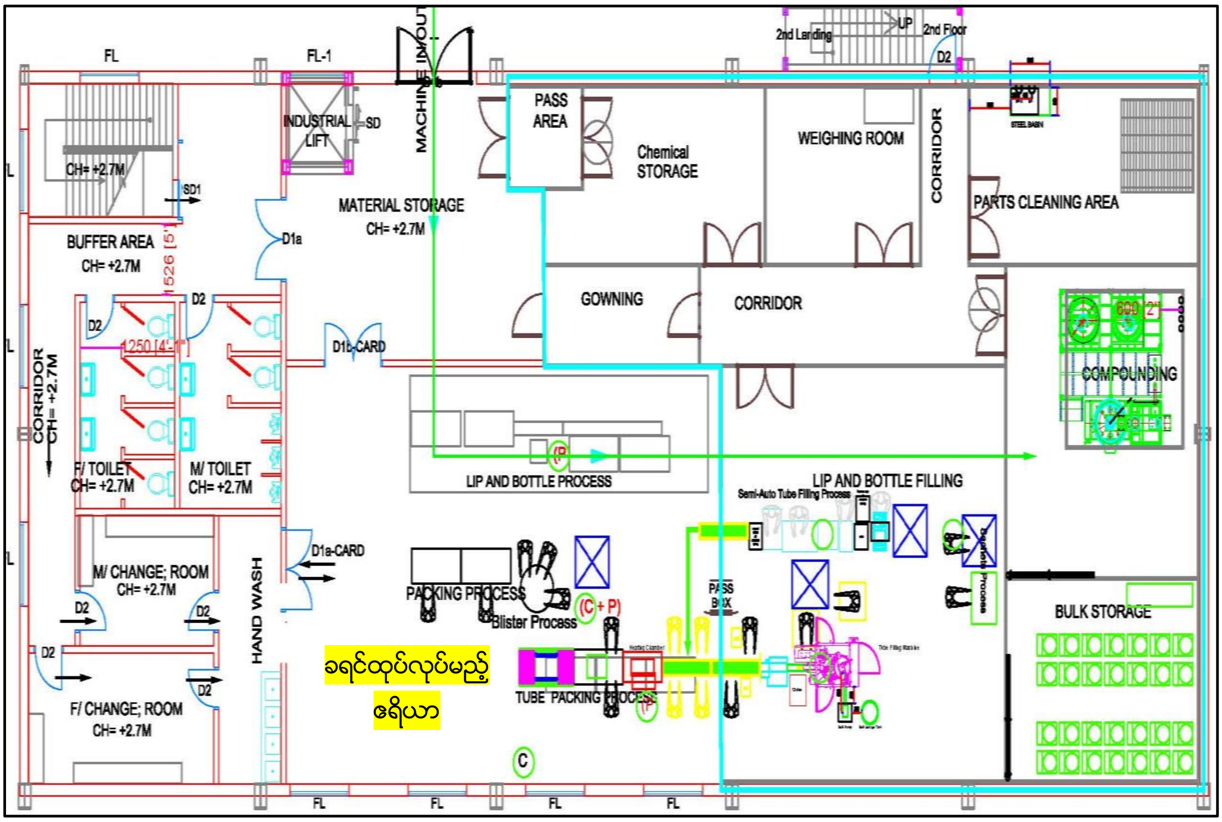


***ရင်ကုန်ချောထုတ်လုပ်သည့် အဆောက်အဦ ရှိ စက်တန်း နှင့် ကုန်ထုတ်ဧရိယာတွင် အခန်းများနေရာချထားမှု***

***<u>အောက်ထပ်</u>***

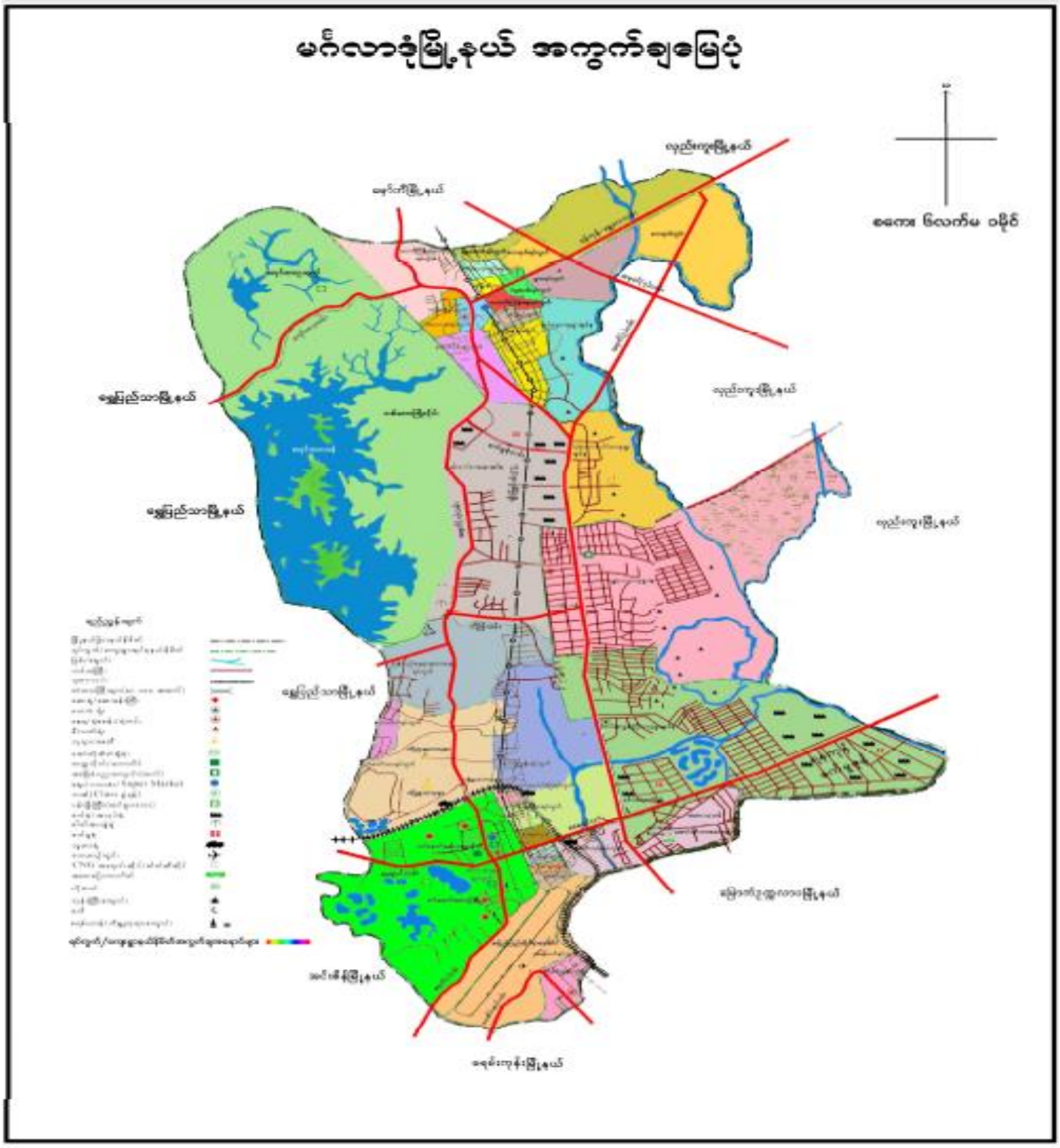



***<u>ဒုတိယထပ်</u>***



**ပတ်ဝန်းကျင်ဆိုင်ရာအခြေအနေများဖော်ပြချက်**

စက်ရုံသည် မင်္ဂလာဒုံစက်မှုဇုန်၊ မင်္ဂလာဒုံမြို့နယ်၊ ရန်ကုန်တိုင်းဒေသကြီးတွင် တည်ရှိသောကြောင့် ပတ်ဝန်းကျင်ခြေအနေများဖြစ်သည့် ပတ်ဝန်းကျင်ဆိုင်ရာအချက်အလက်များကို မြို့နယ်အထွေထွေ အုပ်ချုပ်ရေးဦးစီးဌာန၏ ၂၀၁၉ ခုနှစ်၊ စက်တင်ဘာလ ရက်စွဲပါ မင်္ဂလာဒုံမြို့နယ် ဒေသဆိုင်ရာအချက် အလက်များမှ ကိုးကားခဲ့ပါသည်။




ရင်းမြစ် - ဒေသဆိုင်ရာအချက်အလက်များ၊ မင်္ဂလာဒုံမြို့နယ် (၂၀၁၉ ခုနှစ်၊ စက်တင်ဘာလ)

ဇယား (၃)။ ပတ်ဝန်းကျင်နှင့်လူမှုဝန်းကျင်ဆိုင်ရာအခြေအနေများဖော်ပြချက်

| **အမျိုးအစား** | **ဖော်ပြချက်** |
|---|---|
| **ပထဝီဝင်အနေအထား** | |
| တည်နေရာနှင့် အကျယ်အဝန်း | • မင်္ဂလာဒုံမြို့နယ်သည် ရန်ကုန်တိုင်းဒေသကြီး မြောက်ပိုင်းခရိုင်အတွင်း ပါဝင်ပါသည်။ မြောက်လတ္တီတွင် ၁၇ ဒီဂရီ ၀၂ မိနစ်မှ ၁၇ ဒီဂရီ ၀၄ မိနစ် အကြား၊ အရှေ့လောင်ဂျီတွဒ် ၉၆ ဒီဂရီ ၀၈ မိနစ် မှ ၉၆ ဒီဂရီ ၁၅ မိနစ်အကြားတွင် တည်ရှိပါသည်။<br>• အကျယ်အဝန်းမှာ (၄၁.၆၉) စတုရန်းမိုင် ကျယ်ဝန်းပါသည်။ |

| အမျိုးအစား | ဖော်ပြချက် |
|---|---|
| | • အရှေ့မှ အနောက်သို့ (၃.၆၁)မိုင်ရှိပြီး တောင်မှ မြောက်သို့ (၁၁.၅၅)မိုင်ရှည်ပါသည်။ |
| နယ်နိမိတ် | • မင်္ဂလာဒုံမြို့နယ်၏ အရှေ့ဘက်တွင် လှည်းကူးမြို့နယ်(မြောက်ပိုင်းခရိုင်)တို့နှင့်၎င်း ထိစပ်လျှက်ရှိပါသည်။ တောင်ဘက်တွင် မရမ်းကုန်းမြို့နယ်(အနောက် ပိုင်းခရိုင်)၎င်း၊ မြောက်ဘက်တွင် မှော်ဘီမြို့နယ်၊ လှည်ကူးမြို့နယ်(မြောက်ပိုင်းခရိုင်)တို့နှင့် နယ်နိမိတ်ချင်း ထိစပ်လျှက်ရှိပါသည်။ |
| အုပ်ချုပ်ရေးနယ်မြေ | • မင်္ဂလာဒုံမြို့နယ်သည် ရပ်ကွက်ပေါင်း (၂၇)၊ ကျေးရွာအုပ်စု (၅)နှင့် ကျေးရွာ (၂၀)ဖြင့် ဖွဲ့စည်းထားပါသည်။ |
| မြေမျက်နှာသွင်ပြင် | • မင်္ဂလာဒုံမြို့နယ်၏ အနောက်ဘက်တွင် ငွေယားတောင်တန်းရှိပြီး တောင်မှမြောက်သို့ သွယ်တန်းလျှက် ရှိပါသည်။ အနောက်ဘက်တွင် ရွှေပြည်သာမြို့နယ်အစပ်တွင် လှော်ကားကန် တည်ရှိပြီး ကျန်ဧရိယာများမှာ လွင်ပြင်များ ဖြစ်ပါသည်။ |
| ရေဆင်း | • မင်္ဂလာဒုံမြို့နယ်တွင် မြစ်ချောင်းများ နည်းပါးသည့် ဒေသတစ်ခုဖြစ်ပြီး ဘားလားချောင်းမှာ မြောက်မှတောင်သို့ (၁၂)မိုင်ခန့်၊ အနောက်မှ အရှေ့သို့ (၈)မိုင်ခန့် စီးဆင်းလျှက်ရှိပါသည်။ ရေစူးမှာ မိုးရာသီတွင် (၁၂)ပေခန့်နှင့် နွေရာသီတွင် (၃)ပေခန့်သာရှိ၍ သင်္ဘော/စက်လှေများ သွားလာနိုင်ခြင်း မရှိပါ။ |
| ပင်လယ်ရေမျက်နှာပြင် အမြင့် | • မင်္ဂလာဒုံမြို့နယ်သည် ပင်လယ်ရေမျက်နှာ မျက်နှာပြင်အထက် ပျမ်းမျှ အမြင့် (၁၀၀)ပေ အကြားတွင်တည်ရှိပါသည်။ |
| **ရာသီဉတုနှင့်သဘာဝပတ်ဝန်းကျင်** | |
| ရာသီဉတု | • မင်္ဂလာဒုံမြို့နယ်သည် ပူအိုက်စွတ်စိုသော ရာသီဉတုရှိပြီး အမြင့်ဆုံး အပူချိန် (၃၉ ဒီဂရီစင်တီဂရိတ်) နှင့် အနိမ့်ဆုံးအပူချိန်မှာ (၁၅.၅ ဒီဂရီစင်တီဂရိတ်) ဖြစ်ပါသည်။ ၂၀၁၉ ခုနှစ်၏ စက်တင်ဘာလကုန်အထိ နွေရာသီအမြင့်ဆုံး (၃၈ ဒီဂရီစင်တီဂရိတ်) နှင့် ဆောင်းရာသီအနိမ့်ဆုံးအပူချိန် (၁၅.၈ ဒီဂရီစင်တီဂရိတ်) ဖြစ်ပါသည်။ |
| သဘာဝပေါက်ပင်များ | • မင်္ဂလာဒုံမြို့နယ်အတွင်း ကျွန်း၊ ပျဉ်းကတိုး၊ သစ်မာ၊ ခနိနှင့်ဒီရေတောများ ပေါက်ရောက်ပါသည်။ |
| ဇီဝမျိုးစုံမျိုးကွဲများ | • မင်္ဂလာဒုံမြို့နယ်အတွင်း တောရိုင်းတိရစ္ဆာန်များ မရှိပါ။ |
| သဘာဝပတ်ဝန်းကျင် | • လှည်းကူးမြို့နယ်သည် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးလုပ်ငန်းများအတွက် ကြိုးဝိုင်းတော၊ ကြိုးပြင်တောများဖြင့် ထိန်းသိမ်းလျက်ရှိပါသည်။ |
| သဘာဝဘေးအန္တရာယ် | • မင်္ဂလာဒုံမြို့နယ်အတွင်း (၂၀၁၈-၂၀၁၉) ခုနှစ်အတွင်း မီးဘေးအန္တရာယ် (၁)ကြိမ် ဖြစ်ပွားခဲ့ပါသည်။ |
| **လူမှုပတ်ဂန်းကျင်** | |
| လူမှုရေးကဏ္ဍ | • မင်္ဂလာဒုံမြို့နယ်၏ ၂၀၁၉ ခုနှစ်၊ စက်တင်ဘာလကုန်အထိ လူဦးရေ (၂၆၃,၇၉၈) ဖြစ်ပါသည်။ မြို့နေလူဦးရေ စုစုပေါင်း (၁၄၉,၈၉၇) ဖြစ်ပြီး ကျေးလက်နေလူဦးရေမှာ (၁၁၃,၉၀၁) ဖြစ်ပါသည်။<br>• ဗမာလူမျိုးအများဆုံးနေထိုင်ကြပြီး ကရင်လူမျိုးများမှာ ဒုတိယအများဆုံးနေထိုင်ကြပြီး မြို့နယ်လူဦးရေ၏ (၁.၄၅ %) ဖြစ်ပါ သည်။ တတိယအများဆုံးနေထိုင်ကြသူများမှာ ရခိုင်လူမျိုးများဖြစ်ပြီး မြို့နယ်လူဦးရေ၏ (၁.၁၈ %) ဖြစ်ပါသည်။ ကချင်၊ ကယား၊ ချင်း၊ မွန်နှင့် ရှမ်းလူမျိုးများလည်း နေထိုင်ကြ ပါသည်။<br>• မင်္ဂလာဒုံမြို့နယ်တွင် တရုတ်၊ အိန္ဒိယ၊ ပါကစ္စတန်၊ ဘင်္ဂလာဒေ့ရှ် နှင့်အခြားလူမျိုးများလည်းနေထိုင်ကြပါသည်။ |
| ကိုးကွယ်ယုံကြည်မှု | • မင်္ဂလာဒုံမြို့နယ်တွင် နေထိုင်ကြသူများမှာ ဗုဒ္ဓဘာသာ (၂၅၂,၁၅၆)၊ ခရစ်ယာန် (၄,၃၃၉)၊ ဟိန္ဒူဘာသာ (၃,၂၃၂)နှင့် အခြား (၄,၀၇၁) တို့ ကိုးကွယ်ကြပါသည်။ |
| စီးပွားရေးနှင့် အသက်မွေး | • မင်္ဂလာဒုံမြို့နယ်သည် ရန်ကုန်တိုင်းဒေသကြီးအတွင်းတွင် တည်ရှိပြီး စီးပွားရေးအရ |

| အမျိုးအစား | ဖော်ပြချက် |
|---|---|
| ဂမ်းကြောင်း | အချက်အခြာကျသော မြို့နယ်တစ်ခု ဖြစ်ပါသည်။<br>• မြို့နယ်အတွင်းတွင် ရန်ကုန်စက်မှုဇုန်၊ မင်္ဂလာဒုံစက်မှုဇုန်နှင့် ပျဉ်းမပင်စက်မှုဇုန်တို့တွင် စက်ရုံအလုပ်ရုံပေါင်း (၁၁၀) ရှိပြီး စက်မှုအခြေခံကျသော မြို့နယ်တစ်ခုဖြစ်ပါသည်။<br>• တပ်မတော်ပိုင်စက်ရုံ (၂)ရုံ လည်းရှိပါသည်။<br>• မင်္ဂလာဒုံမြို့နယ်သည် ရန်ကုန်-ပြည်လမ်း၊ အမှတ်(၃)လမ်းမကြီးတည်ရှိပြီး လမ်းပန်း ဆက်သွယ်ရေး ကောင်းမွန်သော မြို့နယ်တစ်ခု ဖြစ်ပါသည်။ |
| ပညာရေးကဏ္ဍ | • မင်္ဂလာဒုံမြို့နယ်တွင် အခြေခံပညာအထက်တန်းကျောင်း (၉)၊ အထက်တန်းကျောင်းခွဲ (၃)<br>• အခြေခံပညာအလယ်တန်းကျောင်း (၇)၊ အလယ်တန်းကျောင်းခွဲ (၆)<br>• မူလတန်းလွန်ကျောင်း (၂)၊ မူလတန်းကျောင်း (၂၅)<br>• မူလတန်းကြိုကျောင်း (၂၄)<br>• ဘုန်းတော်ကြီးသင် ပညာရေးကျောင်း (၂၂) ရှိပါသည်။ |
| ကျန်းမာရေးကဏ္ဍ | • မင်္ဂလာဒုံမြို့နယ်တွင် အစိုးရဆေးရုံ (၅)<br>• ပုဂ္ဂလိကဆေးပေးခန်း (၁၁)၊<br>• ကျေးလက်ကျန်းမာရေးဌာန (၅)နှင့် ဌာနခွဲ (၂၆) ရှိပါသည်။<br>• ဒေသတွင်းအများဆုံးဖြစ်တတ်သော ရောဂါများမှာ ဝမ်းလျှော၊ ဝမ်းကိုက်၊ အသည်းရောင် ရောဂါများ ဖြစ်တတ်ပါသည်။ |
| အားကစားကဏ္ဍ | • မင်္ဂလာဒုံမြို့နယ်ရှိ အားကစားနှင့်ဖျော်ဖြေရေးဆိုင်ရာ အချက်အလက်များအနေဖြင့် ဘောလုံးကွင်း (၁)၊ တင်းနစ်ကွင်း(၁)၊ ပန်းခြံ(၁) ရှိပါသည်။ |
| ရှေးဟောင်းယဉ်ကျေးမှု | • မင်္ဂလာဒုံမြို့နယ်တွင် သာသနိကအဆောက်အဦများ၊ ဘုရား၊စေတီနှင့်ပုထိုးများ ရှိသော်လည်း သမိုင်းဝင်ထင်ရှားသော ဘုရားစေတီပုထိုးများမရှိပါ။ |

**ပတ်ဝန်းကျင်ဆိုင်ရာအရည်အသွေး တိုင်းတာခြင်း**

စီမံကိန်းနှင့်စပ်လျဉ်း၍ ပတ်ဝန်းကျင်ဆိုင်ရာအရည်အသွေးတိုင်းတာခြင်းလုပ်ငန်းကို ၂၇.၅.၂၀၂၀ မှ ၂၈.၅.၂၀၂၀ ရက်နေ့ ထိ စက်ရုံသို့ ကွင်းဆင်းဆောင်ရွက်ခဲ့ပါသည်။ စီမံကိန်းဧရိယာအတွင်းတွင် လေထုအရည်အသွေး အကဲဖြတ်ရန် အတွက် တည်နေရာ ၃ ခု သတ်မှတ်တိုင်းတာခဲ့ပါသည်။ ပတ်ဝန်းကျင်လေထု အရည်အသွေး တိုင်းတာ ခြင်းကို ၂၄ နာရီ တိုင်းတာခဲ့ပြီး လုပ်ငန်းခွင်လေထုအရည်အသွေး၂ တိုင်းတာ ခြင်းများကို တစ်နေရာလျှင် တစ်နာရီ နှုန်းဖြင့် တိုင်းတာခဲ့ပါသည်။ လေထုအရည်အသွေး တိုင်းတာမှုရလဒ်များကို အမျိုးသား ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ (၂၀၁၅) နှင့် အခြားသောနိုင်ငံများ၏ စံနှုန်းများ နှင့်ပါ နှိုင်းယှဉ်ပါ သည်။

***(၁) ပတ်ဂန်းကျင်လေထုအရည်အသွေးတိုင်းတာခြင်းရလာဒ်များ***

| စဉ် | အမျိုးအစား | ရလာဒ် | ယူနစ် | တိုင်းတာခဲ့သည့်အချိန်(နာရီ) | အမျိုးသားပတ်ဂန်းကျင် လေထုအရည်အသွေး | | |
|---|---|---|---|---|---|---|---|
| | | | | | စံနှုန်း | စံသတ်မှတ်ထားသောအချိန် | သတ်မှတ်နိုင်ငံ |
| ၁ | နိုက်ထရိုဂျင်ဒိုင်အောက်ဆိုဒ် | ၁၀၁.၈ | μg/m$^3$ | - | ၄၀ μg/m$^3$ | ၁ နှစ် | မြန်မာနိုင်ငံ |
| | | | | ၂၄ | ၂၀၀ μg/m$^3$ | ၁ နာရီ | |
| ၂ | အမှုန်အမွှား (PM ၁၀) | ၁၉.၆၆ | μg/m$^3$ | - | ၂၀ μg/m$^3$ | ၁ နှစ် | မြန်မာနိုင်ငံ |
| | | | | ၂၄ | ၅၀ μg/m$^3$ | ၂၄ နာရီ | |
| ၃ | အမှုန်အမွှား (PM ၂.၅) | ၉.၃၆ | μg/m$^3$ | - | ၁၀ μg/m$^3$ | ၁ နှစ် | မြန်မာနိုင်ငံ |
| | | | | ၂၄ | ၂၅ μg/m$^3$ | ၂၄ နာရီ | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ၄ | ဆာလဖာဒိုင်အောက်ဆိုဒ် | ၀ | µg/m$^3$ | ၂၄ | ၂၀ µg/m$^3$ | ၂၄ နာရီ | မြန်မာနိုင်ငံ |
| | | | | - | ၅၀၀ µg/m$^3$ | ၁၀ မိနစ် | |
| ၅ | အိုဇုန်း | ၈၃.၆၆ | µg/m$^3$ | ၂၄ | ၁၀၀ µg/m$^3$ | တစ်ရက် ၈ နာရီ | မြန်မာနိုင်ငံ |
| ၆ | အမိုးနီးယား | ၀ | ppm | ၂၄ | ၅၀ ppm | - | - |
| ၇ | ကာဗွန်ဒိုင်အောက်ဆိုဒ် | ၃၆၈.၅၈ | ppm | ၂၄ | စံနှုန်းမရှိ | - | - |
| ၈ | ကာဗွန်မိုနောက်ဆိုဒ် | ၀ | ppm | ၂၄ | စံနှုန်းမရှိ | | - |
| ၉ | အငွေ့ပျံလွယ်သောဓာတ်ပေါင်းများ (TVOC) | ၀ | ppb | ၂၄ | စံနှုန်းမရှိ | - | - |
| ၁၀ | အောက်ဆီဂျင် | ၂၁.၂၄ | % | ၂၄ | စံနှုန်းမရှိ | - | - |

ပတ်ဂန်းကျင်လေထုအရည်အသွေးတိုင်းတာခြင်းအရ တိုင်းတာရရှိသောတန်ဖိုးများမှာ သတ်မှတ်စံနှုန်းများအတွင်းတွင်သာရှိပါသည်။

*(၂) လုပ်ငန်းခွင်လေထုအရည်အသွေးတိုင်းတာရေးရလာဒ်များ*

| တိုင်းတာသည့်နေရာ | အမျိုးအစား | ယူနစ် | တိုင်းတာသည့်ကြာချိန် | ရလာဒ် |
|---|---|---|---|---|
| **ကုန်ထုတ်သည့်နေရာ** | အမှုန်အမွှား (PM ၁၀) | [µg/m$^3$] | ၁ နာရီ | ၃၆ |
| | အမှုန်အမွှား (PM ၂.၅) | [µg/m$^3$] | ၁ နာရီ | ၁၂ |
| | အငွေ့ပျံလွယ် သောဓာတ်ပေါင်းများ (TVOC) | ppm | ၁ နာရီ | ၀ |
| | | | | |
| **ကုန်လှောင်ရုံ** | အမှုန်အမွှား (PM ၁၀) | [µg/m$^3$] | ၁ နာရီ | ၂၈ |
| | အမှုန်အမွှား (PM ၂.၅) | [µg/m$^3$] | ၁ နာရီ | ၂၄ |
| | အငွေ့ပျံလွယ် သောဓာတ်ပေါင်းများ (TVOC) | ppm | ၁ နာရီ | ၀ |

ပတ်ဝန်းကျင်ဆူညံမှုတိုင်းတာခြင်းကို လေထုအရည်အသွေးတိုင်းတာခဲ့သော နေရာနှင့်အတူ တိုင်းတာခဲ့ပါသည်။ လုပ်ငန်းခွင်ဆူညံသံအရည်အသွေးတိုင်းတာခြင်းကို အလုပ်ချိန် ၈ နာရီအတွင်းတွင် တိုင်းတာမှုကြာချိန်(၁) နာရီနှုန်းဖြင့် နေရာ ၂ နေရာတိုင်းတာခဲ့ပါသည်။ တိုင်းတာမှုတန်ဖိုးမှာအောက်ပါအတိုင်းဖြစ်ပါသည်။

| တိုင်းတာသည့်နေရာ | အမျိုးအစား | ယူနစ် | တိုင်းတာသည့်ကြာချိန် | ရလာဒ် |
|---|---|---|---|---|
| စက်ရုံခြံဂန်းအတွင်း | ဆူညံသံ | dBA | ၂၄ နာရီ | နေ့ - ၆၈ |
| | | | | ည - ၅၄ |
| ကုန်ထုတ်သည့်နေရာ | ဆူညံသံ | dBA | ၁ နာရီ | ၇၀.၂ |
| ကုန်လှောင်ရုံ | ဆူညံသံ | dBA | ၁ နာရီ | ၆၂.၁ |

နေ့အချိန်နှင့် ညအချိန် တိုင်းတာခဲ့သော ဆူညံသံ ရလဒ်များသည် စက်မှုဇုန်ဧရိယာ အတွက်သတ်မှတ်ထားသော ဆူညံသံသတ်မှတ်ချက် အတွင်းရှိပါသည်။ လုပ်ငန်းခွင် ဆူညံသံ အရည်အသွေးသတ်မှတ်ချက်သည် အလုပ်ချိန် ၈ နာရီအတွက် ၉၀ dB ရှိသောကြောင့် လုပ်ငန်းခွင်ဆူညံသံသည် သတ်မှတ်ချက်အတွင်းတွင်ရှိပါသည်။

**ရေအရည်အသွေးတိုင်းတာခြင်း**

ရေထုအရည်အသွေးတိုင်းတာရန်အတွက် စီမံကိန်းဧရိယာအတွင်းမှ ရေနမူနာနစ်ခု ကောက်ယူခဲ့ပါသည်။ စက်ရုံသုံးရေ နှင့် စက်ရုံ ရေမြောင်းရေနမူနာကို ကောက်ယူခဲ့ပြီး စိမ်းလန်းမြန်မာ ပတ်ဝန်းကျင်ဆိုင်ရာ ဝန်ဆောင်မှု ကုမ္ပဏီလီမိတက်ဓာတ်ခွဲခန်းတွင် တိုင်းတာခဲ့ပါသည်။

***(၁) စက်ရုံတွင်းမြောင်းရေ ဓာတ်ခွဲစမ်းသပ်မှု ရလာဒ်***

| စဉ် | အမျိုးအစား | ယူနစ် | ရလာဒ် | အမျိုးသား ပတ်ဝန်ကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်- အထွေထွေ |
|---|---|---|---|---|
| ၁ | 5-day Biochemical Oxygen Demand | mg/l | <၃၀ | ၅၀ |
| ၂ | Ammonia | mg/l | ၀.၃၄ | ၁၀ |
| ၃ | Arsenic | mg/l | ၀ | ၀.၁ |
| ၄ | Chemical Oxygen | mg/l | <၃၀ | ၂၅၀ |
| ၅ | Chromium (Hexavalent) | mg/l | ၀.၁၁ | ၀.၂ |
| ၆ | Chromium (Total) | mg/l | ၀.၁၆ | ၀.၅ |
| ၇ | Copper | mg/l | - | ၀.၅ |
| ၈ | Cyanide (Total) | mg/l | - | ၁ |
| ၉ | Iron | mg/l | ၀.၁ | ၃.၅ |
| ၁၀ | Nickel | mg/l | - | ၀.၅ |
| ၁၁ | Oil and Grease | mg/l | <၅ | ၁၀ |
| ၁၂ | pH | - | ၇.၈ | ၆~၉ |
| ၁၃ | Phenol | mg/l | ၀.၂၂ | ၀.၅ |
| ၁၄ | Sulfide | mg/l | - | ၁ |
| ၁၅ | Temperature | ˚C | ၂၇ | <၃၅ |
| ၁၆ | Total Phosphorus | mg/l | ၀.၁၄ | ၂ |
| ၁၇ | Total Suspended Solids | mg/l | ၂၄ | ၅၀ |
| ၁၈ | Zinc | mg/l | - | ၂ |

စက်ရုံမြောင်းရေ ဓာတ်ခွဲမှုအရ ရလာဒ်မှာ သက်မှတ် စံနှုန်းအတွင်းသာရှိပါသည်။

***(၂) စက်ရုံသုံးရေ ဓာတ်ခွဲစမ်းသပ်မှု ရလာဒ်***

| စဉ် | အမျိုးအစား | ယူနစ် | ရလာဒ် | သောက်သုံးရေစံနှုန်း | | |
|---|---|---|---|---|---|---|
| | | | | **WHO (2011)** | **EPA (Spring 2012)** | **Indian Specification(IS:10500,2012)** |
| ၁ | Aluminum | mg/l | ၀.၀ | ၀.၂ | ၀.၂ | 0.03 |
| ၂ | Arsenic | mg/l | ၀ | ၀.၀၁ | ၀.၀၁ | ၀.၀၁ |
| ၃ | Chloride | mg/l | ၁၄ | ၂၅၀ | ၂၅၀ | ၂၅၀ |
| ၄ | Copper | mg/l | - | ၂ | ၁ | ၀.၀၅ |

| | | | | | | |
|---|---|---|---|---|---|---|
| ၅ | Cyanide | mg/l | - | ၀.၀၇ | ၀.၂ | ၀.၀၅ |
| ၆ | Manganese | mg/l | - | ၀.၄ | ၀.၀၅ | ၀.၁ |
| ၇ | pH | mg/l | ၇.၄ | ၆.၅~၈.၅ | ၆.၅~၈.၅ | ၆.၅~၈.၅ |
| ၈ | Sulfate | mg/l | ၄.၂ | ၂၅၀ | ၂၅၀ | ၂၀၀ |
| ၉ | Total Alkalinity as | mg/l | ၆၈ | - | - | ၂၀၀ |
| ၁၀ | Total Dissolved Solids | mg/l | ၂၆၀ | ၆၀၀ | ၅၀၀ | ၅၀၀ |
| ၁၁ | Total Hardness as | mg/l | ၆၁ | ၅၀၀ | - | ၂၀၀ |
| ၁၂ | Total Iron | - | ၀.၁ | ၀.၃ | ၀.၃ | ၀.၃ |
| ၁၃ | Turbidity | mg/l | ၆.၇ | ၅ | - | ၁ |

စက်ရုံသုံးရေဓာတ်ခွဲမှုအရ ရလာဒ်မှာ သက်မှတ် စံနှုန်းအတွင်းသာရှိပါသည်။

***မြေအရည်အသွေးတိုင်းတာခြင်း***

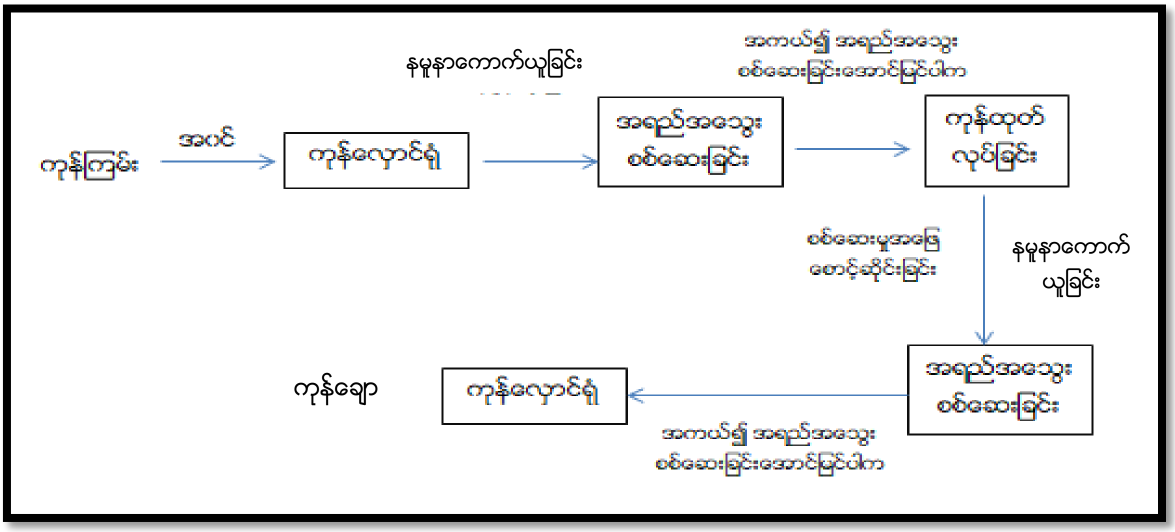
မြေထုအရည်အသွေးတိုင်းတာရာတွင် စီမံကိန်းဧရိယာအတွင်းမှ မြေနမူနာကောက်ယူပြီး စိမ်းလန်းမြန်မာ ပတ်ဝန်းကျင်ဆိုင်ရာဝန်ဆောင်မှုကုမ္ပဏီတွင် ဓာတ်ခွဲတိုင်းတာခဲ့ပြီး တိုင်းတာခဲ့ သော ရလဒ်များမှာစီမံကိန်းဧရိယာ၏ လက်ရှိမြေထုအရည်အသွေးဖြစ်ပါသည်။ လက်ရှိအချိန်တွင် အပင်များကောင်းမွန်ဖြစ်ထွန်းစွာ ပေါက်ရောက်ထားနိုင် သောကြောင့် လက်ရှိမြေထု အရည်အသွေးသည် ညစ်ညမ်းမှုမရှိသေးဟု သတ်မှတ်နိုင်ပါသည်။

***(၁) မြေအရည်အသွေးတိုင်းတာမှု ရလာဒ်***

| စဉ် | အမျိုးအစား | ယူနစ် | ရလာဒ် |
|---|---|---|---|
| ၁ | Aluminum | mg/kg soil | ၀.၁ |
| ၂ | Arsenic | mg/kg soil | ၀ |
| ၃ | Chloride | g/kg soil | ၀.၆၇၅ |
| ၄ | Copper | mg/kg soil | - |
| ၅ | Cyanide | mg/kg soil | - |
| ၆ | Extractable Acidity | cmol/kg soil | ၄.၂၅ |
| ၇ | Manganese | mg/kg soil | ၂.၈၅ |
| ၈ | P - Alkalinity | mmol/l extract | ၀ |
| ၉ | pH | - | ၆.၄၂ |
| ၁၀ | Total Alkalinity | mmol/l extract | ၃.၁ |
| ၁၁ | Total Iron | g/kg soil | ၀.၀၅ |

**လုပ်ငန်းစဉ်အကြောင်းအရာဖော်ပြချက်**

အောက်တွင်ဖော်ပြထားသော လုပ်ဆောင်ပုံသည် Rohto Myanmar Co., Ltd ၏ ယေဘုယျ ကုန်ချော ထုတ်လုပ်မှု ပုံစံဖြစ်ပါသည်။ Rohto Myanmar Co., Ltd တွင် ကုန်ချောထုတ်လုပမှုသည် (၂) မျိုးရှိပါသည်။ (၁) ပြည်ပမှ တင်သွင်းလာသော ကုန်ချော ခရင်၊ အရည်များ၊ အခဲများကို ဗူးသွင်း၍ ဖြန့်ဖြူးရောင်းချခြင်း နှင့် (၂) ခရင်များကို ရောစပ်ထုတ်လုပ်ခြင်း လုပ်ငန်းစဉ်ကိုပါ ပြုလုပ်ခြင်းတို့ဖြစ်ပါသည်။ ယခုလက်ရှိတွင် ပြည်ပမှ တင်သွင်းလာသော ကုန်ချော ခရင်၊ အရည် များ၊ အခဲများကို ဗူးသွင်း၍ ဖြန့်ဖြူးရောင်းချ ခြင်းကို လုပ်ကိုင်ဆောင်ရွက် နေပါသည်။




ပုံ (၁)၊ ယေဘုယျ ကုန်ချော ထုတ်လုပ်မှုပုံစံ

**ကုန်ထုတ်လုပ်မှုလုပ်ငန်းစဉ်**

ကုန်ထုတ်လုပ်မှုလုပ်ငန်းစဉ်တွင် (၂) မျိုးရှိပြီး ယခုလက်ရှိတွင် နိုင်ငံခြားမှ တင်သွင်းလာသော ဆေးဘက်ဝင် အလှကုန် ပစ္စည်းအမျိုးမျိုးကို ဖူးသွင်း၍ ရောင်းချနေပြီး ယခုအခါတွင် မျက်နှာသန့်စင်ခရင်များကို ဖော်စပ်ကာ ရောင်းချခြင်းကိုပါ ထပ်မံပြုလုပ်သွားမည်ဖြစ်ပါသည်။ ထုတ်လုပ်မှုလုပ်ငန်းစဉ်များမှာ အောက်ပါအတိုင်းဖြစ်ပါသည်။

**မျက်နှာသန့်စင်ခရင်ထုတ်လုပ်မှုလုပ်ငန်းစဉ်**

ယေဘူယျအားဖြင့် မျက်မှာသန့်စင်ခရင် ထုတ်လုပ်ခြင်းသည် အသုတ်လိုက်အဆင့်ဆင့် ပြုလုပ်သော ထုတ်လုပ်မှုဖြစ် သည်။ ယင်းတွင် ဓာတုဓာတ်ပြုမှု အနည်းငယ် (သို့မဟုတ်) လုံးဝ မပါပါ။ အများအား ဖြင့် စက်မှုပိုင်းဆိုင်ရာ လုပ်ငန်းများဖြစ်သည်။ ထုတ်လုပ်မှုတွင် ကုန်ကြမ်းများပြင်ဆင်၊ ချိန်တွယ်ခြင်း၊ ရောမွှေခြင်း၊ ပျံ့နှံ့ကွဲလွင့်စေခြင်း၊ အပျစ်အကျဲထိန်းညှိခြင်း၊ ထည့်စရာများအတွင်းဖြည့်ခြင်း၊ ဂိုဒေါင်တွင် သိုလှောင်ခြင်းနှင့် သယ်ယူပို့ဆောင်ခြင်း လုပ်ငန်းများပါဝင်သည်။

***(၁)* ကြိုတင်-ပျံ့နှံ့စေရန်ရောမွှေခြင်း**

- ခရင် ထုတ်လုပ်ရာတွင် ရေပူ နှင့် အမှုန့်ခြောက်များ ကိုရောနှော၍ စွမ်းအားမြင့်မွှေစက်တွင် ထည့်သွင်းရောမွှေ ခြင်းဖြင့် စတင်ဆောင်ရွက်သည်။ ထိုကဲ့သို့ မွှေနေစဉ်အတွင်း ရေနှင့် ပျော့ပြောင်း စေမည့် ပစ္စည်း များထပ်မံရောစပ်ရမည်။

***(၂) ပျံ့နှံ့ကွဲလွင့်စေခြင်း၊ အမှုန့်ကြိတ်ခြင်းနှင့် ရောနှောခြင်း***

- ရောနှောမှု ဆောင်ရွက်နေစဉ်အတွင်း၊ ယင်းအသုတ်အားထပ်မံလိုအပ်သော အမှုန့်ကြိတ်ခြင်းနှင့် ရောနှောခြင်း တို့အတွက် ဂလိုင်ကော (glycol) ကဲ့သို့ ဖျော်ရည်ထပ်မံထည့်၍ လိုအပ်ချော အနေထားထိရောက်သည်အထိမွှေရပါမည်။

***(၃) အပျစ်အကြဲ/ ထိန်းညှိခြင်း***

- ထို့နောက် ရောနှောကန်အတွင်း ရွှေ့ပြောင်းကာ အပျစ်အကျဲပြုလုပ်ခြင်း (ထုံးစံအားဖြင့် glycol ထပ်မံ ရောစပ်ခြင်း)နှင့် လိုအပ်သော အဖြည့်ပစ္စည်းများ ထပ်မံထည့်ပါသည်။ ထို့နောက် စက်အတွင်း ပျံ့နှံ့ကွဲလွင့်ပြီး ရရှိလာမည့် အရောင်အား ထိန်းညှိပါသည်။ ယင်းနမူနာနှင့် လိုအပ်သည့် သတ်မှတ်ချက်နှင့် တိုက်ဆိုင် စစ်ဆေးရမည်။ အရောအနှောအတွင်းသို့ လိုအပ် သော အမှုန့်များ၊ ဖျော်ရည် နှင့် အော်ဂဲနစ် ဒြပ်ပေါင်းတို့အား အချိုးအမျိုးမျိုးပေါင်းစပ်၍ ရောနှော၍ ထည့်ပေးရမည်။

***(၄) စစ်ခြင်း***

- လိုအပ်သော အပျစ်အကျဲရရှိပါက မပျံ့နှံ့ မကွဲလွင့်ဘဲ ကျန်နေသောအမှုန်များ မပါရှိရန် ဇကာဖြင့်စစ်ရမည်။

***(၅) အရည်အသွေးထိန်းသိမ်းခြင်း***

- ရရှိလာသော ထုတ်လုပ်ပြီး ခရင်များကို ထုပ်ပိုးမှုမပြုလုပ်မီ အပျစ်အကြဲ၊ စေးကပ်မှု၊ အရောင်၊ နှင့် အခြားသတ်မှတ်ထားသော အရည်အသွေးများ ပြည့်မီ/မမီ စစ်ဆေးရမည်။ အရည်အသွေး စစ်ဆေးပီးသော ကုန်ချောပါဝင်သည့် အိုးများ (tank) ကို ၂၄ နာရီခန့် ပြင်ပလေ မဝင်ရောက်နိုင်သော အခန်း (clean room) တွင်ထားရှိပါသည်။ ထို့နောက်မှ လိုအက်သော ထုတ်ပိုးမှုပြု လုပ်ခြင်းလုပ်ငန်း ကို စတင်ပါသည်။

***(၆) ထုပ်ပိုးခြင်း***

- အရည်အသွေးအောင်မြင်သောကုန်ချော ခရင်များကို အမျိုးမျိုးသော ညှစ်ဗူးများ အတွင်းသို့ ဖြည့်တင်း၍ ညှစ်ဗူးများကို အပူးပေးပိတ်ခြင်းများလုပ်ဆောင်ပါသည်။ ထို့နောက် ဗူးများကို ပလပ်စတစ်ဖြင့် တခုစီထုတ်ပိုး၍ ထုတ်ပိုးပီး ညှစ်ဗူးများကို စက္ကူဗူးသေးလေးများအတွင်းထည့်၍ ထုတ်ပိုးခြင်း နှင့် နောက်ဆုံးအဆင့်ပြီးစီးသော ဖြည့်ပြီးဘူးများ အား ကတ်ပုံးများအတွင်းထည့်ကာ ဂိုဒေါင်အတွင်းမပို့မီ ထပ်ဆင့်ထားရမည်။

**အဓိကဖြစ်နိုင်ခြေရှိသောပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှုများနှင့် လျော့ပါးစေသက်သာစေမည့် နည်းလမ်းများ**

အဓိကဖြစ်နိုင်သော ပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှုများကို အောက်ပါကိန်းဂဏန်းများဖြင့် တွက်ချက် ဖော်ပြကာ သိသာထင်ရှားမှုပမာဏကိုဖော်ထုတ်ပါသည်။

| **သက်ရောက်မှု အရွယ်စား** | **ပမာဏ** |
|---|---|
| **ဖြစ်နိုင်ခြေ** | |
| မဖြစ်နိုင်မှု | ၁ |
| ဖြစ်တန်မှု | ၂ |
| ဖြစ်တန်ချေမြင့်မား | ၄ |
| အတိအကျဖြစ်မှု | ၅ |
| **ကြာချိန်** | |
| အချိန်တို | ၁ |
| အတော်အသင့် ကြာချိန် | ၃ |
| အချိန်ကြာမြင့် | ၄ |
| အမြဲတမ်း | ၅ |
| **အရွယ်အစား** | |
| စီမံကိန်း | ၁ |
| အနီးနားဒေသ | ၂ |
| တိုင်းဒေသနယ်ပယ် | ၃ |
| **ပြင်းထန်မှုမာဏ** | |
| နည်းပါး | ၂ |
| အတော်အသင့် | ၆ |
| မြင့်မား | ၈ |

***သီသာထင်ရှားမှု***

သိသာထင်ရှားမှုဆိုသည်မှာ အရေးကြီးသောသက်ရောက်မှုများ၏ သက်ရောက်မှုအချိန် ပမာဏများ၏ အဆင့်ကိုဖော်ထုတ်ကာ ကုစားမှုလုပ်ဆောင်ရန် ပမာဏကိုခန့်မှန်းခြင်းဖြစ်သည်။

**သိသာထင်ရှားမှု = (ကြာချိန် + အရွယ်အစား + ပြင်းထန်မှုပမာဏ) x ဖြစ်နိုင်ခြေ**

| **သိသာထင်ရှားမှု** | |
|---|---|
| **သက်ရောက်မှု အရွယ်စား** | **ပမာဏ** |
| လစ်လျူရှု | < ၂၀ |
| နည်းပါး | < ၄၀ |
| အသင့်အတင့် | < ၆၀ |
| မြင့်မား | > ၆၀ |

လုပ်သား၊ အလုပ်ရှင်နှင့် သဘာဝပတ်ဝန်းကျင်တို့ကို ကာကွယ်စောင့်ရှောက်ရန်အလို့ငှာ ပတ်ဝန်း ကျင် နှင့် သက်ဆိုင်သည့် ရှုထောင့်၊ လိုအပ်ချက်၊ အကျိုးသက်ရောက်မှုနှင့် ထိခိုက်မှုလျော့ပါး သက်သာ စေမှု၊ လုံခြုံစိတ်ချရမှု၊ ဘေးအန္တရာယ်လျော့ကျမှုစသည့် ကုစားလုပ်ဆောင်မှုများကို အကောင် အထည်ဖော် လိုက်နာ ဆောင်ရွက်ရမည်။

အဆိုပြုစီမံကိန်းတွင် အုပ်ချုပ်ရေးရုံး၊ အနားယူခန်း၊ ရေချိုးခန်းနှင့်အိမ်သာ၊ အညစ်အကြေးစွန့်ကန် နှင့် ဆက်စပ်အထောက်အကူပြုဝန်ဆောင်မှုများစသည်တို့ပါဝင်ပါမည်။ တည်ဆောက်ရေးနှင့်အကြိုရှင်းလင်းလုပ်ဆောင်မှုများအတွက် ရွေ့ပြောင်းလွယ်သော ဆောက်လုပ်ရေးပစ္စည်းများနှင့် စက်ပစ္စည်းများ လိုအပ်ပါသည်။ လုပ်ငန်းအကောင်အထည်ဖော်၍ လုပ်ငန်းလည်ပတ်ခြင်း ပတ်ဝန်းကျင်ထိန်းသိမ်း ကာကွယ်ရေးလုပ်ဆောင်ရန် အရေးကြီးပါသည်။ မျက်နှာသန့်စင်ခရင် ထုတ်လုပ်မှု စက်ရုံများအတွက် လုပ်ငန်း အကောင်အထည်ဖော်၍ လုပ်ငန်းဆောင်ရွက် လည်ပတ်ချိန် အတွင်း လေလွင့်ပစ္စည်း ထွက်ရှိမှု လျော့နည်းစေမည့် စီမံခန့်ခွဲမှုအစီအစဉ်များကို အောက်ပါဇယားတွင် ဖော်ပြထားပါသည်။

**ပတ်ဝန်းကျင်အပေါ်ဆိုးကျိုးသက်ရောက်နိုင်မှုများနှင့် လျော့ပါးသက်သာစေမည့်နည်းလမ်းများ အကျဉ်းချုပ်**

| သက်ရောက်မှုများ | အရင်းအမြစ် | ပါဝင်မှုများ | သိသာထင်ရှားမှု (D+S+M)xP=S | လျော့ချနိုင်သော နည်းလမ်းများ | ကြွင်းကျန် သက်ရောက်မှု (D+S+M)xP=S |
|---|---|---|---|---|---|
| **လုပ်ငန်းလည်ပတ်ရေးကာလ** | | | | | |
| လေအရည် အသွေး | ထုတ်လုပ်မှု လုပ်ငန်း စဉ် | VOC, PM | (၄+၁+၆)x၅ = ၅၅ (အတော်အသင့်) | **ကုန်ထုတ်လုပ်မှုလုပ်ငန်းစဉ်မှထွက်ရှိခြင်း**<br>***အနံ့ထွက်၊ အငွေ့ပျံလွယ်သောဓာတုဓာတ်ပေါင်းများနှင့် အမှုန်ထွက်ရှိမှု အနံ့ နှင့် အငွေ့ပြန်လွယ်သောဓာတ်ငွေ့များ ထွက်ရှိမှုလျော့ချရန်***<br>• သင့်လျော်သောလေဝင်လေထွက်နှင့် ကျန်းမာရေးသုံးပစ္စည်းများအား ပြုပြင်ထိန်းသိမ်းခြင်းဖြင့် အနံ့ထွက် ရှိမှုလျော့ချရန်<br>• ယာဉ်များမှထွက်ရှိသော အခိုးငွေ့များထိန်းချုပ်ခြင်းဖြင့် အနံ့ နှင့် အခိုးငွေ့ထွက်ရှိမှုကို ကာကွယ်ရန်<br>• သန့်ရှင်းရေးကို စနစ်တကျလုပ်ဆောင်ရန်<br>• စက်ရုံခန်းအတွင်း အနံ့များအားကာကွယ်ရန် ဓါတ်ကြွကာဗွန်အသုံးပြုခြင်း ဖြင့် အနံ့အသက် ဖယ်ရှားခြင်း နည်းစနစ်များကို အသုံးပြုခြင်း၊<br>• အငွေ့ပြန်လွယ်သောအရည်များအား ပတ်ဂန်းကျင်သို့အငွေ့ပြန်ခြင်းကာကွယ်ရန် အဖုံးပိတ် ထားသော ပုံးများထည့်သိုလှောင်ကာအေးသောနေရာတွင်သိုလှောင်ရန်နှင့် ၄င်းအရည်များ အား စုပ်ယူနိုင်ရန် ပုံးများ တွင် ပန့်များတပ်ဆင်ထားရန်<br>• စက်ရုံသည် အလှကုန် နှင့် ဆေးဝါးပစ္စည်းထုတ်လုပ်ခြင်း ဖြစ်သဖြင့် ပြင်ပလေမထိစေရန် CLEAN ROOM ထားရှိကာလုပ်ငန်းလုပ်ကိုင်သဖြင့် အခန်းတွင်းအနံ့အသက်ကင်းဝေးစေရန် အခိုး အငွေ့ဖယ်စနစ်များအား ပုံစံပြင်ဆင်စစ်ဆေးရန် ထုတ်လုပ်သော ကုမ္ပဏီ၏ ညွှန်ကြားစာ အတိုင်းအခိုးအငွေ့ဖယ်စနစ်များ မှ ဖယ်ရှားဇကာများအား သတ်မှတ် ချက်မကိုက်ညီပါက ချက်ချင်း အစားထိုးလဲ လှယ်ခြင်း<br>• မီးစက် အင်ဂျင်များအားပုံမှန် စစ်ဆေးခြင်း၊ ပြုပြင်ခြင်းပြုလုပ်ရမည်။ | (၄+၂+၂)x၂ = ၁၄ (လျစ်လျူရှုနိုင်) |
| | အရံ ဒီဇယ်မီးစက် အင်ဂျင် | CO, $CO_2$, $SO_2$, $NO_x$, PM | (၁+၂+၂)x၅ = ၂၅ (နည်းပါး) | | (၁+၁+၂)x၂ = ၈ (လျစ်လျူရှုနိုင်) |
| | စွန့်ပစ်ရေဆိုး သန့်စင်စက် | VOC, အနံ့ | (၄+၁+၆)x၄ = ၄၄ (အသင့်အတင့်) | | (၄+၂+၂)x၂ = ၁၄ (လျစ်လျူရှုနိုင်) |
| | ကုန်လှောင်ရုံ နှင့် သန့်ရှင်းရေးလုပ်ငန်း များ | VOC, အနံ့ နှင့် အမှုန် | (၄+၁+၆)x၅ = ၅၅ (အတော်အသင့်) | | (၄+၂+၂)x၂ = ၁၄ (လျစ်လျူရှုနိုင်) |

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| | | | | ***အမှုန်ထွက်ရှိမှုကိုထိန်းချုပ်ရန်***<br>• အမှုန်အမွှားများ လေရေမြေထဲတွင် ပျံ့နှံနိုင် သောကြောင့် စက်ရုံမှ အမှုန်အမွှားထွက်ရှိမှုကို ထိန်းချုပ်ရပါမည်။<br>• ယာဉ်အသွားအလာနေရာများတွင်ပစ္စည်းများကျကွဲပါကချက်ခြင်းသန့်ရှင်းရေးပြုလုပ်ရပါမည်။<br>• ကြမ်းခင်းသန့်ရှင်းရေးမှရသောအမှိုက်မှုန်များ၊ ဖုန့်မှုန့်များ၊ အရောင်ချယ်ပေါင်ဒါဆေးမှုန်များ (သို့) သန့်ရှင်း ရေး ပစ္စည်းကိုစနစ်တကျ အိတ်ဖြင့်လုံခြုံအောင်ပိတ်ကာ မစွန့်ပစ်မီဖုံး အုပ်ထားသော စည်ပိုင်းများ အတွင်း စုဆောင်းရပါမည်<br>• ကြမ်းခင်းဆေးခြင်းလုပ်ဆောင်ရာတွင် လှည်းကျင်းခြင်း၊ ရေဖြန်းခြင်းများ အစား အမှုန်စစ်ဇကာ ပါသော အစို/ အခြောက်လေမဲ့ သန့်ရှင်းရေး စက်များအား အသုံးပြုကာ သန့်ရှင်ရေးလုပ်ရပါ မည်။<br>• အကာအကွယ်မရှိသောမျက်နှာပြင်မှထွက်ရှိသောညစ်ညမ်းမှုရှိအမှုန်များအား လျော့ချရန်<br>***ရေဆိုးသန့်စင်စနစ်မှအခိုးငွေ့ထွက်ရှိမှု***<br>ရေဆိုးသန့်စင်စနစ်မှထွက်ရှိသော အခိုးငွေ့နှင့် အနံ့များအား ကာကွယ်ရန် လျော့ချရန် ထိန်းချုပ်ရန် လုပ် ဆောင် ရမည်များမှာအောက်ပါအ တိုင်းဖြစ်ပါသည်။<br>• အနံ့ထွက်ရှိမှု လျော့ချရန်နှင့် နိုင်ငံတော်မှချမှတ်ထားသောလိုအပ်ချက်များနှင့် နိုင်ငံတကာမှ လက်ခံ နိုင်သော လမ်းညွှန်ချက်များနှင့် ကိုက်ညီရန် အခိုးငွေ့ထွက်ရှိသော နေရာများအားဖုံးအုပ် ထားရပါမည်။<br>• အငွေ့ထွက်ရှိမှုလျော့ချရန်အတွက်နည်းစနစ်အသစ်များပြောင်းလည်းစဉ်းစားရန်လိုအပ်ပါသည်။<br>***စက်ရုံအတွင်းအခိုးအငွေ့အမှုန်အမွှားပျံ့လွင့်မှုထိန်းချုပ်ခြင်း***<br>• ဓာတုပစ္စည်းများ၊ အရည်များအား စည်ပိုင်းများဖြင့် သိမ်းဆည်းခြင်းရပါမည်။ ယာဉ်များလာမှုကြောင့် အခိုးငွေ့အမှုန်မွှားပျံ့လွင့်မှုကိုထိန်းချုပ်ရန် စက်ရုံတွင်းလမ်းများအား၊ ပုံမှန်သန့်ရှင်း ရေးလုပ်ခြင်း၊ | |

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| | | | | ယာဉ်များ ပုံမှန်ပြုပြင်ထိန်းသိမ်းခြင်း | |
| အသံဆူညံမှု | ထုတ်လုပ်မှု လုပ်ငန်း စဉ် | ဆူညံမှုအဆင့်, dB (A) | (၄+၂+၂)x၅ = ၄၀ (အသင့်အတင့်) | • ဆူညံသံဖြစ်ပေါ်နိုင်မှုများကိုရှောင်ကြဉ်ရန် လုပ်ငန်းသုံးစက်ပစ္စည်းကိရိယာများကို ထိန်းသိမ်းပြုပြင်မှုများ စနစ်တကျ လေ့ကျင့်ပေးရန်<br>• ပန့်၊ မော်တာစက်နှင့်လေဖိစက်၊ ဘွိုင်လာများ ပုံမှန်လည်ပတ်ခြင်းနှင့် ပြုပြင်ခြင်း စသော ကြိုတင်ကာကွယ် လျှော့ချရေး နည်းလမ်းများကို လုပ်ဆောင်ရန်နှင့် ရင်းမြစ်တွင် ဆူညံသံလျှော့ချရန် ၄င်းတို့ကို သီးသန့်ခန်းတွင် ထားရှိခြင်း | (၄+၁+၂)x၂ = ၁၄ (လျစ်လျူရှုနိုင်) |
| | အရံ ဒီဇယ်ဆီသုံး မီးစက် | ဆူညံမှုအဆင့်, dB (A) | (၁+၂+၆)x၅ = ၄၅ (အသင့်အတင့်) | • ဒီဇယ်ဆီသုံးမီးစက်များ၊ ဘွိုင်လာ၊ လေဖိစက်များနှင့် လေမှုတ်ပန်ကာများကို အသံလုံ နံရံများဖြင့် ထားရှိခြင်း၊ အသံအကာအကွယ် ပစ္စည်းများ တွင်၂၅ dB ပေါ် အခြေခံ၍ ဒီဇိုင်းထုတ်ခြင်း<br>• စက်ပစ္စည်းကိရိယာများဝယ်ယူချိန်တွင် ဆူညံသံထိန်းချုပ်မှု သတ်မှတ်ချက်များကို စဉ်းစားရန်နှင့် ပစ္စည်းပေးသွင်းသူထံမှ ဆူညံသံသတ်မှတ်စံနှုန်းများ အတွက် အာမခံချက် ရရှိရန်<br>• ဆူညံသံဖြစ်ပေါ်စေသော စက်ကိရိယာများလည်ပတ်ခြင်းမှထွက်ပေါ်လာသော ဆူညံသံအဆင့် သည် ၆၀-၇၀ dBA ထက်မကျော်လွန်စေရန် ဆူညံသံထိန်းချုပ်မှု သတိပေးဆိုင်းဘုတ်များအား စက်ရုံဝန်းကျင်တွင် တပ်ဆင်ရန်<br>• စက်ရုံဧရိယာနှင့် စက်ပစ္စည်းများအနီးတွင် ဆူညံသံအဆင့်ကို အကဲဖြတ်ရန် ဆူညံသံ စောင့်ကြပ်ကြည့်ရှု ရေးကို နှစ်စဉ်ပြုလုပ်ခြင်း<br>• စောင့်ကြပ်ကြည့်ရှုရေးကို NEQG standard များနှင့်အညီ ဆောင်ရွက်ခြင်း | (၁+၂+၂)x၄ =၂၀ (နည်းပါး) |
| ရေအရည် အသွေး | စီးဆင်းရေ | အရည်ပျော် နိုင်သော အနယ် အနစ်များ၊ သတ္တု၊ ဒီဇယ်၊ စက်ဆီ၊ ချောဆီများ၊ | (၄+၂+၆)x၅ = ၆၀ (အသင့်အတင့်) | • အနီးဝန်းကျင်ရှိ ရေလမ်းကြောင်းများအတွင်း စွန့်ပစ်ရည်စီးဆင်းမှုကို လျှော့ချရန် ရေနုတ်မြောင်းစနစ်၊ အပါအဝင် သင့်တော်သော ရေစွန့်ထုတ်ခြင်း စီမံခန့်ခွဲမှုစနစ် ကိုသုံးရန်<br>• အန္တရာယ်ရှိ (သို့မဟုတ်) ညစ်ညမ်းမှုဖြစ်ပေါ်လာစေနိုင်သောပစ္စည်းများ (ဥပမာ - လောင်စာ၊ ဆီ၊ ထုတ်လုပ်မှုအဆင့်များတွင်သုံး | (၁+၁+၆)x၂ = ၁၆ (လျစ်လျူရှုနိုင်) |

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| | | ပေါ်လီဆိုင်ကလစ်၊ အန်သင်းဟိုက်ဒရိုကာဗွန်များ coliform, စသည် | | သော(သို့) ထုတ်သောဓာတုပစ္စည်းများ)ကို ရေနှင့်ပေါ်းသော၊ ရေမစိမ့်ဝင်နိုင် သော၊ အသုံးမလိုလျှင် တစုတစည်းတည်း ထိန်းထားရမည်။<br>• အတင်အချပြုလုပ်သောနေရာနှင့် စက်လည်ပတ်ခြင်းပြုလုပ်သော ဧရိယာတွင် ညစ်ညမ်းမှုနှင့် ရေနုတ်မြောင်းအတွင်း သီးခြားစီ စက်ရုံမှစွန့်ထုတ်ခြင်း၊ (မစွန့်ထုတ်ခင် သတ်မှတ်ထားသော အထူးသန့် စင်မှုကို ပြုလုပ်ရန် လိုအပ်ပါ သည်)<br>• မော်တော်ယာဉ်ရပ်နားဧရိယာတွင် ဆီစစ်ဇကာများထားရှိခြင်း၊ ဆီဖိတ်မဖိတ်ကို ပုံမှန်စစ်ဆေး ခြင်းနှင့် သန့်ရှင်းရေး ပြုလုပ်ခြင်း<br>• လောင်စာဆီများ နှင့် ကုန်ကြမ်းပစ္စည်းအရည်များသိုလှောင်ရာ နေရာများ အောက်တွင် ဗန်းများခံထားခြင်းဖြင့် ဖိတ်စင်မှုများမှ ရေထုအတွင်းကျရောက်မှုကို ကာကွယ်ခြင်း<br>• စီမံကိန်းဧရိယာတွင် မတော်တဆဖြစ်ပွားမှုနှင့် ဆီယိုဖိတ်ခြင်းများ လျှော့ချရန်နှင့် ကြိုတင် ကာကွယ်ရန် အရေးပေါ် အစီအစဉ်များ ရေးဆွဲခြင်းနှင့် လုပ်ထုံးလုပ်နည်းများအတိုင်း လေ့ကျင့် စမ်းသပ်ခြင်း<br>• ရေအရည်အသွေးစံနှုန်းများသည် ခွင့်ပြုဘောင်အတွင်းဝင်လျှင် လုပ်ငန်းအတွင်း ရေလို အပ်ချက် အတွက် မိုးရေကို ရင်းမြစ်အဖြစ် သုံးနိုင်ရန် စီစဉ်ဆောင်ရွက်ခြင်း<br>• မိုးရေများနှင့်ရောပါလာတတ်သော အနည်အနစ်များအားအနည်ထိုင်ကန်ပြု လုပ်စုဆောင်းခြင်း နှင့် သန့်စင်မှုစနစ်မှ ထွက်ရှိသောအနစ်များ သည်လည်းညစ်ညမ်းမှုမရှိစေရန် စက်မှုဇုန် ၏ ညွှန်ကြား ချက် အတိုင်း စွန့်ပစ်ရန် ထိုသို့ ညွှန်ကြားချက်အတိုင်းစွန့်ပစ်ပါက ပတ်ဝန်းကျင်လူထု ကျန်းမာရေး နှင့် ဘေးအန္တရာယ် ကင်းရှင်းအတွက် ကာကွယ် နိုင်ခြင်း၊ ရေ နှင့် မြေအရင်းမြစ်ကို လည်း အချိန်အတော် အကြာထိန်းသိမ်း ကာကွယ်နိုင်ပါသည်။<br>• မိလ္လာကန်များကို ဇီဝစနစ်မိလ္လာကန်များအသုံးပြုရန် နှင့် မိလ္လာ စွန့်ပစ်မှုအတွက် မြို့နယ်စည်ပင် သာယာ ရေးအဖွဲ့သို့ သာဆက်သွယ်စွန့်ပစ်ရန်။ စက်ရုံတွင်မိလ္လာစနစ်အား အလုံပိတ်မိလ္လာ စနစ်ကို အသုံး | |
| | စွန့်ပစ်ရေဆိုး | ဘီအိုဒီ (BOD), စီအိုဒီ (COD), ရေတွင်ပျော်ဝင်သောအစိုင်အခဲ, ရေတွင်ကျရောက်သောအနည်, ဆီ နှင့် ချောဆီ | (၄+၂+၆)x၅ = ၆၀ (အသင့်အတင့်) | | (၁+၁+၆)x၂ = ၁၆ (လျစ်လျူရှုနိုင်) |
| | မိလ္လာစွန့်ပစ်ရေ | မြေပေါ် နှင့် မြေအောက်ရေ | (၄+၂+၆)x၂ = ၂၄ (နည်းပါး) | | (၁+၁+၆)x၁= ၈ (လျစ်လျူရှုနိုင်) |

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| | | | | ပြုထားပါသည်။<br>• မိုးရေကိုသီးခြားရေမြောင်းဖြင့် စီးစေ၍ အဖုံးဖုံးထားရန်<br>• ရေအရည်အသွေးစောင့်ကြပ်ကြည့်ရှုရေးကို NEQG (သို့) စက်မှုဇုန်မှ သတ်မှတ်ထားသော standard များနှင့်အညီ ဆောင်ရွက်ခြင်း | |
| မြေ ညစ်ညမ်းမှု | ထုတ်လုပ်မှု လုပ်ငန်း စဉ် | မြေဆီလွှာ နှင့် မြေအောက်ရေ ညစ်ညမ်းခြင်း | (၃+၂+၆)x၂ = ၂၆ (နည်းပါး) | မြေညစ်ညမ်းမှုကင်းဝေးစေရန်ပတ်ဝန်းကျင်သို့ ဘေးအန္တရာယ်ရှိ ပစ္စည်းများနှင့် အမှိုက်များ၊ (သို့) စက်ဆီ ချောဆီများကျရောက်မှုကို ကြိုတင်ကာကွယ်ခြင်း (သို့) ထိန်းချုပ်ခြင်းပြုလုပ်ရပါမည်။ မြေလွှာပျက်ဆီးမှုကို မဖြစ်စေရန်ကုစားရမည့်နည်းလမ်းများမှာ<br>• သင့်လျော်သော အဆောက်အဦး ဒီဇိုင်းရှိရန်<br>• အမြင်ဖြင့်တွေ့မြင်နိုင်သော သက်ရောက်မှုများအတွက်သင့်လျော်သော ကာကွယ်မှု ပြုလုပ်ရန် ဥပမာ အမှိုက်များကို မြေပေါ်တွင်တိုက်ရိုက်ထားရှိခြင်း မရှိစေရန် အမှိုက်ကန်များထား၍ စုဆောင်းခြင်း၊ လောင်စာဆီ သိုလှောင်ရာ နေရာတွင် အခံဗန်းများထားရှိခြင်း<br>• မြေဆီလွှာပျက်ဆီးမှု မြေကျွံ့မှု နှင့် မြေမှုန်များကြောင့် ရေထုညစ်ညမ်း မှုနည်းပါးစေရန် မြေပြင်ဆင်ခြင်းများစနစ်တကျပြုလုပ်ရန်<br>• အထိုင်ချထားသောစက်များအောက်တွင် ဆီယိုစိမ့်မှုတားဆီးနိုင်သော အခံဗန်းများ၊ အီပေါက်ဆီများ သုတ်ထားခြင်းဖြင့် မြေလွှာအတွင်းနှင့် မြေအောက်ရေအတွင်း စက်ဆီချောဆီများစိမ့်ဝင်မှုကို ကာကွယ်နိုင် ပါသည်။ | (၁+၁+၂)x၂ = ၈ (လျစ်လျူရှုနိုင်) |
| | သိုလှောင်ဧရိယာ | မြေဆီလွှာ နှင့် မြေအောက်ရေ ညစ်ညမ်းခြင်း | (၃+၂+၆)x၂ = ၂၆ (နည်းပါး) | | (၁+၁+၂)x၂ = ၈ (လျစ်လျူရှုနိုင်) |
| စွန့်ပစ်ပစ္စည်း စွန့်ပစ်မှု | အန္တရာယ်ရှိသော စွန့်ပစ်ပစ္စည်းများ | ရေနှင့် မြေဆီလွှာ ညစ်ညမ်းခြင်း | (၄+၂+၆)x၅ = ၆၀ (အသင့်အတင့်) | ***စုဆောင်းခြင်း***<br>စက်ဆီချောဆီ နှင့် အကြွင်းကျန်အရည်များ ကို ၂၀၀ လီတာ ရှိ စတီး တိုင်ကီများဖြင့် စုဆောင်းသင့်ပါ သည်။ ဘေးအန္တရာယ် ရှိစွန့်ပစ် ပစ္စည်းများကို ပိုလီသီးလ် အိတ်များဖြင့် စုဆောင်း သင့်ပါသည်။<br>***သိမ်းဆည်းခြင်း***<br>စက်ရုံဧရိယာအတွင်း အစိုင်အခဲစွန့်ပစ်ပစ္စည်းအား သီးခြားနေရာ သတ်မှတ် စွန့်ပစ်ရန် | (၁+၁+၂)x၄ = ၁၆ (လျစ်လျူရှုနိုင်) |
| | အန္တရာယ်မရှိသော စွန့်ပစ်ပစ္စည်းများ | ရေနှင့် မြေဆီလွှာ ညစ်ညမ်းခြင်း | (၄+၂+၆)x၅ = ၆၀ (အသင့်အတင့်) | | (၁+၁+၂)x၄ = ၁၆ (လျစ်လျူရှုနိုင်) |
| | ရုံးသုံး စွန့်ပစ်ပစ္စည်းများ | ရေနှင့် မြေဆီလွှာ ညစ်ညမ်းခြင်း | (၄+၂+၆)x၅ = ၆၀ (အသင့်အတင့်) | | (၁+၁+၂)x၄ = ၁၆ (လျစ်လျူရှုနိုင်) |

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| | | | | - **ဘေးအန္တရာယ်ရှိစွန့်ပစ်ပစ္စည်းများထိန်းသိမ်းထားမှု**<br>ဘေးအန္တရာယ်ရှိစွန့်ပစ်ပစ္စည်းများအား စွန့်ပစ်ရန်ပုံး/တိုင်ကီများဖြင့် ထည့်သွင်းစွန့်ပစ်ပြီး ပမာဏ စွန့်ပစ်ထားမှုကြာချိန်များအား သေချာစွာ မှတ်သားရန်<br>- **ဘေးအန္တရာယ်မရှိစွန့်ပစ်ပစ္စည်းများထိန်းသိမ်းထားမှု**<br>ဘေးအန္တရာယ်မရှိစွန့်ပစ်ပစ္စည်းများအား ပတ်ဝန်းကျင်သို့မကျရောက်စေရန် ပုံမှန် စွန့်ပစ် ပေးရန် နှင့် လေ နှင့် ပတ်ဝန်းကျင်မြေရေထဲ သို့မကျ ရောက်စေရန် မစွန့်ပစ်မီ သေချာစွာ သိုလှောင်ထားရန်<br>**စွန့်ပစ်မှုပုံစံ**<br>• ဘေးအန္တရာယ်ရှိစွန့်ပစ်ပစ္စည်းများကိုလစဉ် နိုင်ငံတော်မှ ခွင့်ပြုခွင့်ပေးထားသော DOWA (သို့) စည်ပင်သာယာ ကဲ့သို့သော စွန့်ပစ်ပစ္စည်းများ စီမံခန့်ခွဲသည့် အဖွဲ့အစည်းများနှင့် ချိတ်ဆက်စွန့်ပစ်ရပါမည်။<br>• ဘေးအန္တရာယ်မရှိစွန့်ပစ်ပစ္စည်းများကိုလစဉ် စည်ပင်သာယာသို့ ချိတ်ဆက် စွန့်ပစ်ရပါမည်။ | |
| ဓါတု ပစ္စည်းများ အသုံးပြုခြင်းနှင့် ကိုင်တွယ်ခြင်း | သယ်ယူပို့ဆောင်ခြင်း | ယိုဖိတ်မှု နှင့် ပေါက်ကွဲမှု | (၃+၃+၂)x၂ = ၁၆<br>(လျစ်လျူရှုနိုင်) | • ဓာတုပစ္စည်းများကိုင်တွယ်သောလုပ်သားများနှင့် ထုတ်လုပ်ရေး တာဝန်ယူသော လုပ်သားအား တစ်ကိုယ်ရေသုံးအကာကွယ် ပစ္စည်းများဖြစ်သော မျက်မှန်၊ လက်အိတ်၊ ကာဗွန်ဖစ်တာပါ နှာခေါင်းစီးထောက်ပံ့ပေးရန်နှင့် သင်တန်းနှင့် အခြားသောဗဟုသုတများပို့ချပေးရန်<br>• သင့်လျော်သောလေဝင်လေထွက်စနစ်များတပ်ဆင်ရန်<br>• အမှုန်စုပ်စက်နှင့် ရေဖြန်းအငွေ့ဖယ်စနစ်များ တပ်ဆင်ထားရန်<br>• ဓာတုပစ္စည်းများသိုလှောင်ရာနေရာများတွင် ယိုဖိတ်မှု နှင့် ယိုစိမ့်မှု ကာကွယ်ရန် စက်ရုံကြမ်းခင်း အား ကွန်ကရစ်ခင်းကာ အီပေါက်ဆီ သုတ်ထားသင့်ပါသည်။ Rohto စက်ရုံတွင် အီပေါက်ဆီ ကြမ်းခင်းခင်းထားပါသည်။<br>• လုံလောက်သော ရေဆိုးသန့်စင်စနစ် တပ်ဆင်ရပါမည်။ | (၁+၃+၂)x၂ = ၁၂<br>(လျစ်လျူရှုနိုင်) |
| | ထုတ်လုပ်မှု လုပ်ငန်း စဉ် | ကိုင်တွယ်ခြင်း နှင့် အသုံးပြုခြင်း ဆိုင်ရာလုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး၊ VOC, PM | (၅+၁+၈)x၄ = ၅၆<br>(အသင့်အတင့်) | | (၃+၁+၂)x၄ = ၂၄<br>(နည်းပါး) |
| | သိုလှောင်ဧရိယာ | လုပ်ငန်းခွင် | (၅+၁+၈)x၄ = ၅၆ | | (၃+၁+၂)x၄ = ၂၄ |

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| | | ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး၊ VOC, PM, မြေဆီလွှာ ညစ်ညမ်းမှုနှင့် အဆိပ်သင့်မှု | (အသင့်အတင့်) | • ဘေးအန္တရာယ်ကင်းရှင်းရေးမှတ်တမ်း (Material Safety Data Sheet –MSDS) အရလိုက်နာ ဆောင်ရွက်ရပါမည်။ | (နည်းပါး) |
| | စွန့်ပစ်မှု | မြေဆီလွှာညစ်ညမ်းမှု၊ VOC၊ အမှုန် | (၅+၁+၈)x၄ = ၅၆ (အသင့်အတင့်) | | (၃+၁+၂)x၄ = ၂၄ (နည်းပါး) |
| လုပ်ငန်းခွင် ကျန်းမာရေး နှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး | ထုတ်လုပ်မှု လုပ်ငန်းစဉ် နှင့် သိုလှောင် ဧရိယာ | အများပြည်သူ ဆိုင်ရာ လုံခြုံရေး နှင့် ကျန်းမာရေး | (၅+၁+၈)x၄ = ၅၆ (အသင့်အတင့်) | ***လေထုအရည်အသွေး***<br>• လုပ်ငန်းခွင်အတွင်းအနံ့ အသက်နှင့်အခိုးအငွေ့ ကင်းစေရန်လေစုပ်စနစ်များတပ်ဆင်ထားရှိရမည်။<br>• ၄င်း လေစစ်စနစ်အားပုံမှန်စစ်ဆေးခြင်း၊ လေစစ်ဇကာများကို ပုံမှန် လည်း လှည်ပေးခြင်း<br>• လုပ်ငန်းခွင်အတွင်းလေဝင်လေထွက်စနစ်များကောင်းမွန်အောင်စီမံ ထားရှိခြင်း<br>• တကိုယ်ရည်သုံးအကာအကွယ်ပစ္စည်းများထောက်ပံ့ပေးခြင်း<br>***စက်ပစ္စည်းကိုင်တွယ်ခြင်း***<br>• ကြိုတင်ဆောင်ရွက်မှုများတွင်စက်ပစ္စည်း ကိုင်တွယ်မှုအထောက်အပံ့ ပစ္စည်းများ၊ စက်ပစ္စည်းဆိုင်ရာကိရိယာများ၊ ကြမ်းပြင်မချောအောင် ပြုလုပ်ပေးခြင်း၊ တစ်ကိုယ်ရည် အကာအကွယ်ပစ္စည်းများ အသုံးပြုခြင်း၊ မ-တင်ခြင်းလမ်းညွှန်ချက်များနှင့် အခြားစက်ပစ္စည်း များကိုင်တွယ်မှု နည်းစဉ်များ အတွက် သင့်လျော်သောသင်တန်း များ ပေးခြင်းစသော လုပ်ငန်းခွင် စွမ်းဆောင် ရည်မြှင့်တင်ခြင်း ဆိုင်ရာ ထိန်းချုပ်မှု များပါဝင် ပါသည်။<br>***အန္တရာယ်ရှိသောဓာတုပစ္စည်းများကိုင်တွယ်ခြင်း*** | (၃+၁+၆)x၂= ၂၀ (နည်းပါး) |
| | အရောင်တင်ဆီပြု လုပ်ခြင်း | အပူချိန်မြင့်မားမှု ဒဏ်ခံစားရခြင်း | (၅+၁+၈)x၄ = ၅၆ (အသင့်အတင့်) | | (၃+၁+၆)x၂= ၂၀ (နည်းပါး) |
| | ကြိတ်ခြင်း နှင့် ရောနှောခြင်း | ဓာတုပစ္စည်းအန္တရာယ် | (၅+၁+၈)x၄ = ၅၆ (အသင့်အတင့်) | | (၃+၁+၆)x၂= ၂၀ (နည်းပါး) |
| | အဖျော်ရည်များသိုလှောင် ခြင်း နှင့် ကိုင်တွယ် ခြင်း | မီးဘေး | (၅+၁+၈)x၄ = ၅၆ (အသင့်အတင့်) | | (၃+၁+၆)x၂= ၂၀ (နည်းပါး) |
| | အရောင်ခြယ်ပစ္စည်းသိုဖြလှောင်ဧရိယာ | အမှုန်များပျံ့ခြင်း | (၅+၁+၈)x၄ = ၅၆ (အသင့်အတင့်) | | (၃+၁+၆)x၂= ၂၀ (နည်းပါး) |

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| | | | | • လေထုညစ်ညမ်းမှုနှင့်အပူဒဏ်မှ တားဆီးကာကွယ်နိုင်ရန် ထိရောက်မှုရှိသော လေဝင် လေထွက် စနစ် နှင့်လေအေးပေးစက် များ တပ်ဆင်ခြင်း<br>• လေထုညစ်ညမ်းမှုမှ ကာကွယ်ရန် ထိရောက်မှုရှိသော လေဝင် လေထွက်စနစ် တပ်ဆင်ခြင်းနှင့် အသက်ရှူလမ်းကြောင်းဆိုင်ရာ အကာအကွယ်ပစ္စည်းများ အသုံးပြုခြင်း။<br>• ဓာတုပစ္စည်းများနှင့် ဖျော်ရည်များကို ကိုင်တွယ်အသုံးပြုရာတွင် လက်အရေပြား ကိုကာကွယ်ရန် ဓာတုခုခံလက်အိတ်များကို အသုံးပြုခြင်း၊ အသုံးပြီးပါက လက်ကို ဆပ်ပြာဖြင့် စင်ကြယ်စွာ ဆေးကြောခြင်း။<br>• ဆေးဝါးအထောက်အကူပြုပစ္စည်းများထားရှိခြင်း၊ အရေပြားပေါ် တွင် အဖုအပိန့်များ၊ ဓာတ်မတည့်မှုများ ဖြစ်ပေါ်လာပါက သက်ဆိုင်ရာ ကျွမ်းကျင် ဆရာဝန်များ၏ အကြံပေး ကုသမှုများ ကို ခံယူစေခြင်း။<br>***အထောက်အကူပစ္စည်းများ***<br>• ကြိုတင်ကာကွယ်မှုနည်းလမ်းများတွင် တုန်ခါမှုလျှော့ချနိုင်သည့် ထောက်ပံ့ပစ္စည်းများနှင့် အခြား အင်ဂျင်နီယာဆိုင်ရာ နည်းလမ်း များ၊ အသံဆူညံမှုနည်းသောစက်ပစ္စည်းများကို အစားထိုးစေခြင်း၊ စက်ပစ္စည်းများကိုကောင်းမွန်စွာ ထိန်းသိမ်းကိုင်တွယ်ခြင်း၊ အသံ ဆူညံသော နေရာများကို လုံခြုံစွာကာရံထားခြင်းနှင့် အသံဆူညံမှု လွန်ကဲ သော နေရာများတွင် အသံလုံစနစ်များ ထားရှိပေးခြင်း။<br>***မတော်တဆမှုများ***<br>• လုပ်ငန်းခွင်အတွင်း၌ အရေးပေါ် ဆေးဝါးအထောက်အကူပြု ပစ္စည်းများ ထားရှိရမည်။ စက်ပစ္စည်းများ အသုံးပြုရာတွင် ကျွမ်းကျင်မှုရှိသော အမြဲတမ်းဝန်ထမ်းများအား ခန့်အပ်ထား ရမည်။<br>• စက်ပစ္စည်းမောင်းနှင်ကိုင်တွယ်မှုကို သင်တန်းများပေးရမည်။<br>• ရှေးဦးသူနာပြုပစ္စည်းများ၊ ဆေးဂါးများကို ထားရှိခြင်း<br>• ဆေးခန်းထားရှိပေးခြင်း<br>• ရှေးဦးသူနာပြုသင်တန်းများပို့ချပေးခြင်း | |

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| | | | | • အရေးပေါ်အခြေအနေတွင်ဆက်သွယ်ရန် ရဲစခန်း၊ ဆေးရုံ စသည့် ဖုန်းနံပတ်များထား ရှိပေးခြင်း<br>• ယာဉ် နှင့် စက်ယန္တရားများကို အရှိန်သတ်မှတ်ပေးခြင်း<br>• ယာဉ်မောင်းများကို ရရှိထားသောလိုင်စင်အပေါ်တွင်သာအခြေခံ၍ သက်ဆိုင်ရာယာဉ်များ မောင်းနှင်စေခြင်း၊ သက်မှတ်လိုင်သင်အရ မောင်းနှင်မှုရှိမရှိကို စစ်ဆေးခြင်း<br>• ယာဉ်ကြောကြပ်တည်းမှုနည်းပါးစေရန် ဆောက်လုပ်ရေးသုံးပစ္စည်းများ (သို့) ဖျက်ဆီးရာ မှရရှိသော ပစ္စည်းများအား ရုံး၊ ကျောင်းဖွင့်ရက်များ နှင့် ယာဉ် ကြောကြပ် တည်းချိန်များ ရှောင်ကြဉ်လုပ်ရန်<br>***ကူးစက်ရောဂါဖြစ်ပွားမှုကာကွယ်ရန်***<br>• အိမ်သာများ နှင့် မိလ္လာကန်များကို စနစ်တကျ သန့်ရှင်း စွာပြုလုပ်ခြင်း၊ အပတ်စဉ် မြို့တော်စည်ပင်သို့ ပုံမှန်စွန့်ပစ်ခြင်း။<br>• စက်ရုံမှ ထွက်ရှိသောဘေးအန္တရာယ်မရှိသောအမှိုက်များကို အနီး နားရှိ ကျေးရွာ၊ ရပ်ကွက် များ ၏ အမှိုက်ပုံများ တွင်စွန့်ပစ်ခြင်းကို တားမြစ် ခြင်း နှင့် အပတ်စဉ်မြို့တော်စည်ပင် နှင့် ချိတ်ဆက်စွန့်ပစ် စေခြင်း<br>• စက်ရုံမှ ထွက်ရှိသောဘေးအန္တရာယ်ရှိသောအမှိုက်များကို အနီး နားရှိ ကျေးရွာ၊ ရပ်ကွက် များ ၏ အမှိုက်ပုံများ တွင်စွန့်ပစ်ခြင်းကို တားမြစ်ခြင်း နှင့် DOWA (သို့) စည်ပင်သာယာသို့ ပိုဆောင် စွန့်ပစ်စေခြင်း<br>• လုပ်သားများအစားအသောက်စားရန်နေရာ စီစဉ်ပေးခြင်း၊ သတ်မှတ် နေရာတွင်သာ စား သောက်ရန် ညွှန်ကြားခြင်း<br>• ရာသီအလိုက်ကူးစက်ရောဂါဖြစ်ပွားမှုကို ကာကွယ်ရန်ဂန်ထမ်းများ အား ဆေးစစ်ပေးခြင်း၊ နှင့် ဆေးဂါး များထောက်ပံ့ခြင်း<br>• ကိုဗစ်-၁၉ ရောဂါကာကွယ်နိုင်စေရန် နေ့စဉ် စက်ရုံအဂင် အထွက်ကို အပူချိန်တိုင်းခြင်း၊ လက်ဆေးစေခြင်း၊ MASK နှင့် မျက်နှာ အကာများတပ်ခြင်းများ အပြင် ကျန်းမာရေးဌာနများ ၏ ညွှန်ကြား ချက်များအတိုင်းလိုက်နာဆောင်ရွက်ရမည်။ | |

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<tr><td rowspan="2">လူမှုပတ်ဝန်းကျင်ကျန်းမာရေး နှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး</td><td>ထုတ်လုပ်မှုလုပ်ငန်းစဉ်</td><td>အများပြည်သူဆိုင်ရာ လုံခြုံရေး နှင့် ကျန်းမာရေး</td><td>(၃+၁+၆)x၁ = ၁၀<br>(လျစ်လျူရှုနိုင်)</td><td rowspan="2">လေထုညစ်ညမ်းမှုကြောင့်သက်ရောက်မှု<br>• စက်ရုံ၏ ခေါင်းတိုင်များမှ ထွက်သောဓာတ်ငွေ့များကို သတ်မှတ်စံနှုန်းများအတွင်းရှိမရှိကို ပုံမှန်တိုင်းတာစစ်ဆေးခြင်း<br>• ကုန်ချော၊ ကုန်ကြမ်းပစ္စည်းပို့ဆောင်သောယာဉ်များကို စနစ်တကျ ဖုန်းအုပ် သယ်ဆောင် စေခြင်း<br>• ယာဉ်များကို ပုံမှန်ပြုပြင်စစ်ဆေးခြင်း<br>ဆူညံသံ နှင့် တုန်ခါမှုကြောင့်သက်ရောက်မှု<br>• ဆူညံသံမြင့်သော စက်ယန္တရားများအနီးလုပ်ကိုင်သူများကို သတ်မှတ်စံနှုန်းများ နှင့်အညီ အချိန်သတ်မှတ်ကာ အလှည့်ကြ ခိုင်းစေခြင်း<br>• ဆူညံသံအဆင့်တိုင်းတာအကဲဖြတ်ခြင်း<br>• မီးစက်အင်ဂျင်များကို အသံလုံနံရံ အတွင်းထားရှိခြင်း<br>• တုန်ခါမှုရှိသောစက်ပစ္စည်းများကို အောက်ခံကွန်ကရစ်ပေါ်တွင် အခိုင်အမာထားရှိခြင်း<br>• စက်ပစ္စည်းများကို ပုံမှန်ပြုပြင်ထိန်းသိမ်း စစ်ဆေးခြင်း<br>မတော်တဆမှုများ<br>• ယာဉ်မောင်းများအကြား ဘေးအန္တရာယ်ကင်းရှင်းရေးဆိုင်ရာ အလေ့အထ များကို ပြုစုပျိုး ထောင်ပေးခြင်း။<br>• ယာဉ်မောင်းများအားယာဉ်မောင်းနှင်ခြင်းဆိုင်ရာအရည်အချင်းမြှင့်တင်ပေးခြင်းနှင့်လိုအပ်သောလိုင်စင်များလျှောက်ထားခြင်း။<br>• ပင်ပန်းနွမ်းနယ်မှုအားရှောင်ရှားနိုင်ရန် ခရီးစဉ်ကြာချိန်အား ကန့် သတ်ပေးခြင်းနှင့် ယာဉ်မောင်း များအား အလှည့်ကျ စီစဉ်မောင်း နှင်စေခြင်း။<br>• မတော်တဆအန္တရာယ်များ လျော့ချနိုင်စေရန် အန္တရာယ်ရှိ သောလမ်းကြောင်းများနှင့် ယာဉ်ကြပ်တည်းချိန် များအား ရှောင်ရှားရန်။<br>ကူးစက်ရောဂါဖြစ်ပွားမှုကာကွယ်ရန်<br>• အိမ်သာများ နှင့် မိလ္လာကန်များကို စနစ်တကျ သန့်ရှင်း စွာပြုလုပ်ခြင်း၊ အပတ်စဉ် မြို့တော်စည်ပင်သို့ ပုံမှန် စွန့်ပစ်ခြင်း။<br>• စက်ရုံမှ ထွက်ရှိသောဘေးအန္တရာယ်မရှိသောအမှိုက်များကို အနီး နား</td><td>(၁+၁+၂)x၁ =၄<br>(လျစ်လျူရှုနိုင်)</td></tr>
<tr><td>စက်ရုံမှ ကုန်ချော ကုန်ကြမ်းပို့ယာဉ်များ၊ ဂန်ထမ်းကြို ပို့ယာဉ်များ</td><td>အများပြည်သူဆိုင်ရာ လုံခြုံရေး နှင့် ကျန်းမာရေး</td><td>(၃+၃+၆)x၂ = ၂၄<br>(နည်းပါး)</td><td>(၁+၃+၂)x၂ = ၁၂<br>(လျစ်လျူရှုနိုင်)</td></tr>
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| | | | | ရှိ ကျေးရွာ၊ ရပ်ကွက် များ ၏ အမှိုက်ပုံများ တွင်စွန့်ပစ်ခြင်းကို တားမြစ်ခြင်း နှင့် အပတ်စဉ်မြို့တော်စည်ပင် နှင့် ချိတ်ဆက်စွန့်ပစ်စေခြင်း<br>• စက်ရုံမှ ထွက်ရှိသောဘေးအန္တရာယ်ရှိသောအမှိုက်များကိုအနီးနား ရှိ ကျေးရွာ၊ ရပ်ကွက်များ ၏ အမှိုက်ပုံများ တွင်စွန့်ပစ်ခြင်းကို တားမြစ်ခြင်းနှင့် DOWA (သို့) စည်ပင်သာယာသို့ ပို့ဆောင်စွန့်ပစ်စေခြင်း<br>• လုပ်သားများအစားအသောက်စားရန်နေရာ စီစဉ်ပေးခြင်း၊ သတ်မှတ်နေရာတွင်သာ စား သောက်ရန် ညွှန်ကြားခြင်း<br>• ရာသီအလိုက်ကူးစက်ရောဂါဖြစ်ပွားမှုကို ကာကွယ်ရန်ဂန်ထမ်းများအား ဆေးစစ်ပေးခြင်း၊ နှင့် ဆေးဝါးများ ထောက်ပံ့ခြင်း | |
| စွမ်းအင်သုံးစွဲမှု | ထုတ်လုပ်မှုလုပ်ငန်းစဉ် | စွမ်းအင်သုံးစွဲမှုမြင့်မားခြင်း | (၄+၃+၆)x၅ = ၆၅<br>(မြင့်မား) | **စွမ်းအင်ထိန်းသိမ်းမှု**<br>စွမ်းအင်ထိန်းသိမ်းမှုအတွက် နည်းလမ်းမျိုးစုံရှိနိုင်ပါသည်။၎င်းတို့တွင်-<br>• စက်ရုံမှသုံးစွဲသောစွမ်းအင်နှင့်ရေပမာဏကိုထိန်းချုပ်နိုင်ရန် တိုင်းတာရေး မီတာများ တပ်ဆင်ထား ခြင်း။<br>• စက်ရုံစီမံခန့်ခွဲမှုအလေ့အကျင့်ကောင်းများကိုပြုစုပျိုးထောင်ပေးခြင်း။ ဥပမာ- စက်ပစ္စည်းများနှင့် မီးအလင်း ရောင်အား အသုံးမပြု သည့်အချိန်တွင် ပိတ်ထားခြင်း။<br>• လျှပ်စစ်ချွေတာသောမီးလုံးများ၊ မီးချောင်းများအသုံးပြုစေခြင်း။<br>• စက်ပစ္စည်းအဟောင်းများနေရာတွင် ပိုမိုထိရောက်စွာစွမ်းဆောင်နိုင်သော စက်ပစ္စည်းများဖြင့် အစားထိုး အသုံးပြုစေခြင်း (ဥပမာ-မော်တာများနှင့် အပူပေးစက်များ)<br>• မော်တာစွမ်းဆောင်ရည်များ စနစ်တကျရှိစေရန် ကွန်ပြူတာထိန်းချုပ်စနစ်များ တပ်ဆင်ထား ရှိခြင်း။<br>• အပူအအေးပေးခြင်းအား ထိန်းချုပ်ရန် အချိန်တိုင်းတာကိရိယာနှင့် အပူချိန် တိုင်း ကိရိယာများ တပ်ဆင် ထားခြင်း။<br>• အကျိုးသက်ရောက်မှုတိုးတက်စေရန်နှင့်ဆုံးရှုံးမှုများ လျော့နည်းစေရန် | (၄+၂+၆)x၂ = ၂၄<br>(နည်းပါး) |
| | ဒီဇယ်မီးစက် | ဒီဇယ်ဆီသုံးစွဲမှု | (၄+၃+၂)x၅ = ၄၅<br>(အသင့်အတင့်) | | (၄+၂+၂)x၂ = ၁၆<br>(လျစ်လျူရှုနိုင်) |

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| | | | | လည်ပတ်စဉ်အတွင်းမှ နည်းစဉ် များကို ထိန်းသိမ်းကာကွယ်ခြင်း။<br>**ဒီဇယ်လောင်စာသုံးစွဲမှုလျှော့ချခြင်း**<br>ဒီဇယ်လောင်စာသုံးစွဲမှုလျှော့ချခြင်းကြောင့် အစိုင်အခဲနှင့်ဓာတ်ငွေ့များ လေထု အတွင်း သို့ ထုတ်လွှတ်မှု အား လျော့နည်းစေနိုင်ပြီး လုပ်ငန်းလည် ပတ်စရိတ်ကိုလည်းလျော့ကျစေနိုင်ပါသည်။ စွမ်းအားမြင့် ဒီဇယ်မီးစက်များ လျော့ကျသုံးစွဲခြင်းမှလည်း ဒီဇယ်လောင်စာအသုံးပြုမှုကို လျှော့ချနိုင်ပါ သည်။ | |
| ရေသုံးစွဲမှု | ထုတ်လုပ်မှု လုပ်ငန်း စဉ် | ရေသုံးစွဲမှု မြင့်မားခြင်း | (၄+၃+၂)x၄ = ၃၆ (အတော်အသင့်) | **လုပ်ငန်းစဉ်ရေသုံးစွဲမှုအားလျှော့ချရန်**<br>အောက်ဖော်ပြပါအမျိုးမျိုးသော ကုန်ထုတ်လုပ်မှု ပြုပြင်မွမ်းမံခြင်းများကို ရေလျှော့ချ သုံးစွဲခြင်း အတွက် အသုံးပြုနိုင်ပါသည်။<br>• ရေသိုလှောင်သောတိုင်ကီမှ ရေများအပြင်သို့ လျှံကျခြင်းမရှိစေရန် ရေကိုသတ်မှတ်အဆင့်တွင်း သိုလှောင်ထားခြင်း။<br>• ဖြစ်နိုင်လျှင်လုပ်ငန်းစဉ်မှရေများကို ပြန်လည်သန့်စင်ပြီး အပင်ရေလောင်းခြင်း နှင့် ခြံဂန်းအတွင်း ကြမ်းခင်းများ ရဖြန်းခြင်းနေရာတွင် ပြန်လည်အသုံး ပြုရန်။<br>• အမျိုးမျိုးထုတ်လုပ်မှုကဏ္ဍများတွင် ရေမီတာများကို တပ်ဆင်ခြင်း၊ စောင့်ကြပ်ကြည့်ရှုခြင်းနှင့် ထိန်းချုပ်ခြင်း။<br>• လုပ်ငန်းရပ်နားစဉ် ရေသုံးစွဲမှုအားရပ်နားခြင်း။<br>• စက်ကိရိယာများ၏ ရေဖျန်းနော်ဇယ်များမှ ရေဖိအားကို လျှော့ချခြင်း။<br>• ကုန်ထုတ်လုပ်မှုရပ်နားခြင်းအတွက် ရေထောက်ပံ့မှုကို ကြားဖြတ်ထိန်းချုပ် နိုင်ရန် ရေစီးထိန်းချုပ် အဆို့ရှင်များနှင့် အလိုအလျောက်အဆို့ရှင်များကို တပ်ဆင်ခြင်း။<br>• အလုပ်သမားများအားလုံး ရေသုံးစွဲမှုထိန်းသိမ်းရေးအတွက် အလေ့အကျင့် ကောင်း များလေ့ကျင့် ပျိုးထောင်ပေးခြင်းနှင့် ရေသုံးစွဲမှုကို ပြန်လည်ဆန်း စစ်ရန်နှင့် တိုးတက်ကောင်းမွန်စေရန်အတွက် စီမံခန့်ခွဲမှုစနစ်များအား အကောင်အထည်ဖော်ရန်။<br>**သန့်ရှင်းရေးပြုလုပ်ခြင်းတွင် အသုံးပြုသောရေအသုံးချမှုလျှော့ချခြင်း** | (၃+၂+၂)x၄ = ၂၈ (နည်းပါး) |
| | သောက်သုံး ခြင်း နှင့် အခြား | ရေသုံးစွဲမှု မြင့်မားခြင်း | (၄+၃+၂)x၂ = ၁၈ (လျစ်လျူရှုနိုင်) | | (၁+၂+၂)x2 = ၁၀ (လျစ်လျူရှုနိုင်) |

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| | | | | စက်ကိရိယာများကို ဆေးကြောခြင်းသည် ရေပမာဏများစွာ အသုံးပြုပါသည်။ နေရာ၌ သန့်ရှင်းရေး ပြုလုပ်ခြင်းတွင် သန့်ရှင်းရေး ပြုလုပ်သော အကောင်းမွန်ဆုံးနည်းလမ်းများမှာ-<br>• ရေသုံးစွဲမှု ၅၀-၇၅% ထိ လျှော့ချပေးနိုင်သော ထုထည်သေးပြီး ဖိအားများ သော သန့်စင် စက်ကိရိယာများ သို့မဟုတ် လေငွေ့နှင့်ရေရော နှောထားသောစက်ကိရိယာများအသုံးပြုခြင်း<br>• ရေထောက်ပံ့ခြင်းစနစ်တွင် ဖိအားမတည်ငြိမ်မှုများကြောင့် ပြောင်းလဲ ခြင်း သို့မဟုတ် သတ်မှတ် ချက် ထက်မြင့်မားနေသော ရေအထွက် စီးဆင်းမှုကို ထိန်းချုပ်ခြင်း<br>• မလိုလားအပ်သောရေဆုံးရှုံးမှုများကိုရှောင်ရှားရန်နှင့် ဓာတုပစ္စည်းများ သန့်ရှင်းခြင်းအတွက် နေရာ၌ သန့်ရှင်းရေး ပြုလုပ်ခြင်း အလုပ်ရုံနှင့် လုပ်ငန်းစဉ်များကို အကောင်းဆုံးထားရှိခြင်း | |
| အရေးပေါ် အန္တရာယ်များ | စက်ရုံနေရာ | ရေလွှမ်းခြင်း | (၁+၂+၂)x၁ = ၅ (လျစ်လျူရှုနိုင်) | • မီးငြိမ်းသတ်ရေးနှင့်အခြားအရေးပေါ်တုံ့ပြန်မှုနှင့်ဆက်လျဉ်း၍ ဝန်ထမ်းများ အားလုံးအား သင်တန်း များ ပို့မှန်ပေးခြင်း<br>• အရေးပေါ်မီးဘေးအန္တရာယ်အတွက်ချမှတ်ထားသော သက်ဆိုင်ရာ စည်းမျဉ်း စည်းကမ်းများကို လိုက်နာရန် ဖွဲ့စည်းထားပါသည်။ ထို့အပြင် အရေး ပေါ်ထွက်ပေါက်၊ မီးငြိမ်းပိုက် နှင့်မီးသတ် ဆေးဗူးကို သတ်မှတ်ထား သော နေရာများတွင် ထားရှိရန် စီစဉ်ခြင်း<br>• မီးငြိမ်းသတ်ကိရိယာများကို နေ့စဉ် စစ်ဆေးခြင်း | (၁+၁+၂)x၁ = ၄ (လျစ်လျူရှုနိုင်) |
| | | မီးဘေး အန္တရာယ် | (၁+၂+၆)x၄= ၃၆ (နည်းပါး) | | (၁+၂+၂)x၂ = ၈ (လျစ်လျူရှုနိုင်) |
| | | လျှောင် အန္တရာယ် | (၁+၂+၂)x၁ = ၅ (လျစ်လျူရှုနိုင်) | | (၁+၁+၂)x၁ = ၄ (လျစ်လျူရှုနိုင်) |
| **ပိတ်သိမ်းခြင်းကာလ** | | | | | |

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| လေအရည်<br>အသွေး | လုပ်ငန်းခွင်<br>နေရာ | TSP, PM | (၁+၁+၆)x၅ = ၄၀<br>(အသင့်အတင့်) | **အမှုန်အမွှားများ ထုတ်လွှတ်ခြင်းကို လျှော့ပါးစေသောနည်းလမ်းများ**<br>အောက်ပါအမှုန်အမွှားထုတ်လွှတ်မှု လျှော့ပါးစေသောနည်းလမ်းများ ကို ပိတ်သိမ်းရေးကာလများတွင် လုပ်ဆောင်ရပါမည်။<br>**(က) လုပ်ငန်းခွင်ဧရိယာနှင့်အဝင်**<br>• ဖိအားများသောရေပိုက်ခေါင်းဖြင့်စီမံကိန်းအဝင်အထွက်နေရာတွင်ယာဉ်များအားဆေးကြောခြင်း<br>• ယာဉ်ဆေးကြောသောနေရာနှင့် စီမံကိန်းအဝင်အထွက်နေရာအကြားလမ်းသားအား ကွန်ကရစ် သို့မဟုတ် ကတ္တရာခင်းခြင်း သို့မဟုတ် မာကြောသော အရာများဖြင့် ခင်းထားခြင်း<br>**(ခ) ကုန်ပစ္စည်းသယ်ပို့သော လမ်းများ**<br>• အဓိကအရေးပါသော လမ်းများအပါအဝင် လမ်းများအားလုံး ကိုသတ္တုပြားများ ခင်းထားခြင်းနှင့် အမှုန်အမွှား ထုတ်လွှတ်နိုင်သော ပစ္စည်းများကို ရှင်းလင်းထားခြင်း<br>• အဓိကလမ်းမကြီးများကို ရေဖြန်းထားခြင်းအသုံးပြုခြင်းဖြင့် လမ်းမျက်နာပြင် အား စိုစွတ်နေစေခြင်း<br>**(ဂ) တည်ဆောက်ရေးဆောင်ရွက်ခြင်းမရှိသော မြေနေရာ**<br>• တည်ဆောက်ရေးဆောင်ရွက်ခြင်းမရှိသောမြေနေရာကို မြေသိပ်သည်းစေခြင်း၊ အပင်များစိုက်ပျိုးခြင်း<br>**(ဃ) သိုလှောင်ထားသော ပစ္စည်းများ**<br>• မည်သည့်သိုလှောင်ထားသော ပစ္စည်းမဆို<br>• အမိုးအကာများဖြင့် လုံခြုံစွာ ဖုံးအုပ်ထားခြင်း<br>• အမိုးနှင့် သုံးဘက်ကာရံထားသော အဆောင်အတွင်း သိုလှောင်ထားခြင်း<br>• ရေဖြန်းခြင်းနှင့် အမှုန်ထွက်ရှိမှုနည်းသော ပစ္စည်းများ အသုံးပြုခြင်း<br>**(င) ဖုန်မှုန့်များ ထုတ်လွှတ်နိုင်သော ပစ္စည်းများ အတင်အချပြုလုပ်ခြင်း (သို့မဟုတ်) သယ်ယူပို့ဆောင်ခြင်း**<br>• ဖုန်မှုန့်များ ထွက်စေနိုင်သော ပစ္စည်းများကို အတင်အချပြုလုပ်ခြင်း | (၁+၁+၆)x၄ = ၃၂<br>(နည်းပါး) |

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| | | | | သယ်ယူပို့ဆောင်ခြင်းများ ဆောင်ရွက်ရာတွင် ရှောင်ရှားခြင်း<br>**(စ) အကျိုးအပဲ့အပျက်အစီးများ ကိုင်တွယ်ခြင်း**<br>• အကျိုးအပဲ့အပျက်အစီးများကို လုံခြုံစွာ ဖုံးအုပ်ထားခြင်း (သို့မဟုတ်) အမိုးနှင့် သုံးဖက်ကာရံထားသောအဆောင်အတွင်း သိုလှောင်ထားခြင်း<br>• ထိုအပျက်အစီးများကို အမိုက်ကားဖြင့် စွန့်ပစ်ခြင်း မပြုမီ အမှုန်အမွှား များ လွင့်စင်မှုမရှိစေရန် ရှောင်ရှားခြင်း<br>**(ဆ) လုပ်ငန်းခွင်ရှင်းလင်းခြင်း**<br>• ဖြိုချဖျက်ဆီးပြီးသော ပစ္စည်းများအားလုံးကို လုံခြုံစွာဖုံးအုပ်ထားရမည် (သို့) အမိုးနှင့် အကာအရံသုံးဖက်ပါသော အဆောက်အဦးဖြင့် သိုလှောင်ထားရန် | |
| | မော်တော်ယာဉ်များ, စက်ယန္တရားကြီး များနှင့် မီးစက်အင်ဂျင်များ မောင်းနှင်မှု | NOx, SO2, CO, CO2, PM | (၁+၁+၂)x၅ = ၂၀ (နည်းပါး) | **အခိုးအငွေ့အမှုန်အမွှားများ ထုတ်လွှတ်ခြင်း**<br>**(က) ယာဉ်များသွားလာခြင်းနှင့် ဒီဇယ်ဂျင်နရေတာများ လည်ပတ်ခြင်း**<br>• ယာဉ်များအားလုံး ရပ်နားရန်နေရာတွင် ရပ်နားထားစဉ်နှင့် မလိုအပ်သော အချိန်များအားလုံး စက်ရပ်ထားရန်<br>• ယာဉ်များ၏ အင်ဂျင်များနှင့် အခြားသော စက်များအား ပုံမှန်စစ်ဆေးမှုများပြုလုပ်ခြင်း<br>• ဆာလဖာပါဝင်မှု နည်းသော လောင်စာဆီကို အသုံးပြုရန် | (၁+၁+၂)x၂ = ၈ (လျစ်လျူရှုနိုင်) |
| အသံဆူညံမှု | ဆောက်လုပ်ရေး လုပ်ငန်း များဖြစ်သောပိုင်ရိုက် လုပ်ငန်းများ၊ သံဂဟေလုပ်ငန်း များ၊ ပိတ်သိမ်း ခြင်း လုပ်ငန်း များဖြစ်သော အုတ်နံရံများ ဖြိုချခြင်း နှင့် | ဆူညံမှု | (၁+၂+၆)x၅ = ၄၅ (အသင့်အတင့်) | **အလုပ်ချိန်အတွင်း လျော့ပါးစေခြင်း**<br>• တည်ဆောက်ရေးနှင့် ဖျက်သိမ်းခြင်း ဆောင်ရွက်မှုများလုပ်ဆောင်ချိန်ကို နံနက် ၇နာရီမှ ၄ နာရီ အထိ သတ်မှတ်ပါမည်။ ဆူညံသံမြင့်မားသော အလုပ်များကို နံနက် ၈ နာရီမှ နေ့လည် ၁၂ နာရီ အတွင်း ဆောင်ရွက်ပါ မည်။<br>• ဆူညံသံမြင့်မားသော အလုပ်များ (ထုခွဲခြင်း၊ မြေတူးခြင်း) စသည့် ဆူညံသံထွက်ရှိတတ်သော အလုပ်များကို တပြိုင်နက်လုပ်ဆောင်ရမည်။<br>• ညအချိန်အလုပ်များလုပ်ဆောင်ခြင်းကိုရှောင်ကြဉ်ခြင်း၊<br>**ဆူညံသံထွက်ပေါ်သော ရင်းမြစ်တွင်လျော့ချခြင်း** | (၁+၂+၆)x၄ = ၃၆ (နည်းပါး) |

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| | ကြမ်းခင်းခွဲခြင်း လုပ်ငန်းများ | | | • အသံထွက်နည်းသောစက်များ၊ ကောင်းမွန်စွာပြုပြင်ထိန်းသိမ်းထားသော ကိရိယာများနှင့် စက်များကို အသုံးပြုခြင်း | |
| | မော်တော်ယာဉ် အဝင်အထွက်၊ စက်ယန္တာရား ကြီးများ နှင့် မီးစက်အင်ဂျင် များ မောင်းနှင်မှု | ဆူညံမှု | (၁+၂+၂)x၅ = ၂၅ (နည်းပါး) | • ဆူညံသံထွက်နှုန်းမြင့်မားသော စက်များကို ဆူညံသံလျော့ချသော ကိရိယာများတပ်ဆင်ခြင်း နှင့် မီးစက်များကို အကာအရံများ ဖြင့်ထားခြင်း<br>• လုပ်ငန်းသုံးယာဉ်မောင်းများကို လုပ်ငန်းခွင်အတွင်း မလိုအပ်ပါက အင်ဂျင်များ ရပ်ထားရန် သတိပေးခြင်း<br>**ဆူညံသံလမ်းကြောင်းတစ်လျှောက် လျော့ချခြင်း**<br>• ဆူညံသံ ထွက်ရှိသော တည်ဆောက်ရေးလုပ်ငန်းခွင်နေရာနှင့် ဆူညံသံ ကြားရနိုင်သော နေရာအကြားတွင် ၂ မီတာမြင့်သော ယာယီအသံကာများ တပ်ဆင်ထားခြင်း<br>• နားကာ၊ နားကြပ် အစရှိသော တကိုယ်ရည် အကာအကွယ် ပစ္စည်းများကို လုပ်ငန်းခွင်တွင် အလုပ်လုပ် နေရသော အလုပ်သမား များအား အသုံးပြု စေခြင်း | (၁+၂+၂)x၄ = ၂၀ (နည်းပါး) |
| တုန်ခါမှု | ပိုင်ရိုက်လုပ်ငန်းများ၊ အုတ်နံရံဖြို ခြင်းလုပ်ငန်းနှင့် ကြမ်းခင်းခွဲခြင်းလုပ်ငန်း စက်ယန္တာရား ကြီးများ နှင့် မီးစက်အင်ဂျင် များ မောင်း နှင်မှု | တုန်ခါမှု | (၁+၁+၂)x၅ = ၂၀ (နည်းပါး) | တည်ဆောက်ရေးနှင့် ပိတ်သိမ်းဖျက်ဆီးခြင်းမှ တုန်ခါမှုလျော့ပါးစေသော နည်းလမ်းများကို စဉ်းစားရန်အတွက် စက်ကိရိယာများ၏ တည်နေရာနှင့် လုပ်ငန်းစဉ်များကို လိုအပ်ပါသည်။<br>ဒီဇိုင်းစဉ်းစားခြင်းဖြင့် လျော့ပါးစေခြင်း<br>• ဖြစ်နိုင်ပါက လူနေထိုင်မှုများနှင့်နီးစပ်သော လမ်းများကို ရှောင်ရှား၍ ထရပ်ကားကြီးများကို မောင်းနှင်စေခြင်း၊ အကယ်၍ အစားထိုးရန် လမ်းမရှိပါက လူနေထိုင်မှု အနည်းဆုံးလမ်းကို ရွေးချယ်၍ မောင်းနှင်ရန်<br>**လုပ်ငန်းစဉ်အတွင်းလျော့ချခြင်း**<br>• မြေတူးဖော်ခြင်းနှင့် မြေကြီးအပေါ် သက်ရောက်မှုရှိသော လုပ်ငန်းစဉ်များကို ဆူညံသံ နှင့် မတူညီပဲ သီးခြားစီလုပ်ဆောင်စေခြင်း<br>• ညအချိန်လုပ်ဆောင်ခြင်းကို ရှောင်ရှားရန်၊ လူများသည် ညအချိန်တွင် ၎င်းတို့အိမ်အတွင်း နေထိုင်ကြသဖြင့် တုန်ခါမှုကို ပိုမိုသတိပြုမိနိုင်ပါသည်။ | (၁+၁+၂)x၄ = ၁၆ (လျစ်လျူရှုနိုင်) |

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| | | | | **လုပ်ငန်းစဉ်ပြောင်းလဲအသုံးပြုခြင်း**<br>• တုန်ခါမှုကို အထိအခိုက်မခံသော ဧရိယာတွင် ပိုင်ရိုက်ခြင်းမပြုလုပ်ရန်၊ ဘူမိဗေဒအရ သတ်မှတ်ခွင့်ပြုထားသော တူးဖော်သည့်ပိုင်ကို အသုံးပြုခြင်း<br>• တုန်ခါမှုကို အထိအခိုက်မခံသော ဧရိယာတွင် မြေကြီတ်ခြင်း လုပ်ငန်းများ လုပ်ဆောင်ခြင်းကို ရှောင်ကြဉ်ရန် | |
| မြေပေါ်ရေ အရည်အသွေး | ဆောက်လုပ်ရေး/ ပိတ်သိမ်းရေး လုပ်ငန်း မှ ထွက်သောစွန့်ပစ်ရေများ၊ ယာယီ မိလ္လာကန်များ၊ ဓာတုပစ္စည်းများ နှင့် စက်ဆီချောဆီ သိုလှောင် ရာနေရာများတွင် ယိုစိမ့်ခြင်း၊ ဖိတ်စင်ခြင်းများ | အရည်ပျော် နိုင်သော အနယ်အနှစ် များ၊ သတ္တု၊ ဒီဇယ်၊ စက်ဆီ၊ ချောဆီများ၊ ပေါ်လီဆိုင်ကလစ်၊ အနံ့သင်း ဟိုက်ဒရိုကာ ဗွန်များ (စသည်..) | (၁+၂+၆)x၅ = ၄၅ (အသင့်အတင့်) | တည်ဆောက်ရေး နှင့် ပိတ်သိမ်းခြင်းလုပ်ငန်းစဉ်များကြောင့်ဖြစ်ပေါ်သော ရွံ့ရေနှင့် အခြား သောရေဆိုးများကို ဆောက်လုပ်ရေး ကန်ထရိုက်တာ မှစီမံခန့်ခွဲရမည်။ ကန်ထရိုက်၏ ဥပဒေ စည်းမျဉ်းအဖြစ် တည်ဆောက်ရေး နှင့် ပိတ်သိမ်းခြင်းလုပ်ငန်းစဉ်အတွင်း ရေထုအပေါ် သက်ရောက် နိုင်မှုများကို ကန်ထရိုက်တာမှ တာဝန်ယူ စီမံခန့်ခွဲရမည်။ ရေများစွန့်ထုတ်ခြင်းကို အနည်းဆုံး ဖြစ်စေရန်နှင့် အခြားသော ရေများအသုံးချမှုကို လျော့ပါး စေရန် စွန့်ပစ်မည့် ရေများကို ဖုန်မထစေရန် ရေဖြန်း ခြင်းလုပ်ငန်းတွင်အသုံးပြုရမည်။<br>မြေပေါ်ရေညစ်ညမ်းမှုကို ကာကွယ်ရန် စက်ကိရိယာများပြုပြင်ထိန်းသိမ်းခြင်း၊ ဆေးကြောခြင်း၊ လောင်စာဆီများသိုလှောင်ခြင်းမှ ယိုဖိတ်ခြင်း၊ ဆီနှင့် ဓာတုပစ္စည်းများ အတင်အချပြုလုပ်ခြင်းနှင့် သိုလှောင်ခြင်း၊ တည်ဆောက်ရေးပစ္စည်းများ သိုလှောင်ခြင်းများကို ကောင်းမွန်စွာ ထိန်းသိမ်းရမည်။ တည်ဆောက်ရေးလုပ်ငန်းသုံး ပစ္စည်းများကို ဖုံးအုပ်ထားခြင်း ၊ အကာအရံများကာရံထားခြင်းဖြင့် မြေပေါ်ရေအပေါ် သက်ရောက်နိုင်မှုများ ကို လျော့ချနိုင်သည်။<br>ဆီနှင့် ဓာတုပစ္စည်းများ (လောင်စာဆီလှောင်ကန်များအပါအဝင်) တို့ကို ကောင်းမွန်စွာ ထိန်းသိမ်းထားရှိရမည်။ စက်ပစ္စည်းကိရိယာများမှ ယိုဖိတ်ခြင်းများ မဖြစ်ပေါ်စေရန် ပုံမှန်စစ်ဆေးမှုများ ဆောင်ရွက်ရမည်။ အစီအစဉ်မရှိ စွန့်ထုတ်ခြင်း၊ ယိုဖိတ်ခြင်းများကို စောင့်ကြပ်ကြည့်ရှုခြင်း အစီအစဉ်အရ အစီရင်ခံခြင်း ကန်ထရိုက်တာမှ ရှင်းလင်းရေးပြုလုပ်ခြင်း၊ စွန့်ပစ်ခြင်း ၊ အသိပေးခြင်းများ လုပ်ဆောင်ရမည်။ | (၁+၂+၂)x၄ = ၂၀ (နည်းပါး) |

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| | | | | မြေကြီးအတွင်း မိလ္လာများတိုက်ရိုက်စွန့်ပစ်ခြင်းကို တားမြစ်၍ အလွယ်တကူ ရွှေ့ပြောင်း နိုင်သော သန့်စင်ခန်းများ ထားရှိပေးရမည်။ | |
| မြေဆီလွှာနှင့် မြေအောက်ရေ ညစ်ညမ်းခြင်း | ဆောက်လုပ်ရေး (သို့) ပိတ်သိမ်း ခြင်း လုပ်ငန်း ထွက်သော စွန့်ပစ် ရေများ ယာယီမိလ္လာ ကန်များ၊ ဓာတု ပစ္စည်းများနှင့် စက်ဆီ ချောဆီ သိုလှောင်ရာ နေရာ များတွင် ယိုစိမ့်ဖိတ် စင်ခြင်း များ | မြေဆီလွှာ | (၁+၂+၆)x၅ = ၄၅ (အသင့်အတင့်) | ယာဉ်များနှင့် စက်ကြီးများမှ ဆီများနှင့် ဟိုက်ဒရောလစ်ဆီများ ယိုဖိတ်မှုကို ပြုပြင်ထိန်းသိမ်းရမည်။ ယိုဖိတ်ထားသော ဆီများကိုလည်း ရေဖြင့်ဆေး ကြောခြင်းမှ ရှောင်ကြဉ်ရမည်။ ရေမြှုပ်ကို အသုံးပြု၍ ဆီကိုစုပ်၍ သတ်မှတ်ထား သော နေရာသို့ ရေမြှုပ်အား စွန့်ပစ်ရမည်။ ယာဉ်များနှင့် ကရိန်းများ ရပ်နားရာ နေရာ တွင် အမာခံခင်းထားပေးခြင်း ၊ ဆေးကြောရေများကို စနစ်တကျ ထိန်းသိမ်းခြင်းဖြင့် ယိုဖိတ်ဆီများ ပျံ့နှံ့ခြင်းကို ကာကွယ်တားဆီး ခြင်း ပြုလုပ်ရ မည်။<br>ရုံးလုပ်ငန်းသုံး၊စားသောက်ခန်းစသည်တို့မှထွက်ရှိသည့် စွန့်ပစ်ရေများ ကို မိလ္လာကန် အသေးတည်ဆောက်၍ စနစ်တကျ စွန့်ပစ်ရမည်။ | (၁+၂+၂)x၄ = ၂၀ (နည်းပါး) |
| | | မြေအောက်ရေ | (၁+၂+2)x၅ = ၂၀ (နည်းပါး) | | (၁+၂+၂)x၂ = ၁၀ (လျစ်လျူရှုနိုင်) |
| စွန့်ပစ်ပစ္စည်း စွန့်ပစ်မှု | စွန့်ပစ်ပစ္စည်းများ (ဆောက်လုပ်ရေးလုပ်ငန်းစဉ် နှင့် ဖျက်သိမ်း ခြင်း လုပ်ငန်း များ မှထွက်ရှိ သော သံတို သံစ၊ သစ်တို သစ်စများ နှင့် အိတ်ခွံ့များ) စွန့်ပစ်မှု၊ ကိုင်တွယ်မှု၊ စွန့်ပစ်သည့် နေရာ ယာယီ မိလ္လာကန်များ၊ | စွန့်ပစ်ပစ္စည်း စွန့်ပစ်မှု | (၁+၂+၆)x၅ =၄၅ (အသင့်အတင့်) | အသုံးပြု၍မရသောပစ္စည်းများကို ပြန်လည်ရောင်းချခြင်း၊ အသုံးပြုနိုင် သည့်ပစ္စည်းများကို ပြန်လည်အသုံးပြုခြင်းပြုလုပ်ရမည်။ အုတ်ခဲ အပိုင်းအစများ၊ ဆောက်လုပ်ရေးသုံး frame များ၊ အမိုးအကာများကို ပြန်လည်အသုံးပြုနိုင် ပါသည်။ အမှိုက်များကို မီးရှို့ခြင်းကို ရှောင်ကျဉ်ရမည်။ ဆောက်လုပ်ရေး ကန်ထရိုက်တာမှ ဆောက်လုပ်ရေးဝန်ထမ်းများကို ဆောက်လုပ်ရေးလုပ်ငန်းခွင် အတွင်း ကောင်းမွန်သော သန့်ရှင်းရေးစနစ်ကို ဖော်ဆောင်ရန်ညွှန် ကြားရမည်။<br>ကောင်းမွန်သောစွန့်ပစ်ပစ္စည်း စွန့်ပစ်ထိန်းသိမ်းမှုအစီအမံများမှာ အမှိုက်စွန့်ပစ်နေရာသတ်မှတ်ပေးခြင်း၊ စွန့်ပစ်ပစ္စည်းစွန့်ပစ်ခြင်း ကို စနစ်တကျ စည်းကမ်းကြပ်မတ်ခြင်း၊ မြေဖို့ခြင်းလုပ်ငန်းများ တွင်ပြန်လည်အသုံးပြုနိုင်ခြင်း၊ ဆောက်လုပ်ရေးပစ္စည်းများ စနစ်တကျ ကိုင်တွယ်နိုင်စေရန် လိုအပ်သော ပစ္စည်းများထောက်ပံ့ပေးခြင်း၊ တာရှည်အထားခံ သော ပစ္စည်းများ ကို ဝယ်ယူ အသုံးပြုခြင်း၊ အမှိုက်ထွက်မှု နည်းစေရန် ဘိလပ်မြေကို အသင့်ဖျော်ပြီးသား ဝယ်ယူအသုံးပြုခြင်းနှင့် ပြန်လည်အသုံး ပြုနိုင်သည့် | (၁+၂+၆)x၂ =၁၈ (လျစ်လျူရှုနိုင်) |

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| | | | | အမှတ်သား ပါသည့် ပစ္စည်းများကိုသာ အသုံးပြုခြင်း<br>ဆောက်ရေးကန်ထရိုက်တာမှအောက်ပါအခက်များကိုလုပ်ဆောင်လျှက်ရှိပါသည်။<br>• အမှိုက်စွန့်ပစ်နေရာသတ်မှတ်ပေးခြင်း<br>• စွန့်ပစ်ပစ္စည်းစွန့်ပစ်ခြင်းကို စနစ်တကျ စည်းကမ်းကြပ် မတ် ခြင်း<br>• မြေဖို့ခြင်းလုပ်ငန်းများတွင်ပြန်လည်အသုံးပြု နိုင်ခြင်း<br>• ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဌာန (သို့) စက်မှုဇုန်မှ သတ်မှတ်ထားသော ဥပဒေအတိုင်းလိုက်နာ စွန့်ပစ်ခြင်း<br>ဆောက်လုပ်ရေးကန်ထရိုက်တာ သည် နေ့စဉ်နက် ၈း၃၀ မှ ၁၀း၀၀ နာရီ အထိ အမှိုက်သိမ်းဆည်းခြင်း နှင့်ယာယီ စွန့်ပစ်ခြင်းကို လုပ်ဆောင်ပါသည်။ ထို့နောက် အပတ်စဉ် စည်ပင်သာယာရေး ကော်မတီ နှင့် ချိတ်ဆက် စွန့်ပစ်ရမည်။ | |
| လုပ်ငန်းခွင်ကျန်းမာရေး နှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး | ပိုင်ရိုက်လုပ်ငန်းများ၊ ဖျက်သိမ်းခြင်းလုပ်ငန်း စဉ်များ။ စက်ယန္တာရားကြီးများ နှင့် မီးစက်အင်ဂျင်များ မောင်းနှင်မှု၊ ဓာတုပစ္စည်းများကိုင်တွယ်မှု | လုပ်ငန်းခွင်ဆိုင်ရာ လုံခြုံရေး နှင့် ကျန်းမာရေး | (၁+၁+၈)x၄ = ၄၀<br>(အသင့်အတင့်) | ***လေထုညစ်ညမ်းမှုကြောင့်သက်ရောက်မှု***<br>• ဝန်ထမ်းများကို တကိုယ်ရည်သုံးအကာအကွယ်ပစ္စည်းများ (PPE) ထောက်ပံ့ပေးခြင်း<br>• လုပ်ငန်းခွင်အတွင်းအမှုန်ထွက်မှုနည်းစေရန် ရေဖြန်းခြင်း၊ ယာဉ်များ နှင့် စက်ယန္တရားများ ကို အရှိန်သတ်မှတ်မောင်း နှင်စေခြင်း<br>• လေထုအရည်အသွေးတိုင်းတာခြင်း<br>• စက်များကိုပုံမှန်ပြုပြင်ထိန်းသိမ်းစစ်ဆေးခြင်း<br>***ဆူညံသံ နှင့် တုန်ခါမှုကြောင့်သက်ရောက်မှု***<br>• ဝန်ထမ်းများကို တစ်ကိုယ်ရည်သုံးအကာအကွယ်ပစ္စည်းများ (PPE) ထောက်ပံ့ပေးခြင်း<br>• ဆူညံသံမြင့်သောစက်ယန္တရားများအနီးလုပ်ကိုင်သူများကို သတ်မှတ်စံနှုန်းများ နှင့် အညီ အချိန်သတ်မှတ်ကာ အလှည့်ကြ ခိုင်း စေခြင်း<br>• ဆူညံသံအဆင့်တိုင်းတာအကဲဖြတ်ခြင်း<br>• မီးစက်အင်ဂျင်များကို အသံလုံနံရံ အတွင်း ထားရှိခြင်း | (၁+၁+၆)x၂ =၁၆<br>(လျစ်လျူရှုနိုင်) |

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| | | | | • အိမ်သာများ နှင့် မိလ္လာကန်များကို စနစ်တကျ သန့်ရှင်းစွာပြုလုပ်ခြင်း၊ အပတ်စဉ် မြို့တော်စည်ပင်သို့ ပုံမှန်စွန့်ပစ်ခြင်း။<br>• စားကြွင်းစာကျန်များကို သတ်မှတ်နေရာများတွင်စွန့်ပစ်စေခြင်း၊ စွန့်ပစ်နေရာများစီစဉ်ပေးခြင်း၊ အမှိုက်ပုံများကို စနစ်တကျဖုံးအုပ်ထားခြင်း အပတ်စဉ်မြို့တော်စည်ပင် နှင့် ချိတ်ဆက် စွန့်ပစ်စေခြင်း<br>• လုပ်သားများအစားအသောက်စားရန်နေရာ စီစဉ်ပေးခြင်း၊ သတ်မှတ် နေရာတွင်သာ စား သောက်ရန် ညွှန်ကြားခြင်း<br>• ရာသီအလိုက်ကူးစက်ရောဂါဖြစ်ပွားမှုကို ကာကွယ်ရန်ဝန်ထမ်းများအား ဆေးစစ်ပေးခြင်း၊ နှင့် ဆေးဝါးများ ထောက်ပံ့ခြင်း | |
| လူမှုပတ်ဝန်းကျင် ကျန်းမာရေး နှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး | ဆောက်လုပ်ရေးပစ္စည်း (သို့) ဖျက်ဆီးပြီးပစ္စည်းများ သယ်ယူသောယာဉ်များသွားလာမှု | အများပြည်သူဆိုင်ရာ လုံခြုံရေး နှင့် ကျန်းမာရေး | (၁+၃+၆)x၄ = ၄၀ (အသင့်အတင့်) | ***လေထုညစ်ညမ်းမှုကြောင့်သက်ရောက်မှု***<br>• စီမံကိန်းအတွင်းအမှုန်အမွှားများအနီးနားကျေးရွာများမပျံ့စေရန် စီမံကိန်းအတွင်းရေးဖြန်း ထားခြင်း<br>• စီမံကိန်း သို့ပစ္စည်းပို့ဆောင်သောယာဉ်များကို စနစ်တကျဖုန်းအုပ်သယ် ဆောင်စေခြင်း<br>• စီမံကိန်းမှထွက်သောယာဉ်များကို မထွက်မီ ဘီးများကို ရေဖြန်းဆေးကြောခြင်း<br>• ယာဉ်များကို ပုံမှန်ပြုပြင်စစ်ဆေးခြင်း<br>***ဆူညံသံ နှင့် တုန်ခါမှုကြောင့်သက်ရောက်မှု***<br>• ဆူညံသံများနိုင်သောလုပ်ငန်းများကို ညအချိန်များတွင် မလုပ်ဆောင်ခြင်း<br>• ဆူညံသံအဆင့် တိုင်းတာအကဲဖြတ်ခြင်း<br>• မီးစက်အင်ဂျင်များကို အသံလုံနံရံ အတွင်းထားရှိခြင်း<br>• တုန်ခါမှုရှိသောစက်ပစ္စည်းများကို အောက်ခံကွန်ကရစ်ပေါ်တွင်အခိုင်အမာထားရှိခြင်း<br>• စက်ပစ္စည်းများကို ပုံမှန်ပြုပြင်ထိန်းသိမ်း စစ်ဆေးခြင်း | (၁+၃+၂)x၂ =၁၂ (လျစ်လျူရှုနိုင်) |

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| | | | | ***ထိခိုက်မှုမှကာကွယ်ခြင်း***<br>• ရှေးဦးသူနာပြုပစ္စည်းများ၊ ဆေးဝါးများကို အနီးနားရှိ ပတ်ဂန်းကျင်ပြည်သူများသို့ ထောက်ပံ့ခြင်း<br>• ရှေးဦးသူနာပြုသင်တန်းများပို့ချပေးခြင်း<br>• အရေးပေါ်အခြေအနေတွင်ဆက်သွယ်ရန် ရဲစခန်း၊ ဆေးရုံ စသည့် ဖုန်းနံပတ်များထား ရှိပေးခြင်း<br>• ယာဉ် နှင့် စက်ယန္တရားများကို အရှိန်သတ်မှတ်ပေးခြင်း<br>• ယာဉ်မောင်းများကို ရရှိထားသောလိုင်စင်အပေါ်တွင်သာအခြေခံ၍ သက်ဆိုင်ရာယာဉ်များ မောင်းနှင်စေခြင်း၊ သက်မှတ်လိုင်သင်အရ မောင်းနှင်မှုရှိမရှိကို စစ်ဆေးခြင်း<br>• ယာဉ်ကြောကြပ်တည်းမှုနည်းပါးစေရန် ဆောက်လုပ်ရေးသုံးပစ္စည်းများ (သို့) ဖျက်ဆီးရာမှရရှိသော ပစ္စည်းများအား ရုံး၊ ကျောင်းဖွင့်ရက်များ နှင့် ယာဉ် ကြောကြပ်တည်းချိန်များ ရှောင်ကြဉ်လုပ်ရန်<br>***ကူးစက်ရောဂါဖြစ်ပွားမှုကာကွယ်ရန်***<br>• အိမ်သာများ နှင့် မိလ္လာကန်များကို စနစ်တကျ သန့်ရှင်းစွာပြုလုပ်ခြင်း၊ အပတ်စဉ် မြို့တော်စည်ပင်သို့ ပုံမှန်စွန့်ပစ်ခြင်း။<br>• စီမံကိန်းမှ ထွက်ရှိသောအမှိုက်များကို အနီးနားရှိကျေးရွာ၊ ရပ်ကွက်များ၏ အမှိုက်ပုံများ တွင်စွန့်ပစ်ခြင်းကိုတားမြစ်ခြင်း<br>• အပတ်စဉ်မြို့တော်စည်ပင် နှင့် ချိတ်ဆက်စွန့်ပစ်စေခြင်း<br>• လုပ်သားများအစားအသောက်စားရန်နေရာ စီစဉ်ပေးခြင်း၊ သတ်မှတ်နေရာတွင်သာ စား သောက်ရန် ညွှန်ကြားခြင်း<br>• ရာသီအလိုက်ကူးစက်ရောဂါဖြစ်ပွားမှုကို ကာကွယ်ရန်ဂန်ထမ်းများအား ဆေးစစ်ပေးခြင်း၊ နှင့် ဆေးဂါးများ ထောက်ပံ့ခြင်း | |
| အရေးပေါ် အန္တရာယ်များ | ဆောက်လုပ်ရေး၊ ဖိတ်သိမ်းခြင်း လုပ်ငန်း ခွင် | ရေလွှမ်းခြင်း | (၁+၂+၂)x၁ = ၅ (လျစ်လျူရှုနိုင်) | • မီးသတ်အခြေခံနှင့် အခြားသော အရေးပေါ်ဖြစ်ပေါ်မှုများအတွက် တုံ့ပြန်မှုများအား ဂန်ထမ်းများ သို့ ပုံမှန် လေ့ကျင့်သင်ကြားပေးရန် | (၁+၁+၂)x၁ = ၄ (လျစ်လျူရှုနိုင်) |
| | | မီးဘေး အန္တရာယ် | (၁+၂+၆)x၂ = ၁၈ | • အရေးပေါ်အခြေအနေများအတွက်လိုက်နာရမည့်ဥပဒေများချမှတ်ထားရန် | (၁+၁+၂)x၁ = ၄ |

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| | | | (လျစ်လျူရှုနိုင်) | နှင့် အရေးပေါ်မီးသတ် ကိရိယာများဖြစ်သော မီးသတ်ပိုက်၊ မီးသတ် ဆေးဘူးများ၊ အရေးပေါ်ထွက်ပေါက်များအား သတ်မှတ်နေရာ များတွင် ပြည့်စုံစွာထားရှိရန်<br>• မီးသတ်ကိရိယာများအား နေ့စဉ်စစ်ဆေးခြင်း | (လျစ်လျူရှုနိုင်) |
| | | ငလျင် အန္တရာယ် | (၁+၂+၂)x၁ = ၅<br>(လျစ်လျူရှုနိုင်) | | (၁+၁+၂)x၁ = ၄<br>(လျစ်လျူရှုနိုင်) |

**ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်**

| ပတ်ဝန်းကျင်ဆိုင်ရာ အချက်အလက်များ | တည်နေရာ | စီမံခန့်ခွဲမှု အစီအစဉ်များ |
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| **လုပ်ငန်းလည်ပတ်ခြင်းကာလ** | | |
| **လေ** | | |
| အမှုန်အမွှားထုတ်လွှတ်ခြင်း | သိုလှောင်ခန်း၊ အရောင်ခြယ် ပစ္စည်း ရောစပ်ခြင်းနှင့် အလေးချိန်တိုင်းသည့် ထုတ်လုပ်ကုန် နေရာ၊ အမှုန် အမွှား စုတ်ယူသည့်နေရာနှင့် အမှုန်အမွှား စုတ်ယူသည့် ပိုက်လိုင်း | • ကောင်းမွန်သည့် လေဝင်လေထွက် စနစ် တပ်ဆင်ခြင်း။<br>• အမှုန်အမွှား စုတ်ယူသည့်စနစ် ကို ပုံမှန် စစ်ဆေး ခြင်း။<br>• အမှုန်အမွှား စုတ်ယူသည့်စနစ်ကို ထိန်းသိမ်းမှု ပုံမှန် ပြုလုပ်ခြင်း။<br>• အမှုန်အမွှား စုတ်ယူသည့်ပိုက် ကို ပုံမှန် စစ်ဆေးခြင်း။<br>• ကုန်ကြမ်းအမှုန့်များကို ဂရုတစိုက် ကိုင်တွယ်ခြင်း နှင့် အလေးချိန် ချိန်ခြင်း။ |
| ဓါတ်ငွေ့များနှင့် အော်ဂဲနစ် ဒြပ်ပေါင်းများ ထုတ်လွှတ်ခြင်း | အမှုန်နှင့် အငွေ့ပျံလွယ်သောဓာတု ဓာတ်ပေါင်းများဖယ်စနစ် နှင့် ၎င်း၏ ခေါင်းတိုင်၊ စုတ်ယူသည့်ပိုက်လိုင်း | • လေစစ်ဇကာများ စသည်တို့ကို စစ်သည့်ကိရိယာကို ပုံမှန် စစ်ဆေးခြင်း။<br>• လေစစ်ဇကာများကို စနစ်တကျ ပုံမှန် လဲလှယ်ပေးခြင်း<br>• ဆက်သွယ်ထားသော ပိုက်လိုင်းများကို ပုံမှန်စစ်ခြင်း။<br>• ဘွိုင်လာမီးခိုးခေါင်းတိုင် နှင့် မီးစက် ခေါင်းတိုင်များတွင် ဓာတ်ငွေ့တိုင်းတာခြင်းကို အချိန်ဇယားအတိုင်း တိုင်းတာခြင်း |
| အနံ့ | သိုလှောင်ခန်း၊ ထုတ်လုပ် ရေးနေရာ၊ ရေဆိုး ပြန်လည် ပြုပြင်သည့် စက်၊ အညစ် အကြေး စွန့်ပစ်နေရာ | • အမှိုက်စုထားသောကန်နှင့် အမှိုက်ပုံးများကို အဖုံးအကာ ထားခြင်း။<br>• လေဝင်လေထွက်စနစ်ကို စစ်ဆေးပြီး ထိန်းသိမ်းခြင်း။<br>• တစ်ကိုယ်ရည်ကာကွယ်ရေးသုံးပစ္စည်းများ ထောက်ပံ့ခြင်း။ |
| **ရေ** | | |
| ရေနှင့် ရေဆိုး | ရေဆိုးသန့်စင်စနစ် | • စက်ရုံမှ ရေဆိုးများကို ကိုယ်ပိုင်ရေဆိုး ပြန်လည်သန့်စင်သည့် စက်သို့ တိုက်ရိုက်စွန့်ပစ်ခြင်း။<br>• စီးဆင်းရေထဲသို့ ဆီပါဝင်မှု နည်းစေရန် ဆီနှင့်ရေ ခွဲသည့်စက်များ၊ ဆီစစ်စက်များ၊ (သို့) အခြားနည်းလမ်းများကို သုံးခြင်း။ |

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| | | • စက်ရုံပြင်ပသို့ မသန့်စင်ရသေးသော ရေများ မရောက် စေရန် စစ်ဆေးခြင်း နှင့် ရေဆိုး ပြန်လည်သန့်စင်သည့် စနစ် ၏ ဝင်ပေါက် နှင့် ထွက်ပေါက်ကို စစ်ဆေးခြင်း။<br>• ရေဆိုးသန့်စင်သည့် စနစ် ကိုပုံမှန် စစ်ဆေး ခြင်း။ |
| မြေအောက်ရေ | စီမံကိန်းဝင်းအတွင်း | • မြေအောက်ရေထုတ်ယူသုံးစွဲမှုကိုတတ်နိုင်သမျှအလွန်အကြူး မပြုလုပ်ခြင်း။<br>• ရေသုံးစွဲမှုကို ပုံမှန် မှတ်တမ်း ထားခြင်း။ |
| စီးဆင်းရေ | စီးဆင်းရေမြောင်း၏ထွက်ပေါက် | • စီးဆင်းရေအတွက် သီးခြား မြောင်းစနစ်ထား ခြင်း။<br>• စီးဆင်းရေ များ စီးဆင်းရေမြောင်း ထဲ ဝင်ရာတွင် အစိုင်အခဲ စွန့်ပစ်ပစ္စည်းများ ရောပါမှု မရှိစေရန် စီးဆင်းရေမြောင်း၏ ထွက်ပေါက်များတွင် ဇကာများ တပ်ဆင်ထား ခြင်း။<br>• ၄င်းဇကာများသည် သန့်ရှင်းပြီး လိုအပ်ပါက အစားထိုးနိုင်ရမည်။<br>• မည်သည့်အချိန်မဆိုလိုအပ်ပါက စီးဆင်းရေ များကို ထုတ်လုပ်ရေး နေရာများ၊ သိုလှောင်ခန်း များ နှင့် အခြားညစ်ညမ်း စေနိုင်သော နေရာများ သို့ မရောက်စေရန် လမ်းလွှဲပေးခြင်း။ |
| မိလ္လာအညစ်အကြေးများ | မိလ္လာကန် | • မိလ္လာကန်များကို ပုံမှန် စစ်ဆေးခြင်း။<br>• စည်ပင်သာယာ သို့ဆက်သွယ် ၍ လိုအပ်သလို စွန့်ပစ်ခြင်း |
| **ဆူညံသံ နှင့် တုန်ခါမှု** | | |
| စက်ပစ္စည်းများ အသုံးပြု ခြင်း (မီးစက်) နှင့် လုပ်ငန်း လည်ပတ် ခြင်းများမှထွက် လာသော ဆူညံ သံ နှင့် တုန်ခါမှု | မီးစက်အခန်း | • ဂျင်နရေတာမီးစက် နှင့် ဘွိုင်လာ၊ ပုံမှန်စစ်ဆေးပြီး ထိန်းသိမ်းခြင်း။<br>• အသံလုံနံရံများထားရှိခြင်း။ |
| | ထုတ်လုပ်ကုန်ဇရိယာ | • ထုတ်လုပ်ရေးဆိုင်ရာ စက်ပစ္စည်းများကို ပုံမှန်စစ်ဆေးပြီး ထိန်းသိမ်းခြင်း။ |
| **မြေထုညစ်ညမ်းခြင်း** | | |
| လောင်စာဆီ၊ ဖျော်ရည်များ နှင့် သန့်ရှင်းရေးပစ္စည်း များ ယိုစိမ့်ခြင်းနှင့်ဖိတ်စင် ခြင်း | ဓာတုပစ္စည်းနှင့်ဆီ သိုလှောင်ဇရိယာ၊ လောင်စာဆီသိုလှောင် ဇရိယာ | • အရည်လှောင်ကန်များတွင် အရည်ခံအိုးနှင့် စည်ဘောင်များထား ရှိရပါမည်။<br>• ဖိတ်စင်မှုများကို ဖမ်းစုတ်ယူနိုင်စေရန် အရည်ခံအိုးနှင့်စည်ဘောင်များအောက်တွင် ပိတ်စများ ခံရမည်။<br>• လုပ်ငန်း ဆောင်ရွက်ပြီးလျှင် အိုးနှင့် ဘောင်များကို ချက်ချင်း သန့်ရှင်း၍ သတ်မှတ်ထား သောအနီးအနား နေရာတွင် သိုလှောင် ထားရမည်။<br>• အရည်ခံအိုးများကိုပိတ်စများနှင့်အတူသိမ်းဆည်းသင့်သည်။<br>• အရည်ခံအိုးများကိုအသုံးပြုခြင်းနှင့်သန့်ရှင်းရေးပြုလုပ် သည့်အချိန် တွင် အရည်တစ်မျိုးချင်း |

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| | | စီအတွက် တစ်ခုချင်းစီ သီးသန့် အသုံးပြုရပါသည်။<br>• ထိုသို့အသုံးပြုခြင်းကြောင့် ဆီလျော့မှု မရှိသော မတော်တဆ ရောနှော ပေါင်းစပ်ခြင်းများကို ရှောင်ရှားနိုင်မည် ဖြစ်ပါသည်။ (ဆိုလိုသည်မှာ အက်ဆစ်နှင့် မီးလောင်နိုင်သောပစ္စည်းများ)<br>• အရည်ခံအိုးများသန့်ရှင်းခြင်းမှထွက်လာသည့် အကြွင်းအကျန်နှင့် ရေများကို လုပ်ငန်းပြီး စီးချိန်တွင်သိမ်းဆည်းရေးကာလတွင် သတ်မှတ် စွန့်ပစ်ကန် (သို့မဟုတ်) ဆီ/ရေခွဲခြား ကြိုတင်သန့်စင်ခြင်း ကန်သို့စွန့်ပစ်ရမည်။<br>• လုပ်ငန်း ဆောင်ရွက်သူများ နှင့် အလုပ်သမားများအားလုံး ၄င်းတို့ ကို အသုံးပြုခြင်း ရှိမရှိ စစ်ဆေးရန် ကြီးကြပ်သူများ၊ ပတ်ဝန်းကျင် ဆိုင်ရာ ကြီးကြပ်သူများတွင် တာဝန်ရှိသည်။ |
| **စွန့်ပစ်ပစ္စည်း စွန့်ပစ်မှု အစီအစဉ်** | | |
| အန္တရာယ်ရှိသောစွန့်ပစ်ပစ္စည်းများ<br>• သိုလှောင်ခြင်း<br>• သန့်စင်ခြင်း<br>• စွန့်ပစ်ခြင်း | အမှိုက်သိုလှောင်ထိန်းသိမ်းသည့်နေရာ | • စွန့်ပစ်ပစ္စည်းများအားလုံး၊ (အန္တရာယ်ရှိ သည်ဖြစ်စေ၊ မရှိသည် ဖြစ်စေ) လွင့်သွားခြင်း၊ မြေမျက်နှာပြင် (သို့) မြေအောက်ရေထဲ စိမ့်ဝင် သွားခြင်း မရှိအောင်ထိန်းသိမ်းခြင်း။<br>• အန္တရာယ်ရှိသောစွန့်ပစ်ပစ္စည်းများပါဝင်သော ကွန်တိန်နာများ (သို့) ကန်များတွင် 'အန္တရာယ်ရှိသောစွန့်ပစ်ပစ္စည်းများ' ဟု ရှင်း လင်းစွာ တံဆိပ်တပ်ထား ခြင်း။<br>• အန္တရာယ်ရှိသောစွန့်ပစ်ပစ္စည်းများသည် ထုတ်လုပ်မှုများအရ ပမာဏ နှင့် ထိန်းသိမ်းရန် အချိန်ကာလ များ ကွဲပြား၍ သတ်မှတ်ချက်အရ ပုံမှန်စွန့်ပစ်ရန်<br>• သန့်စင်ခြင်းနှင့် အခြောက်ခံသော အော်ဂဲနစ်ရောင်ခြယ်အိတ်များ နှင့် စည်များကို စွန့်ပစ်ရာတွင် အန္တရာယ်ရှိ သောစွန့်ပစ် ပစ္စည်းများ အဖြစ်စွန့်ပစ်ရမည်။<br>• အန္တရာယ်ရှိသောစွန့်ပစ်ပစ္စည်းများသည် ဒိုဝါကဲ့သို့ သတ်မှတ်ထားသော စွန့်ပစ်ပစ္စည်း ပြန်လည် ပြုပြင် သည့် နေရာများ သို့ စွန့်ပစ်ခြင်း။<br>• စွန့်ပစ်ပစ္စည်း အမျိုးအစားနှင့် ပမာဏကို မှတ်တမ်းထားခြင်း။ |
| အန္တရာယ်မရှိသော စွန့်ပစ်ပစ္စည်းများ<br>• သိုလှောင်ခြင်း<br>• သန့်စင်ခြင်း<br>• စွန့်ပစ်ခြင်း | အမှိုက်သိုလှောင်ထိန်းသိမ်းသည့်နေရာ | • အန္တရာယ်မရှိသော စွန့်ပစ်ပစ္စည်းများ ကို ပတ်ဝန်းကျင်သို့လွင့်သွားခြင်း နှင့် စုပုံခြင်းမှ ကာကွယ်ရန် ပုံမှန် စွန့်ပစ်မှုပြုလုပ်ခြင်း။<br>• အန္တရာယ်မရှိသော စွန့်ပစ်ပစ္စည်းများကို လေထဲလွင့်သွားခြင်း၊ ပတ်ဝန်းကျင် ရှိ နေရာများ နှင့် ရေ ထဲ ရောက်ရှိခြင်းမှ ကာကွယ် ရန် ထိန်းသိမ်းမှုပြုခြင်း။<br>• အန္တရာယ်မရှိသော စွန့်ပစ်ပစ္စည်းများ ကို သက်ဆိုင်ရာမြို့နယ် စည်ပင်သာယာရေးအဖွဲ့စည်း သို့စွန့်ပစ်ခြင်း။<br>• စွန့်ပစ်ပစ္စည်းအမျိုးအစားနှင့် ပမာဏကို ပုံမှန်မှတ်တမ်းယူခြင်း။ |

| **အခြား** | | |
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| လုပ်ငန်းခွင်ဆိုင်ရာ ကျန်းမာရေး နှင့် လုံခြုံရေး အစီအစဉ် | စက်ရုံဧရိယာ | • စက်ရုံဥပဒေ နှင့် အညီ လိုအပ်သော ထောက်ပံ့ရေးပစ္စည်း များ ရှိစေခြင်း။<br>• အလုပ်သမားများအတွက်ပုံမှန် ကျန်းမာရေး ဆေးစစ်မှုများလုပ် ပေးခြင်း။<br>• အလုပ်သမားအသစ်များကို လုပ်ငန်းခွင်ဆိုင်ရာ ကျန်းမာရေး နှင့် လုံခြုံရေး သင်တန်းများ ပုံမှန် ပေးခြင်း။<br>• မတော်တဆမှုများ နှင့် ထိခိုက်ဒဏ်ရာရရှိမှုများ ကို မှတ်တမ်းထားခြင်း။<br>• နစ်နာမှုတိုင်ကြားမည့်စနစ်များအကောင်အထည်ဖော်ခြင်း။<br>• လုပ်ငန်းခွင်အတွင်းအရေးပေါ်အခြေအနေဖြစ်ပေါ်ပါက ဆက်သွယ်ရန် ဆေးရုံ၊ မီးသတ်၊ ရဲစခန်း စသည့်ဖုန်းနံပတ်များအလွယ်တကူထားရှိပေးခြင်း။<br>• လုပ်ငန်းခွင်အတွင်းယာဉ်အရှိန်သတ်မှတ်ပေးခြင်း။<br>• သက်ဆိုင်ရာ လုပ်ငန်းခွင်အလိုက် PPE ဝတ်ဆင်မှုရှိမရှိကို စစ်ဆေးခြင်း။<br>• အိမ်သာ နှင့် မိလ္လာစနစ်များသန့်စင်မှုရှိမရှိကို စစ်ဆေးခြင်း။<br>• ယာဉ်ကြီးအမှိုက်စုကန်များ၊ အမှိုက်ပုံးများ ကိုပုံမှန်စစ်ဆေးခြင်း။<br>• ကူးစက်ရောဂါဖြစ်ပွားမှုကာကွယ်ရန် ဆေးဝါးထောက်ပံ့မှုများပြုလုပ်ခြင်း။<br>• ရှေးဦးသူနာပြုဆေးပစ္စည်းများ နှင့် ကုသမှုနည်းများထောက်ပံ့ပေးခြင်း။ |
| လူမှုပတ်ဝန်းကျင် ကျန်းမာရေး နှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး | ဒေသဆိုင်ရာ | • လိုအပ်သော ထောက်ပံ့ရေးပစ္စည်း များ ရှိစေခြင်း။<br>• ကားမောင်းစဉ် ကားမောင်းသမားအား ယာဉ်အမြန်နှုန်းသတ်မှတ်မောင်းနှင်စေခြင်း<br>• ကုန်ကြမ်းများ သယ်ယူပို့ဆောင်ရာတွင် MSDS တွင် ဖော်ပြထားသော သယ်ယူပို့ဆောင်ရေး နည်းလမ်းများအရ အများပြည်သူထိခိုက်မှုမရှိစေရန်လုပ်ဆောင်ခြင်း။<br>• မတော်တဆမှုများ နှင့် ထိခိုက်ဒဏ်ရာရရှိမှုများ ကို မှတ်တမ်းထားခြင်း။<br>• နစ်နာမှုတိုင်ကြားမည့်စနစ်များအကောင်အထည်ဖော်ခြင်း။<br>• အရေးပေါ်အခြေအနေဖြစ်ပေါ်ပါက ဆက်သွယ်ရန် ဆေးရုံ၊ မီးသတ်၊ ရဲစခန်း စသည့်ဖုန်းနံပတ်များအလွယ်တကူထားရှိပေးခြင်း။<br>• ကူးစက်ရောဂါဖြစ်ပွားမှုကာကွယ်ရန် ဆေးဝါးထောက်ပံ့မှုများပြုလုပ်ခြင်း။<br>• ရှေးဦးသူနာပြုဆေးပစ္စည်းများ နှင့် ကုသမှုနည်းများထောက်ပံ့ပေးခြင်း။<br>• ကိုဗစ-၁၉ ကာကွယ်ထိန်းချုပ်ရေးကို ဥပဒေကို အထူးဂရုပြုလိုက်နာရမည်။ |
| လူမှုရေးအရထည့်သွင်း | စက်ရုံဧရိယာ နှင့် ဒေသ ဆိုင်ရာ နေရာများ | • လူမှုရေးဆိုင်ရာ တာဝန်ယူမှုအဖွဲ့အစည်း ရန်ပုံငွေကို သတ်မှတ်ထားရှိခြင်း |

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| စဥ်းစားမှုများ | | • အလုပ်အကိုင်အခွင့်အလမ်းများဖန်တီးပေးခြင်း။<br>• အလုပ်သမားများအတွက် လူမှုဖွံ့ဖြိုးရေးအစီအစဥ်များကို ပုံမှန် စီမံခန့်ခွဲပေးခြင်း။ |
| အရေးပေါ်အန္တရာယ်များ | စက်ရုံဧရိယာ | • ဝန်ထမ်းများအားလုံးအတွက် မီးသတ်နှင့် အခြားအရေးပေါ်တုံ့ပြန်ရေး ဆိုင်ရာ သင်တန်းများနှင့် လေ့ကျင့် မှုများ ပုံမှန်ပေးခြင်း။<br>• စီမံကိန်းသည် မီးအရေးပေါ်အန္တရာယ်အတွက် သက်ဆိုင်သောနည်းလမ်းများ၊ ဥပဒေများ နှင့်အညီ ဖန်တီးထားခြင်း။ ထို့နောက် အရေးပေါ်ထွက်ပေါက်များ၊ မီးသတ်ပိုက်များနှင့် မီးသတ်ဆေးဘူးများကို တိကျ သေချာသော ဒီဇိုင်း၊ အနေအထားများဖြင့် ထားရှိခြင်း။<br>• မီးသတ်ပစ္စည်းများကို နေ့စဥ် စစ်ဆေးခြင်း။ |
| သင်တန်းပေးခြင်း နှင့် ပညာပေး | အလုပ်သမားများ | • အလုပ်သမားများအားလုံးကို (အကောင်းဆုံးစီမံခန့်ခွဲခြင်းအလေ့အကျင့် - BMP) ဆိုင်ရာ ညှိနှိုင်းပွဲများနှင့် ညစ်ညမ်းမှုနှင့် ညစ်ညမ်းမှုတားဆီးရေးဆိုင်ရာဆွေးနွေးပွဲများကို ပုံမှန်အချိန်ဇယား နှင့် တက်စေခြင်း။<br>• သင်တန်းပေးခြင်းတွင် လုပ်ထုံးလုပ်နည်းများ၊ BMP နည်းပညာများ၊ ကြီးကြပ်ရေးမှူးတာဝန်နှင့် တာဝန်ယူမှုများကို အလေးပေးဖော်ပြ ထားရမည်။<br>• စာချုပ်ခွဲများချုပ်ဆိုထားသော ကုမ္ပဏီများအား BMP သင်တန်းပေး အစီအစဥ်များတွင် ပါဝင်ရန် ပြင်းထန်စွာ တွန်းအားပေးရမည်။<br>• အလုပ်သမားအသစ်များကို BMPs ကို အလုပ်စသောနေ့မှ စပြီး သတိပြုစေခြင်းနှင့် ပုံမှန် အသိပေးခြင်း။ |
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| **ပိတ်သိမ်းရေးကာလ** | | |
| **လေ** | | |
| အမှုန်အမွှား ထုတ်လွှတ်ခြင်း | ပိတ်သိမ်းရေးလုပ်ငန်းခွင် နှင့် လမ်း (လုပ်ငန်းခွင် အရှေ့ ဘက်) | • လိုအပ်သည့်နေရာတိုင်းကို ရေဖြန်းခြင်း။ |
| လုပ်ငန်း သုံး ယာဥ်များ မှ ထွက်လာ သော ဓါတ်ငွေ့များ | အကြီးစား စက်ပစ္စည်းများ နှင့် မီးစက် များ | • ယာဥ်များမှ ဓါတ်ငွေ့ထုတ်လွှတ်မှု နှင့် ညစ်ညမ်းမှု ဖြစ်ပွားခြင်းကို ထိန်းသိမ်းမှုများနှင့် သေချာစွာ စစ်ဆေး ခြင်း။ |
| **ရေနှင့် ရေဆိုး** | | |
| မြေအောက်ရေ | ပိတ်သိမ်းရေးလုပ်ငန်းခွင် | • မြေအောက်ရေထုတ်ယူမှု မပြုလုပ်ခြင်း။ |
| မြေပေါ်ရေ အရင်းအမြစ်များ | ပိတ်သိမ်းရေးလုပ်ငန်းခွင် | • စက်ရုံအပြင်ဘက် နှင့် မင်္ဂလာဒုံစက်မှုဥယျာဥ် ၏ ရေမြောင်းအတွင်း (စက်မှုဇုန် retaining |

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| | | channel) သို့ ရေဆိုး မစွန့် ပစ်ခြင်း ။ |
| သောက်ရေလိုအပ်မှု | ပိတ်သိမ်းရေးလုပ်ငန်းခွင် | • သန့်စင်ထားသော သောက်ရေ စီမံပေးခြင်း။ |
| အလုပ်သမားစခန်းများမှ ထွက်လာသော ရေဆိုး | ပိတ်သိမ်းရေးလုပ်ငန်းခွင် | • သင့်တော်သော မိလ္လာစနစ် နှင့် ရေမြောင်းစနစ် အသုံး ပြုခြင်း၊ ရေဆိုးများကို ရေအရင်းအမြစ် (မြစ်၊ချောင်း၊ ကန်) များ နှင့် စက်မှုဇုန် retaining channel များထဲ သို့ တိုက်ရိုက်စွန့်ပစ်မှု မပြုခြင်း။<br>• မိလ္လာရေဆိုးများကို တာဝန်ရှိသော အဖွဲ့ဆီသို့သာ စွန့်ပစ်စေခြင်း။ |
| **ဆူညံသံ နှင့် တုန်ခါမှု** | | |
| စက်ပစ္စည်းများ နှင့် ပိတ်သိမ်းရေး လုပ်ငန်း များ မှ ဆူညံသံ နှင့် တုန်ခါမှု | ပိတ်သိမ်းရေးလုပ်ငန်းခွင် ကြီးမားသော စက်ပစ္စည်းများ နှင့် မီးစက် များ | • စက်ပစ္စည်းများကို စံသတ်မှတ်ထားသော ဆူညံသံ နှင့် တုန်ခါမှု အဆင့်များနှင့် အညီဖြစ်စေခြင်း။<br>• စက်ပစ္စည်းများကိုပုံမှန် စစ်ဆေးခြင်း။ |
| **မြေ** | | |
| မြေပြုပြင်မှု | ပိတ်သိမ်းရေးလုပ်ငန်းခွင် | • အစိမ်းရောင်မြေနေရာ ဖွံ့ဖြိုးရေး တွင် အသုံးချရန် တူးဖော်ထား သော မြေများကိုမူလအခြေအနေ အတိုင်း ထိန်းသိမ်းထားခြင်း။ |
| **စွန့်ပစ်ပစ္စည်းများ စွန့်ပစ်မှု အစီအစဉ်** | | |
| အန္တရာယ်ရှိသော စွန့်ပစ် ပစ္စည်းများ (ဆေးပျော်ရည် များ၊ ဆီ နှင့် ဓါတုပစ္စည်းများ) | အမှိုက်သိုလှောင်ထိန်းသိမ်းသည့်နေရာ | • စွန့်ပစ်ပစ္စည်းများ လွင့်သွားခြင်း၊ မြေမျက်နှာပြင် (သို့) မြေအောက်ရေထဲစိမ့်ဝင်သွားခြင်း မရှိအောင် ထိန်းသိမ်းခြင်း။<br>• စွန့်ပစ်ပစ္စည်းများကိုအမျိုးစားခွဲခြားထိန်းသိမ်းထားခြင်း<br>• ပမာဏကို မှတ်တမ်းတင်ခြင်း<br>• စနစ်တကျကိုင်တွယ်ခြင်း<br>• DOWA (သို့) စည်ပင်သာယာအဖွဲ့ သို့ ပို့ဆောင် စွန့်ပစ်ခြင်း |
| အန္တရာယ်မရှိသော စွန့်ပစ် ပစ္စည်းများ (ဆောက်လုပ် ရေးသုံး စွန့်ပစ်ပစ္စည်းများ၊ ပလတ်စတစ်များ) | အမှိုက်သိုလှောင်ထိန်းသိမ်းသည့်နေရာ | • အန္တရာယ်မရှိသောစွန့်ပစ်ပစ္စည်းများကို ပတ်ဝန်းကျင် သို့လွင့်သွားခြင်းနှင့် စုပုံခြင်းမှ ကာကွယ်ရန် ပုံမှန် စွန့်ပစ်မှုပြုလုပ်ခြင်း။<br>• အန္တရာယ်မရှိသောစွန့်ပစ်ပစ္စည်းများကိုလေထဲလွင့်သွား ခြင်း၊ ပတ်ဝန်းကျင်ရှိနေရာများ နှင့် ရေထဲရောက်ရှိခြင်းမှ ကာကွယ်ရန် ထိန်းသိမ်းမှုပြုခြင်း။<br>• အန္တရာယ်မရှိသော စွန့်ပစ်ပစ္စည်းများကို စည်ပင်သာ ယာသို့ပို့ပြီး စွန့်ပစ်ရပါမည်။<br>• စွန့်ပစ်ပစ္စည်းပမာဏကို ပုံမှန် မှတ်တမ်း ယူခြင်း ။ |
| **အခြား** | | |

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| လုပ်ငန်းခွင်ဆိုင်ရာ ကျန်းမာရေး နှင့် လုံခြုံရေး အစီအစဉ် | ဆောက်လုပ်ရေး၊ ပိတ်သိမ်းရေး လုပ်ငန်းခွင် | • စက်ရုံဥပဒေနှင့်အညီလိုအပ်သော ထောက်ပံ့ရေးပစ္စည်း များ ရှိစေခြင်း။<br>• မတော်တဆမှုများ နှင့် ထိခိုက်ဒဏ်ရာရရှိမှုများကို မှတ်တမ်းထားခြင်း။ |
| လူမှုပတ်ဝန်းကျင် ကျန်းမာရေး နှင့် ဘေးအန္တရာယ်ကင်းရှင်း ရေး | ဒေသဆိုင်ရာနေရာများ | • လိုအပ်သော ထောက်ပံ့ရေးပစ္စည်းများ ရှိစေခြင်း။<br>• ယာဉ်မောင်းများအား ယာဉ်စည်းကမ်း၊ လမ်းစည်းကမ်း လိုက်နာစေရန် ကြီးကြပ်ကွပ်ကဲစေခြင်း<br>• မတော်တဆမှုများနှင့် ထိခိုက်ဒဏ်ရာရရှိမှုများကို မှတ်တမ်းထားရှိခြင်း။ |
| လူမှုရေးအရထည့်သွင်းစဉ်းစား မှုများ | အနီးပတ်ဝန်းကျင်ရပ်ရွာများ | • အလုပ်အကိုင်အခွင့်အလမ်းများ ဖန်တီးပေးခြင်း။ |
| အရေးပေါ် အန္တရာယ်များ | ဆောက်လုပ်ရေး၊ ပိတ်သိမ်းရေးလုပ်ငန်းခွင် | • ဘေးကင်းလုံခြုံမှု ပြဌာန်းချက်များ အရ ထိန်းသိမ်းခြင်း။<br>• နေ့စဉ် လုံခြုံရေးဆိုင်ရာ အစည်းအဝေး ပြုလုပ်ခြင်း။<br>• တစ်ကိုယ်ရည်လုံခြုံမှု ပစ္စည်းများကို စစ်ဆေးခြင်း။ |

**ဓါတုပစ္စည်းစီမံခန့်ခွဲမှုအစီအစဉ်**

| **စီမံခန့်ခွဲမှုခေါင်းစဉ်** | **စီမံခန့်ခွဲမှုအစီအစဉ်များ** |
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| ဓါတုအန္တရာယ်သတ်မှတ်ချက်များ | • စက်ရုံမှကိုယ်စားလှယ်များသည် လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး ကြီးကြပ်သူများ မှ ညွှန်ကြား သော လုပ်ဆောင်ချက်များနှင့်အတူ ဓါတုပစ္စည်းနှင့် လောင်စာ ဆိုင်ရာ ဆက်စပ် အန္တရာယ်များ ကို အစဉ်သတိပြုပြီး ထိန်းချုပ်မှု အစီအစဉ်များ ကို လုပ်ဆောင်ရမည်။ ဓါတုမှတ်ပုံတင် (သို့) သင့်တော် သည့် မူဂါဒကြေငြာစာတမ်းများတွင်ပါဝင်သည့် မီးခိုး၊ ဖုန်၊ အခြားပျံ့နှံ့နေသော အငွေ့များကဲ့သို့ အန္တရာယ်ရှိသော အခြားလုပ်ငန်းစဉ်များ ကိုထည့်သွင်းစဉ်းစားရမည်။<br>• ထုတ်လုပ်ရေး၊ အန္တရာယ်ရှိသည့်ကုန်ပစ္စည်းများနှင့် ကုန်စည်များ အတွက် မှတ်ပုံတင်များ နှင့် ဓါတုမှတ်တမ်းများ၊ သိုလှောင် ထားသော ဓါတုပစ္စည်းများနှင့် လောင်စာများအားလုံးအတွက် ဓါတုမှတ်တမ်းများကို တာဝန်ကျရာနေရာမှလူများ အလွယ်တကူ ဖတ်နိုင် အောင် ထားရှိရမည်။<br>• ဓါတုပစ္စည်းများအားလုံးအတွက် ရှိထားပြီးသည့် ဓါတုပစ္စည်းလုံခြုံမှုအချက်အလက်စာရွက်များ ကို ကွန်ပြူတာ ဟတ်ဒ်ဒစ် များကဲ့သို့သော အီလက်ထရွန်းနစ်စက်များတွင်သိမ်းဆည်းထားခြင်းဖြင့် လိုအပ်ပါက လွယ်ကူစွာ ယူဆောင်ကြည့်ရှုနိုင်သည်။ ဓါတုပစ္စည်း တစ်ခုချင်းစီအတွက် လုံခြုံမှု အချက်အလက်စာရွက်များကို ၎င်းတို့ရှိရာနေရာတွင် လူတိုင်းအလွယ်တကူရရှိနိုင် အောင်ထား ရှိရမည်။ |
| ဓါတုအန္တရာယ်အကဲဖြတ်မှု | • မည်သည့် အန္တရာယ်ရှိသည့်ပစ္စည်းမဆို ဝယ်ယူ အသုံးပြုခွင့်မရှိပါ။<br>➢ အဆိုပါအသုံးပြုမှုများနှင့် ပစ္စည်းတစ်ခုချင်းစီ၏ သိုလှောင်ထားမှုသည် အန္တရာယ်ရှိ သော ကြောင့် အမျိုးသားရေးဆိုင်ရာ စည်းမျဉ်းစည်းကမ်းများ၊ နည်းစနစ်များနှင့်အညီ အကဲဖြတ် အတည်ပြုရပါသည်။ |

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| | ➢ ဓါတုအန္တရာယ်အကဲဖြတ်မှုကိုမှတ်တမ်းတင်ထားပြီး ၄င်း၏ စီမံခန့်ခွဲမှုဆိုင်ရာ အကြံပေးချက် များကို သင့်တော်သည့် အချိန်တွင် စံသတ်မှတ်ချက် လုပ်ထုံးလုပ်နည်းများ ၊ အခြားစာရွက် စာတမ်းများ နှင့် ပေါင်းစည်းပြီး အကောင်အထည် ဖော်ရသည်။<br>• စားသောက်ထုတ်ကုန်များသည် ပမာဏများစွာအသုံးပြုခြင်း (သို့) အခြား ရည်ရွယ်ချက်အတွက် အသုံးပြုခြင်းမရှိပါက အန္တရာယ် အကဲဖြတ်မှုမလိုအပ်ပါ။<br>• ပြီးစီးသောအန္တရာယ်အကဲဖြတ်မှုများကို ဓါတုအန္တရာယ်အကဲဖြတ်မှုမှတ်တမ်းနှင့် သိသာထင်ရှား သောအန္တရာယ်အကဲဖြတ်မှု မှတ်တမ်းများ တွင် သင့်တော်သလို မှတ်တမ်းထားရှိရမည်။<br>• ဓါတုနှင့် လောင်စာများကို အချို့သောအခြေအနေများ နှင့် ပြောင်းလဲမှုများပေါ် လိုက်ပြီး ပြန်လည်အကဲဖြတ်ရမည်။ |
| ဓါတုအန္တရာယ် ထိန်းချုပ်ရေး ဆောင်ရွက်ချက်များ | • သိသာထင်ရှားသည့် အန္တရာယ်များကို ဖော်ထုတ်ထားရှိသည့်နေရာတိုင်း တွင် အန္တရာယ်အကဲဖြတ်မှုများအတွက် ထိန်းချုပ်ရေး ဆောင်ရွက်ချက်များ ကို ဓါတုပစ္စည်းများအသုံးမပြုမီ အကောင် အထည်ဖော်ဆောင်ရွက်ရမည်ဖြစ်သည်။<br>• တံဆိပ်တပ်ခြင်းသည်လည်း ဓါတုပစ္စည်းများကို သယ်ယူပို့ဆောင်ခြင်း၊ သိုလှောင်ခြင်း၊ ကိုင်တွယ် ခြင်း နှင့်စွန့်ပစ်မှုအတွက် ထိန်းသိမ်းမှုအစီအစဉ်တစ်ခုဖြစ်သည်။ ဓါတုပစ္စည်းများ၊ ထုတ်ကုန်များ နှင့် စွန့်ပစ်ပစ္စည်းများပါဝင်သည့် ကွန်တိန်နာများကို တံဆိပ်မှန်ကန်စွာတပ်ထားရမည်။ ထို့အပြင် အန္တရာယ်ရှိသည့် ပစ္စည်းများပါဝင်သည့် ဗီဒိုများကို သင့်တော်သည့် အမှတ်အသား များကပ်ပြီး ကောင်းမွန်စွာထားရှိရမည်။ အောက်ပါ အချက်အလက်များအတိုင်း လိုက်နာဆောင်ရွက်ရမည်။<br>➢ သိုလှောင်သည့်နေရာ၏ အောက်ခြေသည် အရည်မစိမ့်ဝင်နိုင်သည့် အလွှာဖြစ်ရမည်။<br>➢ သိုလှောင်သည့်နေရာသည် ရေစီးမြောင်းများ၊ တွင်းများနှင့် မြေပေါ်ရေ၏ အဝေးတွင် ထားရှိရမည်။<br>➢ အထူးသဖြင့်ကုန်ပစ္စည်းသိုလှောင်မှုကို စနစ်တကျလုံခြုံအောင်ထားရှိရ မည်။<br>➢ ယိုဖိတ်မှုများရှိပါက ချက်ချင်းပြောင်းလဲထည့်ထားနိုင်သည့်ပစ္စည်း (ပုံး၊ ခွက်) များ ထားရှိ ရမည်။<br>➢ လုံလောက်သည့် မီးသတ်စနစ်ကိုထားရှိရမည်။<br>• ယာယီသိုလှောင်မှုများ (သို့) အသေးစားသိုလှောင်မှုများကို အောက်ပါအချက် များနှင့်အညီ ထည့်သွင်းစဉ်းစားရမည်။<br>➢ စည်းမျဉ်းစည်းကမ်းဆိုင်ရာလိုအပ်ချက်များ<br>➢ သက်ဆိုင်သည့် နိုင်ငံတကာစံနှုန်းများ<br>➢ သဘာဝပတ်ဝန်းကျင်အတွက်အန္တရာယ်ရှိသည့် ပစ္စည်းများ၏ ပမာဏ နှင့် ၄င်းတို့၏သဘာဝများ<br>➢ အနီးအနားတွင် ရေနုတ်မြောင်း၊ မိုးရေချိန် နှင့် စိမ့်ဝင်မှုစွမ်းရည်များ ကဲ့သို့သော တည်နေရာကြောင့်ဖြစ်ပွားလာ သည့် သိသာထင်ရှား သည့်ပတ်ဝန်းကျင်ဆိုင်ရာ တန်ဖိုး များ နှင့် အန္တရာယ်များ<br>• ယိုဖိတ်မှုများ၊ ရေဖြင့်မျောပါမှုမှ ကာကွယ်တားဆီးသည့်စည်းများအား စစ်ဆေးခြင်း၊ ပြုပြင် ထိန်းသိမ်းမှုများ ပြုလုပ်ရပါမည်။<br>• ယိုဖိတ်နိုင်သော ပစ္စည်းများကို အချိန်မှီ ပြန်လည်ထုတ်ပိုးပြီး ပုံမှန်စစ်ဆေးရမည်။ ဓါတုပစ္စည်းများ၊ လောင်စာနှင့် အန္တရာယ်အဆင့် သတ်မှတ်ထားသောယိုဖိတ်မှုပစ္စည်းများကို သင့်တော်စွာ သိုလှောင် ထားရမည်။ |

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| ဓါတုပစ္စည်းများ ခွင့်ပြုချက်ရယူမှု | • ဓါတုပစ္စည်းများသယ်ယူပို့ဆောင်ရေး၊ အသုံးပြုမှု၊ သိုလှောင်မှုကိုင်တွယ်မှုနှင့် စွန့်ပစ်မှုနှင့် သက်ဆိုင်သည့် ဆက်စပ် အန္တရာယ်များ အတွက် ၎င်းတို့ကို အသုံးမပြုမီ ဦးစွာပြည်တွင်း ခွင့်ပြုချက်များရယူရန်လိုအပ်သည်။ |
| အရေးပေါ် ကြိုတင်ကာကွယ်မှု | • ပတ်ဝန်းကျင်ဆိုင်ရာ ထိခိုက်မှုများအတွက် အရေးပေါ် ပြင်ဆင်မှုများကို လိုက်နာရန် လိုအပ်ပါသည်။<br>• ယိုဖိတ်မှုများ၊ ယိုစိမ့်မှုများ (သို့) ဓါတုအစိုင်အခဲများ၊ ဓါတုရည်များကို အမှတ်တမဲ့ လွှတ်ပစ်မိခြင်း၊ လောင်စာ နှင့် အခြားအန္တရာယ် ရှိသောအရာများကို မှတ်တမ်းထား ပြီး သေချာစွာ စီမံခန့်ခွဲရမည်။<br>• ယိုဖိတ်မှုများ၊ ယိုစိမ့်မှုများ (သို့) ဓါတုအစိုင်အခဲများ၊ ဓါတုရည်များကို အမှတ်တမဲ့ လွှတ်ပစ်မိခြင်း တို့မှ မြေဆီလွှာ၊ မြေအောက်ရေ တို့ကို ညစ်ညမ်းစေမှုတို့ကို ဓါတုပစ္စည်း ဘေးကင်းလုံခြုံမှု ဆိုင်ရာစာရွက်များအရ မှတ်တမ်းထား ပြီး သေချာစွာ စီမံခန့်ခွဲရမည်။<br>• လုံခြုံစိတ်ချရသောဒီဇိုင်း၊ တည်နေရာ နှင့် သိုလှောင်ထားရှိမှုများ၊ ကိုယ်တွယ်ရေး နည်းစနစ် များရှိစေရန် ဂရုပြုရမည်။<br>• ဓါတုပစ္စည်းများအချင်းချင်းဓါတ်ပြုမှုကို တားဆီးရန် အရာဝတ္ထုများကို သီးခြားစီ ခွဲထားရမည်။<br>• မီးလောင်လွယ်သည့်ပစ္စည်းများအနီးတွင် မီးလောင်စေသည့်ပစ္စည်းများမထားရ။<br>• သင့်တော်သည့် လုံခြုံရေး ဆိုင်းဘုတ်များ၊ စာတန်းများကို ချိတ်ဆွဲထားရမည်။<br>• ဖိတ်စင်မှုများအတွက် သန့်ရှင်းရေးစနစ်များကိုပါ ပြင်ဆင်ထားရှိရမည်။<br>• ဘေးအန္တရာယ်ရှိသည့်ဓါတုပစ္စည်းများပါဝင်သည့် ထိခိုက်မှုများကို  ထိခိုက်မှု ဖြစ် ပွားသည့်နေရာ တွင် အရေးပေါ်ကုသနိုင်ရန် အစီအစဉ်များ ထားရှိရမည်။<br>• သင့်တော်သည့် တစ်ကိုယ်ရေသုံးအကာအကွယ်ပစ္စည်းများ ထောက်ပံ့ပေးပြီး မှန်ကန်စွာ ထားရှိ ရမည်။<br>• မီးဘေးလုံခြုံရေးပစ္စည်းများကိုလွယ်ကူစွာရရှိအသုံးပြုနိုင်အောင်ထားရှိရမည်။<br>• ဓါတုပစ္စည်းများကိုခွင့်ပြုချက်မရှိပဲ ဝင်ရောက်မှုကိုတားဆီးရမည်။ |

***ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုရေး***

လည်ပတ်ရေးကာလနှင့် ပိတ်သိမ်းခြင်းအတွင်းတွင် ဆောက်ရွက်ရမည့် ပတ်ဝန်း ကျင်စောင့်ကြပ်ကြည့်ရှုခြင်းဆိုင်ရာ အချက်အလက်များကို အောက်ဖော်ပြပါဇယားဖြင့် ပြထားပါသည်။ အောက်တွင် ဖော်ပြထား သော စောင့်ကြပ်ကြည့်ရှုမှုများကို လုပ်ငန်းလည်ပတ်ရေးကာလတွင် ၁ နှစ် ၂ ကြိမ် စောင့်ကြပ်ကြည့်ရှုရေး အစီရင်ခံစာကို ပတ်ဂန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန ချင့် သက်ဆိုင်ရာ စက်မှုဇုန် စီမံအုပ်ချုပ်မှုအဖွဲ့ သို့တင်ပြရ မည်ဖြစ်ပါသည်။

| စောင့်ကြပ်ကြည့်ရှုတိုင်းတာရမည့် အစီအစဉ်များ | တိုင်းတာသည့် အချက်အလက် | နေရာ | အကြိမ် အရေ အတွက် | တာဝန်ယူမှု |
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| **ပိတ်သိမ်းခြင်းကာလ** | | | | |
| လေအရည်အသွေး | • အမှုန်အမွှား(Particulate matters)၊ များ ထွက်ရှိမှု မှတ်တမ်း တင်ခြင်း<br>• စက်ပစ္စည်းများပြင်ဆင် ထိန်းသိမ်းမှုများ မှတ်တမ်းတင်ခြင်း<br>• ဖုန်မှုန်ထွက်ရှိမှုများအား ထိန်းချုပ်ခြင်း (ရေဖြန်း ခြင်း) | ပိတ်သိမ်းရေး လုပ်ငန်းခွင် | လစဉ် | ဆောက်လုပ်ရေး ကန်ထရိုက်တာ |
| မြေထုအရည်အသွေး | • စတိုများ၊ သိုလှောင် ကန် များမှဓာတုပစ္စည်း နှင့် အဆိပ်ရှိပစ္စည်းများ ထုတ်လွှတ်/ ယိုစိမ့်မှု အခြေအနေမှတ်တမ်း တင်ခြင်း<br>• ယာဉ်များမှ ဓာတု ပစ္စည်းများ၊ စက်ဆီ ချောဆီများ ယိုစိမ့်မှု | ပိတ်သိမ်းရေး လုပ်ငန်းခွင် | လစဉ် | ဆောက်လုပ်ရေး ကန်ထရိုက်တာ |
| ရေအရည်အသွေး | • ယာယီအိမ်သာများမှ ရေဆိုးထွက်ရှိမှု နှင့် စွန့်ပစ်မှု အခြေအနေ<br>• ယာယီမိုးရေဆင်း မြောင်း များ၏အခြေ အနေ | ပိတ်သိမ်းရေး လုပ်ငန်းခွင် | လစဉ် | ဆောက်လုပ်ရေး ကန်ထရိုက်တာ |
| ရေအသုံးပြုမှု | နေ့စဉ် ရေသုံးစွဲမှုပမာဏ | ပိတ်သိမ်းရေး လုပ်ငန်းခွင် | နေ့စဉ် | ဆောက်လုပ်ရေး ကန်ထရိုက်တာ |
| ဆူညံသံ နှင့် တုန်ခါမှု | • လုပ်ငန်းခွင်ဆူညံသံ တိုင်းတာခြင်း | ပိတ်သိမ်းရေး လုပ်ငန်းခွင် | လစဉ် | ဆောက်လုပ်ရေး ကန်ထရိုက်တာ |
| စွန့်ပစ်ပစ္စည်းစွန့်ပစ်မှု | • အလုပ်သမားများမှ စွန့် ပစ်သည့်၊ စွန့်ပစ်ပစ္စည်း များ နှင့် မိလ္လာထွက် စွန့်ပစ် ပစ္စည်း များ ပမာဏမှတ်တမ်း | ပိတ်သိမ်းရေး လုပ်ငန်းခွင် | နေ့စဉ် တွေ့ရှိ ချက် | ဆောက်လုပ်ရေး ကန်ထရိုက်တာ |

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| | • သိုလှောင်ဧရိယာအား စစ်ဆေးခြင်း။<br>• စွန့်ပစ်ပစ္စည်းများအား အမျိုးစားခွဲခြားစွန့်ပစ်မှုကို စစ်ဆေးခြင်း။<br>• စွန့်ပစ်မှုကိုစစ်ဆေးခြင်း။ | | | |
| | • စွန့်ပစ်မှုဆိုင်ရာ လိုအပ်ချက်အတိုင်း စွန့်ပစ်သော ဆောက်လုပ်ရေး စွန့်ပစ်ပစ္စည်းပမာဏ မှတ်တမ်း<br>• အန္တရာယ်ရှိသော စွန့်ပစ်ပစ္စည်းနှင့် အန္တရာယ်မရှိသော စွန့်ပစ်ပစ္စည်းအား ခွဲခြား ခြင်း<br>• သိုလှောင်ဧရိယာအား စစ်ဆေးခြင်း | ပိတ်သိမ်းရေး လုပ်ငန်းခွင် | အပတ်စဉ် | ဆောက်လုပ်ရေး ကန်ထရိုက်တာ |
| အလုပ်အကိုင်ရရှိမှု | • အလုပ်အကိုင်ရရှိသူ ဦးရေ | ပိတ်သိမ်းရေး လုပ်ငန်းခွင် | လစဉ် | ဆောက်လုပ်ရေး ကန်ထရိုက်တာ |
| အခြားလူမှုစီးပွားအတွက် ထည့်သွင်းစဉ်းစားချက်များ | • လူမှုစီးပွားတာဝန်ယူမှု အစီအစဉ်<br>• လုပ်သားများအတွက် ဖူလုံရေးအစီအစဉ် | စောင့်ကြည့် လေ့လာရေးအဖွဲ့ | လစဉ် | ဆောက်လုပ်ရေး ကန်ထရိုက်တာ |
| လုပ်ငန်းခွင်ကျန်းမာရေး နှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး | • ဘေးအန္တရာယ်ကင်းရှင်းရေး အစီအစဉ်၊ မတော်တဆမှု မှတ်တမ်း၊<br>• ကျန်းမာရေးဆိုင်ရာ မှတ်တမ်း<br>• အလုပ်သမား၏ မကျေနပ်မှု နှင့် အငြင်းပွားမှု ဆိုင်ရာ မှတ်တမ်း<br>• PPE ထောက်ပံ့ပေးမှု မှတ်တမ်း<br>• ရှေးဦးသူနာပြုပစ္စည်းများ ထောက်ပံ့ပေးမှု | အလုပ်သမားများ | လစဉ် | လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး ကြီးကြပ်သူအရာရှိ |
| လူမှုပတ်ဝန်းကျင် ကျန်းမာရေး နှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး | • မတော်တဆမှုမှတ်တမ်း<br>• ယာဉ်မောင်းများနှင့် လုံခြုံရေးဝန်ထမ်းများအား သင်တန်း ပို့ချမှု မှတ်တမ်း | ဒေသတွင်း နေထိုင်သူများ | လစဉ် | လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး ကြီးကြပ်သူအရာရှိ |

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| အရေးပေါ်အခြေအနေ | • မတော်တဆမှု မှတ်တမ်း၊<br>• မီးဘေး၊ ရေဘေး၊ လျှော့ အန္တရာယ် စသည့် အရေးပေါ် အခြေအနေ တုန့်ပြန်မှုမှတ်တမ်း<br>• သင်တန်းများ၊ လေ့ကျင့် သင်ကြားပေးမှု | ပိတ်သိမ်းရေး လုပ်ငန်းခွင် | လစဉ် | လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး ကြီးကြပ် သူအရာရှိ |
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| **လုပ်ငန်းလည်ပတ်သည့်ကာလ** | | | | |
| လေအရည်အသွေး | အမှုန်အမွှား (Particulate matters)၊ အငွေ့ပျံလွယ် သော ဓာတုဒြပ်ပေါင်း (VOC)၊ ကာဗွန်မိုနောက် ဆိုဒ် (CO) ကာဗွန်မိုဒိုင် အောက်ဆိုဒ်(CO2)၊ နိုင်ထ ရိုဂျင်ဒိုင် အောက် ဆိုဒ်(NO2 ၊ဆာလဖာဒိုင် အောက်ဆိုဒ် (SO2) | ပတ်ဝန်းကျင် လေထု | တစ်နှစ် ၂ ကြိမ် | စက်ရုံမန်နေဂျာနှင့် လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး ကြီးကြပ် သူအရာရှိနှင့် ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးအရာရှိ |
| | မှုန်အမွှား (Particulate matters)၊ အငွေ့ပျံလွယ် သော ဓာတုဒြပ်ပေါင်း (VOC) | လုပ်ငန်းစဉ်ဧရိယာ ၁ -၃ပမာ ရောစပ် ဧရိယာ၊ စွန့်ပစ် ရေသန့် စင်ရုံသို လှောင် ဧရိယာ၊ | တစ်နှစ် ၂ ကြိမ် | စက်ရုံမန်နေဂျာနှင့် လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး ကြီးကြပ် သူအရာရှိနှင့် ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးအရာရှိ |
| | လောင်ကျွမ်းဓာတ်ငွေ့ များ (ကာဗွန်မိုနောက် ဆိုဒ် (CO) ကာဗွန်မိုဒိုင် အောက်ဆိုဒ်(CO2)၊ နိုင်ထ ရိုဂျင်ဒိုင် အောက် ဆိုဒ်(NO2 ၊ဆာလဖာဒိုင် အောက်ဆိုဒ် (SO2)) | ဘွိုင်လာ နှင့် မီးစက် မီးခိုး ခေါင်းတိုင် အထွက် | တစ်နှစ် ၂ ကြိမ် | စက်ရုံမန်နေဂျာနှင့် လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး ကြီးကြပ် သူအရာရှိနှင့် ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးအရာရှိ |
| | • အမှုန်အမွှားနှင့် အနံ့ ဖယ်စနစ်ကို ပုံမှန်ပြု ပြင်စစ်ဆေးခြင်း<br>• အသုံးပြုစက်ကိရိယာ များ နှင့် ယာဉ်များပုံမှန် စစ်ဆေးခြင်း<br>• လေဝင်လေထွက်စနစ်မျ ားပုံမှန်စစ်ဆေးခြင်း<br>• ရေဆိုးသန့်စင်စနစ် ကိုအနံ့အသက်ထွက်ရှိမှု | လုပ်ငန်းခွင် အတွင်း | လစဉ် | စက်ရုံမန်နေဂျာနှင့် လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး ကြီးကြပ် သူအရာရှိနှင့် ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးအရာရှိ |

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| | မရှိစေရန်ဖုံးအုပ်ထားမှုကို စစ်ဆေးခြင်း<br>• အိမ်သာများ နှင့် မိလ္လာ စွန့်ပစ်မှုအခြေအနေ များကိုစစ်ဆေးခြင်း<br>• အမှိုက်ကန်များ နှင့် အမှိုက်ပုံးများစနစ်တကျ ဖုံးအုပ်ထားရှိမှုကို စစ်ဆေးခြင်း<br>• စစ်ဆေးမှုအားလုံးကို မှတ်တမ်းထားရှိခြင်း | | | |
| စွန့်ပစ်ရေအရည် အရည်အသွေး | pH, ဆီနှင့်ချောဆီ, ရေတွင် အနည်ကျသော အမှုန်များ, ဘီအိုဒီ, စီအိုဒီ , အရောင် နှင့် အပူချိန် | စက်ရုံရေမြောင်း အထွက် | လစဉ် | စက်ရုံမန်နေဂျာနှင့် လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး ကြီးကြပ် သူအရာရှိနှင့် ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးအရာရှိ |
| | စွန့်ပစ်ရေအရည်အသွေး | စွန့်ပစ် ရေသန့် စင် စနစ် အဝင် နှင့် အထွက် | တစ်နှစ် ၂ ကြိမ် | စက်ရုံမန်နေဂျာနှင့် လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး ကြီးကြပ် သူအရာရှိနှင့် ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးအရာရှိ |
| စွန့်ပစ်ပစ္စည်းစွန့်ပစ်မှု | • ဓာတုပစ္စည်းထည့် သည့် ပလပ်စတစ်၊ စည်ပုံး၊ စက္ကူပုံး/ စွန့်ပစ်ရေဆိုး သန့်စင်ရုံမှ ထွက် သော အနည်အနှစ် များ စွန့်ပစ်မှု ပမာဏ ကို မှတ်တမ်း တင်ခြင်း<br>• အမှိုက်သိမ်း စနစ်အား စစ်ဆေးခြင်း<br>• သိုလှောင်မှုအား စစ်ဆေး ခြင်း<br>• စွန့်ပစ်ပစ္စည်းများအားခွဲ ခြား ခြင်း (အန္တရာယ်ရှိ သော စွန့်ပစ် ပစ္စည်း နှင့် အန္တရာယ်မရှိ သောစွန့် ပစ် ပစ္စည်း) | စက်ရုံအတွင်းနှင့် ပတ်ဝန်းကျင် | လစဉ် | စက်ရုံမန်နေဂျာနှင့် လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး ကြီးကြပ် သူအရာရှိနှင့် ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးအရာရှိ |
| မြေဆီလွှာညစ်ညမ်းမှု | ဆီများယိုစိမ့်ခြင်း၊ ဖျော်ရည်၊ ဓာတု ပစ္စည်းများ စွန့်ပစ်ရေ ဧရိယာမှ ဖိတ်စင်ခြင်း | စက်ရုံပတ်ဝန်း ကျင်၊ဓာတု ပစ္စည်း သိုလှောင်ဧရိ ယာ၊ လောင်စာ | လစဉ် | စက်ရုံမန်နေဂျာနှင့် လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး ကြီးကြပ် သူအရာရှိနှင့် ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးအရာရှိ |

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| | | ဆီ သိုလှောင် ဧရိယာ၊ | | |
| ဆူညံသံနှင့်တုန်ခါမှု | ဆူညံသံနှင့်တုန် ခါမှု အဆင့် | စက်ရုံဝန်းကျင်၊ လုပ်ငန်းခွင် | တစ်နှစ်-(၂) ကြိမ် နှင့် ညွှန်ကြားချက် အတိုင်း | စက်ရုံမန်နေဂျာနှင့် လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး ကြီးကြပ်သူအရာရှိနှင့် ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးအရာရှိ |
| အနံ့အသက် | လေဝင်လေထွက် ကောင်းမွန်မှုအား စစ်ဆေးခြင်း | အလုပ်ရုံ နှင့် သိုလှောင်ရုံ များ | အပတ်စဉ် | စက်ရုံမန်နေဂျာနှင့် လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး ကြီးကြပ်သူအရာရှိနှင့် ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးအရာရှိ |
| အန္တရာယ်ရှိပစ္စည်းများ နှင့် ဓာတုပစ္စည်းများ | • အန္တရာယ်ရှိပစ္စည်းများ နှင့် ဓာတုပစ္စည်းများ မှတ်တမ်းတင်ခြင်း<br>• အရောင်ခြယ်အမှုန့်/ အနှစ်၊ ဖြည့်စွက် ပစ္စည်း များ စသည်တို့ကို ကိုင် တွယ် ခြင်း၊ အသုံးပြု ခြင်း များ နှင့် ကို စစ်ဆေးခြင်း<br>• သိုလှောင်ဧရိယာများ အား စစ်ဆေးခြင်း<br>• စွန့်ပစ်ခြင်း နည်းစနစ်များ အား စစ်ဆေး ခြင်း<br>• ကုန်ကြမ်းသုံးစွဲမှု ပမာဏကိုမှတ်တမ်း ပြုလုပ် ခြင်း | အလုပ်ရုံ နှင့် သိုလှောင်ရုံများ | အပတ်စဉ် | စက်ရုံမန်နေဂျာနှင့် လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး ကြီးကြပ်သူအရာရှိနှင့် ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးအရာရှိ |
| စိမ်းလန်းအစီအစဉ် | • စက်ရုံတွင်းစိမ်းလန်းစို ပြည်မှုဧရိယာ အခြေ အနေ မှတ်တမ်း<br>• စိုက်ပျိုးပင်များ အမျိုး အစား မှတ်တမ်း<br>• အပင်သေမှု နှင့် ထပ်မံ စိုက်ပျိုးမှုမှတ်တမ်း | စက်ရုံပတ်ဝန်း ကျင် | တစ်နှစ်-(၂) ကြိမ် | စက်ရုံမန်နေဂျာနှင့် လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး ကြီးကြပ်သူအရာရှိနှင့် ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးအရာရှိ |
| မြေသားပြုပြင်ခြင်း | စက်ရုံတွင်းမြေယာပြုပြင် ထိန်းသိမ်းမှုအခြေအနေ မှတ်တမ်း | စက်ရုံပတ်ဝန်း ကျင် | တစ်နှစ်-(၂) ကြိမ် | စက်ရုံမန်နေဂျာနှင့် လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး ကြီးကြပ်သူအရာရှိနှင့် ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးအရာရှိ |
| လုပ်ငန်းခွင်ကျန်းမာရေး နှင့်ဘေးအန္တရာယ်ကင်း | • လုပ်ငန်းခွင် ဘေးအန္တ ရာယ် ကင်းရှင်းရေးနှင့် | စက်ရုံပတ်ဝန်း ကျင် | လစဉ် | လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး ကြီးကြပ် |

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| ရှင်းရေး | မတော်တဆမှု မှတ်တမ်း<br>• အလုပ်သမား၏မကျေနပ်မှု နှင့်အငြင်းပွားမှု ဆိုင်ရာ မှတ်တမ်း<br>• တစ်ကိုယ်ရည်သုံး အကာအကွယ်ပစ္စည်းများစစ်ဆေးခြင်း နှင့် ထောက်ပံ့ပေးမှုမှတ်တမ်း<br>• အရေးပေါ်တုန့်ပြန်မှုအစီအစဉ်<br>• ရှေးဦးသူနာပြုပစ္စည်းများထောက်ပံ့ပေးမှု<br>• လုပ်သားများ အတွက်သောက် သုံးရေ နှင့် နားနေ ဆောင် စီမံထားရှိမှု အခြေအနေ<br>• အိမ်သာနှင့် မိလ္လာကန်များစစ်ဆေးခြင်း<br>• စီမံကိန်းအတွင်း လမ်းများ သတ်သတ် မှတ် မှတ်ထားရှိပေး ခြင်း နှင့် ပိတ်ဆို့မှု ရှိမရှိ စစ်ဆေးခြင်း<br>• လုပ်သားများ၏ တိုင်းကြားမှုမှတ်တမ်း | | | သူအရာရှိနှင့် ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးအရာရှိ |
| | • ဝန်ထမ်း တစ်ဦးချင်းစီ ၏ ဆေးမှတ်တမ်း<br>• ဂန်ထမ်းများကိုပုံမှန် ဆေးစစ်ပေးခြင်း<br>• ရှေးဦးသူနာပြုသင်တန်း ပို့ချမှု<br>• လုပ်ငန်းခွင် ကျန်းမာရေး နှင့် လုံခြုံရေးဆိုင်ရာ သင်တန်းများပို့ချမှု<br>• ကူးစက်ရောဂါ ကာကွယ် ရေးမှတ်တမ်းများ | စက်ရုံပတ်ဝန်း ကျင် | တစ်နှစ်-(၂) ကြိမ် | လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး ကြီးကြပ် သူအရာရှိနှင့် ပတ်ဂန်းကျင် ထိန်းသိမ်းရေးအရာရှိ |
| စက်ပစ္စည်းများပြုပြင် ထိန်းသိမ်းမှု | • ရေဆိုးသန့်စင်စနစ်၊<br>• လေစုပ်စနစ် နှင့် ပိုက်လိုင်း များ<br>• မီးစက် အင်ဂျင် နှင့် ဘွိုင်လာ | စက်ရုံဝန်းအတွင်း နှင့် လုပ်ငန်းခွင် နေရာအားလုံး | လစဉ် နှင့် လိုအပ် သည့် အချိန်တိုင်း | စက်ရုံမန်နေဂျာ နှင့် စက်ပစ္စည်းပြင်ဆင်ထိန်းသိမ်း ရေးဂန်ထမ်း |

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| | • သယ်ယူပို့ ဆောင်ရေး ယာဉ်များ (ဂန်ချီ ဂန်မ ယာဉ်၊ မော်တော် ယာဉ် များ)<br>• ကုန်ချောထုတ်စက်များ | | | |
| | • ပြုပြင်ထိန်းသိမ်းမှု မှတ်တမ်းထားရှိခြင်း<br>• အသုံးပြုသည့်အချိန် များ မှတ်တမ်းတင်ခြင်း | စက်ရုံဝန်းအတွင်း နှင့် လုပ်ငန်းခွင် နေရာအားလုံး | လစဉ် နှင့် လိုအပ် သည့် အချိန်တိုင်း | စက်ရုံမန်နေဂျာနှင့်စက်ပစ္စည်း ပြင်ဆင်ထိန်းသိမ်းရေး ဂန်ထမ်း |
| လူမှုပတ်ဂန်းကျင် ကျန်းမာရေး နှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး | • မတော်တဆမှု မှတ်တမ်း<br>• ယာဉ်မောင်းများနှင့် လုံခြုံရေးဂန်ထမ်း များအား သင်တန်း ပို့ချမှု မှတ်တမ်း<br>• ဒေသခံများ၏တိုင် ကြားချက်များမှတ် တမ်းထားရှိခြင်း | ဒေသတွင်း နေထိုင်သူများ | လစဉ် | လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး ကြီးကြပ် သူအရာရှိနှင့် ပတ်ဂန်းကျင် ထိန်းသိမ်း ရေး အရာရှိ |
| | • အမှုန်အမွှားပျံလွင့်မှုမရှိစေရန် သယ်ယူ ပို့ဆောင်ရေးယာဉ် များကိုစနစ်တကျ ဖုံး အုပ်ခြင်း ရှိမရှိ စစ်ဆေး ခြင်း<br>• ယာဉ်မောင်းများအား အမြန်နှုန်းသတ်မှတ် ပေးခြင်း | ဒေသတွင်း နေထိုင်သူများ | နေ့စဉ် | လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး ကြီးကြပ် သူအရာရှိနှင့် ပတ်ဂန်းကျင် ထိန်းသိမ်းရေးအရာရှိ |
| အခြားလူမှုစီးပွားအတွက် ထည့်သွင်းစဉ်းစားချက် များ | • လူမှုစီးပွားတာဝန်ယူမှု အစီအစဉ်<br>• ဒေသခံများအလုပ် အကိုင်ဖန်တီးပေးမှု | စောင့်ကြည့် လေ့လာရေးအဖွဲ့ | နှစ်စဉ် | လူမှုဆက်ဆံရေး မန်နေဂျာ |
| အရေးပေါ်အခြေအနေ | • မီးသတ်ကိရိယာများ ပုံမှန်စစ်ဆေးခြင်း၊<br>• မီးသတ်သင်တန်း ပို့ချမှုမှတ်တမ်းများ<br>• အန္တရာယ်ရှိပစ္စည်းများ နှင့် ဓာတုပစ္စည်းများ ကိုင်တွယ်သုံးစွဲမှု နှင့် စီမံခန့်ခွဲမှုစနစ်ကို ပုံမှတ်စစ်ဆေးခြင်း<br>• စက်ရုံတွင်းရေမြောင်း များကို စစ်ဆေးခြင်း နှင့် စစ်ဆေးမှုမှတ် တမ်း | စက်ရုံ ပတ်ဝန်းကျင် | လစဉ် နှင့် လိုအပ်သည့် အချိန်းတိုင်း | လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး ကြီးကြပ် သူအရာရှိနှင့် ပတ်ဂန်းကျင် ထိန်းသိမ်းရေးအရာရှိ |

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| | ထားရှိခြင်း<br>• အရေးပေါ်မတော်တဆ ဖြစ်ပွားမှု များ နှင့် ၎င်းတို့ အား ဖြေရှင်း မှု အစီ အစဉ် မှတ်တမ်း<br>• ဆောက်အဦများ၏ ငလျင်ဒဏ်ခံနိုင်မှုကို စစ်ဆေးခြင်း နှင့် မှတ်တမ်းထားရှိခြင်း | | | |
| | • အရေးပေါ်တုန့်ပြန်မှု သင်တန်းများပေးခြင်း | စက်ရုံ ပတ်ဝန်းကျင် | တစ်နှစ် ၂ ကြိမ် | လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး ကြီးကြပ် သူအရာရှိနှင့် ပတ်ဂန်းကျင် ထိန်းသိမ်းရေး အရာရှိ |

**လူမှုစီးပွားတာဝန်သိအစီအစဉ်**

စီမံကိန်းအကောင်အထည်ဖော်ဆောင်သူသည် လူမှုစီးပွားတာဝန်သိအစီအစဉ်အတွက် နိုင်ငံတော်မှ သတ်မှတ်ထားသော နှစ်စဉ်ရရှိသောအကျိုးအမြတ်ငွေ ၏ ရာခိုင်နှုန်းတစ်ခုကို အသုံးပြုမည်ဟု ကတိပြုထားပြီး ထိုရန်ပုံငွေကို ကုမ္ပဏီ၏ မူဝါဒနှင့် စည်းမျဉ်းများအတိုင်း အသုံးပြုသွား မည်ဖြစ်ပါသည်။

လူမှုစီးပွားတာဝန်သိအစီအစဉ်ကို အကောင်းဆုံးဖြစ်စေရန် စီမံကိန်းအကောင်အထည် ဖော်ဆောင်သူသည် အောက်ပါအတိုင်းအသုံးပြုသင့်ပါသည်။

(၁) ပညာသင်စရိတ်ထောက်ပံ့ခြင်း နှင့် ပညာပေးအစီအစဉ်များ

(၂) သက်ဆိုင်ရာတာဝန်ရှိသူများနှင့် လူမှုဖွံ့ဖြိုးမှုအစီအစဉ်

(၃) အလုပ်အကိုင်အခွင့်အလမ်းအတွက် သင်တန်းများပေးခြင်းအစီအစဉ်

(၄) ကျန်းမာရေး နှင့် ဘေးအန္တရာယ်ကင်းရှင်း အစီအစဉ်

(၅) လမ်းပန်းဆက်သွယ်ရေး အတွက် အစီအစဉ်

(၆) ပတ်ဂန်းကျင်စောင့်ကြည့်ရေး နှင့် စီမံခန့်ခွဲမှုအစီအစဉ်

**အများပြည်သူနှင့်ဆွေးနွေးတိုင်ပင်ခြင်းနှင့် သတင်းအချက်အလက်ထုတ်ပြန်ခြင်း**

ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းဆောင်ရွက်ရာတွင် အများပြည်သူနှင့်တွေ့ဆုံဆွေးနွေးခြင်းများ ပြုလုပ်ရခြင်းသည် စက်ရုံလုပ်ငန်းဆိုင်ရာ အကြောင်းအရာများကို အမှန်တကယ် သိရှိနားလည် သဘော ပေါက်စေရန်၊ စက်ရုံလုပ်ငန်း လုပ်ဆောင်မှုကြောင့် ပတ်ဝန်းကျင်အပေါ်သက်ရောက်နိုင်မှုများနှင့် စက်ရုံလုပ်ငန်းကြောင့် အလုပ်အကိုင်အခွင့်အလမ်းများ တိုးတက်လာခြင်းများကို အများပြည်သူများ အနေဖြင့် သိရှိစေရန် ရည်ရွယ်ပါသည်။ အဆိုပြုစီမံကိန်းကြောင့် ထိခိုက်နိုင်သည့်သူများနှင့် အခြား မည်သည့်သူများမဆို တွေ့ဆုံဆွေးနွေးခြင်း လုပ်ငန်းစဉ်များတွင် ပူးပေါင်းပါဝင်ဆွေးနွေးကြခြင်းဖြင့် လုပ်ငန်းရှင်များအနေဖြင့် ဖြစ်ပေါ်လာနိုင်သည့် ပြဿနာများကို ကြိုတင်ကာ ဖြေရှင်းနိုင်သွားမည် ဖြစ်ပါသည်။

**<u>လုပ်ဆောင်မည့်နည်းလမ်း</u>**

စိမ်းလန်းမြန်မာပတ်ဝန်းကျင်ဆိုင်ရာဝန်ဆောင်မှုလုပ်ငန်းကုမ္ပဏီလီမိတက်အနေဖြင့် အဆိုပြု စက်ရုံ နှင့် ပတ်သက်၍ အများပြည်သူများထံမှ သဘောထားရယူခြင်းနှင့် သတင်းအချက်အလက်များထုတ်ပြန် ရာတွင် စက်ရုံအနီးပတ်ဝန်းကျင် အများပြည်သူများနှင့်တွေ့ဆုံဆွေးနွေးအကြံပြုချက်များရယူခြင်း ကိုဆောင်ရွက်ခဲ့ပါသည်။

**စက်ရုံအနီးပတ်ဝန်းကျင်အများပြည်သူများနှင့်တွေ့ဆုံဆွေးနွေးအကြံပြုချက်များရယူခြင်း**

ပတ်ဂန်းကျင်စီမံခန့်ခွဲအစီအစဉ် (Environmental Mangement Plan-EMP) အစီရင်ခံစာ ရေးဆွဲခြင်းအတွက် အများပြည်သူနှင့်တွေ့ဆုံဆွေးနွေးခြင်း (Public Consultation Meeting - PCM) လုပ်ငန်းစဉ်များသည် စက်ရုံနှင့်ပတ်သက်၍ အများပြည်သူထံမှ သဘောထားအမြင်များ၊ အကြံပြုချက်များ ကို ရရှိစေရန်နှင့် လုပ်ငန်း၏ သတင်းအချက်အလက်များ သိစေရန်အတွက် ဖြန့်ဝေရခြင်းဖြစ်ပါသည်။ အများပြည် သူများနှင့် တွေ့ဆုံဆွေးနွေးပွဲသို့ ဌာနဆိုင်ရာအစိုးရအဖွဲ့အစည်းများ၊ စက်မှုဇုန် စီမံခန့်ခွဲရေး ကော်မတီမှ တာဝန်ရှိသူများ၊ စက်မှုဇုန်အတွင်းရှိစက်ရုံများမှတာဝန်ရှိသူများ၊ စက်ရုံမှတာဝန်ရှိ သူများ စုစုပေါင်း (၁၆) ဦးခန့် တက်ရောက်ခဲ့ပါသည်။ ဆွေးနွေးပွဲကို ၂၀၂၂ ခုနှစ်၊ အောက်တိုဘာလ (၁၆) ရက်နေ့ တွင် စက်မှုဇုန် စီမံခန့်ခွဲရေး ကော်မတီရုံး၊ မင်္ဂလာဒုံစက်မှုဥယျာဉ်၊ မင်္ဂလာဒုံမြို့နယ်၊ ရန်ကုန်တိုင်းဒေသကြီး။

တွေ့ဆုံဆွေးနွေးပွဲတွင် အကြံပြုစာရွက် (၆) စောင် ရရှိခဲ့ပါသည်။ ဆွေးနွေး ပွဲတက်ရောက်သူများစာရင်းကို ကနဦးပတ်ဝန်းကျင် ဆန်းစစ်ခြင်း အစီရင်ခံစာ၏ နောက်ဆက်တွဲ (၁၁) နှင့် အကြံပြုချက်များကို နောက်ဆက်တွဲ (၁၂) တွင် ဖော်ပြထားပါသည်။ အများပြည်သူနှင့်တွေ့ဆုံဆွေးနွေးပွဲဆိုင်ရာ အချက်အလက်များကို အောက်တွင် ဖော်ပြထား ပါသည်။

ဇယား (၄)။ အများပြည်သူနှင့်တွေ့ဆုံဆွေးနွေးပွဲမှဖော်ပြချက်များ

| စဉ် | အကြံပြုဆွေးနွေးသူ/အကြံပြုချက်များ | ပြန်လည်ရှင်းလင်းဖြေကြားမှုများ |
|---|---|---|
| ၁ | **ဒေါ်ညိုလင်းထက် (ဒုတိယဦးစီးမှူး)**<br>**ရန်ကုန်မြောက်ပိုင်းခရိုင်၊**<br>**ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန**<br>• ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဆိုင်ရာအဖွဲ့ကို စက်ရုံတွင်ဖွဲ့စည်းထားရန်နှင့် ၎င်းအဖွဲ့အစည်း အနေဖြင့် ပတ်ဝန်းထိန်းသိမ်းစောင့်ရှောက်မှု ဆိုင်ရာ များနှင့်ပတ်သက်၍ စက်ရုံဝန်ထမ်း များကို အသိပညာပေးခြင်း၊ သင်တန်းများ ပို့ချခြင်းများကို လုပ်ဆောင်သင့်ပါကြောင်း။<br>• ပတ်ဝန်းကျင်ဆိုင်ရာ ထိန်းသိမ်း စောင့်ရှောက် မှုများနှင့်ပတ်သက်၍ သိရှိလိုပါက ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဦးစီးဌာန၏ ဝက်(ဘ်)ဆိုဒ်နှင့် လူမှု ကွန်ယက်စာမျက်နှာများတွင် ဝင်ရောက် လေ့လာ နိုင်ပါကြောင်း။<br>• ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနမှ ချမှတ် ထားသော လမ်းညွှန်ချက်များအတိုင်း လိုက်နာ ဆောင်ရွက်သင့်ပါကြောင်း။<br>• စက်ရုံတွင် လုပ်ကိုင်နေကြသော ဝန်ထမ်းများ အတွက် ကျန်းမာရေးစောင့်ရှောက်မှုဆိုင်ရာ များ ကို အလေးထား ဆောင်ရွက်သင့်ပါ ကြောင်း။<br>• စက်ရုံလုပ်ငန်းအတွက် လိုအပ်သော လုပ်ငန်း လိုင်စင်များကိုသက်ဆိုင်ရာဌာနဆိုင်များသို့ တင်ပြ၍ ခွင့်ပြုချက်တောင်းခံပြီး လိုက်နာ လုပ်ဆောင်သင့်ပါကြောင်း အကြံပြုအပ် ပါသည်။ | **ဦးကျော်စိုးဝင်း - အုပ်ချုပ်မှုဒါရိုက်တာ**<br>**(Green Myanmar Environmental Services Co., Ltd.)**<br>• စက်ရုံများအနေဖြင့် မိမိတို့၏စက်ရုံတွင် Pollution Control Manager (သို့) Safety Officer ကဲ့သို့သော ကျွမ်းကျင်ဝန်ထမ်းများကို ခန့်အပ် ထား ရန်လိုအပ်ပါကြောင်း။<br>• ၎င်းဝန်ထမ်းများအနေဖြင့် သက်ဆိုင်ရာ စက်ရုံ များရှိ ဝန်ထမ်းများ၏ လုပ်ငန်းခွင်ဆိုင်ရာ ဘေးအန္တ ရာယ်ကင်းဝေးရေးနှင့် ပတ်ဝန်းကျင်ဆိုင်ရာထိန်း သိမ်း စောင့်ရှောက်မှုများကို ဆောင်ရွက်ရန်လို အပ်ပါကြောင်း။<br>• ဆွေးနွေးပွဲသို့ တက်ရောက်လာသူများ အနေဖြင့် လည်း ကိုယ်တိုင်ကိုယ်ကျ ဆွေးနွေး လိုခြင်းမရှိပါက ဖြန့်ဝေထားသော အကြံပြု စာရွက်များတွင် အကြံပြု ချက်များကို ရေးသား နိုင်ပါကြောင်း ပြောကြားခဲ့ ပါသည်။ |

ဇယား (၅)။ တွေ့ဆုံဆွေးနွေးပွဲတက်ရောက်လာသူများ၏ အကြံပြုစာရွက်များမှ ဖော်ပြချက်များ

| စဉ် | အကြံပြုဆွေးနွေးသူ | အကြံပြုဆွေးနွေးချက်များ |
|---|---|---|
| ၁ | ဦးအောင်သူ | • ပတ်ဝန်းကျင်ထိန်းသိမ်းမှုဆိုင်ရာ စီစဉ်ဆောင်ရွက်ထားရှိမှုများ ကောင်းမွန်ပါသည်။ |
| ၂ | ဦးသက်မျိုးထိုက် | • Future plan တွင် Facial wash product များ ထုတ်လုပ်ရာတွင် Mixing process နှင့် cleaning process များ ရှိလာမည် ဖြစ်သဖြင့် waste water treatment system အား ပုံမှန်ပြုပြင်ထိန်းသိမ်းမှုများ လုပ်ဆောင်သင့် ပါသည်။ |
| ၃ | မမေမျိုးရွှေ | • CSR activities များ ၊ No plastic program များ လုပ်ဆောင်ခြင်းအားဖြင့် ကောင်းမွန်ပါသည်။ |
| ၄ | မဇင်မာလှိုင် | • အကြံပြုချက်များမရှိပါ။ |
| ၅ | မေချမ်းခိုင် | • အစိုးရမှထုတ်ပြန်ထားသော ဥပဒေနှင့်စည်းမျဉ်းများအတိုင်း လိုက်နာဆောင်ရွက်ပေးပါရန်။ |
| ၆ | ဒေါ်ညိုလင်းထက် | • CSR လုပ်ငန်းစဉ်တွင် ဝန်ထမ်းများ၏ ကျန်းမာရေးဆိုင်ရာ စီစဉ် ဆောင်ရွက်ထားရှိမှုအား ထည့်သွင်းဖော်ပြရန်။<br>• ဝန်ထမ်းများအား ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဆိုင်ရာ အသိပညာများ ဖြန့်ဝေရန်နှင့် ပတ်ဝန်းကျင်ဆိုင်ရာ အသိပညာပေးများအား Environmental Conservation Department – Yangon Region Facebook တွင် ဝင်ရောက်လေ့လာနိုင်ပါကြောင်း ဆွေးနွေးအကြံပြုသည်။ |

**<u>အများပြည်သူများ၏ အကြံပြုချက်များအပေါ် ဆောင်ရွက်ပေးမှုအစီအစဉ်</u>**

အများပြည်သူများ၏ အကြံပြုချက်များအပေါ် စက်ရုံမှပြန်လည်ဖြေကြားချက်များကို အောက်ပါ ဇယား ဖော်ပြထားပါသည်။ ကုမ္ပဏီမိတက်မှ အကြံပြုချက် ဆန္ဒသဘောထားများအပေါ် ဆောင်ရွက်ပေးမှုအစီအစဉ် စာရွက်ကို ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း အစီရင်ခံစာ၏ နောက်ဆက်တွဲ (၁၄) တွင် ဖော်ပြထားပါသည်။

ဇယား (၆)။ အများပြည်သူများ၏ အကြံပြုချက်များအပေါ် စက်ရုံမှဆောင်ရွက်ပေးမှုအစီအစဉ်

| စဉ် | အကြံပြုချက်များ | စက်ရုံမှ ဆောင်ရွက်ပေးမည့်အစီအစဉ် |
|---|---|---|
| ၁ | • ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဆိုင်ရာအဖွဲ့ကို စက်ရုံ တွင် ဖွဲ့စည်းထားရန်နှင့် ၎င်းအဖွဲ့အစည်း အနေဖြင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းစောင့်ရှောက်မှုဆိုင်ရာများ နှင့် ပတ်သက်၍ စက်ရုံဝန်ထမ်းများကို အသိ ပညာ ပေးခြင်း၊ သင်တန်းများပို့ချခြင်းများကို လုပ်ဆောင်သင့်ပါကြောင်း။ | • ပတ်ဝန်းကျင်ထိန်းသိမ်းစောင့်ရှောက်မှုဆိုင်ရာ များနှင့် ပတ်သက်၍ စက်ရုံဝန်ထမ်းများကို အသိပညာ ပေးခြင်း၊ သင်တန်းများပို့ချပေး လျှက် ရှိပါသည်။ |
| ၂ | • ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနမှ ချမှတ်ထားသော လမ်းညွှန်ချက်များအတိုင်း လိုက်နာဆောင်ရွက်သင့်ပါကြောင်း။ | • ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနမှ ချမှတ် ထားသော လမ်းညွှန်ချက်များအတိုင်း လိုက်နာ ကျင့်သုံးလျှက်ရှိပါသည်။ |
| | • စက်ရုံတွင် လုပ်ကိုင်နေကြသော ဝန်ထမ်းများ အတွက် ကျန်းမာရေးစောင့်ရှောက်မှုဆိုင်ရာများကို အလေးထား ဆောင်ရွက်သင့်ကြောင်း။ | • စက်ရုံတွင် လုပ်ကိုင်လျှက်ရှိသော ဝန်ထမ်းများ၏ ကျန်းမာရေးကို ဒေသန္တရဆေးခန်းများ၊ လူမှုဖူလုံရေး ဆေးခန်းများနှင့်ဆက်သွယ်၍စောင့်ရှောက်မှုပေးလျှက် ရှိပါသည်။ |
| | • စက်ရုံလုပ်ငန်းအတွက် လိုအပ်သော လုပ်ငန်း လိုင်စင်များကို သက်ဆိုင်ရာဌာနဆိုင်များသို့ တင်ပြ၍ ခွင့်ပြုချက်တောင်းခံပြီး လိုက်နာ လုပ်ဆောင် သင့်ပါ ကြောင်း အကြံပြုအပ်ပါသည်။ | • စက်ရုံလုပ်ငန်းအတွက် လိုအပ်သော လုပ်ငန်း လိုင်စင်များကို မြို့နယ်အလိုက်သော်၎င်း၊ တိုင်းဒေသကြီး အလိုက်သော်၎င်း၊ သက်ဆိုင်ရာ ဌာနဆိုင်ရာများသို့ တင်ပြ၍ ခွင့်ပြုချက် တောင်းခံပြီး လိုက်နာကျင့်သုံး |

| | | |
|---|---|---|
| | | လျှက်ရှိပါသည်။ |
| ၃ | • ပတ်ဝန်းကျင်ထိန်းသိမ်းမှုဆိုင်ရာစီစဉ် ဆောင်ရွက်ထားရှိမှုများကောင်းမွန်ပါသည်။ | • မှန်ကန်ပါသည်။ |
| ၄ | • Future plan တွင် Facial wash product များ ထုတ်လုပ်ရာတွင် Mixing process နှင့် cleaning process များ ရှိလာမည် ဖြစ်သဖြင့် waste water treatment system အား ပုံမှန်ပြုပြင် ထိန်းသိမ်း မှုများ လုပ်ဆောင်သင့် ပါသည်။ | • Waste water treatment system ကို အကောင်အထည်ဖော် ဆောင်ရွက်လျှက်ရှိပြီး Facial wash product များ ထုတ်လုပ်သည့် အခါတွင် ပတ်ဝန်းကျင်ထိခိုက်ပျက်စီးမှု မရှိစေ ရန် အသေးစိတ် Procedure များ Guideline များ ချမှတ်ရေးဆွဲ၍ လိုက်နာဆောင်ရွက် သွားမည် ဖြစ်ပါသည်။ |
| ၅ | • CSR activities များ ၊ No plastic program များ လုပ်ဆောင်ခြင်းအားဖြင့် ကောင်းမွန် ပါသည်။ | • ကျွန်ုပ်တို့ ကုမ္ပဏီ အနေဖြင့် CSR activities များ၊ No plastic Program များ လုပ်ဆောင် လျှက်ရှိပါသည်။ |
| ၆ | • အစိုးရမှ ထုတ်ပြန်ထားသော ဥပဒေနှင့် စည်းမျဉ်းများအတိုင်းလိုက်နာဆောင်ရွက်ပေး ပါရန်။ | • အစိုးရ၏ ဥပဒေနှင့်စည်းမျဉ်းများအတိုင်း လိုက်နာ ဆောင်ရွက်လျှက်ရှိပါသည်။ |
| ၇ | • CSR လုပ်ငန်းစဉ်တွင် ဝန်ထမ်းများ၏ ကျန်းမာရေး ဆိုင်ရာစီစဉ်ဆောင်ရွက် ထားရှိမှုအား ထည့်သွင်း ဖော်ပြရန်။ | • လိုက်နာကျင့်သုံးပါမည်။ |
| | • ဝန်ထမ်းများအားပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဆိုင်ရာ အသိပညာများ ဖြန့်ဝေရန်နှင့် ပတ်ဝန်းကျင် ဆိုင်ရာ အသိပညာပေးများအား Environmental Conservation Department – Yangon Region Facebook တွင် ဝင်ရောက်လေ့လာနိုင်ပါကြောင်း ဆွေးနွေးအကြံပြုသည်။ | • ဝန်ထမ်းများအား ဤသတင်းအချက်အလက် များ ပြန်လည်မျှဝေ၍ နှီးဆော်တိုက်တွန်း ပါမည်။ မိမိတို့ ကိုယ်တိုင်လည်း Environmental Conservation Department – Yangon Region Facebook တွင် ဝင်ရောက် လေ့လာပါမည်။ |

**နိဂုံး**

ထိခိုက်မှုတွက်ချက်ခြင်းအရ ထိခိုက်မှုအားလုံးသည် စက်ရုံတွင်းတွင်ဖြစ်နိုင်ပါသည်။ ထိခိုက်မှု၏ သိသာထင်ရှားမှုများကို တွက်ချက်မှုများအရ လုပ်ငန်းလည်ပတ်ခြင်းကာလတွင် ၊ လုပ်ဆောင်မှုအများစုနှင့် ယင်းတို့၏ ထိခိုက်မှုများသည် မီးဘေးမှလွဲ၍ အတန်အသင့်နှင့် နည်းပါးပါသည်။ ကုန်ချောသည် အန္တရာယ်မရှိသော်လည်း ကုန်ကြမ်း ဓာတုပစ္စည်းများ၊ ပလတ်စတစ်များသည့် မီးလောင်နိုင်မှုအားဖြင့် အသင့်တင့်ရှိပါသည်။

သို့သော် ထိခိုက်မှု လျော့ကျစေရန် အချက်များကို လုပ်ဆောင်ပြီးပါက မီးလောင်နိုင်မှုသည် နည်းပါး သွားနိုင်မည်ဖြစ်ပြီးလက်သင့်ခံနိုင်သော အခြေအနေရှိပါသည်။ လုပ်ငန်းပိတ်သိမ်းခြင်းကာလအတွက် ဆူညံသံ ထွက်ရှိနိုင်မှုသည်သာ တစ်ခုတည်းသော အချက်ဖြစ်နိုင်ပါသည်။ သို့သော် ထိခိုက်မှု လျော့ကျစေရန် အချက်များကို လုပ်ဆောင်ပြီးပါက ဆူညံသံထွက်ရှိမှုသည် နည်းပါးသွားနိုင်မည်ဖြစ်ပြီးလက်သင့်ခံနိုင်သော အခြေအနေရှိပါသည်။

***အကြံပြုချက်များ***

ထိခိုက်နိုင်မှုအများစုသည် စက်ရုံအတွင်းတွင်သာ ဖြစ်နိုင်ပြီး အရေးကြီးသော ထိခိုက်နိုင်မှုမရှိပါ။ အကြံပြု ချက်များ ကို အောက်တွင် ဖော်ပြထားပါသည်။

- မီးဘေးအန္တရာယ်ကို လျော့ချနိုင်ရန် ၊ မီးဘေးကာကွယ်ရေးအစီအစဉ်ကို အကောင်အထည်ဖော် ဆောင်ရမည်။
- အမှုန်များထွက်ရှိမှုကို လျော့ချရန် လေစုပ်စက်များနှင့် လေဝင်လေထွက် ကောင်းမွန် အောင်ထား ရှိရန် အကြံပြုပါသည်။
- ရေဆိုးသန့်စင်စနစ်၏အဝင်အထွက်ရေနမူနာများကိုသတ်မှတ်ချက်အတိုင်းစစ်ဆေးရန်အကြံပြုပါသည်။

- စွန့်ပစ်ရန် ဓာတုပစ္စည်းများကို ပုံးများအတွင်းသေချာစွာထားရှိရန်၊ သက်ဆိုင်ရာ စွန့်ပစ်ပစ္စည်း သိမ်းဆည်းသူ နှင့်ချိတ်ဆက်၍ ကောင်းမွန်စွာ စွန့်ပစ်ရန်

စီမံကိန်းအကောင်အထည်ဖော်ဆောင်သူသည် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် နှင့် ပတ်ဝန်းကျင်စောင့်ကြည့်တိုင်းတာရေးအစီအစဉ်ကို သက်ဆိုင်ရာဌာနဆိုင်ရာက အတည်ပြုပြီးသော ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီရင်ခံစာပါ အတိုင်းလိုက်နာ လုပ်ဆောင်ရမည်။ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် အတိုင်းလုပ်ဆောင်ခြင်းကို နှစ်စဉ် ပြန်လည်သုံးသပ်ပြီး လိုအပ်ချက်များကို ပြုပြင်ရမည်။ ဤအကျိုးဆက်အနေဖြင့် စီမံကိန်းလုပ်ငန်း အနေဖြင့် ပတ်ဝန်းကျင်အပေါ် မည်သည့်ထိခိုက်မှုမျှ မရှိပဲ လုပ်ဆောင်နိုင်မည်ဖြစ်ပါသည်။

# 1.0 INTRODUCTTION

## 1.1 Background

Rohto Pharmeaceutical Co., Ltd. was established since 1899 in Japan and carried out manufacturing and marketing of OTC medicines & cosmetics. Moreover, sub companies and factories were established at many countries around the world. Rohto-Mentholatum (Myanmar) Company Limited is a 100% foreign owned investment by 98% from Rohto Pharmaceutical Company Limited Incorporated in Japan and 2% from Rohto-Mentholatum (Vietnam) Company Limited Incorporated in Vietnam. It is incorporated and registered in Myanmar having registration number of 106149046 (14.9.2012).

The factory was operated with manufacturing of OTC medicines and cosmetics since 2013 for packaging process. From 2022, facial wash cleanser compounding process will be operated. The factory is located at Plot No. D-5, Mingaladon Industrial Park, Corner of No.3 Highway Road and Khayebin Road, Mingaladon Township, Yangon Region, Myanmar.

In July 2020, Green Myanmar Environmental Services Company Limited (GMES) was requested by Rohto-Mentholatum (Myanmar) Company Limited to provide professional consultation service for "Manufacturing and Marketing of OTC Medicines and Cosmetics" Project and asset the submission of the Environmental Management Plan (EMP) to the Environmental Conservation Department (ECD), Ministry of Natural Resources and Environmental Conservation (MONREC).

This report is prepared for assessing chemical management due to chemical storage, usage and handling for operation process. This document is also prepared in accordance with the existing prevention of hazard from chemical and related substances rules and law. Furthermore, Rohto-Mentholatum (Myanmar) has followed not only the Mingaladon Industrial Park (MIP) agreement but also the government regulations.

Table 1.1 Salient Features of the Project

| No. | Salient Features | Description/Quantities |
|---|---|---|
| 14. | **Project Name** | Manufacturing and Marketing of OTC Medicines and Cosmetics |
| 15. | **Project Proponent** | Rohto-Mentholatum Myanmar Co., Ltd. |
| 16. | **Company Registration No.** | 106149046<br>(14.9.2012) |
| 17. | **Project Address** | Plot No. D-5, Mingaladon Industrial Park, Corner of No.3 Highway Road and Khayebin Road, Mingaladon Township, Yangon Region, Myanmar. |
| 18. | **Geographical Coordinates** | Latitude : 16˚ 56′ 23″ N<br>Longitude : 96˚ 9′ 15.38″ E |
| 19. | **Type of Land** | Industrial Land |
| 20. | **Total Land Area** | 10,004 $m^2$ |
| 21. | **Land Acquisition** | Lease Land |
| 22. | **Lessor** | MIP (Mingalardon Industrial Park Co., Ltd.) |

| | | |
|---|---|---|
| 23. | **Initial Period permitted to use the land (Validity of land grant)** | 2012 ~ 2048 (36 Years) |
| 24. | **Type of Investment** | 100% Foreign Investment |
| 25. | **Total Amount of Investment** | USD 12.438 Million |
| 26. | **Type of Business** | Manufacturing and Marketing of OTC Medicines and Cosmetics |
| 27. | **Contact Person**<br>**Designation**<br>**Contact Details**<br>**Mobile Phone:**<br>**Email:** | U Naing Aye<br>Factory Manager<br>Plot D-5, Mingalardon Industrial Park.<br>+959 5149886<br>naingaye@rohto.com.mm |
| 28. | **Established Time** | 31-Dec-2012 |
| 29. | **Date of Test Run** | June-2013 |
| 30. | **Date of Commercial Run** | 11-June-2013 |
| 31. | **Surrounding Environment** | North - TI Garment<br>East - Tashin Garment<br>South - Sunflower Lace (2)<br>West - Wedtex |
| 32. | **Employees** | Male – 11, Female – 15<br>Total – 26 persons |
| 33. | **Operation Time** | 8:30 a.m. - 4:20 p.m. (7:20 hours/day)<br>Lunch Time: 00:30 min<br>Over Time: 4:50 p.m. - 6:50 p.m. |
| 34. | **Operating Days** | 285 days/year |

## 1.2 Need of EMP

EMP is a study that predicts the environmental consequences of a proposed development. It evaluates the expected effects on the natural environment, human health and on property. The study requires a multi-disciplinary approach. EMP is one of the most important tools for sound decision making and for achieving sustainable development.

This EMP report can serve as a guideline for use by the proponent in obtaining environmental authorization as well as to enlighten the environmental authorities on the operational cycles of the Myanmar Synergy Garment Co., Ltd.

Environmental protection and resource management has conventionally been given importance all over the world which has increased in recent time. The ancient practices taught people to live in perfect harmony with nature. However, industrialization, urbanization and changing lifestyles over the years have affected the environment drastically in causing pollution and environment degradation.

The pollution in air, water and land has led to ecological imbalance and potential health hazards. As a result, regulations in the form of laws and policies on environmental protection were introduced. The Environmental Management Plan (EMP) is one such effort.

The project proponent needs to prepare an EMP report containing an analysis of the likely environmental impact of the project, and mitigation measures to be taken into

consideration in order to obtain the permission from Myanmar Investment Commission (MIC).

## 1.3 Need of the Project

The garment factory has occupied a unique place in the industrial scenario of our country by generating substantial export earnings and creating lots of employment. Its contribution to industrial production, employment and export earnings is very significant. This industry provides one of the basic necessities of life. The employment provided by it is a source of livelihood for many people. It also provides maximum employment with minimum capital investment. Since this industry is highly labor-intensive, it is ideally suited to Myanmar condition. Considering its advantageous position, it is assumed that there will be no constraint in the establishment of stocks.

## 1.4 Scope and Objectives of the EMP

### 1.4.1 Objectives of EMP

The primary purpose of Objective of Environmental Management Plan (OMEP) is to provide an easily interpreted reference document which ensures that the project environmental commitments, safeguards and mitigation measures from the environmental planning documents, project approvals, and the scope of works and technical criteria are implemented. It aims to minimize impacts associated with the operation of the project. The purpose of operation Environmental Management Plan is to:

- Define details of who, what, where & when environmental management & mitigation measures are to be implemented.
- Provide government agencies and their contractors, developments & other stakeholder better onsite management control over the life of a project.
- Ensure that the commitments made as a part of the project's EIA are implemented throughout the project life.
- Ensure the environment management detail is captured & documented at all stages of the project.

This EMP document aims to:

- Provide environmental management plans that minimize the environmental impact of the works and identify those responsible for its implementation.
- Define the monitoring program which assesses the implementation.

### 1.4.2 Scope

An EMP is a site or project specific plan developed to ensure that appropriate environmental management practices are followed during a project's operation. The scope & content of EMP will be function of both the significance of a project's potential environmental impact and also a project's site. In case of EMP Rohto-Mentholatum (Myanmar) Co., Ltd. the study area covers the factory overview, environmental management plans, monitoring & review details.

## 1.5 Methodology Adopted

Data collection was done in October 10th 2021. Necessary information is collected through field study and literature review to accommodate all issues and analyze environmental impacts of physical, biological and socio-economic. Secondary information is collected through reports, maps and photographs. Primary level of information is collected through questionnaires, checklist, data sheets from walkover survey and EMP team judgment.

The EMP team also explained environmental issues at Industrial Zone Management Office on October 10th 2021. Thus, The Chairman signed a letter in recognition stating that there is no objection on the proposed project.

## 1.6 Report Structure

This report is framed with twelve sections including this introduction chapter:

(1) Introduction
(2) Policy, Institutional and Legal Framework
(3) Description of the Project and Process
(4) Baseline Conditions of the Existing Environment
(5) Potential Environmental Impacts and Mitigation Measures
(6) Environmental Management Plan and Monitoring Plan
(7) Public Consultation and Information Disclosure
(8) Conclusion and Recommendation

## 1.7 Study Team

This project report on Environmental Management Plan (EMP) was prepared by Green Myanmar Environmental Services Co., Ltd - **Transitional Consultant Registration Number of Organization No.0006.** And then, Certificate of Organization and Personal are as shown in Appendix (4) and (5) respectively.

Address: No. (115), Kanaung Min Thar Gyi Road, Hlaing Thar Yar Industrial Zone (1), Hlaing Thar Yar City, Yangon, Myanmar

Tel: 951-3685572,

Fax: 951-3685571,

Email: gmescompany@gmail.com, info@mes-mm.com

**GMES EMP TEAM**

| No. | Title of Post | Terms of Reference | Nominee, Organization & Transitional Consultant Registration Number |
|---|---|---|---|
| **Main EMP Working Team** | | | |
| 1. | Team Leader | ▪ Overall management of EMP operation<br>▪ Work plan<br>• Technical meeting & workshop<br>• Document reviewing and process flow studying | Engr. U Kyaw Soe Win<br>Managing Director<br>Green Myanmar Environmental Services Co., Ltd.<br>Experience in EMP |

| | | | |
|---|---|---|---|
| | | • Lead and facilitation of public consultation<br>• Data compilation & analysis<br>• Coordination with stakeholders | processing<br><br>No.0019 |
| 2. | Environmental Consultant | • Advise on the design of EMP<br>• Develop term of reference for duty and responsibility among EMP team<br>• Advise on the environmental baseline<br>• Advise on the field survey<br>• Facilitate technical analysis<br>• Streamline the Environmental Management Plan (EMP) | Engr. Daw Khin Swe Aye<br>Former Lecturer, Chemical Engineering Dept., YTU<br><br>No.0021 |
| 3. | Field Supervisor | • Develop operational checklist for Environmental Study<br>• In charge for preliminary field visit<br>• Establish field operational office for field survey<br>• Supervise field survey<br>• Finalize checking for report and report formatting | U Kyi Han Bo<br>B.E - Aerospace Fuel and Propellant Engineer<br>Myanmar Aerospace Engineering University, Quality Engineer and Senior Environmental Experts |
| 4. | Public Coordinator | • Assist in stakeholder meeting<br>• Assist in public consultation meeting<br>• Preparation for public consultation meeting | U Aung Kyaw Than<br>B.E (Chemical) |
| **Supporting Team for EMP Studying** | | | |
| 5. | Consultant (Air Quality Management) | • Give advice on collecting field data for air quality<br>• Assist on air quality control system<br>• Give advice on air pollution evaluate and mitigation<br>• Give advice for data processing, computing, projection, modeling and analysis<br>• Give advice in report preparation | Engr. U Sein Thaung Oo<br>Chairman<br>Green Myanmar Environmental Services Co., Ltd.<br>Professional Engineer<br><br>No.0023 |
| 6. | Wastewater Management Consultant | • Collecting field data for industrial and municipal wastewater<br>• Assist in laboratory testing<br>• Data processing, computing, projection, modeling and analysis<br>• Assist in report preparation | Engr. Daw Tin May Soe<br>Consultant<br>Green Myanmar Environmental Services Co., Ltd.<br><br>Retired Professor and Head Chemical Engineering Department, Mandalay Technological University. |

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|---|---|---|---|
| | | | (Experience in environmental toxicology and pollution control)<br><br>No.0028 |
| 7. | Consultant for Laboratory Analysis | • Advise on data processing and laboratory testing and prepare instruction for laboratory testing<br>• Check the result of environmental laboratory testing<br>• Compare the laboratory result and verification | U Myo Myint<br>Consultant<br>Green Myanmar Environmental Services Co., Ltd.<br><br>Retired Former Factory Manager, Ministry of Industry (1)<br><br>No.0026 |
| 8. | Consultant on Energy Saving Management and Chemical Risk Assessment & Hazardous Chemical Management | ▪ Advise on energy saving management<br>▪ Advise on the risk assessment preparation<br>▪ Develop terms of reference for duty and responsibility among EMP team<br>▪ Advise on the environmental baseline<br>• Advise on the field survey | Daw Kyaw Kyaw Win<br>Director (Retired)<br>Myanma Petrochemical Enterprise<br>Ministry of Electrical and Energy |
| 9. | Social Operation and Field Coordinator | • Develop operational checklist for social survey<br>• Facilitate technical meeting and record keeping<br>• Assist in data mining and secondary data collection and coordinate with local authority and communities for village level meeting | U Khin Aung<br>Consultant<br>Green Myanmar Environmental Services Co., Ltd.<br><br>No.0025 |
| 10. | Consultant (Environmental Quality Management) | • Assist in preparation of guideline for environmental sampling of air and water quality<br>• Monitor the sample collection<br>• Register and inspect the sample collected<br>• Assist in report preparation for environmental baseline | Daw Khin Shwe Htay<br>Former Lecturer, Chemical Engineering Dept., YTU<br>Environmental Engineer<br><br>No.0022 |
| 11. | Junior Environmental Experts | • Environmental and social survey<br>• Data collection<br>• Document reviewing<br>• Process studying<br>• Preparation of impact evaluation and assessment, and management | Daw Hnin Htet Htet Hlaing<br>B.E - Port and Harbor<br>Myanmar Maritime University<br><br>Daw Aye Thuzar Hein |

| | | | |
|---|---|---|---|
| | | plan<br>• Report preparing and formatting | B.E (Chemical Engineering) |
| 12. | Environmental Monitoring Team | • Environmental baseline measuring<br>• Data analysis<br>• Coordinate for public consultation meeting<br>• Environmental baseline report preparing and formatting | U Aung Ko Min<br>B.E (Chemical)<br>(Monitoring Technician)<br><br>U Thi Ha Zaw<br>(Assistant Monitoring Technician) |
| 14 | Laboratory Experts | • Water sampling and laboratory testing<br>• Preparation for water & wastewater sampling<br>• Preparation for laboratory testing<br>• Laboratory testing<br>• Reporting for laboratory result | U Thet Min Paing<br>B.E (Chemical Engineering) |

## 1.8 Timeframe of the EMP

The EMP started from May 2021 and ended in July 2022.

# 2.0 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

## 2.1 Background

The emerging environmental scenario calls for attention on conservation and judicious use of natural resources. There is a need to integrate the environmental consequences of the development activities and for planning suitable measures in order to ensure sustainable development. The environmental considerations in any developmental process have become necessary for achieving sustainable development. To achieve such goals, the basic principles to be adopted are:

- To enhance the quality of environment in and around the project area by adopting proper measures for conservation of natural resources;
- Prevention of adverse environmental and social impact to the maximum possible extent;
- To mitigate the possible adverse environmental and socio-economic impact on the project-affected areas.

Policy, legal and institutional framework of the proposed project relating to the environmental, social, health and economic conditions are discussed in this section.

## 2.2 Policy Framework

This section highlights the relevant environmental policies established by the Government of Myanmar for purposes of environmental protection towards the process of sustainable development. The Government, through the Ministry of Natural Resources and Environmental Conservation (MONREC), has established environmental policies which broadly aim at:

- Encouraging respect for the environment by all and being mindful and taking care of the environment;
- Ensuring environmental issues are integrated with economic matters to attain sustainable development;
- Reviewing and evaluating development plans to ensure they follow the set environmental guidelines/policies;
- Encouraging the public to take part in environmental matters so as to enlighten them on the same hence improve on environmental performance.

## 2.3 Myanmar Regulatory Framework for Environmental Assessment

Myanmar Government issued:

- National Environmental Policy in 2019,
- Myanmar Agenda 21 in 1997,
- National Sustainable Development Strategy in 2009,
- The Environmental Conservation Law in 2012,
- The Environmental Conservation Rules in 2014,
- Environmental Impact Assessment Procedure and National Environmental Quality (Emission) Guidelines in 2015.

### 2.3.1 National Environmental Policy of Myanmar (2019)

Myanmar National Environmental Policy, which already included for social policy, subsequently gazette on 10th June 2019 is as follows:

To establish sound environment policies in the utilization of water, land, forests, marine resources and other natural resources in order to conserve the environment and prevent its degradation, the Government of the Union of Myanmar hereby adopts the following policy:

***"The wealth of a nation is its people, its cultural heritage, its environment and its natural resources."***

The objective of Myanmar's environment policy is aimed at achieving harmony and balance between these through the integration of environmental considerations into the development process to enhance the quality of the life of all citizens.

Every nation has the sovereign right to utilize its natural resources in accordance with its environmental policies, but great care must be taken not to exceed its jurisdiction or infringe upon the interests of other nations. It is the responsibility of the state and citizen to preserve its natural resources in the interest of present and future generations. Environmental protection should always be the primary objective in seeking development."

### 2.3.2 Myanmar Agenda 21 (1997)

The commission also formulated a blue print, the Myanmar Agenda 21, in 1997 as a follow up of national environmental policy in response to the call of the Earth Summit to develop national strategies to implement the Global Agenda 21. Myanmar Agenda 21 serves as a framework for integrating environmental considerations in future national development plans as well as sectorial and regional development plans in Myanmar and recognizes the need of environmental impact assessment, integrated economic development and sustainable social development respectively.

### 2.3.3 National Sustainable Development Strategy (2009)

National Sustainable Development Strategy was formulated to implement the National Environmental Policy in 2009 by Ministry of Forestry with the vision of wellbeing and happiness of Myanmar people. Three overarching goals identified are sustainable management of natural resources; integrated economic development and sustainable social development. In order to achieve these goals, a series of objectives are set along with activities. In addition, leading institution and collaboration institutions are identified to perform the activities.

### 2.3.4 The Environmental Conservation Law (2012)

The principle law governing environmental management in Myanmar is the Environmental Conservation Law, which was issued in March, 2012 (The Pyidaungsu Hluttaw Law No.9/2012). The law stipulates that government bodies are in charge of

environmental conservational as well as their relevant roles and responsibilities. It touches on water, noise, vibration and solid waste qualities but does not provide specific standards to be met.

It also mentions that any new development project must perform a system of Environmental Impact Assessment (EIA) and Social Impact Assessment (SIA) in order to find out whether or not a project or activity to be undertaken by any government department, organization or person may cause a significant impact on the environment or not. In the context of project development, it is important to note that the law adopts the notion of 'Polluter Pays Principle' as it implies that the project proponents are responsible for covering all environmental and social costs generated by the project.

The law serves as the basic for founding of Environmental Conservation Department (ECD) under the Ministry of Natural Resources and Environmental Conservation (MONREC), both of which will be explained later. Following the Environmental Conservation Law are two legal instruments: Environmental Conservation Rules (2014) and EIA Procedures (2015).

The main objectives of Environmental Conservation Law related to this Project are abstracted from ***Section 3*** as follows.

(a) To enable to emerge a healthy and clean environment and to enable to conserve natural and cultural heritage for the benefit of present and future generations;

(b) To reclaim ecosystems as may be possible which are starting to generate and disappear;

(c) To enable to manage and implement for decrease and loss of natural resources and for enabling the sustainable use beneficially;

As the important reference, the following sections are excerpted: Section 7 for provisions of duties and powers of MONREC, Section 10 for Environmental Quality Standards, Section 13 for monitoring as well as Section 14 and Section for polluter's responsible.

***Section 7: Duties and Powers relating to the Environmental Conservation of the Ministry***

a. To specify categories and classes of hazardous wastes generated from the production and use of chemicals or other hazardous substances in carrying out industry, agriculture, mineral production, sanitation and other activities;
b. To prescribe categories of hazardous substances that may affect significantly at present or in the long run on the environment;
c. To promote and carry out the establishment of necessary factories and stations for the treatment of solid wastes, effluents and emissions which contain toxic and hazardous substances;
d. To prescribe the terms and conditions relating to effluent treatment in industrial estates and other necessary places and buildings and emissions of machines, vehicles and mechanisms;

e. To lay down and carry out a system of EIA and SIA as to whether or not a project or activity to be undertaken by any Government department, organization or person may cause a significant impact on the environment;
f. To manage to cause the polluter to compensate for environmental impact, cause to contribute fund by the organizations which obtain benefit from the natural environmental service system, cause to contribute a part of the benefit from the businesses which explore, trade and use the natural resources in environmental conservation works.

***Section 10: Environmental Quality Standards***

The Ministry may, with the approval of the Union Government and the Committee, stipulate the following environmental quality standards:

a. Suitable surface water quality standards in the usage in rivers, streams, canals, springs, marshes, swamps, lakes, reservoirs and other inland water sources of the public;
b. Water quality standards for coastal and estuarine areas;
c. Underground water quality standards;
d. Atmospheric quality standards;
e. Noise and vibration standards;
f. Emissions standards;
g. Effluent standards;
h. Solid wastes standards;
i. Other environmental quality standards stipulated by the Union Government.

***Section 13: Monitoring***

The Ministry shall, under the guidance of the Committee, maintain a comprehensive monitoring system and implement by itself or in co - ordination with relevant Government departments and organizations in the following matters:

a. The use of agro- chemicals which cause to impact on the environment significantly;
b. Transport, storage, use, treatment and disposal of pollutants and hazardous substances in industries;
c. Disposal of wastes come out from exploration, production and treatment of minerals, industrial mineral raw materials and gems;
d. Carrying out waste disposal and sanitation works;
e. Carrying out development and constructions;
f. Carrying out other necessary matters relating to environmental pollution.

***Section 14:*** A person causing a point source of pollution shall treat, emit, discharge and deposit the substances which cause pollution in the environment in accord with stipulated environmental quality standards.

***Section 15:*** The owner or occupier of any business, material or place which causes a point source of pollution shall install or use an on-site facility or controlling equipment in order to monitor, control, manage, reduce or eliminate environmental pollution. If it is impracticable, it shall be arranged to dispose the wastes in accord with environmentally sound methods.

### 2.3.5 The Environmental Conservation Rules (2014)

Environmental Conservation Rules provide a platform to bridge the Environmental Conservation Law with more specific and practical rules and guidelines including EIA Procedures and environmental quality standards, the rules stipulate that the Ministry of Environmental Conservation and Forestry will adopt and carry out the environmental impact assessment system which includes determination of categories of plans, business or activity that requires Environmental Impact Assessment (EIA).

***Rule 61:*** The Ministry may approve and reply on the EIA report or IEE or EMP with the guidance of the Committee.

### 2.3.6 Environmental Impact Assessment Procedure (2015)

The objectives of the EIA procedures are to provide a common framework for EIA reporting and to ensure that EIA reporting is in line with legal requirements, good practices and professional standards.

***Section 76:*** For Project types which require IEE according to the Article 55 (a) of the Rules or Article 24 of the Procedure, the Project Proponent may prepare an IEE by itself or may appoint a person or organization who/which is registered according to the Article 18.

***Section 77:*** The Project Proponent shall issue a letter of endorsement in a format prescribed by the Ministry according to the Article 63. Such letter shall be submitted to the Department prepared either in the Myanmar language, or in the English language or both. The Project Proponent shall submit the IEE to the Department in both digital form and complete paper copies, together with the required service fee as prescribed by the Department, and confirming:

a. the accuracy and completeness of the IEE;
b. that the IEE has been prepared in strict compliance with applicable laws including this Procedure; and
c. that the Project will at all times comply fully with the commitments, mitigation measures, and plans in the IEE.

***Section 78:*** Upon Receipt of the IEE from the Project Proponent, the Department shall review and submit to the Ministry to enable it to make a final decision on approval of the IEE.

***Section 79:*** If it is determined by the Ministry that the IEE does not satisfy requirements, then the Project Proponent shall be called upon by the Department to undertake necessary amendments and/or to provide supplementary information as directed by the Ministry.

***Section 80:*** Upon completion of its review of the IEE, the Ministry shall;

a. approve the IEE, subject to any conditions it may prescribe, and issue an ECC; or
b. require that the Project carry out an IEE or EIA, citing the reasons for this decision and informing the Project Proponent of its decision; and, in either case
c. publicly disclose its decision.

***Section 81:*** The Department shall deliver the final decision of the Ministry within thirty (30) working days of receipt of an IEE. If the Ministry requires an IEE to be amended, then the due date for delivery of the Ministry's decision shall be extended accordingly.

### 2.3.7 National Environmental Quality (Emission) Guidelines (2015)

The objective of these national guidelines is to provide the basis for regulation and control of noise and vibration, air emissions, liquid discharges from various sources. According to these guidelines, all projects subject to EIA procedure have to comply with and refer to applicable national guidelines standards or international standards adopted by the Ministry. In addition, a project proponent shall be responsible for the monitoring of their compliance with general and applicable industry- specific guidelines as specified in the EMP and ECC (Environmental Compliance Certificate). In addition, the Project Proponent is responsible to monitor the environmental quality based on the developed EMP as specified in the following sections.

***Section 12:*** As specified in the EIA Procedure, projects shall engage in continuous, proactive and comprehensive self- monitoring of the project and comply with applicable guidelines and standards. For purposes of these Guidelines, projects shall be responsible for the monitoring of their compliance with general and applicable industry- specific Guidelines as specified in the EMP and ECC.

***Section 13:*** Air emissions, noise, odor, and liquid/ effluent discharges will be sampled and measured at points of compliance as specified in the project EMP and ECC.

## 2.4 Environmental-related Laws and Regulations in Myanmar

There are several laws and regulations relating to the environmental matters administered by various relevant ministries in Myanmar. The environmental-related laws and regulations are tabulated with their main purposes/description in following table.

Table 2.1 Environment-Related Laws and Rules

| **I. Administrative Sector** |
|---|
| ***The Penal Code (1861)***<br>The insight of relevant provisions to the project<br>▪ Voluntarily corrupts or fouls the water of any public spring or reservoir, so as to render it less fit for the purpose for which it is ordinarily used shall be punished. [section 277]<br>▪ Voluntarily vitiates the atmosphere in any place, so as to make it noxious to the health of persons in general dwelling or carrying on business in the neighborhood or passing along a public way shall be punished. [section 278]<br>▪ Doing any act so rashly or negligently as to endanger human life or to be likely to cause hurt or injury to any other person with any explosive substance or machinery or, fails to guard sufficiently against any probable danger to human life from that substance or such machinery, shall be punished. [section 286, 287] |
| ***The Police Act (1945)***<br>No person shall commit the following acts:<br>▪ Throwing or placing any dirt, filth, rubbish, or any stones or building materials, or |

causing any offensive matter to run from any house factory on any road or in any open place or street may be taken into custody by any police. [section 34 (6)]

- Neglecting to fence in or duly protect any well, tank or other dangerous place or structure. [section 34 (9)]

***The Ward or Village Tract Administration Law (2012)***

- The ward or village tract administrator shall cause the residents in ward of village tract to work and live peacefully and tranquilly. [section 12 (c)]

***The Myanmar Fire Brigade Law (2015)***

- Factory, industry, the business owner or manager of endangered from fire safety shall form the reserved fire brigade and shall keep the equipment related to fire safety. [section 25]

***The Constitution of the Union of Myanmar, 2008***

Section 24 – The Union shall enact necessary laws to protect the rights of workers.

Section 349 (b) – Citizens shall enjoy equal opportunity in carrying out occupation.

Section 359 -The Union prohibits forced labor except hard labor as a punishment for crime duly convicted and duties assigned by the Union in accord with the law in the interest of the public.

## II. Environmental Conservation Sector

***The Environmental Conservation Law (2012)***

The following provisions are particularly relevant to Environmental Impact Assessment requirements and this project:

*For waste disposal,*

- A person causing a point source of pollution shall treat, emit, discharge and deposit the substances which cause pollution in the environment in accord with stipulated environmental quality standards. [section 14]
- The owner or occupier of any business, material or place which causes a point source of pollution shall install or use an on-site facility or controlling equipment in order to monitor, control, manage, reduce or eliminate environmental pollution. If it is impracticable, it shall be arranged to dispose the wastes in accord with environmentally sound methods. [section 15]

*For prior permission,*

- No one shall, without the prior permission operate business, work-site or factory, workshop which is required to obtain the prior permission under this law. [section 28]

***The Environmental Conservation Rules (2014)***

MOECAF (Now in MONREC) launched Environmental Conservation Rules on June 5$^{th}$, 2014. The Rules reinforce the obligation for project developers to submit an EIA or an IEE. It aims to establish and adopt the necessary programs for the conservation and enhancement of environment, protection, control and reduction of pollution in environment, and conservation.

The Environmental Conservation Rules stipulate the following relevant articles under Chapter (XI) Environmental Impact Assessment.

- The Ministry shall determine the categories of project, business, service or activity which shall conduct environmental impact assessment. [section 52]
- The government department, organization or an individual who would develop the categories of project, business, service or activity stipulated under section 52:
  a. Shall carry out environmental impact assessment for his project, business, service or activity;
  b. Shall submit that the environmental impact assessment is intended to conduct by which third party or an organization to the Ministry in advance;

c. Shall submit the environmental impact assessment report to the Ministry. [section 54]

- The person who carries out any project, business or activity shall arrange and carry out for conducting the environmental impact assessment for any project, business or activity by a qualified third person or organization accepted by the Ministry. [section 56]
- The Ministry shall, on submission that the environmental impact assessment is intended to conduct by which third party or an organization under section 54 (b) to the Ministry in advance, determine and decide after making scrutiny whether or not it is a suitable third party or an organization to conduct the environmental impact assessment. The decision of the Ministry relating to such matter is final and conclusive. [section 57]
- The Ministry shall form the environmental impact assessment report Review Body with experts from relevant Government departments and organizations. [section 58]
- If private experts are included in the environment impact assessment report Review Body, honorariums, expenses and allowances for them shall be borne from the environmental management fund. [section 59]
- The Ministry may assign the Department to scrutinize the report of environmental impact assessment prepared and submitted by a third party or an organization and report to the Ministry through the environmental impact assessment Review Body. [section 60]
- The Ministry may approve and reply the environmental impact assessment report or environmental management plan with the guidance of the Committee. [section 61]

***The Environmental Impact Assessment Procedure (2015)***

The Environmental Impact Assessment Procedure stated that:

- All projects department, organization, local and organization, government or authority, company, cooperative, institution, Project expansions corporation, undertaken board, by development committee and organization, local government or authority, company, cooperative, institution, enterprise, firm, partnership or individual (and/or all Projects, field sites, factories and businesses including expansions of such Projects, field sites, factories and businesses identified by the Ministry, which may cause impact on environmental quality and are required to obtain Prior Permission in accordance with Section 21 of the Law, and Article 62 of the Rules) having the potential to cause Adverse Impacts, are required to undertake IEE or EIA or to develop an EMP, and to obtain an ECC in accordance with this Procedure.

***The National Environmental Quality (Emission) Guidelines (2015)***

These national Environmental Quality (Emission) Guidelines (hereafter referred to as Guidelines) provide the basis for regulation and control of noise and vibration, air emissions, and liquid discharges from various sources in order to prevent pollution for purposes of protection of human and ecosystem health.

- Para 4 states that these Guidelines refer to emission sources, and are intended to prevent or minimize adverse impacts to environmental quality or human health by ensuring that pollutant concentrations do not reach or exceed ambient guidelines and standards. The Guidelines apply to projects that generate noise or air emissions, and / or that have either direct or indirect discharge of process water, wastewater from utility operations or storm water to the environment.
- Para 6 mentions the provisions of the general and applicable industry-specific Guidelines shall be reflected in project environmental management plan (EMP) and environmental compliance certificate (ECC) and together constitute a project's

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| commitment to take necessary measures to avoid, minimize and control adverse impacts to human health and safety, and the environment through reducing the total amount of emissions generation; to adopting process modifications, including waste minimization to lower the load of pollutants requiring treatment; and as necessary, to apply treatment techniques to further reduce the load of contaminants prior to release or discharge.<br>• Para 7 states recognizing that these Guidelines are intended to prevent pollution through reducing the mass of pollutants emitted to the environment, dilution of air emissions and effluents to achieve maximum permitted values is not acceptable. Specified guideline values should be achieved, without dilution, at least 95 percent of the time that a project is operating, to be calculated as a proportion of annual operating hours. |
| ***The Conservation of Water Resources and Rivers Law (2006)***<br>• No person shall dispose of engine oil, chemical, poisonous material and other materials which may cause environmental damage, or dispose of explosives from the bank or from a vessel which is plying, vessel which has berthed, anchored, stranded or sunk. [section 11 (a)] |
| **III. City Development Sector** |
| ***The Underground Water Act (1930)***<br>• Digging tube wells shall be done only with the license issued by prescribing terms and conditions. [section 3]<br>• Digging underground water or attempt to do so shall be informed to the authorized official determined by the president. [section 5] |
| ***Yangon City Development Committee Law (2018)***<br>Provisions relating to environmental sanitation, pollution of air and water, and public health. |
| **IV. Finance and Revenue Sector** |
| ***The Myanmar Insurance Law (1993)***<br>• An entrepreneur or an organization operating an enterprise which may cause damage to the life and property of the public or which may cause pollution to the environment shall affect compulsory General Liability Insurance with the Myanmar Insurance. [section 16] |
| ***Union Tax Law (2018)***<br>• The taxes received by the Union contained in the laws relating to expenditure under the budget are the taxes earmarked for collection in table (1) of this law for the relevant financial year. [section 3]<br>• If the Tax Rates contained in this law should be amended, supplemented or substituted, the Union Government shall submit the matter to the Pyidaungsu Hluttaw so that it is decided after discussion. [section 4] |
| **V. Biodiversity and Ecosystem Sector** |
| ***The Forest Law (2018)***<br>Provision to conserve water, soil, biological diversity and the environment; sustain forest produce yields; protect forest cover; establish forest and village firewood plantations; sustainably extract and transport forest products. |
| ***Protection of Biodiversity and Protected Area Law (2018)***<br>The objective of this Law is to provide opportunities for more effective conservation of forests while recognizing the rights and the potential roles of local communities. |

## VI. Health Sector

***The Public Health Law (1972)***

Includes a general provision that empowers Union Government to carry out measures relating:

- To protect environment from gas, odor, dust, sound and radio activity which is endanger in the public environment. [section 3 (1) (c)]
- To keep the factory, industry, work site produced and sell food clean. [section 3 (2) (d)]
- Examine if necessary, in the government lab. [section 3 (2) (h)]
- To be cautions to be in conformity with the standard prescribed by the Union Government from time to time. [3 (2) (i)]

***The Prevention and Control of Communicable Disease Law (1995)***

- For prevention of the outbreak of Communicable Disease and effective control of Communicable Disease when it occurs, the public shall, under the supervision and guidance of the Health Officer of the relevant area, undertake the responsibility of carting out the following environmental sanitation measures;
  (a) in-door, out-door sanitation or inside the fence, outside the fence sanitation;
  (b) well, ponds and drainage sanitation;
  (c) proper disposal of refuse and destruction thereof by fire;
  (d) construction and use of sanitary latrines;
  (e) other necessary environmental sanitation measures. [ section 8 ]

***The Control of Smoking and Consumption of Tobacco Product Law (2006)***

- This law aims to protect from the danger which affects public health adversely by creating tobacco-free environment and to up lift the health, economy, and social standard of the public through control of smoking and consumption of tobacco product. [section 3]
- The responsible person shall arrange the written statements that state non-smoking area in the prescribed places. [section 9 (a)]
- Smoking area shall be arranged and statements that show specific places for smoking area in non-smoking area provided in section 7. [section 9 (b)]
- No one shall smoke in no-smoking area. [section 9 (c)]
- No-smoking areas are prescribed and smoking, burning, carrying, holding are liable to a fine. [section 7+17]

***Consumer Protection Law (2019)***

To regulate the liability of manufacturers, wholesalers, distributors and others involved in the supply chain for defective goods, which until now has been largely regulated by colonial era tort law which in large part was un-enforced and insufficient to appropriately protect the rights of consumers in the modern economy.

## VII. Industrial Sector

***The Petroleum Act (1934)***

- Import, transport or storage of petroleum shall be abided by the rules made under section and terms and conditions of the license that requires to obtain under the rules. [section 3]
- Dangerous petroleum (petroleum lower than 76°F which is flammable) shall be warned as a duty. [section 6]

***The Private Industrial Enterprise Law (1990)***

- The salient basic principles to operate the industrial business are provided in section 3.
- To develop production in each and every economic business connected to industrial business.

- To avoid or decrease utility of technology which causes environmental pollution.
- To use energy in the least way.

***The Export and Import Law (2012)***

- No person shall export or import restricted, prohibited and banned goods. [section 5]
- Without obtaining license, no person shall export or import the specified which is to obtain permission. [section 6]

***Prevention of Hazard from Chemical and Related Substances Law (2013)***

- No one shall produce, treat and formulate, use, possess, store, distribute, sell, transport, import or export the chemical or related substances prohibited by the Central Leading Board. [section 33]
- No one shall operate the chemical and related substances business without license. [section 34]
- No one shall use the chemical or the related substances which are unregistered or annulled from the registered list or not met to the quality and norm in the chemical and related substance business. [section 35]
- A person who has obtained a license, shall put the insurance in accordance with the prescriptive stipulations to be able to pay the compensation, if the impact and damage is occurred on the Human Being and Animals or the environment in respect of the chemical and related substances business. [section 17]
- A person who has obtained a license shall apply the related chemical and related substances that will be used in his chemical and related substances business in accordance with the stipulations to the Central Supervisory Board. (section 20)

***Prevention of Hazard from Chemical and Related Substances Rules (2016)***

- If the relevant Board of Inspection finds the violation on any prohibition in the law and rules, the Board of Inspection shall submit to the respective Supervisory Board for taking action under the law. [section 47]

The relevant Board of Inspection shall carry out the regular inspection, surprise check and inspection due to information to chemical and related substances businesses. [section 48]

***The Standardization Law (2014)***

The aims of this Law are also related to this project.

- To enable to protect the consumers and users by guaranteeing imports and products are not lower than prescribed standard, and safe from health hazards. [section 3 (c)]
- To enable to protect manufacturing, distributing and importing the disqualified goods which do not meet the prescribed standard and those which are not safe and endangered to the environment. [section 3 (e)]
- The person who obtains the certificate of certification whose representative and successors shall oblige the mandatory standards. [section 29]

***The Electricity Law (2014)***

- No electrical business shall be operated other than the business contained in the permit by any permit holder. [section 45]
- No one shall produce, transmit, connect, contact and use the electric power without electric safety certificate. [section 47]
- No one shall connect, waste, and utilize the electric power without the permission of the permit holder. [section 52]
- No one shall cut off the electric power line, transfer electricity, destroy electrical equipment and used in any electrical business. [section 53]

***Industrial Design Rights Law (2019)***

The objectives of this Law are as follows:

(a)To protect the rights and interests of the owner of the industrial design and the

inventors in accordance with this Law;

(b)To support the development of industrial businesses by providing protection for industrial design creations;

(c)To support the development and spread of industrial design technology.

**VIII. National Planning and Economic Development Sector**

***The Myanmar Investment Law (2016)***

- The objectives are to protect the invertors and their businesses in accordance with law, to create job opportunities for the people, to develop high functioning production, service, and trading sectors. [sections 3 (b), (c) and (e)]
- An investor who obtains permit or endorsement under this Law has the right to obtain a long-term lease of land or building from the owner if it is private land or building, or from the relevant government departments or government organization if it is land managed by the government, or land or building owned by the Union in accordance with the stipulations in order to do investment. Citizen investors may invest in their own land or building in accordance with relevant laws. [section 50 (a)]
- The Government guarantees not to nationalize any investment carrying out in accordance with the law. Except under the following conditions, the Government guarantees not to take any measures which expropriate or indirectly expropriate or is likely to effect a result in the termination of an investment:
  (a) actually necessary for the interest of the Union or its citizen;
  (b) non-discriminatory manner;
  (c) measures in accordance with the applicable Laws;
  (d) prompt, fair and adequate payment of compensation. [section 52]
- The investor shall abide by applicable laws, rules, procedures and best standards practiced internationally for this investment so as not to cause damage, pollution, and loss to the natural and social environment and not to cause damage to cultural heritage. [section 65 (g)]

***The Myanmar Investment Rules (2017)***

- After obtaining the permit, the investor who requires environmental and social impact assessment shall submit the required performances on environmental and social impact assessments to the Commission along the course of operating business. [section 189]

**IX. Transportation Sector**

***The Motor Vehicle Law (2015)***

- No one is allowed to drive, request someone to drive, or park, motor vehicles in public places under the following conditions;
  (a) The motor vehicle is not registered.
  (b) The registration has been suspended, revoked or expired; the registration card is not displayed.
  (c) The registration card has been revoked or is expired. [section 45]
- No one is allowed to drive, or allow to drive, motor vehicles in public places without risk insurance for others. This prohibition does not extend to passengers. [section 46]
- (a) No one is allowed to drive a motor vehicle in public places without carrying the driving license with him/her.
  (b) No one is allowed to drive a motor vehicle in public places without a driving license.
  (c) The owner of, and the person responsible for, motor vehicles are not allowed to give permission to someone without a driving license to drive in public

places.[section 47]

- No one is allowed to do the following in public places;
  - (b) Driving above the speed limit or below the minimum speed.
  - (c) Driving a motor vehicle which endangers others.
  - (d) Driving a motor vehicle after the consumption of narcotic drugs or alcohol. [section 49]

***The Motor Vehicle Rules (1989)***

- No vehicles shall carry more than the number or weight of goods which is permitted according to registration. [section 138]

## X. Workforce Sector

***The Workmen's Compensation Act (1923)***

- This law is for factories which have failed to register with the Social Security Office and to subscribe to the 2012 Social Security Law and Rules.
- Required to employees who become injured or who die in any accidents arising during and in consequence of their employment. Such compensation also must be made for diseases which arise as a direct consequence of employment, such as carpal tunnel syndrome. [section 3]

***The Factories Act (1951)***

**Working hours**

- Shall not exceed 8 working hours per day or 44 hours per week [section 59+62]
- Shall not exceed 48 hours per week for the work which has to be done continuously [section 59]
- There must be a minimum 30 minutes interval after each 5 working hours [section 63]
- The combined working hours and interval time shall not exceed 10 hours per day [section 64]
- The working days shall not exceed 6 days per week
- There must be one day holiday each week (Sunday). If Sunday service is required, there must be a substitution of another day. There must be substituted an alternative day-off. [section 61]

**Overtime**

- Shall not exceed more than 16 hours per week or, for continuous work, 12 hours per week
- The overtime wage shall be calculated as double the basic wage
- Permission of Factories and the General Labor Law Inspection Department must be obtained for an approval of a constant overtime policy

**Calculation of Overtime Wages**

- For salary earners: Overtime wage per hour = {(salary x 12 month) / 52-week x 44 (48) hrs} x 2
- For daily wages worker: Overtime wage per hour = {(daily wage x 6 day) / 44 (48) hrs} x 2
- Piece-work laborers: Overtime wage per hour = {(daily average wage x 6 day) / 44 (48) hrs} x 2

**Worksite Safety and Health Measures**

- The factory must be kept clean and the workspace must be situated away from drains, latrines or other things which create a bad or unhealthy smell. [section 13]
- Wastes must be disposed systematically. [section 14]
- There must be proper ventilation, light and heat. [section 15+19]
- There must be no dust or smoke in the hall or factory. [section 16]
- There must be clean drinking water in proper places for all workers. [section 20]

- Population of workers must not be dense and there must be sufficient light. [section 19]
- The latrines must be in suitable places. [section 21]
- The generators and other auxiliary units must be kept undercover. [section 23, 24]
- There must be arrangements made for any emergency cut out of electricity service. [section 26]
- In weaving or spinning machines, any female workers and any children must not be allowed to handle. [section 28]
- Females and young workers are not allowed to lift heavy loads.
- Floors, stairs and paths must be well-built and hand rails are to be built and necessary covers must be placed. [section 34]
- Explosive and flammable substances should be covered and protected. [section 39]
- In every factory, the arrangement of escape routes and fire alarms must be kept. [section 40]

**Welfare**

- There must be washing and cleaning facilities for workers. [section 44+45]
- There must be sufficient seats for workers if a chance is given for sitting. [section 46]
- There must be sufficient First Aid Boxes. [section 47]
- If the workers in a factory exceed 250, doctors or nurses in clinic are to be appointed. [section 48]
- If the workers of a factory exceed 100, recreation centers and canteens are to be kept for food. [section 49]
- For factories with over 50 female workers, there must be a child nursery center available for the children under 6 year of age. [section 50]

***The Leave and Holiday Act (1951)***

The objectives are:

- To allow worker for leave and holiday allowances, religious or social activities with earn allowance, and benefits for Health allowances.
- Concerned workers: Daily wage workers/temporary workers/permanent workers.
- Causal Leave (6) days [section 5]
  - (a) Casual leave of 6 days with wages is to be provided
  - (b) Causal leave can be taken a maximum of 3 days at a time except in special cases
  - (c) Causal leave cannot be joined with any other leave
  - (d) Leave will be cancelled if it has not been used within a year.
- Earned Leave (10) days [section 4]
  - (a) For continuous service of 12 months and above, 10 days of 'earned leave' shall be entitled
  - (b) If the service day is not 24 days, 1 day deduction from earned Leave is made,
  - (c) Can be accumulated for up to 3 years.
- Medical Leave (30) days [section 6]
  - (a) Workers are entitled to 30 days of medical leave with full pay if 6 months service has been completed
  - (b) If 6 months service has not been completed, 'leave without pay' can be granted for medical needs
  - (c) If not taken within a year, medical leave is void or cancelled.
- Maternity Leave [section 7-A]
  - (a) 6 weeks maternity leave before confinement and at least (8) weeks after confinement

(b) Entitled jointly with medical leave.

- Public Holidays (21) days [section 3]
  - (a) Workers can enjoy time off with full pay
  - (b) If work is given on a public holiday, twice the rate of regular wages is required.

***Constitution of the Republic of the Union of Myanmar (2008)***

- The Union shall enact necessary laws to protect the rights of workers. [section 24]
- The Citizens shall enjoy equal opportunity in carrying out occupation. [section 349 (b)]
- The Union prohibits forced labor except hard labor as punishment for crime duly convicted and duties assigned by the Union in accord with law in the interest of public. [section 359]

***Employment and Skill Development Law (2013)***

The facts required to be included & specified in the employment agreement [section 5]

(1) Type of employment
(2) Probation period
(3) Wage, salary
(4) Location of establishment
(5) Term of agreement
(6) Working hours
(7) Days-off, holidays and leave
(8) Working overtime
(9) Meal arrangements within working hour
(10) Accommodation
(11) Medical treatment
(12) Travel arrangements to/from work
(13) Regulations to be followed by the employee
(14) If the employee is sent to attend training, limitation agreed by the employee to continue his duty after the training
(15) Employee resignation and termination of establishment
(16) Termination of agreement
(17) Obligations under the conditions of agreement
(18) Termination of employment agreement by the mutual understanding of employer and employee
(19) Any other matters
(20) Specifying, amending and adding the conditions of agreement
(21) Miscellaneous

- Aforesaid specifications shall not be less than the benefits of existing laws
- The employer shall send a copy of the employment agreement entered into by the employer and employee to the relevant employment exchange office within the stipulated period and shall obtain its approval.
- An employment agreement concluded before the entering into force of this law shall continue to be valid until the end of the term of the original agreement.
- Counterfeiting the certificate shall be punished. [section 34]

***The Minimum Wages Law (2013) and The Minimum Wages Rules (2013)***

As to the preamble of this law, the objectives are:

- To fulfill the basic needs of the workers and their families who are working in commercial establishments, production and servicing establishments, agriculture and

livestock.

- And, to develop the work performance and competitiveness of workers.

The minimum wages law was passed by parliament in late 2013 and amounts were specified/ finalized by a national tripartite committee in mid-2015. Implementation of the new wage rates was required to start on 1 September 2015.

***Duties of the Employer***

- 3,600 Kyats per 8-hour working day (450 Kyat/hour) shall be the minimum wage paid to skilled employees of companies with more than 15 employees in all industries, throughout all of Myanmar.
- 50% of the minimum – 1,800 Kyats per 8-hour working day (225 Kyats/hour) – may be paid to completely unskilled newly hired workers engaged in a training/induction program up to a maximum of 3 months.
- 75% of the minimum – 2,700 Kyats per 8-hour working day (338 Kyats/hour) – may be paid to newly hired employees during their 2nd 3 months of employment, regarded as a 'probationary period'.

***The Social Security Law (2012) and the Social Security Rules (2014)***

- The objective is benefit for sickness, maternity, death, employment injury, invalidity benefit, superannuation benefit by: giving medical treatment, providing cash benefit or granting a right to residency. [section 3]
- All establishments shall contribute to the social security fund from the salary of insured workers as follows:
  - (a) Health and social care fund: 2% from employer, 2% from employee
  - (b) Injury fund: 1% from employer
  - (c) The accepted maximum salary per month to qualify for participation in the social security fund is currently set at 300,000 kyats.
- kinds of social security funds are:
  - (a) Health and social care fund
  - (b) Family assistance fund
  - (c) Injury fund
  - (d) Invalidity benefit, superannuation benefit, and survivors' benefit fund
  - (e) Unemployment benefit fund
  - (f) Other social security fund (e.g. hosing plan).

For medical treatment and cash benefit for sickness;

- Beneficiaries have the right to take medical treatment at the permitted hospital or clinic for a period up to 26 weeks. [section 22 (a)]
- When the insured person/beneficiary is retired, 50% payment of medical treatments is entitled if social security contributions have been paid for more than 180 months. [section 29]
- Beneficiaries have the right to enjoy 60 percent of average wages, calculated against the most recent four-month working period, as a cash benefit, during a period of illness lasting up to maximum 26 weeks. [section 23]

For maternity benefits: [section 25, 26, and 27]

(a) Benefits are allowed to be taken if the prior working period of an employee has been a minimum of one year and if there have been paid social security contributions by the worker for a minimum of six months.
(b) Maternity leave may total six weeks before confinement and eight weeks after confinement, up to 14 weeks in total.
(c) An additional four weeks are allowed for maternity leave if twins have been delivered

(d) Up to a maximum of six weeks total leave is allowed to be taken in cases of miscarriage
(e) Full wages may be taken for prenatal examination at the rate one day per time and up to a maximum of seven times
(f) 70% of average wages of the previous year can be taken as maternity leave compensation before the birth
(g) An additional 50% of wages which can be taken once the child is born (additional 75% for twins, 100% for triplets). Hence, 120% of average wages will be administered for the eight weeks of maternity leave which may be taken after birth
(h) Has the right to take leave for medical treatment for their child up until one year after birth
(i) A father is entitled to take up to 15-days unpaid leave for infant care upon confinement of his wife.

For funeral expenses

- If a Social Security insured person passes away, his or her beneficiary is entitled to receive five times their average month's wage. This is determined as the average wage of the last four working months of the deceased person.
- The obligations of employers are:
  (a) To inform immediately to the Social Security Office when an injury has happened to an employee. [section 54 (a)]
  (b) To register their business in the Social Security Office within 30 days from the day of first business operations. [Rules]
  (c) To register every newly appointed employee with the Social Security Office. [Rules]
- The employer who registered in accordance with the Social Security Law has the right to be exempted from the Workmen's Compensation Act.

***The Payment of Wage Law (2016)***

- Receipt of wages is made regularly when the work is completed or the time of agreed period. Unlawful deductions are not to be made.
- Resignation or own volition, dismiss or decrease of the employee shall be paid according to the provisions of section 4.

## XI. Disaster Sector

***Natural Disaster Management Law (2013)***

- The objectives are to implement natural disaster management programs systematically and expeditiously in order to reduce disaster risks, to conserve and restore the environmental affected by natural disasters and to provide health, education, social and livelihood programmes in order to bring about living conditions for victims. [section 3 (a), (d) & (e)]
- Organization or person that has been assigned responsibility under this law: [section 13 (a)-i, ii & iii]
- Preparatory and preventive measures for natural disaster risk reduction in pre-disaster period
- Emergency responses including search and during natural disaster
- Conservation of the environment that has been affected by natural disaster
- Applying knowledge and innovation to be a habit of safety and resilience at every level from National level to the ward or village tract level [section 14 (c)]
- When the natural disaster strikes, emergency responses including search and rescue include the following: [section 17 (h), (i)]
  - Conducting emergency response including search and rescue according to the

type of natural disaster

- Performing other duties assigned by this Law in respect of emergency responses including search and rescue.
    - Rehabilitation and reconstruction activities to be carried out after disaster include the following: [section 18 (a)]
- Data collection and confirmation of damage and losses due to natural disaster
- Aggrieved person who has been directly affected in any of the private own properties and has been loss of life or has been affected to the member due to any of the disaster risk reduction activities is entitled to compensation in accord with the stipulations. [section 37]

## XII. Labor Sector

***The Labor Organization Law (2011) and The Labor Organization Rules (2012)***

As to the preamble of this law, the objectives are:

- To protect the rights of the workers in accordance with section 24 of the Constitution
- To promote good relations between the employer and the worker
- To enable to workers to form an **The Settlement of Labor Disputes Law** d carry out the labor organizations systematically and independently.

***Rights and Responsibilities of the Labor Organization***

- The labor organizations shall have the right to carry out freely in drawing up their constitution and rules, in electing their representatives, in organizing their administration and activities or in formulating their programs
- The labor organizations have the right to negotiate and settle with the employer if the workers are unable to obtain and enjoy the rights of the workers contained in the labour laws and to submit demands to the employer and claim in accord with the relevant law if the agreement cannot be reached
- The labor organization has the right to demand the relevant employer to re-appoint a worker if such worker is dismissed by the employer and if there is cause to believe that the reasons of such dismissal were based on labor organization membership or activities, or were not in conformity with the labor laws
- The labor organizations have the right to send representatives to the Conciliation Body in settling a dispute between the employer and the worker
- In discussions with the Government between the employer and the complaining workers, the representatives of the labor organization also have the right to participate and discuss
- Have the right to participate in solving the collective bargaining of the workers
- Shall carry out peacefully the holding of meetings, strikes and the carrying out any other collective activities
- Shall assist in making agreements between the employer and the workers. [section 17 to 23]

***Duties of the Employer***

The employer shall:

- Recognize the labor organizations
- Allow the member of executive committee assigned by the labor organization to perform their duty not exceeding two days per month
- Shall assist as much as possible if the labor organizations requests help which is in the interest of the factory's workers. [section 29 to 31]

***Prohibitions***

No employer shall

- Lock-out any service without the permission of relevant conciliation body

- Lock-out any work during the settlement of dispute period
- Carry out an illegal lock-out; dismiss a worker for his membership in a labour organization or for the exercise of organizational activities or participating in a strike. [section 43+44]
- No worker shall
  - (a) Go on strike without informing in advance the relevant employer or the relevant conciliation body
  - (b) Go on strike during the settlement of dispute period
  - (c) Go on an illegal strike [section 45+46]

***The Settlement of Labor Disputes Law (2012)(Amendment in 2016)***

As to the preamble of this law, the objectives are:

- To safeguard the rights of workers
- To promote a good relationship between employer and workers and creating a peaceful workplace
- To obtain the rights fairly, rightfully and quickly by settling disputes between employer and worker justly.

***Forming Workplace Coordinating Committee***

The employer shall, in an establishment which has 30 employees and above and if there is a labor organization,

- ➢ Allow 2 nominated workers for each labor organization
- ➢ Assign employer representatives who are the same number as the representatives of the workers

If there is no labor organization,

- ➢ Organize election of 2 representatives of the workers
- ➢ Appoint 2 representatives of the employer

The term of such committees is one year.

***Settlement of Dispute***

- A party, employer or worker, may complain to the conciliation body.
- If he is not satisfied with the conciliation of Conciliation Body, may apply to the court. [section 23]
- The Conciliation Body shall refer the collective dispute which does not reach settlement to the relevant Arbitration Body. [section 25]
- No party shall be barred to proceed with the right to institute criminal or civil proceedings in respect of such dispute during conciliation or arbitration. [section 52]
- As a strike suspends the employment agreement temporarily, the employer shall not be liable to pay salary or allowance during such period to the workers who go on strike. [section 54]

**XIII. Laws related to Occupational Health and Safety including Communicable Diseases**

***Occupational Safety and Health Law (2019)***

The objectives of this law are:

(a) to implement Occupational Safety and Health matters effectively in the respective industries/ businesses;

(b) to determine the duties of relevant persons applicable under this law including employers and workers of lessen and mitigate occurrence of occupational diseases and occupational accidents;

(c) to cause relevant persons applicable under this law, employers and workers to take precaution and prevention against occupational hazards and occupational diseases;

| |
|---|
| (d) to improve the productivity and health of workers by preventing the occurrence of occupational accidents and occupational diseases for their safety;<br>(e) to create workplaces that are safe and good for health by prescribing the occupational safety and health standards relevant to the Union's status after considering international and regional standards; and<br>(f) to support and help research activities carried out for the development of occupational safety and health matters. [section 3]<br>• Any person who is currently conducting or wants to conduct any industry/ business to which this law applies shall, in accordance with the stipulations, apply to the Department for registration to enable to conduct occupational safety and health matters. [section 8(a)] |
| **XIV. Rules and Regulation in SEZ** |
| ***Myanmar Special Economic Zone Law (2014)***<br>The objectives are:<br>(a) to support the main objectives of the national economic development plan;<br>(b) to affect employment for the people, to promote their living standards, to promote the export of goods with the improvement of production and to increase foreign exchange earnings;<br>(c) to encourage, promote and attract being for the balanced development of the industrial, economic and social sectors in the State;<br>(d) to promote cooperation in industrial, economic and commercial activities, services and financial transactions between the State and other countries, and to provide the opportunities for vocational training to the citizens;<br>(e) to encourage and attract domestic and foreign investments by building good foundations for the Developers and the Investors;<br>(f) to promote the flow of domestic and foreign investments in the Special Economic Zone and to establish linkages in continuity among the industries in and the Special Economic Zone with the creation of new jobs. [section 4] |
| ***Myanmar Special Economic Zone Rules (2015)***<br>• Prohibit undertaking the manufacturing, packing, or providing services for products which can cause environmental pollution. [section 52 (b)]<br>• Prohibit undertaking the manufacturing, selling or packing products which may cause harm to public health and the environment. [section 52 (i)]<br>• Prohibit repairing, decorating or polishing up used products from aboard with the purpose of using them again in the country. [section 53 (c)]<br>• The investor has to comply with the standards of controlling air pollution and environmental preservation. [section 55 (c)]<br>• The investor is responsible for the implementation of environmental preservation measures with regard to the destruction of goods. [section 110] |

## 2.5 International Conventions, Treaties and Agreements

Myanmar has signed several international treaties related to the environment. Table 2.2 is presented a list of the conventions signed by Myanmar to date that are potentially relevant to the Project.

Table 2.2 International Treaties and Conventions

| | |
|---|---|
| 1 | Convention Concerning the Protection of the World Cultural and Natural Heritage |
| 2 | Montreal Protocol on Substances that Deplete the Ozone Layer & all amendments |
| 3 | Stockholm Convention on Persistent Organic Pollutants |
| 4 | Convention on Biological Diversity |
| 5 | Cartagena Protocol on Biosafety |
| 6 | International Tropical Timber Agreement |
| 7 | Ramsar Convention on Wetlands |
| 8 | Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) |
| 9 | ASEAN Agreement on the Conservation of Nature and Natural Resources |
| 10 | United Nations Convention to Combat Desertification |
| 11 | United Nations Framework Convention on Climate Change (UNFCCC) and Kyoto Protocol |
| 12 | Global Tiger Forum, India in August 1994 |

## 2.6 Institutional Framework of Myanmar Government Responsible for Project

### 2.6.1 Myanmar Invest Commission (MIC)

The Myanmar Investment Commission is a government-appointed body which is responsible for verifying and approving investment proposals and regularly issues notifications about sector-specific developments. The MIC is comprised of representatives and experts from government ministries, departments and governmental and non-governmental bodies. It has been formed under the Foreign Investment Law and the Myanmar Citizen Investment Law. Objectives of MIC are as follows:

- To protect investors according to the new investment law promulgated by Union Hluttaw (Parliament)
- To safeguard environmental conservation
- To deeply emphasize on social impact
- To practice accounting and auditing in accordance with international standard in financial matters including transparency and accountability
- To create job opportunities
- To abide existing labor law
- To support corporate social responsibilities
- To transfer technology

The MIC issued a Notification on 30 June 1994 on the Protection of Environment stating that:

(1) The Myanmar Investment Commission, at its meeting 8/94 held on 17 June 1994 has resolved that all projects established with the permission of the Commission shall be responsible for the preservation of the environment at and around the area of the project site. The enterprises are entirely responsible that they shall be able to control pollution or air, water and land, and other environmental degradation, and that they keep the project site environmentally friendly.

(2) Consequently, it is hereby notified that the treatment plant, industrial wastewater treatment plant and other pollution control procedures should be promptly implemented and complies with the sanitary and hygienic rules and regulations set by the relevant authorities.

(3) In the future proposals that are to be submitted to the Commission, either under the Union of Myanmar Foreign Investment Law or the Myanmar Citizens Investment Law, shall incorporate the provision in their contracts that they will undertake proper sewage and industrial wastewater treatment systems and other environmental control systems. The system used shall be in accordance with the rules and regulations specified by the respective development committees and local authorities.

### 2.6.2 Directorate of Investment and Company Administration (DICA)

The Directorate of Investment and Company Administration (DICA) was formed under the Ministry of National Planning and Economic Development on October 13, 1993.

As the primary interface between businesses and the government, DICA is mandated to promote private sector development and to boost domestic and foreign investment by creating a conductive investment climate. DICA is taking several functions

1. as a regulator on investment and companies,
2. as a company registrar,
3. as an investment promotion agency, and
4. as the Secretariat of MIC.

Furthermore, DICA is also responsible for drafting, negotiating and approving bilateral Investment Promotion and Protection Agreements and serves as a focal department for all ASEAN investment related affairs (e.g. ASEAN Comprehensive Investment Agreement, bilateral ASEAN Investment Agreements).

### 2.6.3 Environmental Conservation Department (ECD)

The Environmental Conservation Department, one of the departments under the Ministry of Natural Resources and Environmental Conservation (MONREC) is responsible for implementing National Environmental Policy, strategy, framework, planning and action plan for the integration of environmental consideration into the national sustainable development process. And then to manage natural resources conservation and sustainable utilization, the pollution control on water, air and land

for the sustainable environment. And also to cooperate with other government organizations, civil societies, private sectors and international organizations concerning with environmental management. The Objectives of ECD are as follows:

1. To implement the National Environment policy.
2. To develop short, medium and long term strategy, policy and planning for the integration of environmental consideration into the sustainable development process.
3. To manage natural resources conservation and sustainable utilization.
4. To manage the pollution control on water, air and land for environmental sustainability.
5. To cooperate with government organization, civil societies, private and international organizations for the environmental affairs.

### 2.6.4 Directorate of Industrial Supervision and Inspection (DISI)

Since 2 December 2011, Ministry of Industry was newly reorganized with the combination of Ministry of Industry No. (1), and Ministry of Industry No. (2) to strengthen the organizations and effective managements.

The ministry organized with two Directorates, six Enterprises and one Central Research & Development Center as follows:

1. Union Ministerial Office
2. Directorate of Industry (DI)
3. Directorate of Industrial Supervision and Inspection (DISI)
4. No. (1) Heavy Industrial Enterprise (HIE-1)
5. No. (2) Heavy Industrial Enterprise (HIE-2)
6. No. (3) Heavy Industrial Enterprise (HIE-3)
7. Textile Industries (TI)
8. Pharmaceutical and Foodstuff Industries (PFI)
9. Paper and Home Utility Industries (PHUI)
10. Central Research and Development Center (CR&DC)

One of the policies of ministry is "To initiate green industries in order to ensure sustainable development without environmental impact and to utilize energy efficiently and renewable energy". The tasks of DISI are:

1. To inspect the industries according to the Private Industrial Enterprise Law (1990), to fulfill their requirements and to supply for development.
2. To inspect and register the boilers according to the boiler law (2012).
3. To generate, distribute, and use the electrical power in state own, corporative or private section according to the electrical power law (2014) and also to do electrical inspection for these cases.

### 2.6.5 Departmental Cooperation Team

The Departmental Cooperation Team was formed to provide the field inspection of the operation of business in accordance with section 14 of the Foreign Investment Law.

The objectives of the Departmental Cooperation Team are as follow:

1. To enhance foreign direct investment
2. To facilitate business process
3. To make field inspection to the business operations
4. To provide one stop service

The structure of Departmental Cooperation Team is composed by representatives from the governmental departments:

5. Directorate of Investment and Company Administration
6. Customs Department
7. Department of Commerce
8. Directorate of Labor
9. Department of Immigration and National Registration
10. Ministry of Hotel and Tourism
11. Internal Revenue Department
12. Central Bank of Myanmar
13. Ministry of Electricity and Energy
14. Directorate of Industrial Supervision and Inspection
15. Ministry of Natural Resources and Environmental Conservation
16. Ministry of Agriculture, Livestock and Irrigation.

## 2.7 Standards and Guidelines for Surrounding Environment of the Project

According to Article 10 of the Environmental Conservation Law (2012), (now MONREC set up the some environmental quality standards, with the approval of the Union Government and the Committee. (See in section 2.3.4)

As of 29 December 2015, emission guideline and target values of ambient air quality, air emission, wastewater, and noise levels were set in NEQG, while other standards have not been set yet by MONREC.

In this Project, the Project Proponent, Foxlink Myanmar Company Limited basically apply the NEQG and in case of no quantitative target values in NEQG, the quantitative target values of other country and international organizations will be referred. Each quantitative target value to be applied is described below sections.

### 2.7.1 Air Quality

Since there is no ambient air quality standard in Myanmar and only air emission guideline values in National Environmental Quality Emission Guidelines (NEQEGs) (2015) referred from WHO's air quality guidelines, these guideline values

shown in below table will be set as target values for both ambient and emission air quality for operation and decommissioning phases.

Table 2.3 Ambient Air Quality Guidelines for Operation and Decommissioning Phases

| No. | Parameter | Averaging Period | Guideline Value (μg/m$^3$) |
|---|---|---|---|
| 1. | Nitrogen dioxide | 1-year | 40 |
| | | 1-hour | 200 |
| 2. | Ozone | 8-hour daily maximum | 100 |
| 3. | $PM_{10}$ | 1-year | 20 |
| | | 24-hour | 50 |
| 4. | $PM_{2.5}$ | 1-year | 10 |
| | | 24-hour | 25 |
| 5. | Sulfur dioxide | 24-hour | 20 |
| | | 10-minutes | 500 |

***Source: National Environmental Quality (Emission) Guidelines (NEQG) (29 Dec 2015)***

Since there is any combustion facilities designed to deliver electrical or mechanical power, steam, heat or any combination of these, it is necessary to set the target value for air emission level from combustion facilities in this project.

Table 2.4 Small Combustion Facilities Emission Guidelines

| No. | Combustion Technology /Fuel | Particulate matter $PM_{10}$[a] | Sulfur dioxide | Nitrogen oxides |
|---|---|---|---|---|
| 1. | Gas | - | - | 200[b] mg/Nm$^3$[c]<br>400[d] mg/Nm$^3$<br>1,600[e] mg/Nm$^3$ |
| 2. | Liquid | 100 | 3 % | 1,600-1,850[f] mg/Nm$^3$ |
| 3. | Natural gas (3-<15 MW[g]) | - | - | 200[h] mg/Nm$^3$<br>310[i] mg/Nm$^3$ |
| 4. | Natural gas (15-<50 MW) | - | - | 50 mg/Nm$^3$ |
| 5. | Fuels other than natural gas (3-<15 MW) | - | 0.5 % sulfur | 200[h] mg/Nm$^3$<br>310[j] mg/Nm$^3$ |
| 6. | Fuels other than natural gas (15-<50 MW) | - | 0.5 % sulfur | 150 mg/Nm$^3$ |
| 7. | Gas | - | - | 320 mg/Nm$^3$ |
| 8. | Liquid | 150 mg/Nm$^3$ | 2,000 mg/Nm$^3$ | 460 mg/Nm$^3$ |
| 9. | Solid [j] | 150 mg/Nm$^3$ | 2,000 mg/Nm$^3$ | 650 mg/Nm$^3$ |

*[a] Particulate matter 10 micrometers or less in diameter, [b] Spark ignition, [c] Milligrams per normal cubic meter at specified temperature and pressure, [d] dual fuel, [e] compression ignition, [f] higher value applies if bore size > 400 m, [g] Megawatt, [h] Electric generation, [i] mechanical drive, [j] Includes biomass*

***Source: National Environmental Quality (Emission) Guidelines (NEQG) (29 Dec 2015)***

The guideline values for air emission levels for Semiconductors and other Electronics Manufacturing Plant set in NEQG (2015) will be applied during the operation phase of the project (see in below Table 2-5).

Table 2.5 Air Emission Level for Semiconductors and other Electronic Manufacturing Plant

| No. | Parameter | Guideline Values | Unit |
|---|---|---|---|
| 1. | Acetone | 150 | mg/Nm$^3$[a] |

| No. | Parameter | Guideline Values | Unit |
|---|---|---|---|
| 2. | Ammonia | 30 | $mg/Nm^3$ |
| 3. | Arsine and arsenic compounds | 0.5 | $mg/Nm^3$ |
| 4. | Hydrogen chloride | 10 | $mg/Nm^3$ |
| 5. | Hydrogen fluoride | 5 | $mg/Nm^3$ |
| 6. | Inorganic hazardous air pollutants[b] | 0.42 | $mg/Nm^3$ |
| 7. | Organic hazardous air pollutants[b] | 20 | $mg/Nm^3$ |
| 8. | Phosphine | 0.5 | $mg/Nm^3$ |
| 9. | Volatile organic compounds[c] | 20 | $mg/Nm^3$ |

[a] *Milligrams per normal cubic meter at specified temperature and pressure*
[b] *Industry-specific hazardous air pollutants include: Antimony compounds, Arsenic compounds, Arsine, Carbon tetrachloride, Catechol, Chlorine, Chromium compounds, Ethyl acrilate, Ethylbenzene, Elthylene glycol, Hydrochloric acid, Hydrofluoric acid, Lead compounds, Methanol, Methyl isobutyl ketone, Methylene chloride, Nickel compounds, Perchloroethylene, Phosphine, Phosphorus, Toluene, 1,1,1-trichloroethane, Trichloroethylene (phased-out), and Xylenes*
[c] *Applicable to surface cleaning processes*
***Source: National Environmental Quality (Emission) Guidelines (NEQG) (29 Dec 2015)***

### 2.7.2 Water Quality

According to International Water Quality Guidelines Study report published by United Nation Environment Program, there are various water quality standards and they are:

a) Water Quality Standards
- ❖ Water Quality Standards for Conservation of the living Environment (Rivers)
- ❖ Water Quality Standards for Conservation of the living Environment (Lakes)
- ❖ Water Quality Standards for Protecting Human Health (Rivers and Lakes)

b) Ground Water Quality Standards

c) Coastal Water Quality Standards
- ❖ Coastal Water Quality Standards for Conservation of the Living Environment
- ❖ Coastal Water Quality Standards for the Protection of Human Health

d) Drinking Water Quality Standards

Although the water quality standards are widespread, for this IEE, Study GMES IEE Team selected WHO Drinking Water Standards - 2011 and also selected National Environmental Quality (Emission) Guidelines (2015) as effluent water quality standards.

Table 2.6 WHO Drinking Water Standards (2011)

| No. | Parameter | Guideline Values | Unit |
|---|---|---|---|
| 1. | Aluminum | 0.2 | mg/l |
| 2. | Arsenic | 10 | µg/l |
| 3. | Chloride | 250 | mg/l |
| 4. | Copper | 2 | mg/l |
| 5. | Cyanide | 0.07 | mg/l |
| 6. | Manganese | 0.4 | mg/l |
| 7. | pH | 6.5~8.5 | - |

| No. | Parameter | Guideline Values | Unit |
|---|---|---|---|
| 8. | Sulfate | 250 | mg/l |
| 9. | Total Alkalinity | - | mg/l |
| 10. | Total Dissolved Solids | 600 | mg/l |
| 11. | Total Hardness | 500 | mg/l |
| 12. | Total Iron | 0.3 | mg/l |
| 13. | Turbidity | 5 | NTU |

The following NEQG general guideline values will be applied for general effluent runoff emitted from utility operations, sewage treatment plant, wastewater treatment plant, and storm water runoff during the operation phase of the project.

Table 2.7 Effluent Water Standards for General Effluent Runoff for the Project

| No. | Parameter | Guideline Values | Unit |
|---|---|---|---|
| 1. | 5-day Biochemical oxygen demand | 50 | mg/l |
| 2. | Ammonia | 10 | mg/l |
| 3. | Arsenic | 0.1 | mg/l |
| 4. | Cadmium | 0.1 | mg/l |
| 5. | Chemical oxygen demand | 250 | mg/l |
| 6. | Chlorine (total residual) | 0.2 | mg/l |
| 7. | Chromium (hexavalent) | 0.1 | mg/l |
| 8. | Chromium (total) | 0.5 | mg/l |
| 9. | Copper | 0.5 | mg/l |
| 10. | Cyanide (free) | 0.1 | mg/l |
| 11. | Cyanide (total) | 1 | mg/l |
| 12. | Fluoride | 20 | mg/l |
| 13. | Heavy metals (total) | 10 | mg/l |
| 14. | Iron | 3.5 | mg/l |
| 15. | Lead | 0.1 | mg/l |
| 16. | Mercury | 0.01 | mg/l |
| 17. | Nickel | 0.5 | mg/l |
| 18. | Oil and grease | 10 | mg/l |
| 19. | pH | 6-9 | S.U.[a] |
| 20. | Phenols | 0.5 | mg/l |
| 21. | Selenium | 0.1 | mg/l |
| 22. | Silver | 0.5 | mg/l |
| 23. | Sulfide | 1 | mg/l |
| 24. | Temperature increases | <3[b] | °C |
| 25. | Total coliform bacteria | 400 | 100 ml |
| 26. | Total phosphorus | 2 | mg/l |
| 27. | Total suspended solids | 50 | mg/l |
| 28. | Zinc | 2 | mg/l |

*[a] Standard unit*
*[b] At the edge of a scientifically established mixing zone which takes into account ambient water quality, receiving water use, potential receptors and assimilative capacity; when the zone is not defined, use 100 meters from the point of discharge*
***Source: National Environmental Quality (Emission) Guidelines (NEQG) (29 Dec 2015)***

### 2.7.3 Noise Levels

According to the NEQG, the noise levels are set as shown in the following table and noise prevention and mitigation measures should be taken by all projects where predicted or measured noise impacts from a project facility or operation exceed the applicable noise level guideline at the most sensitive point of reception. Noise impacts should not exceed the levels shown below, or result in a maximum increase in background levels of three decibels at the nearest receptor location off-site. Since the project is located Mingaladon Industrial Park and surrounding receptors are industrial and commercial areas, the target noise level targeted to industrial and commercial receptors will be applied during operation phase of the project.

Table 2.8 Ambient Noise Level Standards for Operation Phase

| **Receptor** | **One Hour $L_{Aeq}$ , dB (A)** | |
|---|---|---|
| | **Day time**<br>**07:00-22:00 (10:00-22:00 for Public holidays)** | **Night time**<br>**22:00-07:00 (22:00-10:00 for Public holidays)** |
| Resident, Institutional, Educational | 55 | 45 |
| Industrial Commercial | 70 | 70 |

***Source: National Environmental Quality (Emission) Guidelines (NEQG) (29 Dec 2015)***

Table 2.9 OHS Noise Exposure Limits for the Work Environment

| **No.** | **Noise (dBA)** | **Permissible exposure Noise (hours and minutes)** |
|---|---|---|
| 1 | 85 | 16 hrs |
| 2 | 87 | 12 hrs 6 min |
| 3 | 90 | 8 hrs |
| 4 | 93 | 5 hrs 18 min |
| 5 | 96 | 3 hrs 30 min |
| 6 | 99 | 2 hrs 18 min |
| 7 | 102 | 1 hrs 30 min |
| 8 | 105 | 1 hr |
| 9 | 108 | 40 min |
| 10 | 111 | 26 min |
| 11 | 114 | 17 min |
| 12 | 115 | 15 min |
| 13 | 118 | 10 min |
| 14 | 121 | 6.6 min |
| 15 | 124 | 4 min |
| 16 | 127 | 3 min |
| 17 | 130 | 1 min |

*Note: Exposures above or below the 90 dB limit have been "time weighted" to give what OHSA believes are equivalent risks to a 90 dB eight-hour exposure. [Source: Marsh (9)]*

### 2.7.4 Light Intensity (Illumination)

Work area light intensity should be adequate for the general purpose of the location and type of activity, and should be supplemented with dedicated work station illumination, as needed.

The minimum limits for illumination intensity for a range of locations/activities appear in Error! Reference source not found.

Table 2.10 Minimum Limits for Workplace Illumination Intensity

| No. | Location/Activities | Light Intensity (Lux) |
|---|---|---|
| **Factories** | | |
| 1. | Emergency Stairs, Warehouse | 20-75 |
| 2. | Exit/Entrance Passages | 75-150 |
| 3. | Packaging Work | 150-300 |
| 4. | Visual Work: Production line | 300-750 |
| 5. | Typesetting: Inspection Work | 750-1500 |
| 6. | Electronic Assembly, Drafting | 1500-3000 |
| **Store** | | |
| 7. | Indoors | 75-150 |
| 8. | Corridor/Store | 150-200 |
| 9. | Reception | 200-300 |
| 10. | Display Stand | 300-500 |
| 11. | Elevator | 500-750 |
| 12. | Show Window, Packaging Table | 750-1500 |
| 13. | Storefront, Show Window | 1500-3000 |

***Source: Environment, Health and Safety (EHS) Guideline of IFC (30 April 2007)***

## 2.8 Commitment of the Project Proponent

The project proponent, Rohto-Mentholatum (Myanamr) Company Limited will implement the following environment, social, and health consideration in order to manage and mitigation potential impacts resulted from operation of the proposed project. The list of key commitments by the project proponent is described in the following.

Table 2.11 List of Key Commitments by the Project Proponent

| Field | No. | Commitment | EMP Reference | Responsibility |
|---|---|---|---|---|
| | | | | Rohto |
| General | 1 | The relevant Myanmar law, rules and regulations as follows will be complied with:<br>• The National Environmental Policy (1994)<br>• The Environmental Conservation Law (2012) and the Environmental Conservation rules<br>• The EIA Procedure (2015)<br>• The National Environmental Quality (Emission) Guideline (2015)<br>• Social Security Law, 2012 and Social Security Law, 2014 | Ch-2 | √ |
| | 2 | The project proponent follow to the National law and regulation | Ch-2 | √ |
| | 3 | The company will comply and implement the EMP and monitoring plan during operation | Ch-6 | √ |
| | 5 | The company will implement all of the | Ch-9 | √ |

| | | | | |
|---|---|---|---|---|
| | | items in the list of commitments | | |
| Air Quality | 1 | The target value of ambient air quality in accordance with the NEQG | Ch-2 | √ |
| | 2 | The target value of boiler stack and generator emission in accordance with the NEQG-small combustion facilities | Ch-2 | √ |
| | 3 | Monitoring of air quality will be conducted in accordance with the EMP during operation phase | Ch-5 and Ch-6 | √ |
| Water and Wastewater Quality | 1 | The sewage effluents and from septic tank will be sucked by hiring the septic trucks of the relevant Township Development Committee or YCDC | Ch-5 and Ch-6 | √ |
| | 2 | Parameter of domestic wastewater quality test report submit to ECD according to monitoring schedule | Ch-2 and Ch-6 | √ |
| Noise & Vibration Quality | 1 | Sufficient mitigation measures would be adopted in operation phase of proposed project to comply with noise level standards by internal regulation or NEQG. | Ch-2 and Ch-6 | √ |
| | 2 | In order to minimize the noise from production process, proper production, construction activities such as piling, vehicle running, D.G and Boiler running, etc., and operation time will be arrange to avoid the evening time as possible. The noise barrier system will adopt by choosing appropriate construction material and distance of production floors | Ch-5 and Ch-6 | √ |
| Land Contamination | 1 | Land contamination due to accidental leakage and spillage of diesel. For sewage disposal, will be disposed regular by contacting city development committee. The factory installed adequate toilets with bio-septic tanks. | Ch-5 and Ch-6 | √ |
| | 2 | Project Proponent will implement the mitigation measures for soil contamination effectively. Occupational awareness and training programs for operation staff would be practiced for handling and storage for materials | Ch-5 and Ch-6 | √ |
| | 3 | The project proponent will comply with the EMP and monitoring plan. | Ch-5 and Ch-6 | √ |
| Waste Disposal | 1 | Used oil and solvent residue will be collected in barrels and other hazardous wastes will be collected in polythene bags | Ch-5 and Ch-6 | √ |
| | 2 | All wastes must be in container or tanks | Ch-5 and | √ |

| | | | | |
|---|---|---|---|---|
| | | clearly labeled with the words. Volumes and time limits for storing waste on-site vary by segregation category. | Ch-6 | |
| Occupational Health and Safety | 1 | The relevant regulations/ rules of labor's rights, health and safety as follows will be complied with:<br>• The worker's Compensation Act (1923)<br>• The Factory Act (1951)<br>• The Payment Act (1936)<br>• The Leave and Holiday Act (1951, partially revised in 2014)<br>• The Labor Organization Law (2011)<br>• The Prevention and Control of Communicable Disease Law (2011)<br>• The Social Security Law (2012)<br>• The Labor Organization Rule (2012)<br>• The Employment and Skill Development Law (2013)<br>• The Minimum Wage Law/ Rules (2013)<br>• Social Security Law, 2012 and Social Security Law, 2014 | Ch-2 | √ |
| | 2 | • Provide necessary training on OSH for workers and supervise their implementation at work place. Implement of OSH programs systematically by appointing a safety officer. | Ch-5 and Ch-6 | √ |
| | 3 | • Precautions include vibration isolators and other engineering controls, replacing noisy equipment, good equipment maintenance, isolation of noise source and a hearing conservation program where excessive noise is present. First aid equipment should be available at the factory. | Ch-5 and Ch-6 | √ |
| | 4 | • Install effective exhaust ventilation and air conditioning to prevent air contamination and heat stress; if necessary.<br>• Install effective exhaust ventilation to prevent air contamination; if necessary, use respiratory protection.<br>• Get medical aid if skin rashes develop; consult an allergy specialist on how to deal with sensitivity to solvents, chemicals, etc. | Ch-5 and Ch-6 | √ |

| | | | | |
|---|---|---|---|---|
| Emergency Risk | 1 | • The construction contractors have installed enough number of fire extinguisher and water receiving tank with the adequate capacity in case of fire. | Ch-5 and Ch-6 | √ |
| | 2 | • There has installed suitable fire-fighting system and implemented the emergency response team for the fire and natural disaster. | Ch-2, Ch-5 and Ch-6 | √ |
| Training and Education | 1 | • The project proponent will implement the training program for new workers, other capacity building program for skill workers and emergency response training for all worker for emergency response | Ch-5 and Ch-6 | √ |
| Reporting | 1 | • There will submit monitoring reports during operation phase regularly according to the MONREC regulation | Ch-6 | √ |

# 3.0 DESCRIPTION OF THE PROJECT

## 3.1 Project Particulars of Rohto-Mentholatum (Myanmar) Co., Ltd.

| | |
|---|---|
| Project Name: | Rohto-Mentholatum (Myanamr) Co., Ltd.'s EMP Project |
| Project Location: | Plot No. D-5, Mingaladon Industrial Park, Corner of No.3 Highway Road and Khayebin Road, Mingaladon Township, Yangon Region, Myanmar. |
| Project Proponent: | Rohto-Mentholatum (Myanamr) Co., Ltd. |
| Company Address: | Plot No. D-5, Mingaladon Industrial Park, Corner of No.3 Highway Road and Khayebin Road, Mingaladon Township, Yangon Region, Myanmar. |
| Contact Person: | U Naing Aye |
| Designation: | Factory Manger |
| Contact Numbers: | +959 5149886 |
| E-mail: | naingaye@rohto.com.mm |

## 3.2 Project Location and its Area

Rohto-Mentholatum (Myanmar) Factory is located at Plot Plot No. D-5, Mingaladon Industrial Park, Corner of No.3 Highway Road and Khayebin Road, Mingaladon Township, Yangon Region, Myanmar (See Figure 3.1). The geographical coordinates of the project site are as follows:

| | | |
|---|---|---|
| Latitude | : | 16˚ 56′ 23″ N |
| Longitude | : | 96˚ 9′ 15.38″ E |

The area occupied is 10,004 $m^2$. The major land use of the area consists mainly of industry.

## 3.3 Site Description

### 3.3.1 Site Accessibility

The Factory is being built in Mingalardon Industrial Park (MIP), Mingalrdon Township. M IP is situated lateral side of the No.3 Highway Road. Factory can be reached from Main Gate of Zone by driving along the road in straight direction until the first junction. After that turn right this junction, and drive across the one plot. Factory is situated the left hand side. (See Figure 3.1)

### 3.3.2 Site Boundaries and Surrounding Environment

The Rohto Factory is surrounded by:

| | | |
|---|---|---|
| North | - | TI Garment |
| East | - | Tashin Garment |
| South | - | Sunflower Lace (2) |
| West | - | Wedtex |

Figure 3.1 Factory Location and Site Access in MIP and Site Boundaries and Surrounding Environment

## 3.4 Layout Plan

The Layout Plan of the project site shows the land use of Rohto factory. There are factory building, auxiliary area such as canteen, generator & electrical building and security gate. Factory building will be a two storey building. On the ground floor of the factory building are packing and filling area, office, chemicals store, boiler room, compressor room, maintenance office and firefighting pump room. The second floor is main production area and temporary store area. Buidling Lyout, 1$^{st}$ Floor, 2$^{nd}$ Layout and Drainage Layout are as shown in the following Figures.

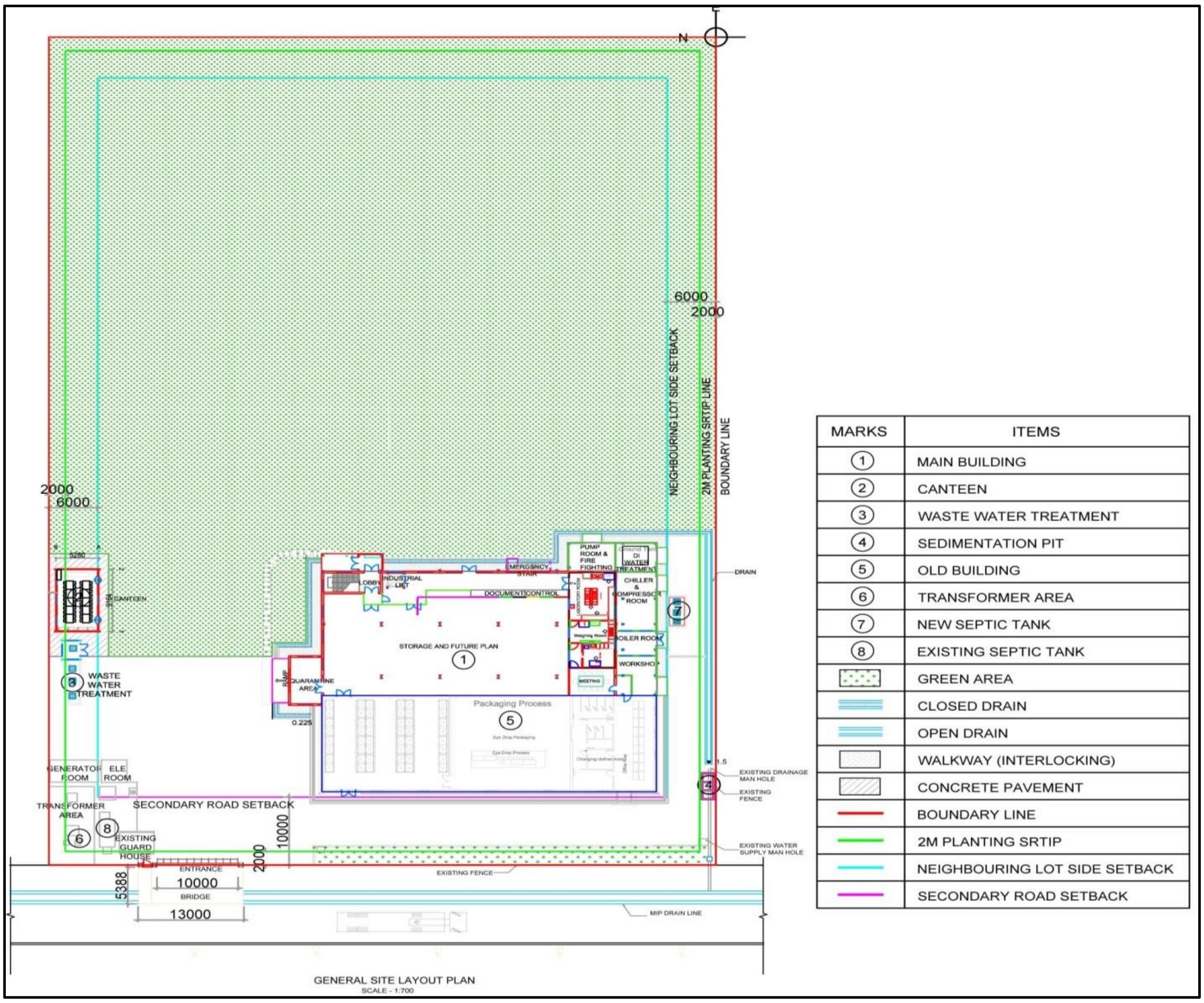
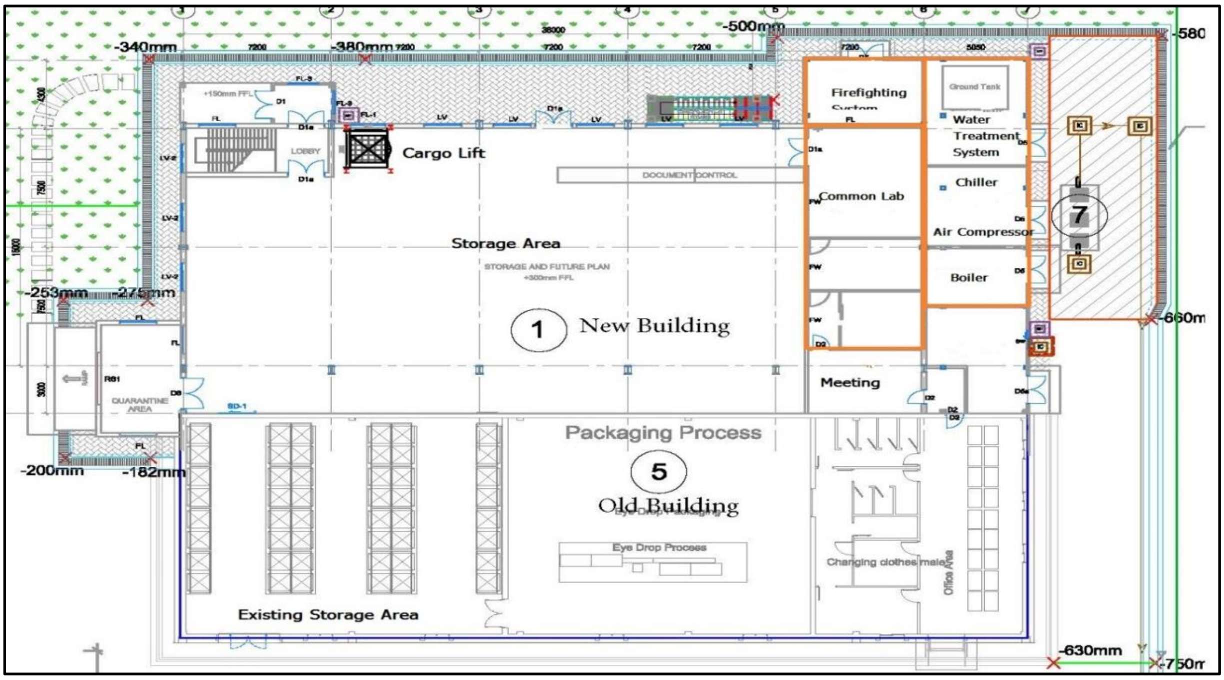
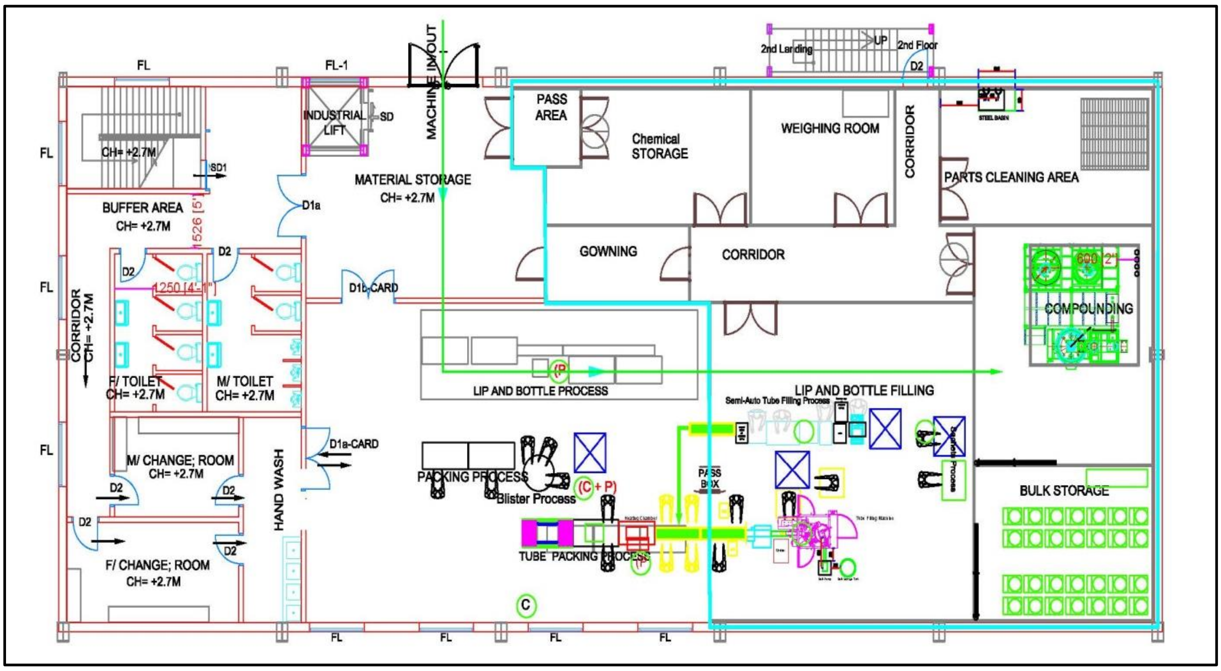



Figure 3.2 Buidling Layout Plan




**First Floor**




**Second Floor**

Figure 3.3 Main Factory Building Layouts with 1st & 2nd Floors

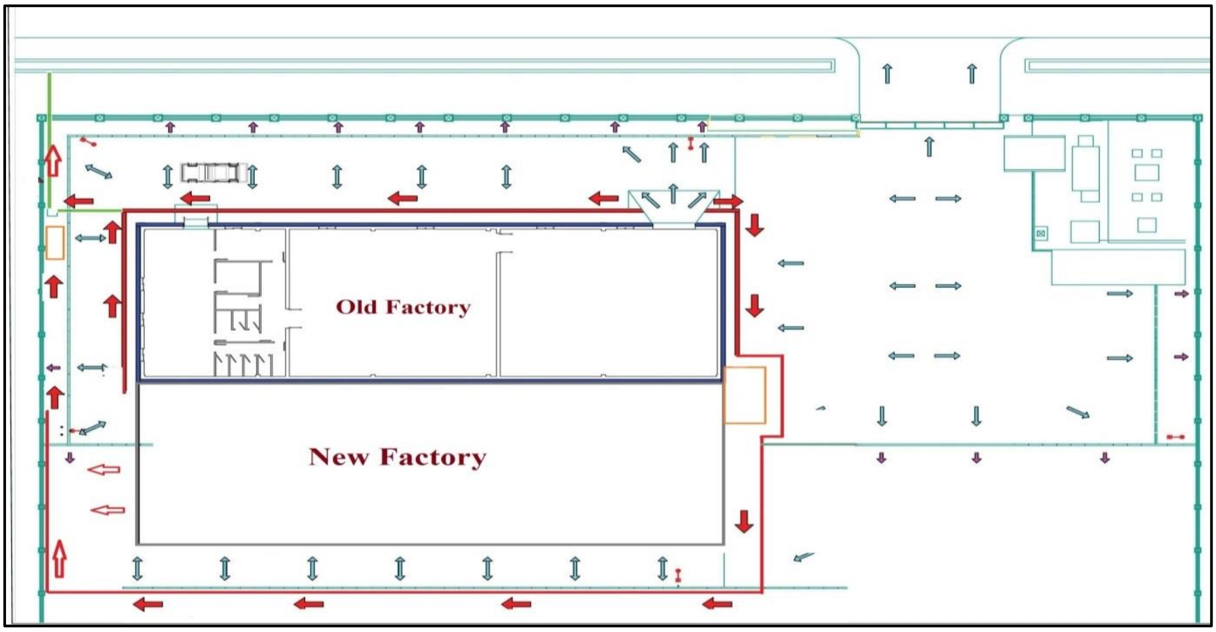



Figure 3.4 Draiage Flow Layout Plan

## 3.5 Investment Details

### 3.5.1 List of Shareholders

Table 3.1 List of Shareholders

| No. | Shareholders | Address | Share Percentage |
|---|---|---|---|
| 1 | Rohto-Pharmaceutical Company Limited. | Osaka, Japan | 98% |
| 2 | Rohto-Mentholatum (Vietnam) Company Limited. | Vietnam | 2% |

#### 3.5.2 Investment Plan

Table 3.2 Detailed Investment Plan

| No. | Particular | Foreign (USD Million) |
|---|---|---|
| 1 | Building | 1.3 |
| 2 | Machinery and Equipment to be import | 1.0 |
| 3 | Furniture and Fixture (Local Purchase) | 0.7 |
| 4 | Office Equipment and Accessories (Local Purchase) | |
| 5 | Machinery and Equipment (Local Purchase) | |
| **Total Investment** | | 3.0 |

## 3.6 Employment and Working Hour

The manpower and working hour are as shown in the below.

Working Hour: 7:30 a.m. - 3:20 p.m. (7:20 hours/day)

Lunch Time: 00:30 min

Over Time: Base on Production Process Situation.

Table 3.3 List of Employees

| No. | Department | Current |
|---|---|---|
| 1 | Factory Manager | 1 |
| 2 | Admin Department | 1 |
| 3 | Engineering Department | 5 |
| 4 | Logistics & Warehouse Department | 6 |
| 5 | QA Department | 6 |
| 6 | QC Department | 2 |
| 7 | Production Department | 14 |
| **Total** | | 36 |

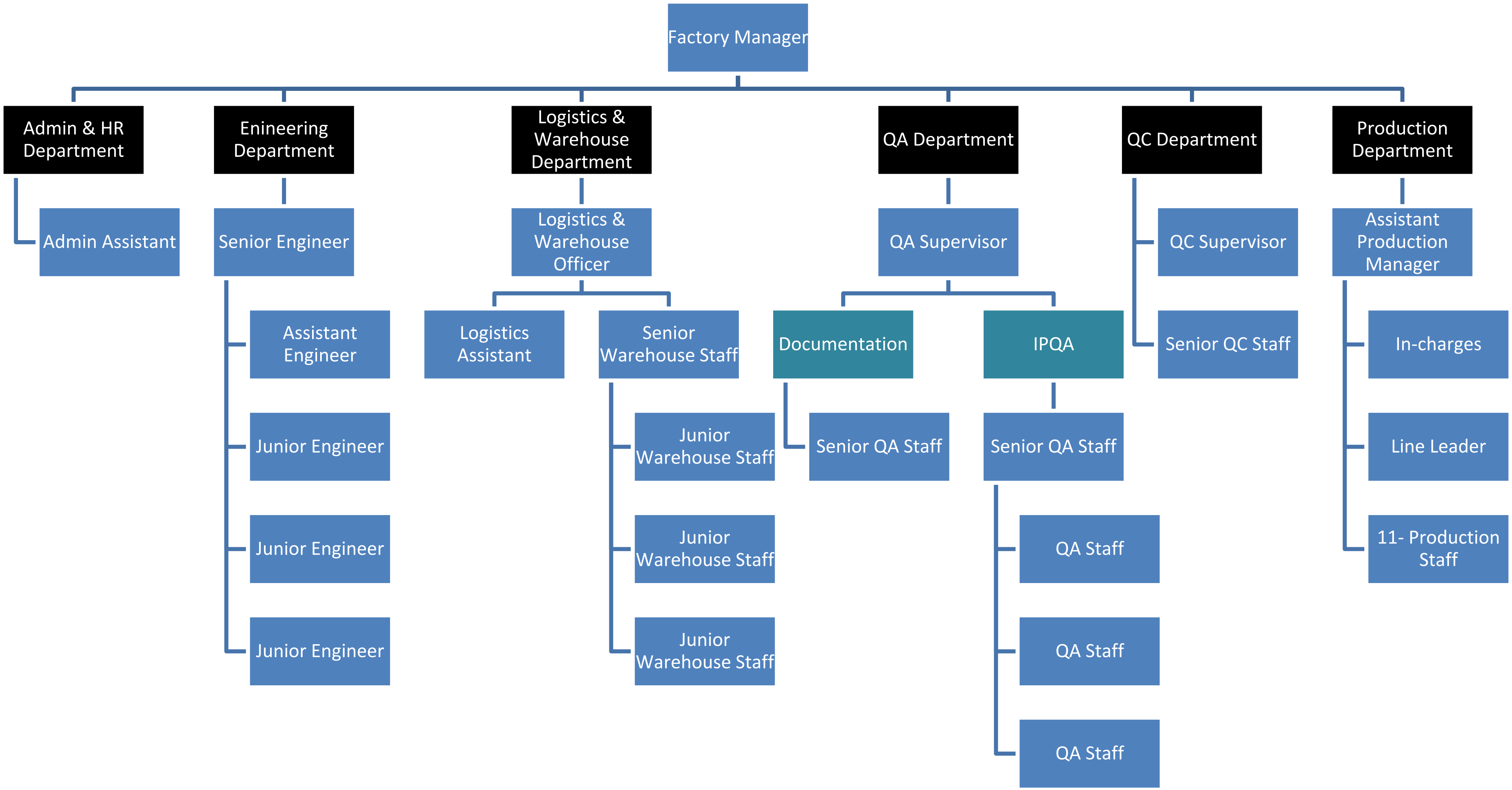



Figure 3.5 Organization Chart

## 3.7 Machineries to be used by Rohto-Mentholatum (Myanmar) Co., Ltd.

The detailed list of machineries to be used for the production process and other purposes are shown in the following table.

Table 3.4 List of Equipment to be imported

| No | Item | Specification | Purpose for using | Supplier/Country Origin | Quantity | Dimension | Using Volt | Power Watt |
|---|---|---|---|---|---|---|---|---|
| 1 | Emulsify Mixer/Compounding MC | 120 ~ 300 Kg | Mixing for Bulk | Shang Yuh Machine Co.,Ltd/ Taiwan | 1 | 3370 x 3300 x 4405 | 3P,380V | 17,200 W |
| 2 | Tube Filling & Sealing with Hot Air Type | 40 ~ 60 pcs /Min | Automatic Cosmetic tube filling and sealing manufacturing | Sirius Machinery (Suzhou From China) | 1 | 1400 x 1200 x 1800 | 3P,380V | 7,000 W |
| 3 | Chiller | - | Supply cooling system for filling machine | Sirius Machinery (Suzhou From China) | 1 | 650 x 500 x 900 | | 9.4 – 40.00 kW |
| 4 | Bulk Pump | 100 L, sus 316 L | Bulk transfer from ground to filling machine's hopper | Local supplier Sai Beacom (Machine From China) | 1 | 700 x 700 x 950 | | 200 W |
| 5 | Check Weighter/Weight Rejector | Weight range : 6 to 600 g; Scale interval : 0.05 g; Maximum Speed : 320 products/min | Automatic weight checking, rejection after tube filling | Local/China | 1 | 1500 x 650 x 1200 | | 350 W |
| 6 | Heating Chamber / Shrink Packing machine | Tunnel Size: 700mm X 350mm X 150mm Conveyor Speed: 0-20M / Min | Semi auto plastic shrinking for tube cap | Local - Wintech Myanmar/China | 1 | 830 x 43o x 250 | 1P, 220V | 2,000 W |
| 7 | Corrugated Box Double Sealing | Min W150 x H120 mm, | Automatic packaging for | Local ; China | 1 | 1755 x 800 x 960 | 1P, 220V | 200 W |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Max W500 x H600 mm | corrugated box | | | | | |
| 8 | Ink Jet Printer | UX-D160W | Date, Lot printing | Local supplier - Sai Beacom | 1 | 400 x 320 x 527 | 1P, 220V | 250 W |
| 9 | Lundary Machine | Washing and Drying | | Local | 2 | | 1P, 220V | 2,500 W |
| 10 | Gluing M/C | - | Plastic melting for packing | Local | 2 | 200 x 200 x 300 | 1P, 220V | 1,500 W |
| 11 | Boiler | 300 Kg | Steam using for emulsify mixer | Local/Japan | 1 | 1350 x 885 x 1980 | 3P, 380V | 300 kg/ h |
| 12 | Air Compressor | DVAW-15 | Air supply for required machines | - | 1 | 1200 x 900 x 1200 | 3P, 380V | 15,000 |
| 13 | Chiller | - | Cooled water using for emulsify mixer | - | 1 | 950 x 397 x 1010 | 1P, 220V | 3,000 |
| 14 | Water Treatment System | - | DI water using for emulsify mixer | - | 1 | - | - | 3810 W |
| 15 | Firefighting System | - | - | - | 1 | - | - | - |
| 16 | Waste water treatment system | - | - | - | 1 | - | - | 920 W |
| 17 | Generator | S275HC(S) | - | - | 1 | 4300 x 1483 x 2145 | - | 275 kVA |

Table 3.5 List of Existing Equipment

| No | Item | Specification | Purpose for using | Supplier/Country Origin | Quantity | Dimension | Using Volt | Power Watt |
|---|---|---|---|---|---|---|---|---|
| 1 | Air Cleaner | 12 ~ 20 | Manual Tube cleaning | RMV / Vietnam | 1 | 400 x 800 x 850 | 1P, 220V | 0.25 W |
| 2 | Filling Machine | 10 ~ 20 pcs/min | Semi auto cosmetic tube | New Diamond /Taiwan | 1 | 900 x 500 x 1550 | 1P, 220V | 370 W |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | filling | | | | | |
| 3 | RMM Sealing Machine | 6 ~ 10 pcs/min | Semi auto cosmetic tube sealing | Chenghao / China | 1 | 1100 x 700 x 810 | 1P, 220V | 2000 W |
| 4 | Direct Heat Sealer | 8 ~ 10 pcs/min | Manual laminate tube sealing | Local / China | 1 | 345 x 485 x 880 | 1P, 220V | 350 W |
| 5 | Blister | 16 ~ 20 pcs/min | Semi auto blistering | RMV / Vietnam | 1 | 1100 x 960 x 1430 | 1P, 220V | 3500 W |
| 6 | Ink Jet Printer | 60 ~ 100 pcs/min | Date, Lot printing | Mekhaung / Vietnam | 1 | 400 x 290 x 515 | 1P, 220V | 210 W |
| 7 | Gluing | 50 ~ 70 pcs/min | Plastic melting for packing | RMV / Vietnam | 3 | 200 x 200 x 300 | 1P, 220V | 1500 W |
| 8 | Hand Dryer | - | Manual plastic shrinking for tube cap | Local/ China | 3 | - | 1P, 220V | 6000 W |
| 9 | Air Compressor and Air Dryer | - | | Local/ China | 1 | 1140 x 400 x 900 | 3p, 380 | 2200 W |
| 10 | Generator (65 kVA) | MGC 65S | Power generation | Local / China | 1 | 700 x 500 x 800 | 1P, 220V | 65 kVA |

### 3.7.1 Boiler

The boiler is used for the production process of ficalcream production.

| | |
|---|---|
| Brand: | Miura |
| Output: | 300kg/h |
| Max; Pressure: | 0.98 MPa (10kgf/cm$^2$) |
| Temp: | 120 ~ 500 ˚C |
| Fuel: | Diesel |

Figure 3.6 Photo of Diesel Boiler

### 3.7.2 Air Compressor

The factory is used compress air for packing machine and other purposes.

Brand: DENAIR, Model: DVAW – 15

Working Pressure: 6 ~ 8 bar

Max; Pressure: 10 bar

Figure 3.7 Photo of Air Compressor

### 3.7.3 Machine for Loading and Unloading

There is 1.3 tons battery fork-lift for the loading and unloading of raw materials and products. The fuel type is electricity.

Equipment: Reach Loader (48V DC)

Model: 8FBR-13

Brand: Sumitomo

Max; Load: 1.3 Ton

Figure 3.8 Photo of Battery Fork-Lift

## 3.8 Raw Materials

### 3.8.1 Imported Amount of Raw Materials and Hazardous Statement

Annual imported raw materials amount is described in below table.

Table 3.6 Medicine Semi-Finished Goods & Raw Material List

| No. | Item Name | SFG Qty |
|---|---|---|
| 1 | New V. Rohto | 1200513 |
| 2 | V.Rohto Cool | 332555 |
| 3 | V.Rohto Vitamin | 79996 |
| 4 | Deep Heat Rub Plus | 11000 |
| 5 | OXY 5 | 16000 |
| 6 | OXY 10 | 15599 |
| 7 | Remos I B | 6515 |
| | **Total (Pcs)** | **1,662,178** |

Table 3.7 Medicine Packaging List

| Item Name | Description | Used Qty-2021 |
|---|---|---|
| V. Rohto | Myanmar unit box | 1,123,258 |
| | Myanmar Instruction sheet | 1,123,258 |
| | Stack Film | 149,970 |

| | | |
|---|---|---|
| | RMM Corrugated box | 2,821 |
| V.Rohto Cool | Unit box | 306,819 |
| | Myanmar Instruction sheet (Local) | 306,819 |
| | V.Rohto Cool Corrugated Box(RMM) | 769 |
| V.Rohto Vitamin | Myanmar unit box | 69,857 |
| | Myanmar Instruction sheet | 69,857 |
| | RMM Corrugated box | 176 |
| Deep Heat Rub Plus | Unit box | 11,001 |
| | Myanmar Instruction Sheet | 11,001 |
| | Stack Film | 1,099 |
| Acnes Medical Cream | Stack Film | 900 |
| | Unit box | 9,008 |
| | Instruction Leaflet | 8,987 |
| OXY 5 | Unit box | 23,001 |
| OXY 10 | Unit box | 11,600 |
| OXY 5 / OXY 10 | Instruction Leaflet | 34,601 |
| OXY 5 / OXY 10 | Stack Film | 2,878 |
| REMOS IB | Unit box | 6,516 |
| | Instruction Leaflet | 6,516 |
| | Stack Film | 650 |
| **Total ( Pcs )** | | **3,281,362** |

Table 3.8 Cosmetic Raw Material and Finished Goods

| **Item Name** | **Kg** |
|---|---|
| Acnes Creamy Wash Bulk | 26,585.03 |
| Acnes Sealing Gel Bulk | 928.12 |
| Acnes Vitamin Cleanser Bulk | 16,737.96 |
| Acnes Oil Control Cleanser Bulk | 3,171.78 |
| Acnes Pure White Wash Bulk | 1,496.77 |
| LIPICE Sheer Color Natural Bulk | 30.00 |
| LIPICE Sheer Color Strawberry Bulk | 40.00 |
| LIPICE Sheer Color Honey Bulk | 20.00 |
| **Total Bulk** | 49,010 |

Table 3.9 Cosmetic Packaging List

| **Item Name** | **Description** | **Used Qty-2021** |
|---|---|---|
| Acnes Creamy Wash 20g | Internal box | 487 |
| | Tube Box Holder | 6,993 |
| | RMM Plain Corrugated Box | 105 |

| | | |
|---|---|---|
| Acnes Creamy Wash 50g | Internal box | 10,349 |
| | Unit Shrink Film Acnes CW 50g | 178,000 |
| Acnes Creamy Wash 100g | Internal box | 11,771 |
| | Unit Shrink Film Acnes CW 100g | 141,400 |
| | RMM Corrugated box | 1,178 |
| Acnes Sealing Gel 9g | Unit box | 86,151 |
| | Instruction Leaflet | 127,996 |
| | Stack film | 8,612 |
| Acnes Sealing Gel 18g | Unit box | 41,845 |
| | Stack film | 4,183 |
| Acnes Foaming Wash | Common Local Sticker | 2,170 |
| Acens Scar Care | Unit box | 22,798 |
| | Sticker | 0 |
| | Instruction Leaflet | 22,798 |
| | Stack film | 2,275 |
| Acnes Sealing Gel 9g & Remos IB | RMM Common Corrugated box | 268 |
| | Use Foaming Wash Corrugated box (For Scar-Z) | 79 |
| Acnes Creamy Wash | Use Creamy Wash 50 Corrugated Box | 1,037 |
| Acnes Oil Remover Film | Common Local Sticker 50sheet | 10,206 |
| Acnes Vitamin Cream | Unit box | 39,711 |
| Acnes C10 | Common Local Sticker | 788 |
| | RMM Corrugated box | 6 |
| Acnes Vitamin Cleanser 50g | Internal box | 6,401 |
| | Unit Shrink Film Acnes VC 50g | 112,400 |
| | RMM Plain Corrugated box (For Vitamin Cleanser 50g,Acnes Pure White Wash 50g,Acnes Oil Control Cleanser 50g,Selsun 50ml,Selsun 100ml) | 1,329 |
| Acnes Vitamin Cleanser 100g | Internal box | 6,377 |
| | Unit Shrink Film Acnes VC 100g | 76,200 |
| | RMM Plain Corrugated box (For Vitamin Cleanser 100g,APWWash, AOCCleanser 100g and Foaming Wash) | 883 |
| Acnes Soothing Toner | Common Local Sticker 90ml | 38,780 |
| Acnes Medical Cream | Stack Film | 900 |
| | Unit box | 9,008 |
| | Instruction Leaflet | 8,987 |
| Acnes Pure White Wash | Common Local Sticker 50g | 15,344 |

| | | |
|---|---|---|
| Acnes Pure White Wash | Common Local Sticker 100g | 13,089 |
| Acnes Pure White Wash 50g | Internal box | 528 |
| | Unit Shrink Film Acnes Pure White Wash 50g | 9,600 |
| Acnes Pure White Wash 100g | Internal box | 804 |
| | Unit Shrink Film Acnes Pure White Wash 100g | 9,800 |
| Acnes Pure White Cream | Unit box | 6,003 |
| | Common Local Sticker 50g | 3,316 |
| | Guarnatee Sticker | 85,428 |
| | Divider | 6,003 |
| | Internal box | 3,813 |
| | RMM Plain Corrugated box | 427 |
| Acnes Oil Control Cleanser | Common Local Sticker 50g | 18,259 |
| Acnes Oil Control Cleanser | Common Local Sticker 100g | 19,519 |
| Acnes Oil Control Cleanser 50g | Internal box | 652 |
| | Unit Shrink Film Acnes Oil Control Cleanser 50g | 21,800 |
| Acnes Oil Control Cleanser 100g | Internal box | 1,630 |
| | Unit Shrink Film Acnes Oil Control Cleanser 100g | 22,000 |
| Hada Labo Advanced Nourish Hyaluron Cleanser 80g | Instruction sheet | 11,277 |
| Hada Labo Perfect White Arbutin Cleanser 80g | Instruction sheet | 3,600 |
| Hada Labo Perfect White Arbutin Lotion 100ml | Instruction sheet | 300 |
| Hada Labo Pro Anti Aging Collagen Plus Cleanser 80g | Instruction sheet | 7,700 |
| HDLB Advanced Nourish Trial set | Local Sticker | 3,409 |
| Sunplay ( 4 ) itmes | RMM Plain Corrugated box (For Sunplay Group and LipIce Sheer Color Q) | 229 |
| Super Block, Baby Mild & WhiteningUV common BlisterDome | | 44,154 |
| Sunplay | Common Internal box | 2,649 |
| Sunplay | POP Label Sticker | 52,929 |
| Sunplay | Common Local Sticker 30g | 56,266 |
| Sunplay Out Going | Blister Dome | 8,775 |
| | Sticker | 0 |
| | Backcard | 8,775 |
| Sunplay Super Block | Sticker | 0 |
| | Backcard | 17,526 |
| Sunplay Baby Mild | Sticker | 0 |
| | Backcard | 11,377 |
| Sunplay Whitening UV | Sticker | 0 |

| | | |
|---|---|---|
| | Backcard | 15,251 |
| Sunplay | Common Local Sticker 70g | 8,783 |
| Sunplay Skin Aqua Clear White 25g | Local Sticker | 1,546 |
| Sunplay Skin Aqua Clear White 55g | Local Sticker | 1,656 |
| Sunplay Skin Aqua Silky White Gel 30g | Local Sticker | 4,780 |
| Sunplay Skin Aqua Silky White Gel 70g | Local Sticker | 4,146 |
| Sunplay Skin Aqua UV Tone Up Essence 50g | Local Sticker | 5,167 |
| Scar Z | Instruction Leaflet | 8,308 |
| | Unit box | 8,308 |
| | Stack Film | 829 |
| Remos IR Spray | Common Local Sticker 60ml | 10,485 |
| Remos IR Spray | Common Local Sticker 150ml | 3,252 |
| Remos IR Cream | Common Local Sticker 70g | 3,677 |
| Selsun Shampoo 50 ml | Unit box | 31,122 |
| Selsun Shampoo 100 ml | Unit box | 26,922 |
| Selsun sachet | Local Sticker | 143,562 |
| LIPICE Colorless | RMM Plain Common Corrugated box (For ASGel 18g, OXY 5 , OXY 10 , Scar Care, Medical Cream, Colorless, Lip On Lip, Deep Heat Rub Plus) | 432 |
| LIPICE Colorless | Common Local Sticker 4.3g | 12,856 |
| LIPICE Sheer Color | RMM Common Corrugated box | 58 |
| LIPICE Sheer Color L N S H P | Common Internal box | 849 |
| LIPICE Sheer Color | Common Blister Dome (Big Size) | 25,300 |
| LIPICE Sheer Color | Common Local Sticker 2.4g | 53,157 |
| LIPICE Sheer Color Natural | Backcard | 6,322 |
| LIPICE Sheer Color Strawberry | Backcard | 11,063 |
| LIPICE Sheer Color Honey | Backcard | 7,915 |
| LipIce Sheer Color Q | Common Blister Dome | 1,360 |
| | Common Internal Box | 57 |
| LipIce Sheer Color Q Orange Juice | Backcard | 1,360 |
| LipIce Sheer Color Fruit Juice series | Common Local Sticker | 12,131 |
| LipIce Sheer Color POP series | Common Local Sticker | 12,147 |
| LipIce Water Lip Citrus series | Common Local Sticker | 3,526 |
| All Unit box | Glue ( kg ) | 90 |
| **Total ( Pcs )** | | **1,875,869** |

## 3.9 Types of Products and Production Capacity

Rotho-Menntholatum (Myanmar) Co., Ltd will imported and distributed many types of OTC medicines and cosmetics. Moreover, the mianly produced the facial cream .The other products are packing and distribution. The types of the product and their targeted production capacity are described below. The sale plan is 100 % for local.

Table 3.10 Types of Medicines Products and Production Capacity (Yearly)

| No. | Brand | Items | Unit | Weight | Unit | Qty |
|---|---|---|---|---|---|---|
| 1 | Medicines | V-Rohto 13ml | ml | 15,606,669 | pcs | 1,200,513 |
| 2 | | V-Rohto Cool 12 ml | ml | 3,990,660 | pcs | 332,555 |
| 3 | | V-Rohto Vitamin 13 ml | ml | 1,039,948 | pcs | 79,996 |
| 4 | | Deep Heat Rub Plus 30g | g | 330,000 | pcs | 11,000 |
| 5 | | Medical Cream 18g | g | 271,548 | pcs | 15,086 |
| 6 | | Remos IB 10g | g | 65,150 | pcs | 6,515 |
| 7 | | OXY 5 10g | g | 230,000 | pcs | 23,000 |
| 8 | | OXY 10 10g | g | 115,990 | pcs | 11,599 |
| Yearly Total Balance | | | | | | 1,680,264 |

Table 3.11 Types of Cosmetic Products and Packing Capacity (Yearly)

| No. | Brand | Items | Unit | Qty | Unit | Weight |
|---|---|---|---|---|---|---|
| 1 | Acnes | Creamy Wash 20 g | Pcs | 43,330 | g | 866,600 |
| 2 | | Creamy Wash 50g | Pcs | 195,728 | g | 9,786,400 |
| 3 | | Creamy Wash 100g | Pcs | 141,189 | g | 14,118,900 |
| 4 | | Soothing Toner 90ml | Pcs | 49,576 | ml | 4,461,840 |
| 5 | | Sealing Gel 9g | Pcs | 91,574 | g | 824,166 |
| 6 | | Sealing Gel 18g | Pcs | 41,845 | g | 753,210 |
| 7 | | Foaming Wash 150ml | Pcs | 2,170 | g | 325,500 |
| 8 | | Oil Remover Films | Pcs | 10,197 | g | 134,600.40 |
| 9 | | Scar Care 12g | Pcs | 17,086 | g | 205,032 |
| 10 | | C 10 15ml | Pcs | 10,403 | ml | 156,045 |
| 11 | | Vitamin Cream 40g | Pcs | 54,537 | g | 2,181,480 |
| 12 | | Vitamin Cleanser 50g | Pcs | 127,019 | g | 6,350,950 |
| 13 | | Vitamin Cleanser 100g | Pcs | 81,900 | g | 8,190,000 |
| 14 | | Pure White Cream 50g | Pcs | 6,686 | g | 334,300 |
| 15 | | Pure White Wash 50g | Pcs | 9,488 | g | 474,400 |
| 16 | | Pure White Wash 100g | Pcs | 19,515 | g | 1,951,500 |
| 17 | | Oil Control Cleanser 50g | Pcs | 16,106 | g | 805,300 |
| 18 | | Oil Control Cleanser 100g | Pcs | 16,642 | g | 1,664,200 |
| 19 | LipIce | Sheer Color Strawberry 2.4 g | Pcs | 6,321 | g | 15,170.40 |
| 20 | | Sheer Color Natural | Pcs | 4,741 | g | 11,378.40 |
| 21 | | Sheer Color Honey | Pcs | 7,915 | g | 18,996.0 |
| 22 | | Sheer Color Q Choco Mint | Pcs | 1,360 | g | 3,264.0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | 2.4g | | | | |
| 23 | | Colourless Apple | Pcs | 1,915 | g | 8,234.50 |
| 24 | | Colourless Strawberry | Pcs | 1,913 | g | 8,225.90 |
| 25 | | Colourless Lemon 4.3g | Pcs | 1,339 | g | 5,757.70 |
| 26 | | LipIce Sheer Color Fruit Juice Cherry 4g | Pcs | 3,036 | g | 12,144 |
| 27 | | LipIce Sheer Color Fruit Juice Strawberry | Pcs | 3,035 | g | 12,140 |
| 28 | | LipIce Sheer Color Fruit Juice Berry | Pcs | 3,032 | g | 12,128 |
| 29 | | LipIce Sheer Color Fruit Juice Orange | Pcs | 3,028 | g | 12,112 |
| 30 | | LipIce Sheer Color POP Pink 2.4g | Pcs | 3,036 | g | 7,286.40 |
| 31 | | LipIce Sheer Color POP Orange | Pcs | 3,037 | g | 7,288.80 |
| 32 | | LipIce Sheer Color POP Rose | Pcs | 3,037 | g | 7,288.80 |
| 33 | | LipIce Sheer Color POP Red | Pcs | 2,653 | g | 6,367.20 |
| 34 | | LipIce Water Lip Citrus Pure Joy 4.3g | Pcs | 1,764 | g | 7,585.20 |
| 35 | | LipIce Water Lip Citrus Herb | Pcs | 1,762 | g | 7,576.60 |
| 36 | Sunplay | Out Going | Pcs | 9,406 | g | 282,180 |
| 37 | | Super Block 30g | Pcs | 7,645 | g | 229,350 |
| 38 | | Super Block 70g | Pcs | 6,176 | g | 432,320 |
| 39 | | Baby Mild 30g | Pcs | 7,379 | g | 221,370 |
| 40 | | Whitening UV-30g | Pcs | 13,048 | g | 391,440 |
| 41 | | Whitening UV-70g | Pcs | 3,812 | g | 266,840 |
| 42 | | Sunplay Skin Aqua Clear White 25g | Pcs | 1,546 | g | 38,650 |
| 43 | | Sunplay Skin Aqua Clear White 55g | Pcs | 1,656 | g | 91,080 |
| 44 | | Sunplay Skin Aqua Silky White Gel 30g | Pcs | 4,780 | g | 143,400 |
| 45 | | Sunplay Skin Aqua Silky White Gel 70g | Pcs | 6,146 | g | 430,220 |
| 46 | | Sunplay Skin Aqua UV Tone Up Essence | Pcs | 3,167 | g | 158,350 |
| 47 | Other Consumer Products | Scar Z | Pcs | 15,268 | g | 183,216 |
| 48 | | Remos IR 60ml | Pcs | 48,965 | ml | 2,937,900 |
| 49 | | Remos IR 150ml | Pcs | 3,492 | ml | 523,800 |
| 50 | | Remos IR Cream Lemon Grass | Pcs | 11,646 | g | 815,220 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 51 | | Selsun Shampoo 50 ml | Pcs | 35,395 | ml | 1,769,750 |
| 52 | | Selsun Shampoo 100 ml | Pcs | 26,508 | ml | 2,650,800 |
| 53 | HADA LABO Series | Advanced Nourish Hyaluron Cleanser 80g | Pcs | 8,085 | g | 646,800 |
| 54 | | Advanced Nourish Hyaluron Lotion 100ml (for normal skin) | Pcs | 3,644 | ml | 364,400 |
| 55 | | Advanced Nourish Hyaluron Lotion 100ml (for oil skin) | Pcs | 3,774 | ml | 377,400 |
| 56 | | Advanced Nourish Hyaluron Cream 50g | Pcs | 9,106 | g | 455,300 |
| 57 | | Perfect White Arbutin Cleanser 80g | Pcs | 1,993 | g | 159,440 |
| 58 | | Perfect White Arbutin Lotion 100ml | Pcs | 5,277 | ml | 527,700 |
| 59 | | Perfect White Arbutin Milk 90ml | Pcs | 4,357 | ml | 392,130 |
| 60 | | Perfect White Arbutin Essence 30g | Pcs | 3,016 | g | 90,480 |
| 61 | | Perfect White Arbutin Cream 50g | Pcs | 8,283 | g | 414,150 |
| 62 | | Pro Anti Aging Collagen Plus Cleanser 80g | Pcs | 5,000 | g | 400,000 |
| 63 | | Pro Anti Aging Collagen Plus Lotion 100ml | Pcs | 4,458 | ml | 445,800 |
| 64 | | Pro Anti Aging Collagen Plus Cream 50g | Pcs | 4,310 | g | 215,500 |
| 65 | | Pro Anti Aging Collagen Plus Essence 30g | Pcs | 2,540 | g | 76,200 |
| 66 | | HDLB Advanced Nourish Trial set (Hyaluron Cleanser 25g + Hyaluron Lotion 40ml) | Pcs | 3,409 | | |
| 67 | | HDLB Perfect White Trial set (Arbutin Cleanser 25g + Arbutin Lotion 40ml) | Pcs | 3,936 | | |
| Total Balance | | | | 1,265,138 | | |

Figure 3.9 Photo of Distributed Oroducts

## 3.10 Resource Requirements

### 3.10.1 Electricity Consumption

5,000 kWh-10,000 kWh from Industrial Zone Distribution System and diesel generator (275 kVA) is used for backup if electricity will be break down.

Figure 3.10 Photo of 315 kVA Transformer

Figure 3.11 Photo of Diesel Generator (275 kVA)

### 3.10.2 Diesel Fuel Consumption

For diesel generator: 50 ~ 70 L/day and for boiler: 90 ~ 100 L/day

### 3.10.3 Water Requirements

The water usage of factory is received from YCDC through the MIP to factory. Water is used for production, domestic purpose and cleaning of equipment. Water requirement for operation phase are shown in the following table. The process using water is required pure water. Therfore, the focatory is carried out treating the suppling water. The installed water treatment system process is as shown in the following figure.

Table 3.12 Estimated Water Utility

| Item | Type of Water | Amount |
|---|---|---|
| Daily Water Consumption during Operation | Process water -Normal Water, DI water | 3000 L |
| | For other (Canteen, Office, Toilets and Housekeeping …etc.) – Normal Water | 1000 L |
| | Total | 4000 L/day |

## 3.11 Waste Generation

### 3.11.1 Wastewater Discharge and Treatment System

**(a) Wastewater Discharge**

There is wastewater from the production process and domestic wastewater will be discharged. Production wastewater from the facial wash cream mixing tanks washing. Domestic wastewater from canteen, office, factory housekeeping and toilet flushing shall be collected in septic tanks for treatment. The outlet from septic tanks and WWTP will be discharged to centralized wastewater treatment system of MIP. Storm water will directly flow to the retention canal and the drainage layout plan is as shown in Figure 3.3.

Table 3.13 Wastewater Discharged Amount

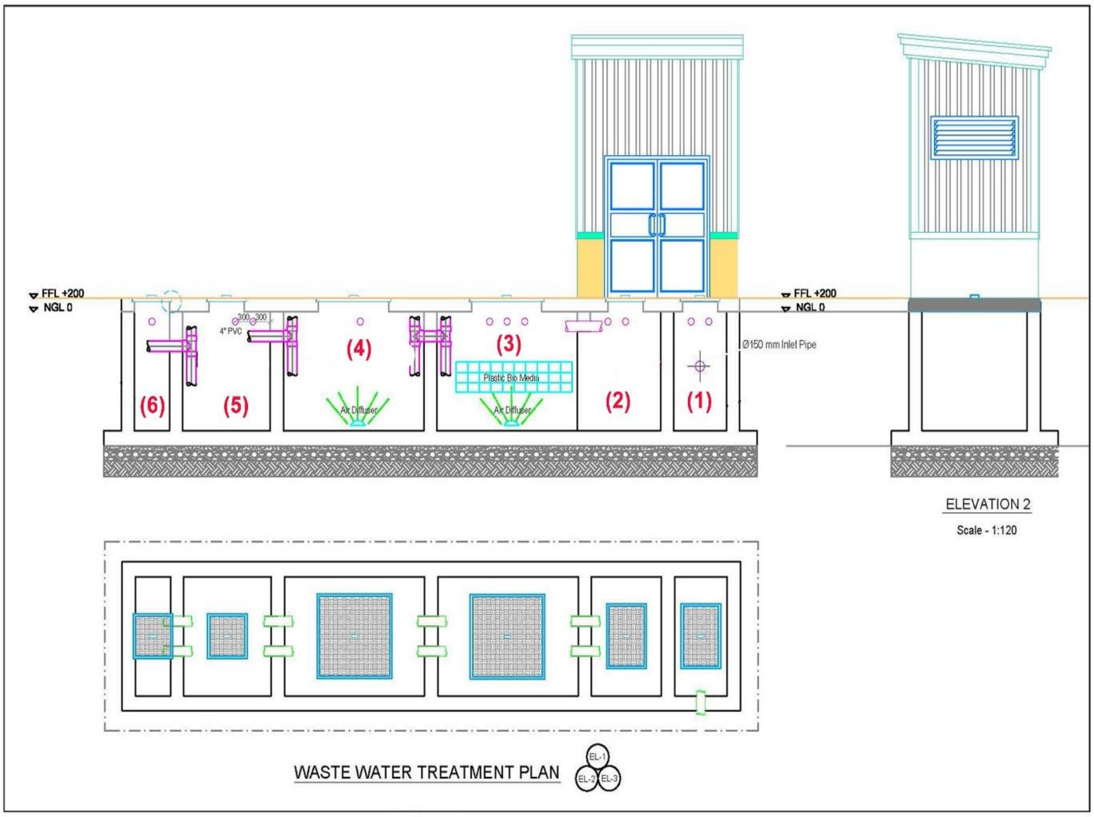
| Item | Type of Water | Amount |
|---|---|---|
| Daily Amount of Wastewater Discharge | From Industry | 2500 L |
| | For Others (Canteen, Office, Toilets, etc.) | 1000 L |
| | Total | 3500 L/day |

**(b) Wastewater Treatment System**

According to the above paragraph, the process wastewater will be treated with wastewater treatment plant (WWTP) that is installed under the ground level. The process flow chart of the WWTP is as shown in the following.

**"WASTEWATER TREATMENT PLANT"**

ရေဆိုးသန့်စင်မှု အဆင့်ဆင့်ပြုလုပ်ခြင်း




**(1) Collection Tank**

**-To collect the wastewater from factory /** စက်ရုံမှရေဆိုးများကို စုဆောင်းရန်၊

**(2) Anaerobic Tank**

**-To digest (or) separate primary solid & liquid particle /** မူလအရည်နှင့် အစိုင်အခဲများ သီးခြားခွဲထုတ်ရန်၊

**(3) Equalization Tank**

**-To equalize pH / pH** တန်ဖိုးအား တန်းတူညီမျှစေရန်၊

**-Separate dissolved particles & materials /** ပျော်ဝင်နေသော အမှုန်အမွှား ပစ္စည်းများကို ခွဲထုတ်ခြင်း၊

**-Coagulation, pre-sedimentation /** ပျစ်ခဲသွားခြင်း၊ ကြိုတင်အနည်ထိုင်စေခြင်း၊

**(4) Aeration Tank**

**-To digest with aerobic bacteria (Activated Sludge) /** နန်းအနည်အနှစ်များအား Aerobic Bacteria ဖြင့်လေမှုတ်ချေဖျက်ရန်၊

**(5) Sedimentation Tank**

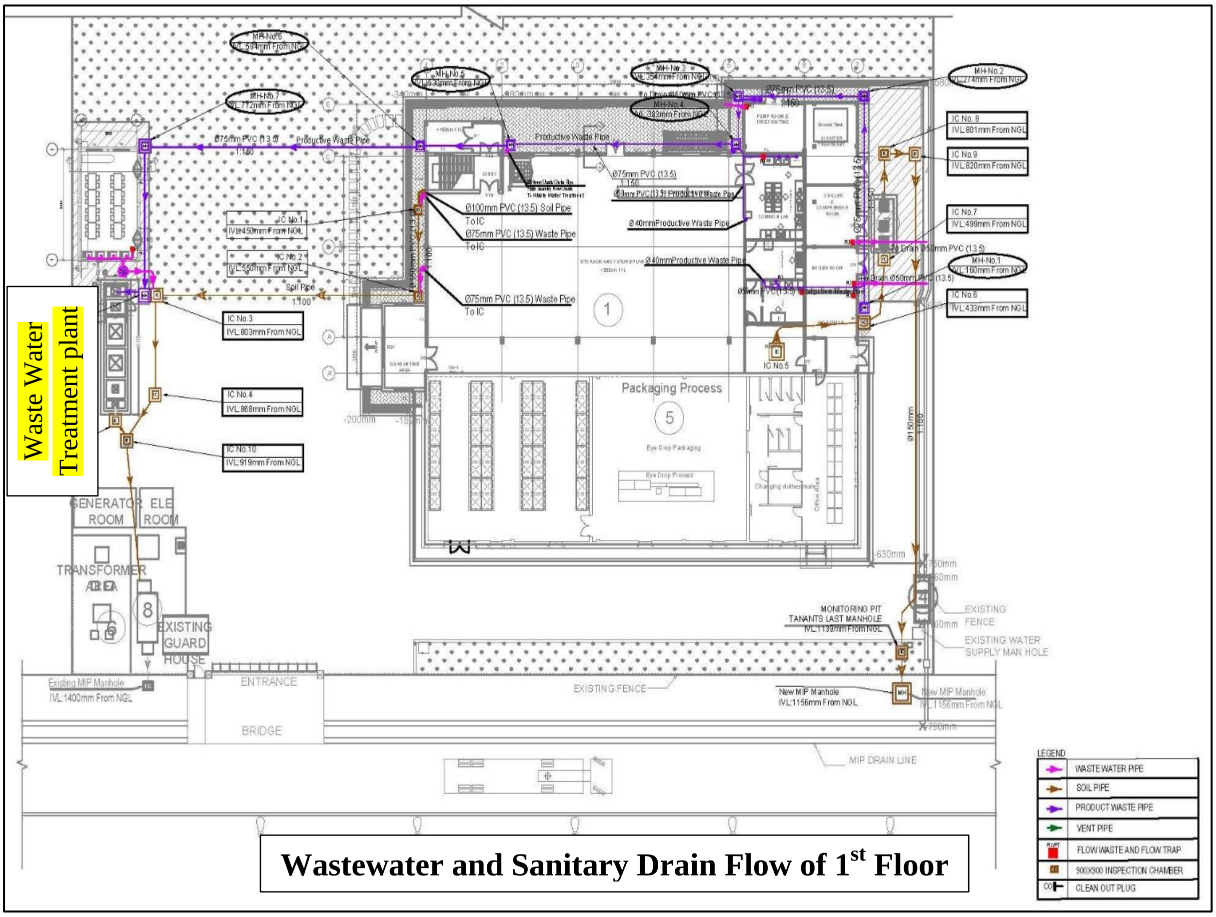
**-To sediment the treatment water / Treatment** ပြုလုပ်ထားသော ရေအား အနည်ထိုင်ရန်၊

**(6) Effluent Tank**

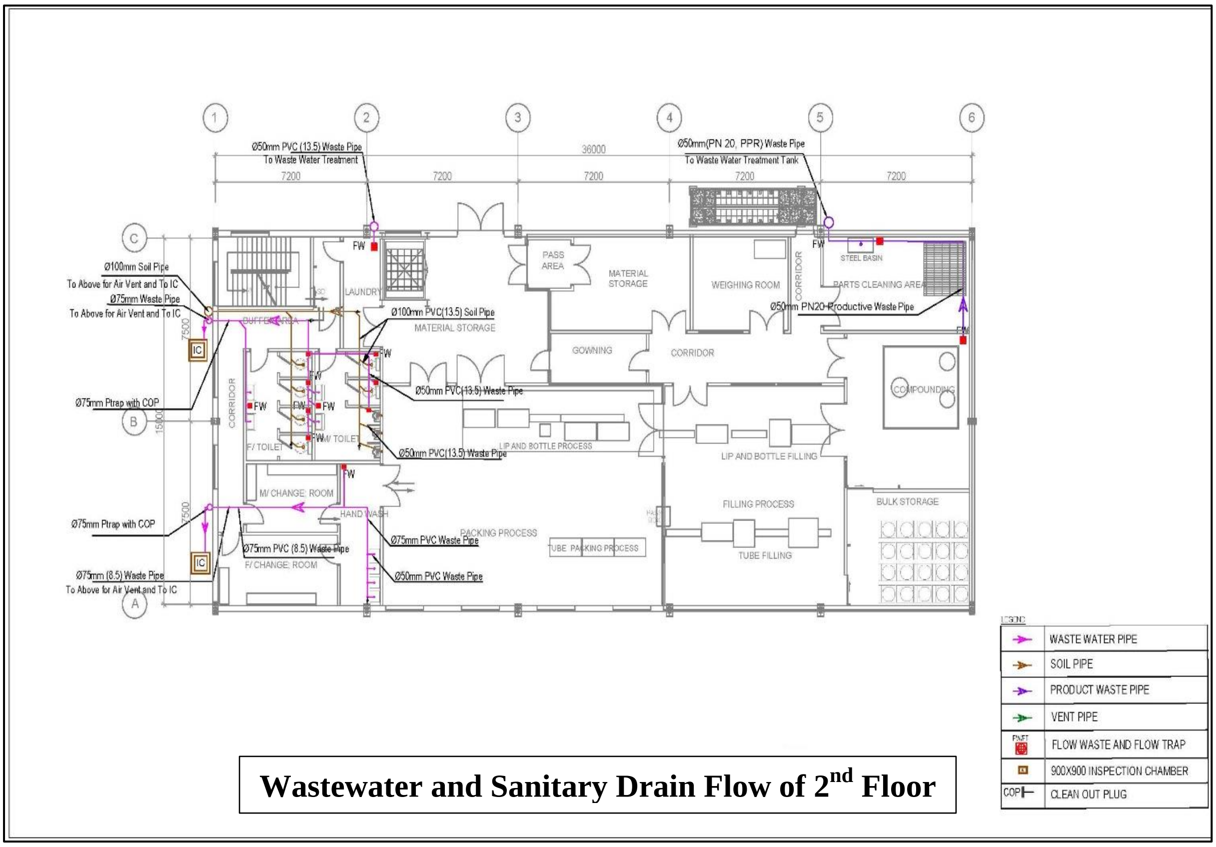
**-To collect the waste treatment water / Treatment** ပြုလုပ်ထားသောရေအား ထုပ်ယူရန်၊

Wastewater ၏ အရေအသွေးပေါ်အခြေခံပြီး Poly-Aluminium Chloride (PAC) နှင့် Chlorine တို့ကိုအချိုးကျရောစပ်အသုံးပြုထားသည်။

Figure 3.12 Process Flow Chart of Water Treatment System




**Wastewater and Sanitary Drain Flow of 1st Floor**




**Wastewater and Sanitary Drain Flow of 2nd Floor**

Figure 3.13 Wastewater and Sanitary Water Drain Flow Charts

Figure 3.14 Photos of Installed WWTP

### 3.11.2 Solid Waste Amount and Disposal System

The solid waste will be discharged from packaging materials such as paper box, wooden pallets, steel drum, paper bag, solvent contaminated wipes, off-specification product. Factory will separately collect and dispose solid waste by hazardous and non-hazardous. Currently Rohto-Mentholatum (Myanmar) Co., Ltd. does not have hazardous waste. If generated, factory will disposal to waste collector such as Golden DOWA Ecosystem Co., Ltd or Yangon City Development Committee (YCDC).

Figure 3.15 Waste Collecting Bins of Factory

Table 3.14 Non-Hazardous Waste Amount

| No. | Type of Non-Hazardous Waste | Quantity (ton/year) | Disposal System |
|---|---|---|---|
| 1 | Cartoon paper box | 4 ~ 6 ton | YCDC and Waste Collection Company |
| 2 | Plastic | 0.6 ~ 1 ton | |
| 3 | Office and Canteen waste | 23.04 ton | |
| Total | | 27.64 ton ~ 29.64 ton | |

## 3.12 Other Facilities

### 3.12.1 Canteen

The factory shall provide a canteen for dinning and it is shown in Figure 3.16.

Figure 3.16 Photo of Canteen

### 3.12.2 Maintenance Workshop and Laboratory

The main function of maintenance workshop is making the repairing and maintenance of the machineries.

The factory has installed laboratory to check the product qualities. Main quality control (QC) checking are performed viscosity, specific gravity, highting, % strength, % molar volume, gloss etc. The tested products are collected seperatedly waste bin and disposed to Authorized Places from Goverment. The laboratory testing equipment is as shown in the following figures.

Figure 3.17 Photo of Maintenance Workshop and Laboratory Room

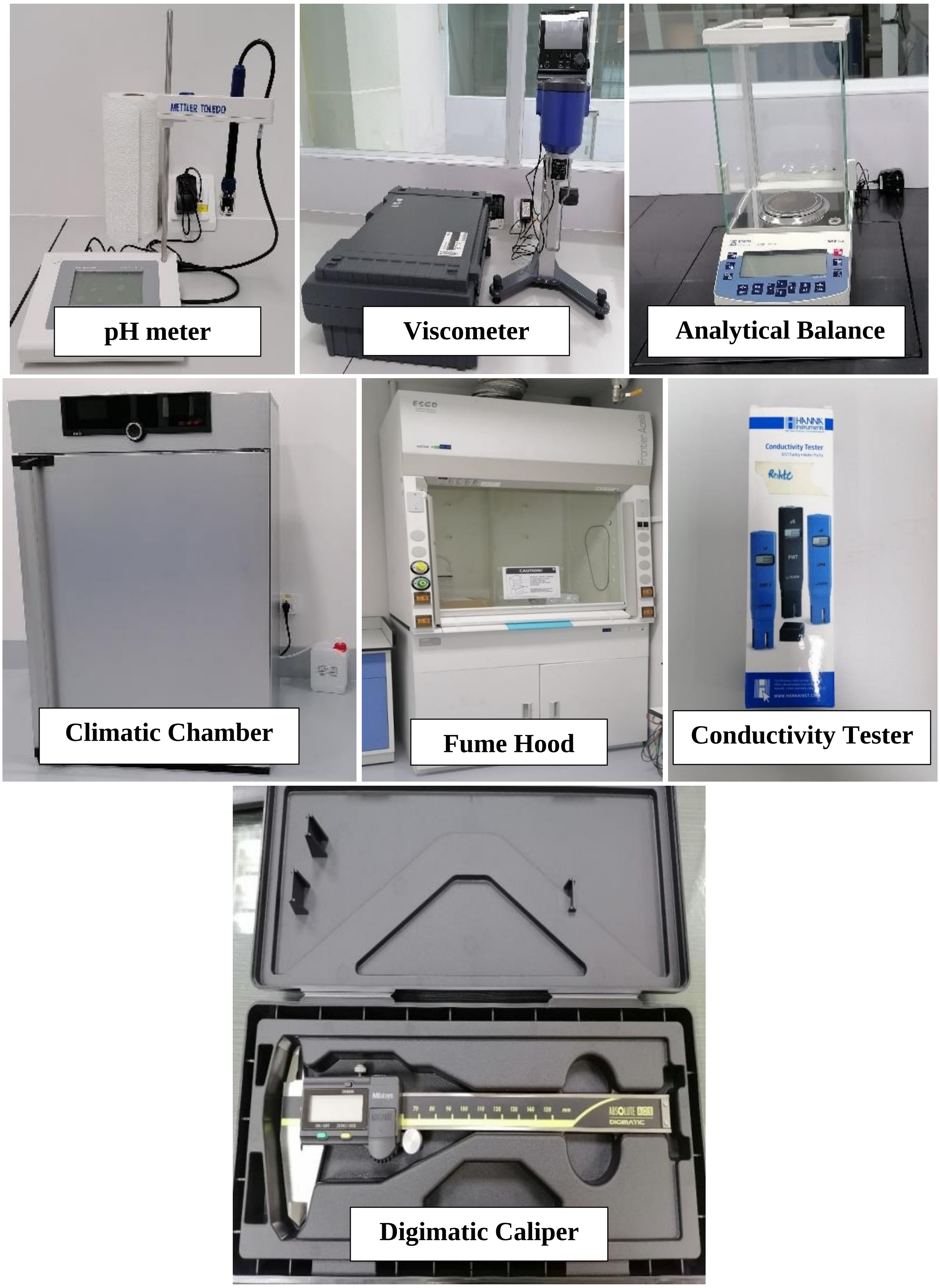



Figure 3.18 Photos of Laboratry Equipments

### 3.12.3 Ventilation System

The proponent shall install air-conditioning in office rooms, meeting room, control rooms and canteen. The installed air conditionings are as shown in the following figure.

Figure 3.19 Photo of Air Conditioning System

### 3.12.4 First Aid Kit

A first aid kit will be provided for employees. The location of first aid kit are as shown in the following Table 3.15 and provided medicines list are as shown in the following Table 3.16.

Table 3.15 Location of First Aid Kits

| **Building No.** | **Location** | **Quantity** |
|---|---|---|
| Building 1 | Office Area | 1 kit |
| Building 2 | Warehouse II Area | 1 kit |
| | Down Stair (near ladder) | 1 kit |
| | Up Stair (Material Storage Area) | 1 kit |
| | Up Stair (Clean Room) | 1 kit |

Table 3.16 List of Medicines of each First Aid Kit

| **No.** | **Name of Medicine** | **Quantity** |
|---|---|---|
| 1 | Stugin | 30 tablets |
| 2 | B 6 | 100 tab/bot |
| 3 | B 2 | 100 tab/bot |
| 4 | Paracetamol | 30 tablets |
| 5 | C - Vit | 100 tab/bot |
| 6 | Neurobion (blue) | 30 tablets |
| 7 | Omeprazole 20mg | 3 strips |
| 8 | Oral Rehydration Salt | 10 packs |
| 9 | Inhaler | 2 pcs |

| | | |
|---|---|---|
| 10 | Dicotil | 3 strips |
| 11 | Meftal Spa | 3 strips |
| 12 | Mirax M (domperidone) | 3 strips |
| 13 | Siloxogene | 3 strips |
| 14 | Kremil S | 3 strips |
| 15 | Metronidazole | 3 strips |
| 16 | Deep Heat Rub Plus | 1 bot |
| 17 | Betadine | 1 bot |
| 18 | Methylated Spirit | 1 bot |
| 19 | Alcohol Pad | 1 pcs |
| 20 | Scissor small | 1 pcs |
| 21 | Tourniquet | 1 pcs |
| 22 | Paper Tape | 1 pcs |
| 23 | Gauze | 1 pcs |
| 24 | Cotton Wool | 1 pack |
| 25 | 2" Bandage | 1 roll |
| 26 | 4" Bandage | 1 roll |
| 27 | Hansaplast | 5 pcs |

## 3.13 Manufacturing Procedure in Rohto-Mentholatum (Myanmar) Co., Ltd.

The following figure shows the main procedure to produce the finished goods in Rohto-Mentholatum (Myanmar) Co., Ltd. There are two type of manufacturing process in the factory. The first one is packing with different type of tube, box, etc. and distributing of the imported products. The next process is fully production of facial wash cream production. The facial cream production steps are as shown in the following.

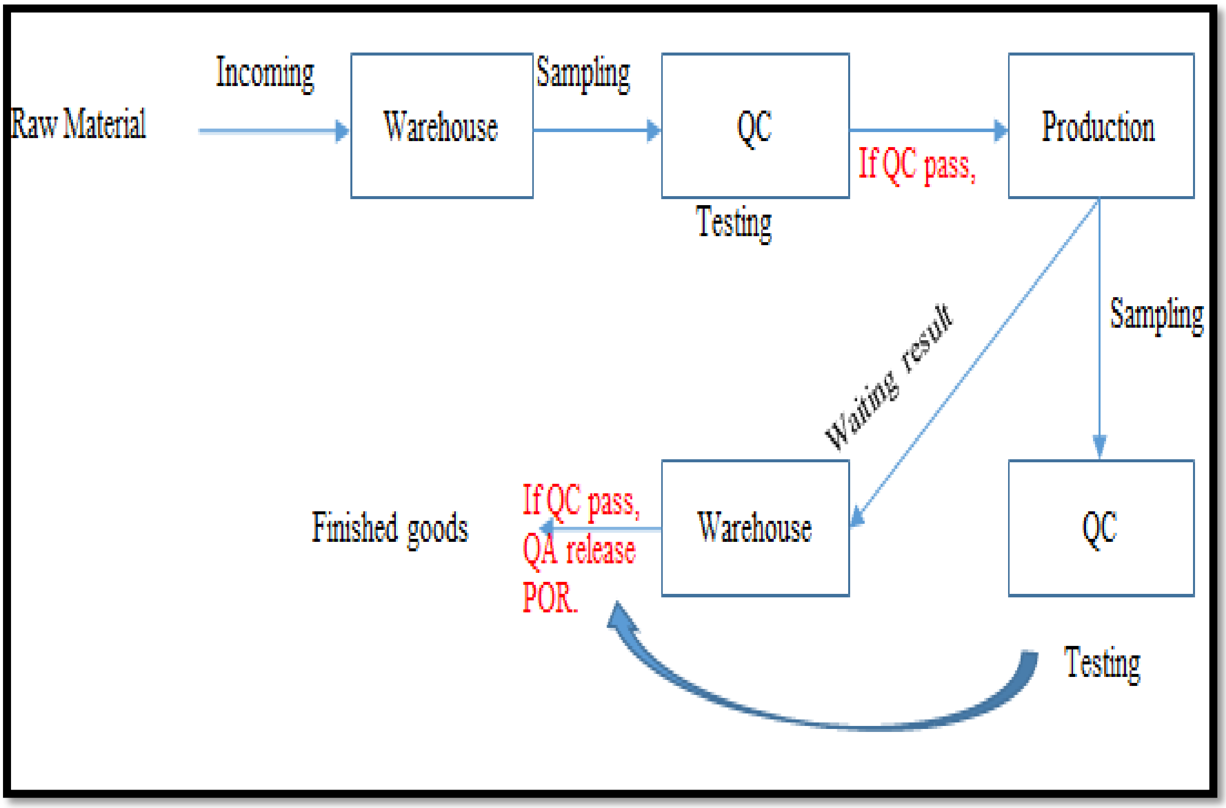



Figure 3.20 General Production Procedure of Rohto-Mentholatu (Myanmar) Co., Ltd

The related processes to the above-stated main process are also shown in Figure 3.21.

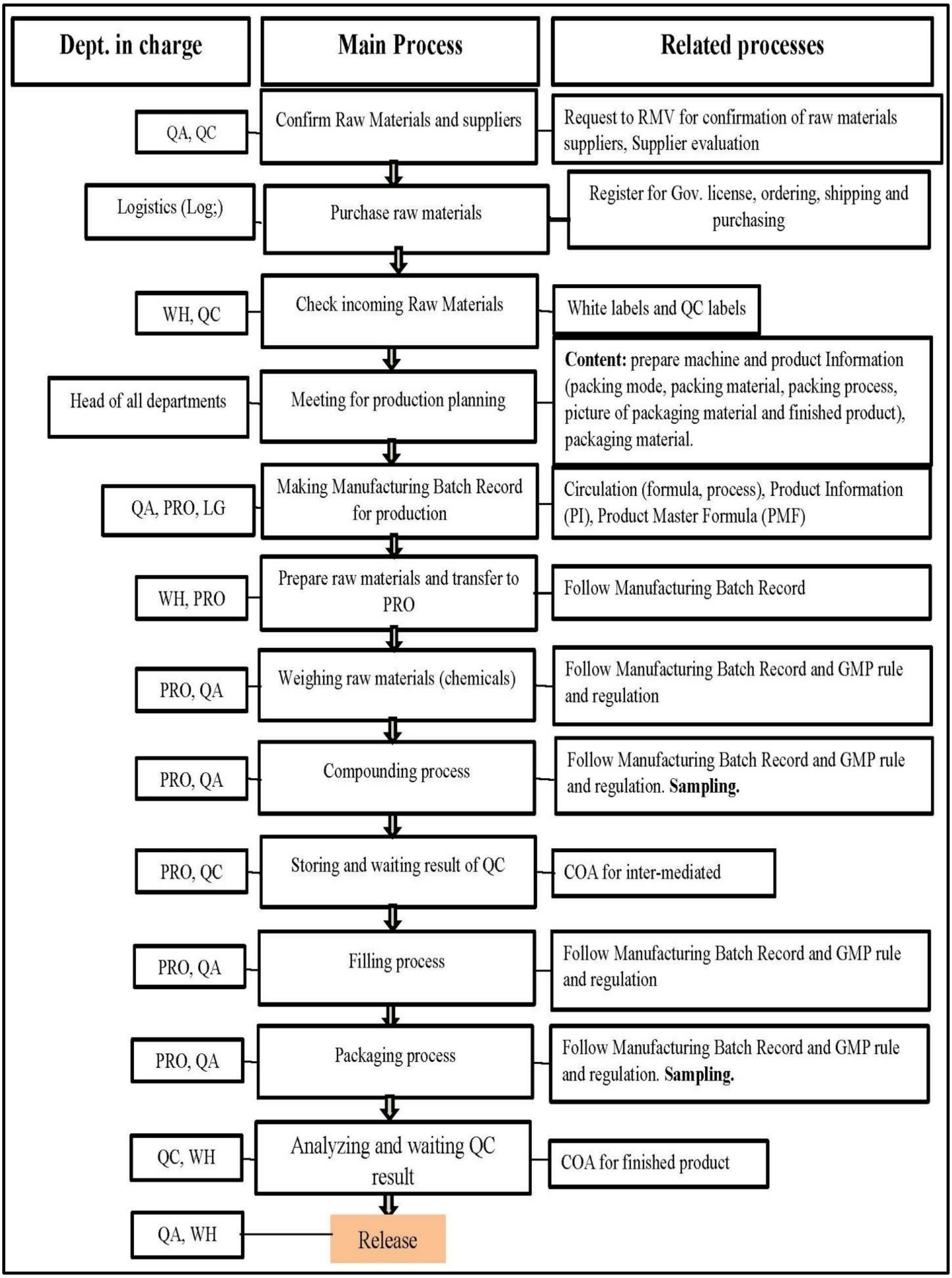



Figure 3.21 Related Processes for the Production

### 3.13.1 Manufacturing Process of Facial Wash Cream

In general, the manufacturing of facial wash cream is a series of unit operations using batch processes. There are few or no chemical reactions; the operations are mostly mechanical. The manufacture involves the preparing and weighing of raw materials, mixing, dispersing, thinning, and adjusting, filling of containers, warehousing and transportation.

***(1) Pre- Dispersion***

- The production of begins by mixing hot water and powder in a high-speed mixer. During this operation, water and powders are also added.

***(2) Dispersion, Grinding and Mixing***

- Following the mixing operation, additional solvent (such as glycol) is input to the mixer for the dispersion.

***(3) Adjusting/Tinting***

- Next, the concentrate is transferred to mixing tank where tints, glycol (usually blend of solvents) and balance additives are added. Then adjust the color and viscosity of completed mill base dispersions. This sample will be compared to the desired standard. Various combinations of powder, solvent and additives are added to the material to meet the requirements.

***(4) Filtering***

- Upon reaching the required consistency, the cream is filtered to remove any non-dispersed pigment.

***(5) Quality Control***

- Quality checks are carried out for consistency, viscosity, color, etc., and other specified properties before batch is approved for packing. Quality control acceptance batch will be stored in the cleaning room about 24 hr. After this period, packaging step will be started.

***(6) Packaging***

- The finished product (QC acceptance) is then transferred to the packaging machine. The products paste will be filled into the different types of tubes. And then, the end of tube will be closed by pressing with heat. After the tube filling, these tubes were putted into plastic bags and putted into the small paper box. Finally, these small boxes were putted in the cartoon boxes and stored at the warehouse before delivery.

The product, facial wash cream, can be either an oil-in-water or water-in-oil emulsion consisting of emollients and lubricants dispersed in an oil phase, and a water phase containing emulsifying and thickening agents, perfume, color and preservatives. Active ingredients are dispersed in either phase depending on the raw materials and the desired properties of the end product.

Pre- Dispersion, Dispersion, Grinding and Mixing operations would be as follows:

Flake/powder ingredients, such as cetyl alcohol and stearic acid, sometimes dry blended in advance, are dispersed into the oil phase. Heating may be required to melt some of the ingredients.

- Active ingredients are dispersed in the appropriate phase.
- The water phase, containing emulsifiers and stabilizers such as Carbopol, is prepared separately.
- The two phases are then mixed to form an emulsion. This is aided by heating to between 110-185˚F (45-85˚C) depending on the formulation and viscosity.
- Mixing is continued until the end product is homogeneous.

A number of problems can be encountered by using conventional agitators:

- Some ingredients can form agglomerates which conventional agitators cannot break down.
- Hydration of thickening and suspending agents is one of the most difficult of all mixing operations. Agglomerates can easily form, and some ingredients require shear in order to develop their desired properties.
- When adding powdered ingredients to the vessel, partially hydrated materials can build up on the vessel wall and parts of the agitator.
- Agitators cannot easily form stable emulsions even when the oil and water phases have been heated.
- Long process times and additional equipment are often required to achieve a homogeneous product.

Using a high shear mixer not only solve these problems but also improve product quality, reduce processing times and eliminate some intermediate stages.

# 4.0 DESCRIPTION OF THE SURROUNDING ENVIRONMENT

In this chapter, the existing environment, the environmental profile and secondary information for the proposed project are described. This section includes the delineation of the study areas and justifies those limits, description of the study area's socio-economic, cultural and visual, physical and biological characteristics. For the purpose of characterization and quantification of various pollutants, visits were made and detailed field studies were conducted in each category. Based on the measured values, the averages values have been taken as basis to characterize the typical pollution streams.

## 4.1 Methodology for Data Collection and Analysis

For preparation of this EMP report, there are two methodologies to collect the data to describe the current environmental and social conditions of the proposed project.

- Primary Data Collection and Analysis ( Air Quality, Noise, Vibration, Water and Soil are measuring)
- Secondary Data Collection and Analysis (regional information such as climate, topography, population, economic., etc.)

### 4.1.1 Primary Data Collection and Analysis

The objective of the EMP baseline data collection is to present the general description of the environment as primary data collection. The methodology is designed to assess the baseline data of the environmental quality factors for "Rohto-Mentholatum (Myanmar) Company Limited" Project. Baseline environmental parameters are defined according to the guidelines, which apply to projects dedicated to the proposed project.

Environmental baseline data (primary data) such as air quality, odor nuisance and noise levels are measured by using instruments. For water quality and soil quality, samples are collected and analyzed at the GMES laboratory, ALARM Ecological laboratory and ISO tech laboratory. The results are mentioned in this Chapter.

All necessary criteria such as site selections for sampling and analysis of ambient air quality, workplace air quality, noise level, water quality and soil quality were identified by GMES.

### 4.1.2 Secondary Data Collection and Analysis

Some data such as socioeconomic conditions, physical/biological environment and weather data are collected from the respective websites and reviewed by the EMP study team. The baseline data of the Mingaladon Township was collected from the Township Data published by General Administration Department (GAD) in 2020.

## 4.2 Environmental Baseline Situation (Primary Data)

Green Myanmar Environmental Services Company Limited had done measuring primary data or baseline environmental parameters such as ambient and indoor air quality, water quality and soil quality on May 2021. The materials and methods of instruments used

for surveying the environmental baseline data and the results are mentioned in the following section.

The water samples, tube well water, wastewaters and soil samples were collected and analyzed the results in the laboratory.

### 4.2.1 Air Quality

The objective of the air-quality monitoring program is to describe the baseline air quality conditions in the project area.

Dispersion of different air pollutants released into the atmosphere has significant impacts on the neighborhood air environment of a project and forms an important part of impact assessment studies.

The air quality status with respect to the project site will form the baseline information over which the predicted impacts due to the proposed project can be superimposed to find out the net (Final) impacts on air environment. Based on the final impacts of the air environment, a viable Environmental Management Plan (EMP) can be prepared.

The baseline status of the air quality can be assessed through scientifically designed air quality measuring network.

**(i) Methods of Sampling and Analysis**

The rate of air quality was recorded automatically every one minute for gases causing air pollution (Sulfur dioxide, nitrogen dioxide, carbon dioxide, carbon monoxide, hydrogen sulfide and particulate matters, etc) to describe ambient air quality.

**(ii) Materials Used for Measuring**

| | |
|---|---|
| The ambient air quality parameters such as nitrogen oxide ($NO_2$), sulfur dioxide ($SO_2$), particulate matters ($PM_{2.5}$ & $PM_{10}$), ammonia ($NH_3$), carbon dioxide ($CO_2$), carbon monoxide (CO), hydrogen sulfide ($H_2S$), methane ($CH_4$), wind speed, wind direction, relative humidity and temperature were measured by using **Haz-Scanner** which is a true environmental air station providing ambient air quality measurement of critical EPA criteria pollutants and air parameters. | |
| **Aeroqual** is used to measure the particulate matters ($PM_{2.5}$ and $PM_{10}$). | Aeroqual 500 Series |

| | |
|---|---|
| **Mx-6** uses for oxygen, toxic and combustible gas, and volatile organic compounds (VOCs) of indoor air quality. | Mx-6 |

**(iii)Selection of Sampling Location**

Air quality measurement was taken at each project site. The sampling points were selected based on their locations relative to key community receptors, as well as their current or potential for impairments.

1) Ambient air quality at the project site was measured at only one sampling point
2) Workplace air quality was measured at two points

***Ambient Air Quality***

Different analysis methods are used for different parameters of ambient air quality as shown in the following table.

Table 4.1 Parameters Measured for Ambient Air Quality

| No. | Parameters | Analysis Methods |
|---|---|---|
| 1. | Sulfur dioxide ($SO_2$) | Electrochemical sensors |
| 2. | Nitrogen dioxide ($NO_2$) | Electrochemical sensors |
| 3. | Carbon dioxide ($CO_2$) | NDIR (optional sensor) |
| 4. | Carbon monoxide (CO) | Electrochemical sensors |
| 5. | Hydrogen Sulfide ($H_2S$) | Electrochemical sensors |
| 6. | Particulate matter 2.5 ($PM_{2.5}$) | Infrared light scattering |
| 7. | Particulate matter 10 ($PM_{10}$) | Infrared light scattering |

Ambient air quality at the project site was measured continuously at only one sampling point for 24 hours in the factory.

Table 4.2 Location of Ambient Air Quality Measuring Point

| No. | Measuring Point | Geographic Information | Description | Remarks |
|---|---|---|---|---|
| 1. | AMP-1 | 16˚ 56' 24.02" N<br>96˚ 09' 15.06" E | Estate of Factory | See Figure 4.1 |

*AMP= Ambient Air Quality Measuring Point*

Figure 4.1 Location of Measuring Ambient Air Quality

***Measuring Results***

At the initial stage of the project, baseline air quality should be measured on the vicinity of the site to assess background levels of key pollutants and to differentiate between existing ambient conditions and project-related impacts in the future. Air quality is defined by the concentration of dust and pollutant gas of the ambient air.

The ambient air measuring was conducted on May 27, 2021 for the factory. The air quality measuring result for ambient air for the factory is described in Table 4.3.

Table 4.3 Measuring Results of Ambient Air Quality Baseline Data (AMP-1)

| No. | Parameters | Result | Unit | Measuring Avg. Period | | NEQG Value | Avg. Period | Remark |
|---|---|---|---|---|---|---|---|---|
| 1 | Nitrogen Dioxide | 101.8 | $\mu g/m^3$ | 24 | hours | $200 \mu g/m^3$ | 1-hour | 28/5/2021 1:54-2:54 (Peak Hour) |
| 2 | Sulphur Dioxide | 0 | $\mu g/m^3$ | 24 | hours | $20 \mu g/m^3$ | 24-hours | |
| 3 | Particulate matter $PM_{10}$ | 18.87 | $\mu g/m^3$ | 24 | hours | $50 \mu g/m^3$ | 24-hours | |
| 4 | Particulate matter $PM_{2.5}$ | 8.56 | $\mu g/m^3$ | 24 | hours | $25 \mu g/m^3$ | 24-hours | |
| 5 | Ozone | 81.98 | $\mu g/m^3$ | 24 | hours | $100 \mu g/m^3$ | 8-hour daily Maximum | 5/27/2021 9:54 - 17:54 |
| 6 | Ammonia | 0 | ppm | 24 | hours | NG | - | |

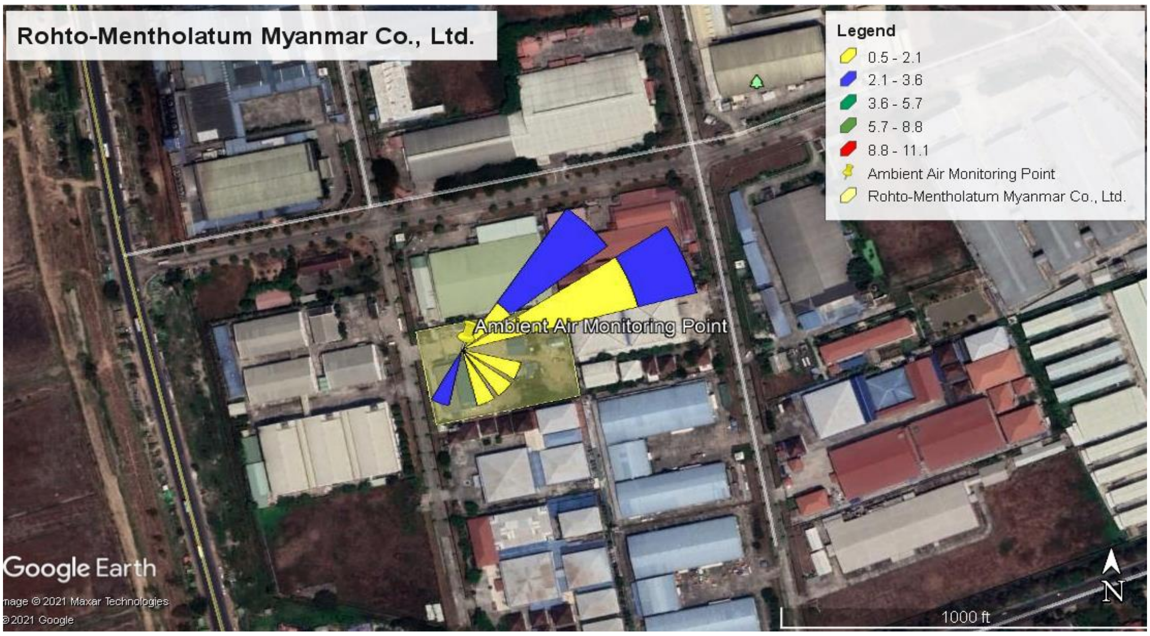
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 7 | Carbon Dioxide | 367.44 | ppm | 24 | hours | NG | - | |
| 8 | Carbon Monoxide | 0 | ppm | 24 | hours | NG | - | |
| 9 | Volatile Organic Compound | 0 | ppb | 24 | hours | NG | - | |
| 10 | Oxygen | 21 | % | 24 | hours | NG | - | |

***Note- NEQG-National Environmental Quality (Emission) Guideline**

According to the above table, Nitrogen Dioxide, Sulphur Dioxide, Particulate matter $PM_{10}$ and $PM_{2.5}$, Ozone) parameters of the ambient air quality are within the National Environmental Quality (Emission) Guidelines.

Figure 4.2 Photo of Ambient Air Quality Measuring

(a) Windrose Plot superimposed over the Project Site

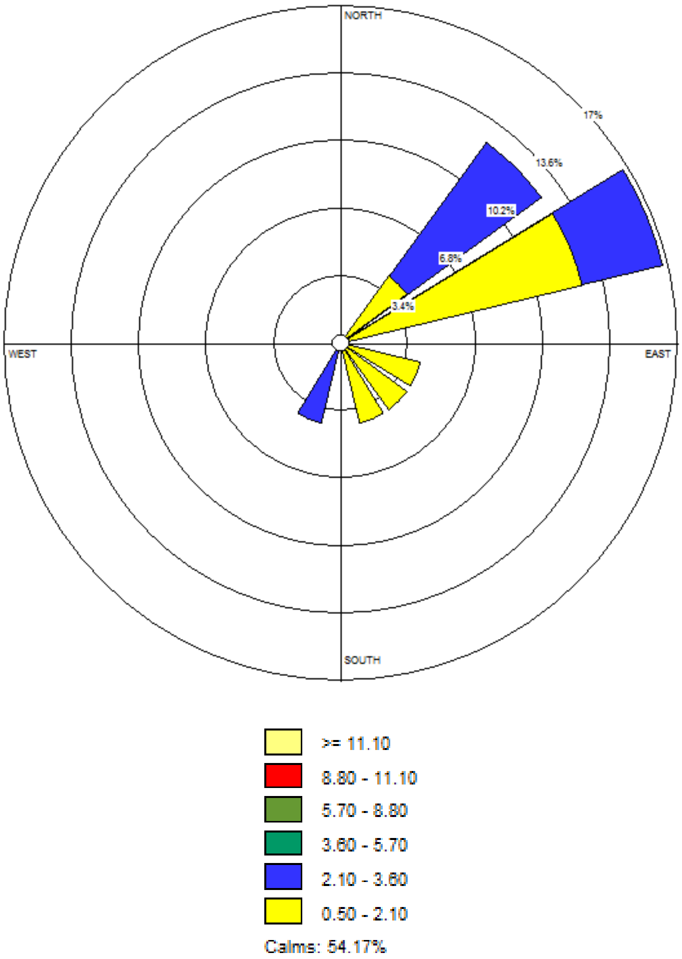


(b) Windrose Plot

**Wind Speed & Wind Direction**

**(Blowing From)**

**Wind Speed (mph)**




(c) Wind Class Frequency Distribution Chart

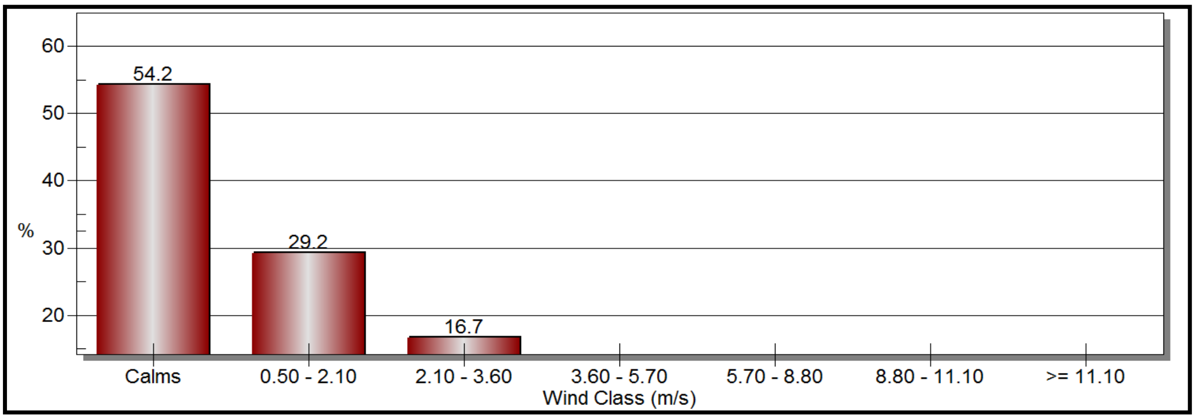



Figure 4.3 (a) Windrose Plot superimposed over the Project Site, (b) Windrose Plot, (c) Wind Class Frequency Distribution Chart

***Workplace (Indoor) Air Quality***

Measurements to determine the environmental conditions of working environment of the factory were carried out for short-time interval samples (one hour for each sample measurement). The instrument was measured by two technicians.

Indoor air quality was measured at two locations on May 27, 2021 inside of the factory. The locations and results are seen in Figure 4.3 and Table 4.4.

Table 4.4 Location of Indoor Air Quality Measuring Point

| No. | Measuring Point | Geographic Information | Description | Remarks |
|---|---|---|---|---|
| 1. | IAMP-1 | 16˚ 56' 23.00" N<br>96˚ 09' 15.50" E | Production Area | See Figure 4.3 |
| 2 | IAMP-2 | 16˚ 56' 23.50" N<br>96˚ 09' 15.40" E | Warehouse | |

*IMP= Indoor Air Quality Measuring Point*

Figure 4.4 Location of Measuring Indoor Air Quality

Figure 4.5 Photos of Measuring Indoor Air Quality

Table 4.5 Indoor Air Quality Measuring Results

| Monitoring Point | Description | Parameters | Unit | Monitoring Duration | Workplace air Monitoring Result | NEQG |
|---|---|---|---|---|---|---|
| IAMP-1 | Production | $PM_{10}$ | [μg/m$^3$] | 1Hour | 36 | 50 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Area | $PM_{2.5}$ | [µg/m$^3$] | 1Hour | 12 | 25 |
| | | VOC | ppm | 1Hour | 0 | - |
| | | | | | | |
| IAMP-2 | Warehouse | $PM_{10}$ | [µg/m$^3$] | 1Hour | 28 | 50 |
| | | $PM_{2.5}$ | [µg/m$^3$] | 1Hour | 24 | 25 |
| | | VOC | ppm | 1Hour | 0 | - |

***Note- NEQG-National Environmental Quality (Emission) Guideline**

According to the above table, most of the particulate matters ($PM_{10}$ and $PM_{2.5}$) were accepted within the National Environmental Quality (Emission) Guidelines.

### 4.2.2 Noise Level

Noise is one of the most undesirable and unwanted by-products of our modern life style. It may not seem as harmful as air and water pollutants but it affects human health and well-being and can contribute to deterioration of human well-being in general and can cause neurological disturbances and physiological damage to the hearing mechanism in particular. It is therefore, necessary to measure both the quality as well as the quantity of noise in and around the site.

Parameter for noise level survey was determined according to Myanmar National Environmental Quality (Emission) Guidelines.

Noise surveys have been conducted at the project site in order to establish an acoustic baseline onto which potential impacts from the proposed project may be superimposed. Noise level measuring was also done at the same sampling points used for air quality monitoring.

**(i) Methods of Monitoring and Analysis of Noise level**

Measurements to determine the environmental conditions of working environment of the factory were carried out for short-time interval samples (one hour for each sample measurement). Ambient noise level monitored continuously for 24 hours.

**(ii) Materials Used for Measuring**

| | |
|---|---|
| **Digital Sound Level Meter** measures the environmental conditions of working environment of the factory carried out for short-time interval samples (one hour for each sample measurement). Ambient noise level measured continuously for 24 hours. | |

***<u>Noise Level Measuring Result</u>***

The noise level measuring points are same with air quality measuring point and result are presented in Table 4.6 and Table 4.7. Indoor noise level measuring point and result are described in Figure 4.7 and Table 4.8.

Table 4.6 Noise Level Monitoring Points

| No. | Monitoring Point | Geographic Information | Description | Remarks |
|---|---|---|---|---|
| 1 | ANMP | 16˚ 56' 24.02" N<br>96˚ 09' 15.06" E | Estate of Factory | See Figure 4.7 |
| 2 | INMP-1 | 16˚ 56' 23.00" N<br>96˚ 09' 15.50" E | Production Area | See Figure 4 7 |
| 3 | INMP-2 | 16˚ 56' 23.50" N<br>96˚ 09' 15.40" E | Warehouse | |

*Note-ANMP-Ambient Noise level Measuring Point, INMP-Indoor Noise level Measuring Point

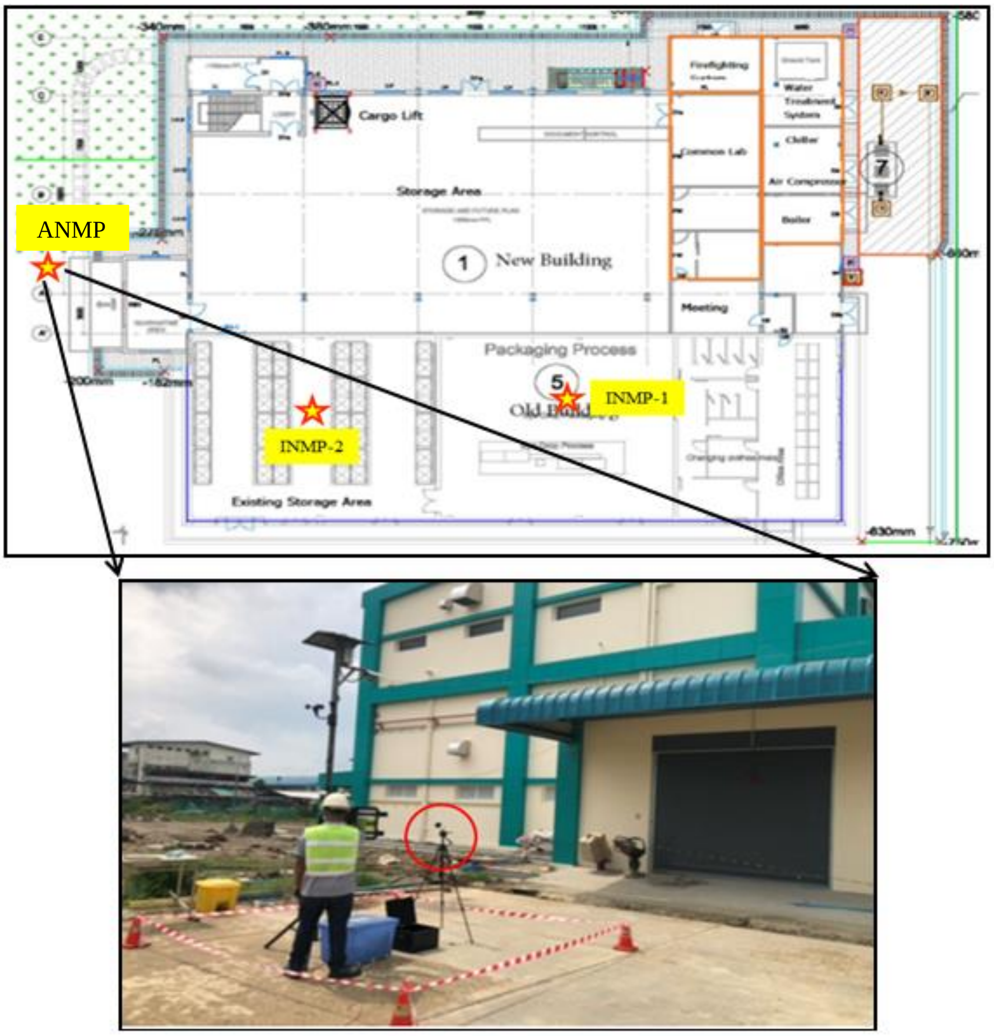



Figure 4.6 Ambient Noise Level Measuring Point

Table 4-7 Ambient Noise Level Measuring Result

| Point | Period | Results | NEQG | |
|---|---|---|---|---|
| | | | Residential, Institutional, Educational | Industrial, Commercial |
| ANMP | Day Time | 68 | 55 | 70 |
| | Night Time | 54 | 45 | 70 |

The factory are located in industrial park, the observed values are compared with the guidelines for industrial area. The observed values of the ambient noise levels for daytime and night time are within the limit of Guidelines. Therefore, the human and the environment cannot be affected by the noise.

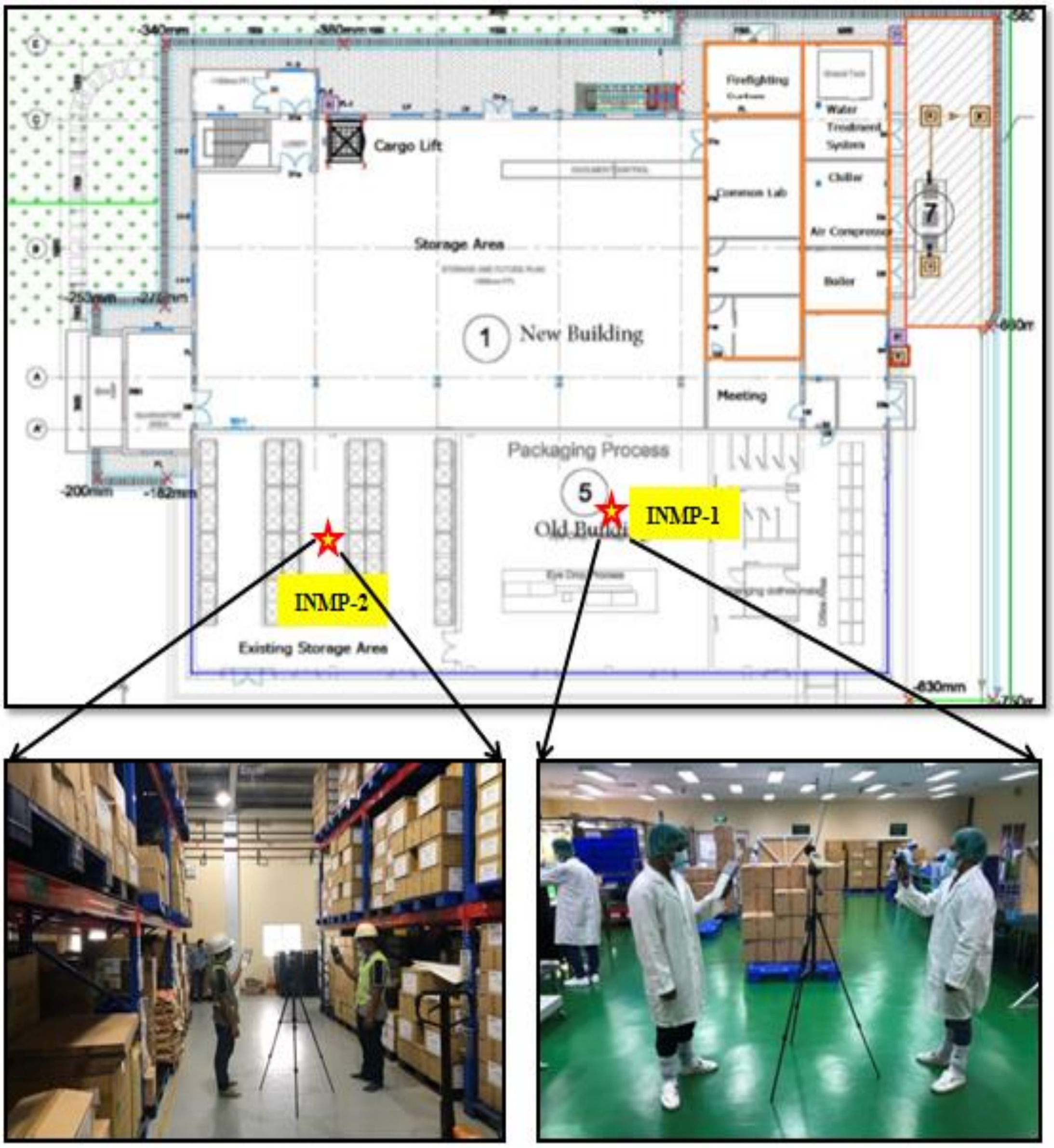



Figure 4.7 Indoor Noise Level Measuring Points

Table 4.7 Indoor Noise Level Measuring Result

| **No.** | **Indoor Noise Level Measuring Points** | **Description** | **Noise Measuring Results (Duration = 1hr) (dB[A])** | **OHS Guidelines (8 hr) (dB[A])** |
|---|---|---|---|---|
| 1. | INMP-1 | Production Area | 70.2 | **90** |
| 2. | INMP-2 | Warehouse | 62.1 | **90** |

The factory are located in industrial park, the observed values are compared with the OHS Guideline. The observed values of the Indoor Noise level for daytime and night time are within the limit of Guidelines. Therefore, Noise level value was within the acceptable conditions.

### 4.2.3 Vibration Level

***Methods of study***

The ground vibration intensity was measured in terms of peak particle velocity (PPV) to evaluate its potential damage. Which is corresponds to an indicator of the structural damage, largely depending on the maximum charging, the distance between blast and measuring point and the characteristics of the medium.

The three axes (directions) of measurement,

- The longitudinal (back to forth) (sometimes called "radial", frequency distribution of a given vibration)
- Transverse (vibration in the side by side) and
- Vertical (up and down) vectors are always measured and reported separately.

One reason for this is that they have different degrees of importance in causing damage. Structures are built to withstand vertical forces. For that reason, vibrations along the vertical vector are usually of lesser importance in causing damage, though not always benign.

Vibrations in both the longitudinal and transverse vectors have the potential for causing shear in the home structure, which is a major contributor to damage effects. When in shear, different parts of the house move at different speeds or even in different directions, which can cause cosmetic cracking or even structural damage. Vibration standards often do not take into account directly these differences in damage potential between vibration direction components, simply specifying the same limits for all three axes of measurement.

Continuous mode can be set at continuous or self-triggering mode. Preset value is generally set at 0.1-mm/sec trigger level. Depending on the sensitivity of buildings, trigger value will be changed after discussion with site engineer.

***Materials Used for Measuring***

| | |
|---|---|
| Vibration Monitoring will be conducted using an Instantly Blast Mate Series III or Mini Mate Plus. Both indicator systems have identical process of preparation, installation and data retrieving. | |

Table 4.8 Guideline for Vibration

| DIN 4150 | | | |
|---|---|---|---|
| **Type of Structure** | **Peak Particle Velocity (mm/sec)** | | |
| **Frequency** | **Acceptable Level** | **Moderate level** | **Extreme Level** |
| **Commercial and Industrial Building (Type-1)** | 20 | 20 ~ 40 | 40 ~ 50 |
| **Dwellings (Type-2)** | 5 | 5 ~ 15 | 15 ~ 20 |
| **Ancient and Historic Buildings (Type-3)** | 3 | 3 ~ 8 | 8 ~ 10 |

***Reference: DIN 4150:Part3 "Structural Vibration in Buildings" Guideline on Limit of Vibration***

***<u>Vibration Level Measuring Result</u>***

The Vibration level measuring point are same with ambient air quality measuring point and result are presented in Table 4.9 and Figure 4.8.

Table 4.9 Vibration Level Monitoring Points

| No. | Monitoring Point | Geographic Information | Description | Remarks |
|---|---|---|---|---|
| 1 | VMP | 16˚ 56' 24.02" N<br>96˚ 09' 15.06" E | Estate of Factory | See Figure 4.8 |

****Note-VMP-Vibration level Measuring Point***

Figure 4.8 Vibration Level Measuring Point

Table 4.10 Vibration Level Measuring Result

| Instrument ID | Date | | Maximum Peak Peak particulate (mm/s) | Current Threshold mm/s | Remark |
|---|---|---|---|---|---|
| VM | 27/5/2021 | 28/5/2021 | 0.6 | 0.5 | Max: PVS on 27th, May 2021, 5:24 PM |

***Remark: Vibration level is less than threshold limit 0.1mm/sec not recorded the data***

The factory are located in industrial park, the observed values are compared with the guidelines for industrial area. The measurement results is acceptable limits. Therefore, the human and the environment cannot be affected by the vibrtaion.

### 4.2.4 Water Quality

Selected water quality parameters of surface water and ground water have been studied for assessing the water environment and evaluating the anticipated impact of the proposed project.

The purpose of this study is to:

- Assess the water quality characteristics for critical parameters,
- Predict impact on water quality by this project and related activities and
- Suggest appropriate mitigation measures.

***Description of Sampling Point***

The outline of sampling points is mentioned in Table 4.11. The photos of conducting field survey at each sampling points are mentioned in Figure 4.9.

Table 4.11 Outline of Sampling Points

| No. | Monitoring Points | Description | Geographic Information | Collecting date |
|---|---|---|---|---|
| 1. | WMP-1 | Water quality from MIP | 16° 56' 24.36" N<br>96° 9' 17.17" E | 27.5.2021 |
| 2. | WMP-2 | Inside drain water quality of the factory | 16° 56' 22.15"N<br>96° 9' 15.07"E | |

***Note: WMP-Water Quality Monitoring Point***

Figure 4.9 Water Quality Monitoring Points

Table 4.12 Result of Water Quality (WMP-1)

| No. | Parameters | Unit | Analysis Value | Minimum Measurement Range of Methods | Drinking Water Standards | | |
|---|---|---|---|---|---|---|---|
| | | | | | WHO (2011) | EPA (Spring 2012) | Indian Specification (IS:10500,2012) |
| 1. | Aluminum | mg/l | 0.09 | **0.01** | **0.2** | **0.2** | **0.03** |
| 2. | Arsenic | mg/l | 0 | **0.005** | **0.01** | **0.01** | **0.01** |
| 3. | Chloride | mg/l | 14 | **5** | **250** | **250** | **250** |
| 4. | Copper | mg/l | ND | **0.5** | **2** | **1** | **0.05** |
| 5. | Cyanide | mg/l | ND | **0.01** | **0.07** | **0.2** | **0.05** |
| 6. | Manganese | mg/l | ND | **0.2** | **0.4** | **0.05** | **0.1** |
| 7. | pH | - | 7.4 | **0.1** | **6.5~8.5** | **6.5~8.5** | **6.5~8.5** |
| 8. | Sulfate | mg/l | 4.2 | **2** | **250** | **250** | **200** |
| 9. | Total Alkalinity as $CaCO_3$ | mg/l | 68 | **5** | **-** | **-** | **200** |
| 10. | Total Dissolved Solids | mg/l | 260 | **1** | **600** | **500** | **500** |
| 11. | Total Hardness as $CaCO_3$ | mg/l | 61 | **5** | **500** | **-** | **200** |
| 12. | Total Iron | mg/l | 0.1 | **0.1** | **0.3** | **0.3** | **0.3** |
| 13. | Turbidity | NTU | 6.7 | **0.01** | **5** | **-** | **1** |

***ND - Not Detected***

According to the lab result, turbidity of WMP-1 are higher than the WHO drinking water standards, it is found that these parameters are within the standards after treatment expect the turbidity values.

Table 4.13 Result of the Drain Water Quality of the Factory

| No. | Parameters | Unit | Analysis Value | Minimum Measurement Range of Method | NEQG - General Application |
|---|---|---|---|---|---|
| 1. | 5-day Biochemical Oxygen | mg/l | ND | **30** | **50** |
| 2. | Ammonia | mg/l | 0.34 | **0.01** | **10** |
| 3. | Arsenic | mg/l | 0 | **0.005** | **0.1** |
| 4. | Chemical Oxygen Demand | mg/l | ND | **30** | **250** |
| 5. | Chromium (Hexavalent) | mg/l | 0.11 | **0.02** | **0.1** |
| 6. | Chromium (Total) | mg/l | 0.16 | **0.02** | **0.5** |
| 7. | Copper | mg/l | ND | **0.5** | **0.5** |
| 8. | Cyanide (Total) | mg/l | ND | **0.01** | **1** |
| 9. | Iron | mg/l | 0.1 | **0.1** | **3.5** |
| 10. | Nickel | mg/l | ND | **0.2** | **0.5** |

| | | | | | |
|---|---|---|---|---|---|
| 11. | Oil and Grease | mg/l | ND | **5** | **10** |
| 12. | pH | - | 7.58 | **0.1** | **6~9** |
| 13. | Phenol | mg/l | 0.22 | **0.1** | **0.5** |
| 14. | Sulfide | mg/l | ND | **0.04** | **1** |
| 15. | Temperature | ˙C | 27 | **1** | **<35** |
| 16. | Total Phosphorus | mg/l | 0.14 | **0.02** | **2** |
| 17. | Total Suspended Solids | mg/l | 24 | **1** | **50** |
| 18. | Zinc | mg/l | ND | **0.02** | **2** |

***ND - Not Detected***

According to the lab result, pH values from WMP-2 (inside drain water quality of the Factory) are higher than the guideline values. The other parameters are within the limits.

### 4.2.5 Soil Quality

In order to monitor the soil quality, soil samples both of the factory premises were taken and tested at GMES laboratory. The location points are tabulated in Table 4.14 and Figure 4.10. The analysis results of the parameters are presented in the Table 4.15.

Table 4.14 Locations of Soil Sampling Point (SSP)

| No. | Sampling Points | Geographic Information | Description | Remarks |
|---|---|---|---|---|
| 1. | SSP | 16° 56' 23.7"N<br>96° 9' 18.3"E | Estate of the factory | See Figure 4.10 |

***Note: SSP-Soil Sampling Point***

Figure 4.10 Photo of Taking Soil Sample inside the Factory Premises

Table 4.15 Results of Soil Quality

| No. | Parameters | Unit | Analysis Value | Minimum Measurement Range of Methods |
|---|---|---|---|---|
| 1. | Aluminum | mg/kg soil | 0.1 | **0.05 mg/kg soil** |
| 2. | Arsenic | mg/kg soil | 0 | **0.025 mg/kg soil** |
| 3. | Chloride | g/kg soil | 0.67 | **0.025 mg/kg soil** |
| 4. | Copper | mg/kg soil | ND | **2.5 mg/kg soil** |
| 5. | Cyanide | mg/kg soil | ND | **0.05 mg/kg soil** |
| 6. | Extractable Acidity | cmol/kg soil | 4.25 | **0.25 cmol/kg soil** |
| 7. | Manganese | mg/kg soil | 1.85 | **1 mg/kg soil** |
| 8. | P - Alkalinity | mmol/l extract | 0 | **0.2 mmol/l extract** |
| 9. | pH | - | 6.42 | **0.1** |
| 10. | Total Alkalinity | mmol/l extract | 3.1 | **0.2 mmol/l extract** |
| 11. | Total Iron | mg/kg soil | 0.5 | **0.5 mg/kg soil** |

***ND: Not Detected***

## 4.3 Natural Environment/ Physical Components (Secondary Data)

Physical environment essentially illustrates baseline conditions of topography, geology, soil, climate, surface water and ground water of the project area, where necessary, of proposed project regardless of an assessment study. The secondary data collection is based on September 2020 General Administration Department of Mingalardone Township.

### 4.3.1 Study Area (Mingaladon Township)

The proposed project (study area) which is located in Mingaladone Industrial Park (MIP), Mingaladon Township has mentioned in project description in detail. Mingaladon Township is located in the northern district of Yangon Region, Myanmar.

It occupies an area of 41.69 square miles. The location of the township is between north latitude 17º 03' and 17º 04' and between east longitude 96º 08' and 96º 15'.

The township shares border with

- Hlegu Township and North Okkalapa Township in the east,
- Shwepyitha Township and Insein Township in the west,
- Mayangone Township in the south, and
- Hmawbi Township and Hlegu Township in the north.

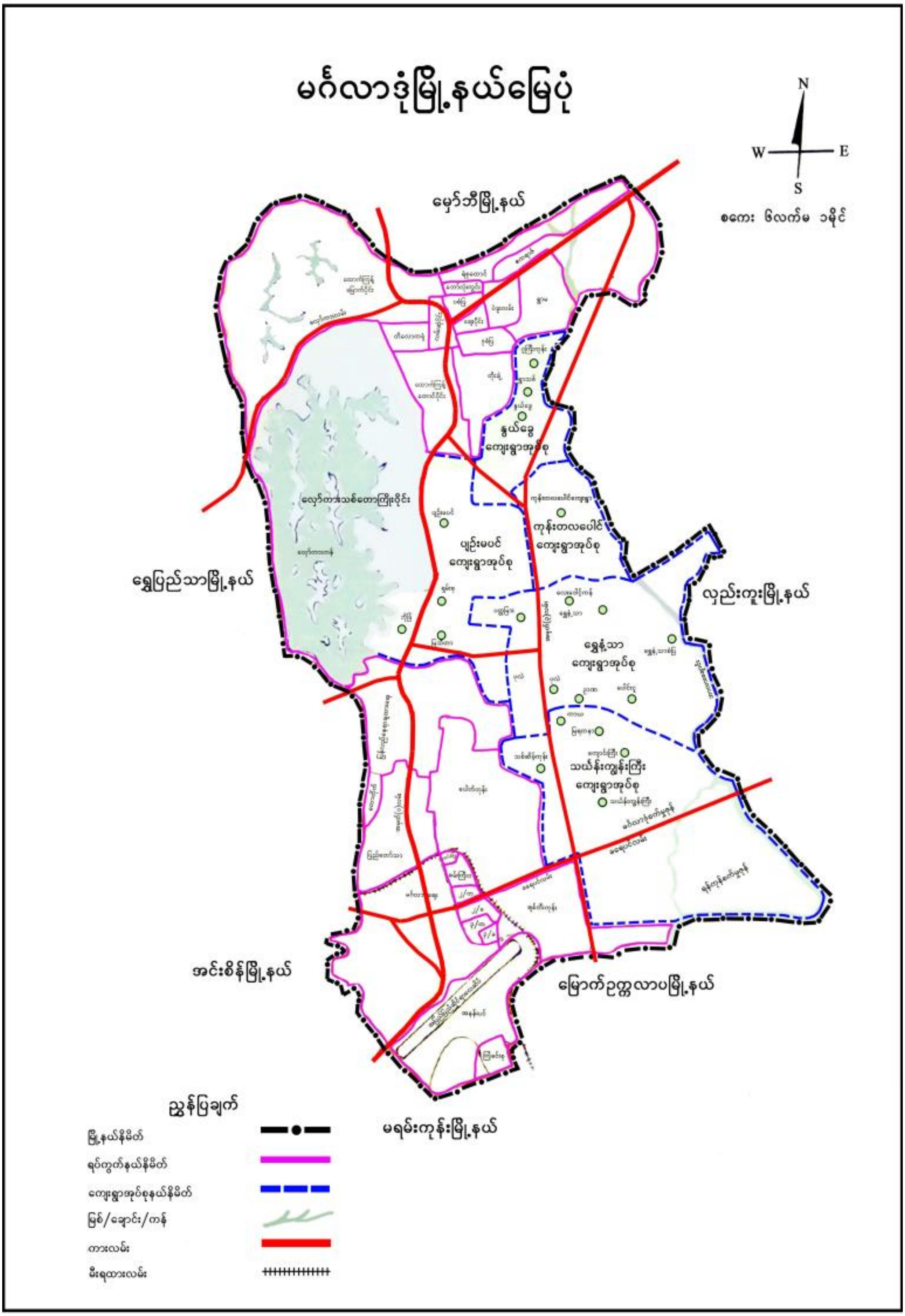



Figure 4.11 Map of Mingaladon Township

### 4.3.2 Climate

The climate of the Mingaladon Township is a tropical monsoon climate. The highest temperature is 39 ºC and lowest temperature is 15.5ºC. The following table shows the yearly rainfall data and temperature of Mingaladon Township.

Table 4.16 Annual Rainfall Data and Temperature at Mingaladon Township

| No. | Year | Rainfall | | Temperature | |
|---|---|---|---|---|---|
| | | Rainy Days | Total Rainfall (inches) | Summer (ºC) | Winter (ºC) |
| | | | | Highest | Lowest |
| 1 | 2017 | 117 | 101.93 | 39 | 15.5 |
| 2 | 2018 | 81 | 79.07 | 39 | 15.5 |
| 3 | 2019 | 135 | 132.85 | 38 | 15.8 |
| 4 | 2020 | 80 | 80.07 | 39 | 15.8 |

***Source: www.gad.gov.mm***

### 4.3.3 Topography

Ranged from south to north, Ngwe Yah Mountains is located in the western part of the Mingaladon Township. The Lawga Lake is situated at the western border near Shwepyitha Township and the rest areas are plains.

### 4.3.4 Geology

Yangon Region, excluding the Coco Islands in the Bay of Bengal, forms largely a flat terrain in the area of the Gulf of Mottama, except for low hills or ridges formed of upper Tertiary strata. Noticably high areas of the Region are the southern end of the Bago Yoma near Phaunggyi, and its farther southward extension of isolated low hills and ridges like those near Hlawga Lake, the Shwedagon pagoda Hill in Yangon City itself, and the ridge or rolling hills southeast of Thanlyin.

The mainland part of the Yangon Region is bordered on the west by the Ayeyawady Region, on the north and east by Bago Region and on the south by the Gulf of Mottama. The Coco islands, forming an outerarc ridge located in the Bay of Bengal, some 270 miles southwest of Yangon, is also part of the Yangon Region.

Being largely a flat alluvium-covered terrain with no notable economic mineral potential, Yangon Region has not attracted much of the attention of the geologists from the mineral prospect point of view. The geological succession of the Yangon Region is shown in Table 4.17.

Laterite for use as road material is now being quarried at Wanetchaung, between Hmawbi and Taikkyi, north of Yangon.

Table 4.17 Geological Succession of the Yangon Region

| Age | Unit |
|---|---|
| Quaternary | Younger Alluvium<br>Unconformity<br>Older Alluvium<br>Unconformity |

| Age | Unit |
|---|---|
| Upper Miocene-Pliocene | Irrawaddy Formation<br>Unconformity |
| Miocene | Pegu Group (upper part only)<br>Unconformity |
| Cretaceous-Eocene | Indoburman Flysch (in Coco islands only) |

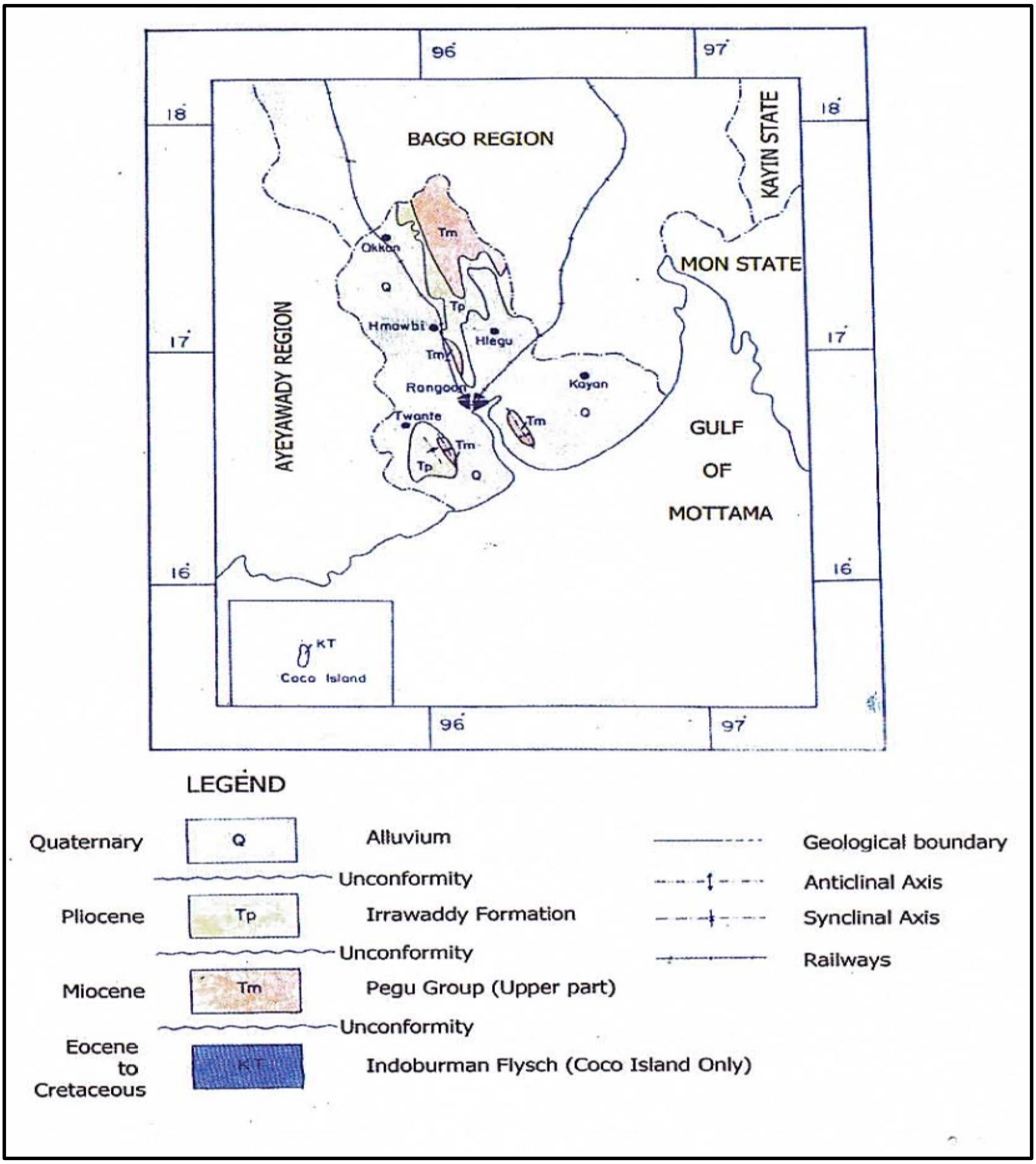



Figure 4.12 Geological Map of Yangon Region

### 4.3.5 Soil

There are several soil types in Yangon Region:

- meadow soils and meadow alluvial soils,

- clay and clay swampy soils,
- swampy soils,
- lateritic soils,
- yellow brown forest soils,
- dune forest and beach sand,
- mangrove forest soils,
- saline swampy meadow and gray soils.

Of them, mostly found soil types in the project area are (1) meadow soils and meadow alluvial soils, and (2) lateritic soils. Soil map of Yangon is shown in Figure 4.13.

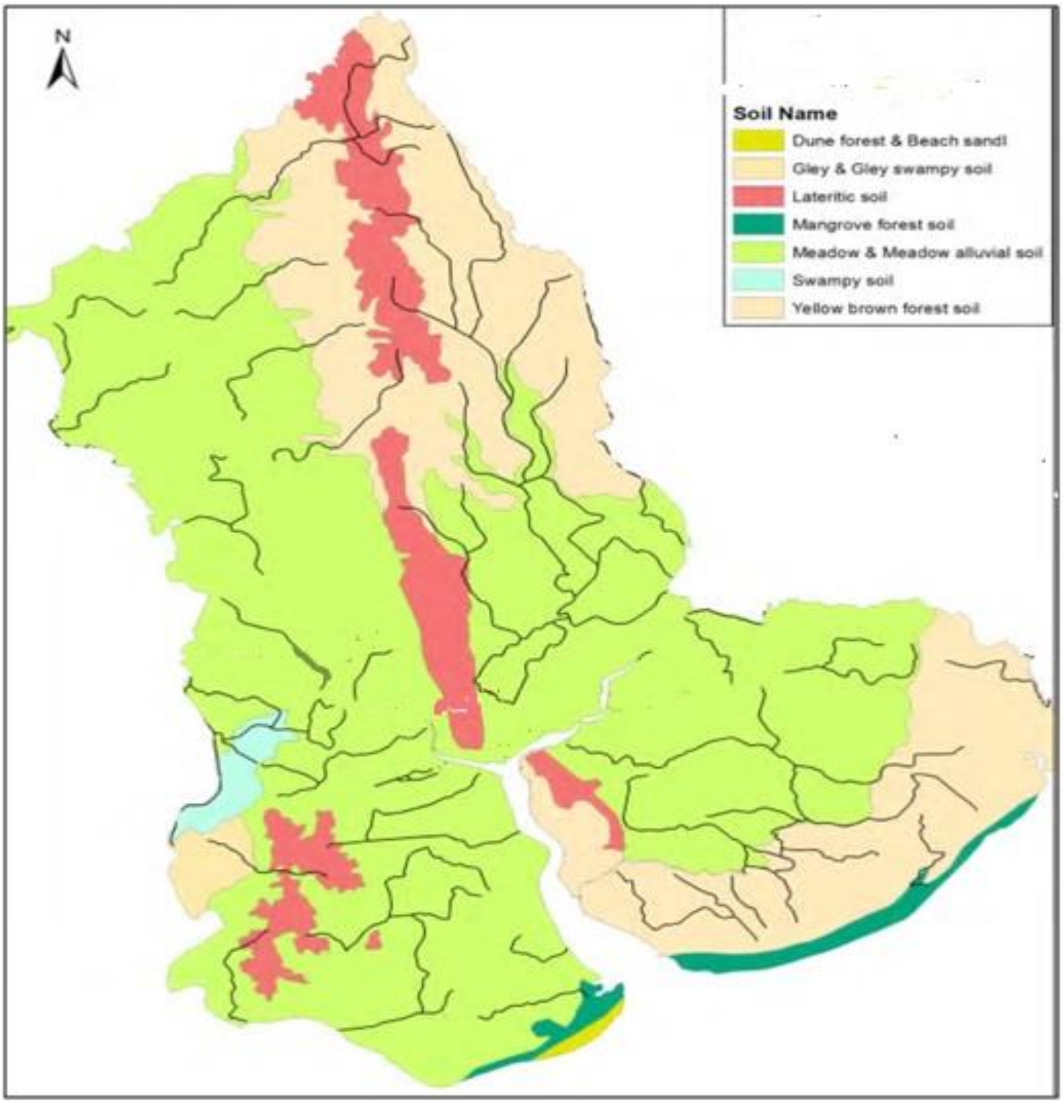



Figure 4.13 Soil Map of Yangon

### 4.3.6 Hydrology

Mingaladon Township has a few rivers and creeks flowing in that Barla Creek flows about 12 miles from north to south and about 8 miles from west to east. Its water depth is about 12 feet in rainy season and about 3 feet in summer and vessels/ boats cannot travel in it.

## 4.4 Biological Components (Secondary Data)

The ecological information was received from the general administrative department of the Mingaladon Township.

### 4.4.1 Natural Vegetation (Flora)

The vegetation such as teak, pyinkadoe, thit-mar, nipa palm and mangroves are found in Mingaladon Township.

### 4.4.2 Wildlife (Fauna)

There is no wildlife in Mingaladon Township.

## 4.5 Socio-Economic Components (Secondary Data)

### 4.5.1 Population and Communities

Mingaladon Township is composed of 27 quarters and 5 village tracts that is composed of 20 villages. There are 52,749 households and 284,929 populations. The female population is slightly higher than male according to the general administration department in 2020. In the township, most of the people are 94.19% Burmese and population by national ethnic group that are lived in Mingaladon Township describes in Table 4.18.

Table 4.18 Population by National Ethnic Group

| No. | Ethnicity | No. of Persons | Percentage (%) |
|---|---|---|---|
| 1. | Kachin | 519 | 0.19 |
| 2. | Kayah | 205 | 0.07 |
| 3. | Kayin | 3,829 | 1.34 |
| 4. | Chin | 2,352 | 0.86 |
| 5. | Mon | 1,630 | 0.57 |
| 6. | Burmese | 268,368 | 94.19 |
| 7. | Rakhine | 3,441 | 1.21 |
| 8. | Shan | 468 | 0.16 |
| **Total** | | **284,922** | **98.68** |

Table 4.19 Population by Foreigner

| No. | Ethnic Race | No. of Persons | Percentage (%) |
|---|---|---|---|
| 1. | Chinese | 282 | 0.06 |
| 2. | Indian | 3,711 | 0.33 |
| 3. | Pakistanis | 1 | 0.01 |
| 4. | Bangladeshis | 17 | 0.07 |
| 5. | Others | - | - |
| **Total** | | **4,011** | **1.47** |

Table 4.20 Population by Sex

| No. | Living Area | Male | Female | Total |
|---|---|---|---|---|
| 1. | Living on town | 73,840 | 85,807 | 159,647 |
| 2. | Living in country | 53,146 | 72,136 | 125,282 |
| **Total** | | **126,986** | **157,943** | **284,929** |

### 4.5.2 Religion

In the township, most of the people are Buddhist and the other religious groups are shown in following Table 4.21

Table 4.21 Religious Groups of Ethnic in Mingalardon Township

| No. | Religious Group | No. of Persons |
|---|---|---|
| 1. | Buddhist | 271,159 |
| 2. | Christian | 3,859 |
| 3. | Hindu | 4,012 |
| 4. | Islam | 5,899 |
| 5. | Others | - |
| **Total** | | **284,929** |

### 4.5.3 Education Attainment

According to the secondary data from General Administration Department, there are 9 basic education high schools, 3 sub high schools, 7 middle schools, 6 sub middle schools, 2 post primary schools, 25 primary schools, 24 pre-primary school and 22 monastery education schools.

### 4.5.4 Connectivity

The selected project location has well connectivity and accessibility through road and air.

*Air*: Nearest airport is Yangon airport which is located around 5 km from.

*Road:* The project is easily approachable from No.3 Main Road.

### 4.5.5 Health Facility

Mingalardone Township has 5 hospitals, 11 clinics and 5 rural health care centers.

### 4.5.6 Economy

Mingardone Township is one of the central economic township in Yangon. It is also an industrial town that composed of Yangon Industrial Zone, Mingalardone Industrial Zone and Pyinmapin Industrial Zone. It has the best communication due to existing of Yangon-Pyi Road and No.3 Main Road.

### 4.5.7 Land Use

The following Table 4.22 describes the land use classification of Mingalardone Township.

Table 4.22 Land Use of Mingalardone Township

| No. | Types of Land | Area (acres) |
|---|---|---|
| **1.** | **Net Cultivation Area** | **4,285** |
| | (i) Paddy land | 2,839 |
| | (ii) Farmland for crop | - |
| | (iii)Cultivated Island | - |

| No. | Types of Land | Area (acres) |
|---|---|---|
| | (iv)Orchard | 1,446 |
| | (v) Hillside | - |
| **2.** | **Vacant Land Area** | **53** |
| | ➢ Paddy land | 2,596 |
| | ➢ Farmland for crop | - |
| | ➢ Cultivated land | - |
| | ➢ Orchard | 88 |
| | ➢ Hillside | - |
| **3.** | **Grazing Ground** | **-** |
| **4.** | **Industrial Land** | **54** |
| **5.** | **Urban Land** | **3,983.189** |
| **6.** | **Rural Land** | **3,431.11** |
| **7.** | **Others** | **7,526.301** |
| **8.** | **Reserved Forest and Protected Forest Area** | **7,175** |
| **9.** | **Wild forest** | **-** |
| **10.** | **Virgin Soil area** | **174** |
| **11.** | **Non-cultivated area** | **-** |
| **Total** | | **26,681.60** |

### 4.5.8 Workforce

There are 218,232 persons, who can be worked. Among them, 192,145 persons are employees but 26,087 persons are jobless. So, the percentage of jobless in Mingalardone Township is 12 %.

Table 4.23 Workforce of Mingalardone Township

| No. | Types of Job | No. of Persons |
|---|---|---|
| 1. | Government Employee | 42,495 |
| 2. | Services | 6,100 |
| 3. | Agriculture | 2,854 |
| 4. | Breed | 154 |
| 5. | Trading | 25,549 |
| 6. | Factory / Workshop Employee | 7,325 |
| 7. | Fishing | 14 |
| 7. | Random Worker | 36,425 |
| 8. | Others | 164,013 |
| **Total** | | **284,929** |

# 5.0 ENVIRONMENTAL, SOCIAL AND HEALTH IMPACTS ASSESSMENT AND MITIGATION MEASURES

## 5.1 Nature of Impact

The existing environmental conditions have been described in the Chapter 4. In the present chapter, the impacts of the project on the environment have been predicted. Impacts on various environmental attributes during construction as well as operation phase, and also mitigation measures for these impacts have been discussed.

The identification and assessment of impacts has been carried out by considering the proposed proposal activities in terms of construction and operation stages. The impact of the activities will be on physical, biological, socio-economic and cultural resources. The impacts generated are both beneficial as well as adverse. The environmental impacts have been identified for a number of issues based on the analysis of the environmental baseline information and activities that are to be undertaken (during construction and subsequent operation phases). The possible adverse impacts from the proposal during the construction and operation stages are presented as following.

## 5.2 Impact Assessment Methodology

The significance of the aspects/ impacts of the process were rated by using a matrix derived from Plomp (2004) and adapted to some extent to fit this process. These matrixes use the consequence and the likelihood of the different aspects and associated impacts to determine the significance of the impacts. The significances of the impacts were determined through a synthesis of the criteria below:

### 5.2.1 Probability

Probability describes the likelihood of the impact actually occurring as follow:

The weights are assigned to each attribute:

Table 5.1 Rating for Probability

| Attribute | Description | Weight |
|---|---|---|
| Improbable | The possibility of the impact occurring is very low, due to the circumstances, design or experience. | 1 |
| Probable | There is a probability that the impact will occur to the extent that provision must be made therefore. | 2 |
| Highly Probable | It is most likely that the impact will occur at some stage of the development. | 4 |
| Definite | The impact will take place regardless of any prevention plans, and there can only be relied on mitigation actions or contingency plans to contain the effect. | 5 |

### 5.2.2 Duration

Duration is described the extend of the impact affected.

Table 5.2 Rating for Duration

| Attribute | Description | Weight |
|---|---|---|
| Short term | The impact will either disappear with mitigation or will be | 1 |

| | | |
|---|---|---|
| | mitigated through natural processes in a time span shorter than any of the phases. | |
| Medium term | The impact will last up to the end of the phases, where after it will be mitigated. | 3 |
| Long term | The impact will last for the entire operational phase of the project but will be mitigated by direct human action or by natural processes thereafter. | 4 |
| Permanent | Impact that will be non-transitory. Mitigation either by man or natural processes will not occur in such a way or in such a time span that the impact can be considered transient. | 5 |

#### 5.2.3 Scale

Scale is the physical and spatial size of the impact as follow:

Table 5.3 Rating for Scale

| Attribute | Description | Weight |
|---|---|---|
| Site | The impacted area extends only as far as the activity, e.g. footprint. | 1 |
| Local | The impact could affect the whole, or a measurable portion of the above mentioned properties. | 2 |
| Regional | The impact could affect the area including the neighboring residential areas. | 3 |

#### 5.2.4 Magnitude/ Severity

Magnitude/ severity determine does the impact destroy the environment, or alter its function.

Table 5.4 Rating for Magnitude or Severity

| Attribute | Description | Weight |
|---|---|---|
| Low | The impact alters the affected environment in such a way that natural processes are not affected. | 2 |
| Medium | The affected environment is altered, but functions and processes continue in a modified way. | 6 |
| High | Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases. | 8 |

#### 5.2.5 Significance

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required.

**Significance (Si) = (Duration (D) + Scale (S) + Magnitude (M)) x Probability (P)**

Table 5.5 Rating for Significance

| Attribute | Description | Weight |
|---|---|---|
| Negligible | The impact is non-existent or unsubstantial and is of no or little importance to any stakeholder and can be ignored. | < 20 |
| Low | The impact is limited in extent, has low to medium intensity; whatever its probability of occurrence is, the impact will not have a material effect on the decision and is likely to require | < 40 |

| | | |
|---|---|---|
| | management intervention with increased costs. | |
| Moderate | The impact is of importance to one or more stakeholders, and its intensity will be medium or high; therefore, the impact may materially affect the decision, and management intervention will be required. | < 60 |
| High | The impact could render development options controversial or the project unacceptable if it cannot be reduced to acceptable levels; and/ or the cost of management intervention will be a significant factor in mitigation. | > 60 |

# 6.0 ENVIRONMNETAL MANAGEMENT PLAN AND MONITORING PLAN

The development and implementation of an effective environmental management plan is hindered by weak institutional capacity for effective environmental management and protection, low environmental regulatory enforcement, and shortage of financial resources and qualified personnel in the environmental field.

## 6.1 Environmental Management Plan for the Proposed Project

The implementation of an environmental management plan of the proposed project could enhance environmental conditions. The objectives of this plan are to reduce the waste volume, recover recyclable material, achieve better quality of the products, and develop the recycling.

The training workshops having some objectives for environment pollution control will be also opened for the locals. Training workshops are required to increase environmental awareness of all individuals concerned with the project (operation, and closing phases of mitigation and monitoring) and to train the workers who will be involved in the facility operation.

Table 6.1 Environmental Management Plan for Operation Phase

| Environmental Component | Location | Management Plan |
|---|---|---|
| **Air** | | |
| Dust Emission | Storage Area, Mixing and weighting, Production line, Dust collector, Collection Pipeline | • Install good ventilation system and dust emission system<br>• Regular checking of dust collector<br>• Regular maintenance of dust collector<br>• Regular checking of dust collection pipeline<br>• Careful handling and weighing of the powder |
| Gaseous & VOC Emission | Boiler Stack, Dust and VOCcontrol equipment, exhaust, Ventilator, collection pipeline | • Regular checking of emission stack and monitoring according to schedule<br>• Regular checking of filter and replace the filter<br>• Regular maintenance the collection system and ventilation system<br>• Regular checking of connecting pipeline |
| Odor | Storage Area, WWTP, Production Area, Waste Disposal | • Covering the collection pond and waste collection bin<br>• Check and maintain the ventilation system |

| | | |
|---|---|---|
| | | • Provide PPE |
| **Wastewater and Water** | | |
| Wastewater | WWTP | • Wastewater from the factory must be directed to the own wastewater treatment plant and treated wastewater will be discharged to Zone's WWTP.<br>• Oil/water separators, skimmers or other methods should be employed to minimize oil contaminated storm water discharge.<br>• No discharge of untreated wastewater outside the plant and check inlet and outlet of own WWTP.<br>• Regular maintenance of the own WWTP |
| Ground water | Site Premise | • No extraction of ground water<br>• However, record the water consumption regularly. |
| Storm water | Strom water drain outlet | • Separate drainage system for storm water.<br>• Provide and install screen at the storm drain outlets to restrict the movement of solid waste into the storm drain system while allowing the storm water to enter.<br>• The screen should be cleaned and/or replaced as necessary.<br>• Whenever possible, storm water should be diverted away from materials manufacturing, storage and other areas of potential storm water contaminants. |
| Sewage Waste | Septic tank | • Regular checking of septic tank<br>• Dispose the authorize agency. |
| **Noise & Vibration** | | |
| Noise & vibration from machineries (such as D.G set) and operation | Diesel generator | • Regular checking and maintenance of the D.G<br>• Should install the sound proof wall |
| | Production Area | • Regular checking and maintenance of the production equipments |
| **Land Contamination** | | |
| Accidental spillage and Leakage of oil,fuel and other chemicals | Chemical storage and oil storage area and fuel storage area | • Drip pans and drum storage platforms should be used to hold containers of fluids that are used at the facility.<br>• Cloths should be placed underneath the drip pans and drum storage platforms to catch and soak up slop spillage.<br>• Once the task is completed, the pans and platforms should be immediately cleaned and stored in a designated and easily accessible location.<br>• The cloths should be stored with the drip pans.<br>• Each drip pan should be used to contain only one type of fluid while in use and prior to cleaning.<br>• This will avoid the accidental mixing of incompatible fluids (i.e., acids, and caustics).<br>• Residues and cleaning waters from drip pans must be properly placed in designated containment tanks for |

| | | |
|---|---|---|
| | | storage prior to ultimate disposal or disposed of in an approved oil/water separator as pretreatment.<br>• Ultimate disposal should be in compliance with Zone Committee or ECD requirements.<br>• It is the responsibility of the supervisor and environmental supervisor to ensure that employees and contractors use drip pans and drum storage platforms. |
| **Waste Disposal** | | |
| Hazardous Waste<br>• Storage<br>• Cleaning<br>• Disposal | Disposal Yard, Cleaning Area | • On-Site Hazardous Waste Storage<br>All waste, hazardous or not, must be contained to prevent it from blowing away and from leaching into surface or groundwater. Hazardous waste must be in containers or tanks clearly labeled with the words "Hazardous Waste". Volumes and time limits for storing hazardous waste on-site vary by generation category.<br>• Cleaning and Drying of Hazardous Waste<br>Cleaning and drying of inorganic pigments bags and drums allow them to be disposed as hazardous wastes.<br>• Disposal<br>Hazardous waste must be disposed at permitted waste facility such as DOWA/ YCDC.<br>• Record amount of waste regularly. |
| Non-hazardous Waste<br>• Storage<br>• Cleaning<br>• Disposal | Disposal Yard, Cleaning Area | • Ensure the waste is nonhazardous<br>• On-Site Nonhazardous Waste Management.<br>Management methods may include tarping, shrouding, berming, and all other BMPs, while storing on-site. The objective is containment.<br>• On-site Nonhazardous Waste Storage.<br>Non-hazardous waste needs to be removed from on-site at regular intervals to prevent release to the environment, and to avoid additional permit requirements. Nonhazardous waste and unused product must be contained to prevent discharge to the air, or runoff to surrounding land or water.<br>• Disposal<br>Non-hazardous waste disposed at permitted waste facility such as Yangon City Development Committee.<br>• Record amount of waste regularly. |
| **Other** | | |
| Occupational Health and Safety | Plant Premises | • Ensure necessary facilities are provided according to Factories Act. |

| | | |
|---|---|---|
| | | • Regular medical checkup for workers.<br>• Give the OHS training for new workers regularly.<br>• Record the accident and injuries. |
| Community Health and Safety | Local | • Regular maintenance of the vehicles<br>• To remind the driver for controlling the high speed driving.<br>• Transportation of raw material must be done according to the MSDS transportation procedure.<br>• Record the accident and injuries. |
| Social Consideration | Plant Premise and Local | • Provide CSR fund regularly<br>• Creation of Job Opportunities<br>• Regular conducting of employee social welfare program. |
| Risk Assessment | Plant premises | • Regular training and exercises for all staff regarding firefighting and other emergency response.<br>• The propose project is designed in compliance with relevant rules and regulations for emergency risk of fire. And then, emergency exits, fire hydrants and extinguisher boxes in a certain distance are considered in design of those facilities.<br>• To check fire fighting equipments daily. |
| Training and Education | Employee | • Management should provide all employees with regularly scheduled Best Management Practices seminars and discussions relating to pollutants and pollution prevention.<br>• The training should emphasize procedures, BMP techniques and supervisory responsibility and accountability.<br>• Subcontracting firms should be strongly encouraged to participate in the BMP training program.<br>• New employees should be made aware of BMPs on the first day of work and be regularly reminded of them. |

Table 6.2 Environmental Management Plan for Closing Phase

| Environmental Component | Location | Management Plan |
|---|---|---|
| **Air** | | |
| Dust Generation | Closing site and road (in front of the site) | Spraying of water wherever required |
| Gaseous Emission from working vehicles | Heavy machineries and D.G set | Ensure checking of vehicular emission and obtaining pollution under control |
| **Water and Wastewater** | | |

| | | |
|---|---|---|
| Ground Water | Closing site | No extraction of groundwater |
| Surface water sources | Closing site | • No disposal of any wastewater outside the plant and the retaining channel.<br>• Regular checking of septic tank<br>• Dispose the authorize agency such as YCDC. |
| Drinking Water Requirement | Closing site | Arrange purified drinking water |
| Wastewater from Workers' camp | Closing site | • Ensure proper sanitation and drainage. No direct wastewater discharge in water bodies or the retaining channel.<br>• The sanitation wastewater should be disposed to the authorize agency. |
| **Noise & Vibration** | | |
| Noise & vibration from machineries and construction activities | Closing activities, Heavy machines and D.G set | • Ensure machineries meeting noise and vibration level standards<br>• Checking the machineries performance regularly |
| **Land** | | |
| Land Development | Closing site | • Preserve the excavated topsoil to be used for green-belt development |
| **Waste Disposal** | | |
| Hazardous Waste such as thinner, oil, and chemical | Disposal Yard | • All waste, hazardous or not, must be contained to prevent it from blowing away and from leaching into surface or groundwater.<br>• Hazardous waste must be in containers or tanks clearly labeled with the words "Hazardous Waste", volumes and time limits for storing hazardous waste on-site vary by generator category.<br>• Cleaning and drying of inorganic pigments bags and drums have to be disposed as hazardous wastes.<br>• Hazardous waste disposed at permitted waste facility such as DOWA/ YCDC.<br>• Record amount of waste regularly. |
| Nonhazardous waste such as construction waste, plastic | Disposal Yard | • Non-hazardous waste needs to be removed from on-site at regular intervals to prevent release to the environment, and to avoid penalty.<br>• Nonhazardous waste must be contained to prevent discharge to the air, or runoff to surrounding land or water.<br>• Nonhazardous waste will be recycled to the authorized solid waste manufacturing company<br>• Record amount of waste regularly. |
| **Others** | | |
| Occupational Health and Safety | Closing site | • Ensure necessary facilities according to Factories Act<br>• Record the accident and injuries |
| Community Health and Safety | Local | • Ensure necessary facilities<br>• To remind the driver for controlling the high speed |

| | | |
|---|---|---|
| | | driving.<br>• Record the accident and injuries. |
| Social Consideration | Local | • Creation of job opportunities. |
| Emergency Risk | Closing site | • Maintain all safety Provisions<br>• Make tool box meeting daily<br>• Check PPE |

## 6.2 Chemical Management Plan

### 6.2.1 Registration of Chemicals and SDS

All hazardous chemicals which are produced, stored, used or handled need registration with local agencies. Rohto will ensure permit or license to obtain the permit of procurement, storage and use. Rohto will maintain a daily registry of inventory of the chemical/ hazardous substances for production. All hazardous substances must have safety data sheet (SDS). A master-list of SDS for all hazardous substances that are produced, stored, used or handled are registered by individual department and submitted to Administrative Officer for compilation.

Respective work area will maintain a file containing all SDS of the hazardous substances used in the area. SDS can point identification of substance and the company, hazard identification, composition of ingredients, first aid measures, fire-fighting measures, accidental release measures, handling and storage, exposure controls and personal protection, physical and chemical properties, stability and reactivity, toxicological information, ecological information, disposal considerations, transportation information, regulatory information and other information.

There are 67 chemicals registered for operation and SDSs are attached in Appendix. Among these, the company is searching suppliers for four chemicals, Fragrance Pure Green Tiv 11-4955, Frangrance Elcondor 0518, Frangrance Lovely Cream R0760660 and MG-60. Hence, their SDSs are not available now. But, these chemicals will be stored and maintained according to following instructions along with the other chemicals.

Table 6.3 Lists of Chemical

| No. | Brand Name | Chemical Name |
|---|---|---|
| 1 | 1,3-Butylene Glycol[1,3-BG] Cosmetic quality/ 1-3-butylene Glycol P | Butylene Glycol |
| 2 | AEROSIL® 200 | Silica |
| 3 | AJIDEW® ZN-100 | Zinc PCA |
| 4 | Alpiniawhite | Butylene Glycol 69.9%, Water (Aqua) 29.9%, Alpinia Katsmadai Seed Extract 0.2%. |
| 5 | AMILITE® GCK-12H | Potassium Cocoyl Glycinate 20%, Potassium Cocoate10%, Water 70% |
| 6 | AMILITE® GCS-12K | Sodium N-Cocoyl Glycinate 30%, Water 70% |
| 7 | AMISOFT® LK-11 (F) | Potassium Lauroyl Glutamate |
| 8 | AMISOL LDE-G | LAURAMIDE DEA |

| | | |
|---|---|---|
| 9 | AMPHITOL 20HD | Lauryl hydoxysultaine 30%, sodium chloride and water |
| 10 | Bengara T-1000 | CI77492 |
| 11 | Dibutylhydroxytoluene (BHT) | Dibutylhydroxytoluene (BHT) |
| 12 | CARBOPOL(R) AQUA SF-1 POLYMER | Acrylate copolymer 30%, Water 70% |
| 13 | Caustic Soda Micropearls | Sodium Hydroxide |
| 14 | Citric Acid Anhydrous BP98 (100-300 Mesh) | Citric Acid |
| 15 | C-MATE / C-MATE (EXP-J) | Magnesium Ascorbyl Phosphate |
| 16 | CUTINA® AGS | Glycol Distearate |
| 17 | Dehyton KE T | Cocamidopropyl Betaine, Preservatives (Methylchloroisothiazoline (and) Methylisothiazolinone: approx. 8ppm) |
| 18 | Dehyton® KE-AS | Cocamidopropyl Betaine 30%, Water 70% |
| 19 | DERMALCARE(R) MAP L-213/K | Potassium Laureth Phosphate 40%, Water 60% |
| 20 | DIPOTASSIUM GLYCYRRHIZINATE | Dipotassium glycyrrhizinate |
| 21 | Clewat N | Disodium EDTA |
| 22 | DL-alpha-Tocopheryl Acetate | Tocopheryl Acetate |
| 23 | Palmac 98-16 Flakes (Palmitic acid) | Palmitic acid ($C_{16}H_{32}O_2$) |
| 24 | Lauric Acid Palmac 98-12 (Flakes) | Lauric acid ($C_{12}H_{24}O_2$) 99-100% |
| 25 | Myristic Acid Palmac 98-14 (Flakes) | Myristic acid($C_{14}H_{28}O_2$) |
| 26 | Stearic Acid Palmac 98-18 (Flakes) | Stearic acid($C_{18}H_{36}O_2$) |
| 27 | EMERSENSE® AM 8025 | Palmkernelamide DEA |
| 28 | Escalol™ 567 UV filter | Oxybenzone |
| 29 | Ethanol (Absolute/ 99.5%) | Ethanol (Absolute) |
| 30 | FD & C Red No.40 Powder (Allura Red) | CI 16035 |
| 31 | FD & C Yellow No.5 Powder | CI 19140 |
| 32 | Fragrance Citrus 046.623 | Benzyl Acetate |
| 33 | Fragrance Pure Green Tiv 11-4955 | Fragrance |
| 34 | Frangrance Elcondor 0518 | Fragrance |
| 35 | Frangrance Lovely Cream R0760660 | Fragrance |
| 36 | Glycerine 99.5% USP / Refined Glycerine 99.7% min USP37, Kosher Certified | Glycerin |
| 37 | Green No.501 (Oxide Green SC) | CI77288 |
| 38 | HYALURONSAN HA-LQ RS/ Hyaluronate IW120B | Sodium Hyaluronate |
| 39 | Isopropylmethylphenol | Isopropyl methylphenol |
| 40 | Merquat™ 550 polymer | Polyquaternium-7 |
| 41 | Metabeads Microwax Green 28/60 | Cera Microcristallina |
| 42 | Methyl paraben / Ueno Methyl Paraben NF | Methyl Paraben |
| 43 | Niacinamide PC | Niacinamide |
| 44 | NIKKOL MGS-ASEV | Glyceryl Monosterate |
| 45 | NIKKOL MYS-2V | PEG-2 Stearate |
| 46 | OLIVE OIL | Olea Europaea (Olive) Fruit Oil |
| 47 | ORAMIX™ L 30 | Water 68.7%, Sodium Lauroyl Sarcosinate 30%, Lauric acid 1%, sodium benzoate 0.1%, Sodium Chloride 0.1%, Tetra Sodium EDTA 0.1% |

| | | |
|---|---|---|
| 48 | Panthenol (Dexpanthenol)/ D-Panthenol (EXP-J) | Panthenol |
| 49 | Potassium Chloride | Potassium Chloridde |
| 50 | Potassium Hydroxide Flake 90% | Potassium hydroxide 90%, Water 10% |
| 51 | Propyl paraben / Ueno Propyl Paraben NF | Propyl Paraben |
| 52 | PURAC® BF/P41 | L-lactic acid 19.5%, Sodium lactate 46%, Water 34.5% |
| 53 | PURAC® HiPure 90 | L-lactic acid |
| 54 | Pyridoxine Hydrochloride | Pyridoxine Hydrochloride |
| 55 | REWODERM LI S 80 | PEG 200 Hydrogenated Glyceryl Palmmate 50%, PEG 7 Glyceryl Cocoate 20%, Water 30% |
| 56 | Salicylic Acid | Salicylic Acid |
| 57 | Sodium Ascorbyl Phosphate | Sodium Ascorbyl Phosphate |
| 58 | Sodium Chloride | Sodium chloride |
| 59 | Sodium Metabisulfite | Sodium Metabisulfite |
| 60 | SORBITOL KAO (Sorbitol solution 70%) | Sorbitol 70%, Water 30% |
| 61 | Stearyl Glycyrrhetinate | Stearyl Glycyrrhetinate |
| 62 | Superox-C™ AF | Glycerin 22.5%, Water 75%, Terminalia Ferdinandiana Fruit Extract 2.5% |
| 63 | TEXAPON® N 70 T | Sodium Laureth Sulfate 70%, Water 30% |
| 64 | TINOGARD® TL | Benzotriazolyl Dodecyl p-Cresol |
| 65 | MG-60 (Tornare) | *Maltooligosyl Glucoside 47% Hydrogenated Starch Hydrolysate27% Water 26%* |
| 66 | Vitamin A Oil (Vitamin A-Palmitate 1.0 Mio IU/G stabilized with Tocopherol) | Retinyl Palmitate, Helianthus Annuus (Sunflower) Seed Oil, BHT |
| 67 | Yukinoshita Liquid MB | Saxifraga Sarmentosa Extract 2.5%, Butylene Glycol, Water |
| 68 | Zinc Gluconate | Zinc Gluconate |

#### 6.2.2 Labelling and Warning Signs

***Labelling***

- All packed containers containing hazardous chemicals shall be labeled in accordance with GHS (Globally Harmonized System).
- The label will indicate the identity of the chemical, its hazards and the precautions to take.
- Original labels may only be removed or modified in that container is no longer to be used for holding that hazardous substance and has been emptied and cleaned to remove any residual substance

***Warning Signs***

According to WSH (Workplace Safety and Health) Law all employees who are required to handle the hazardous substances must be aware of the hazards and the precautionary measures.

- Warning signs or notices specifying the nature of the danger of the hazardous substances will be prominently displayed in areas where such substances are used or handled.

### 6.2.3 Handling, Transportation and Storage

***Handling***

- Avoid aerosol formation.
- Wear suitable protective clothing and eye/face protection.
- Avoid contact with the skin, eyes and clothing.
- Keep container tightly sealed.
- Ensure that there is no crystallized product in the container before use.
- Processing machines must be fitted with local exhaust ventilation.
- Protection against fire and explosion:
- Risk of self-ignition when a large surface area is produced due to fine dispersion.
- Soiled textiles / cleaning rags / adsorbents and Silica are capable of self-ignition and should be wetted with water and must be disposed of in a safe manner.
- Take precautionary measures against static discharges.

Avoid all sources of ignition:

- Heat, sparks, open flame. If exposed to fire, keep containers cool by spraying with water.

***Transportation***

Whenever hazardous substances are transported within or outside Rohto, precautionary measures should be taken to ensure that the potential risks are communicated to persons who will come into contact with the hazardous substances during transportation. . This can be accomplished through

- Marking and labeling of packages or containers to indicate the hazards of the consignment.
- The relevant information can be included in the transport documents, and by placing or sticking placards on the transport units i.e., vehicles and containers. These labels should conform to the Prevention of Hazard from Chemical and Related Substances Rules.
- The vehicles should be equipped with appropriate firefighting appliances and
- Drivers should be trained in the safe transport of Hazardous Substance as well as in dealing with emergency situations.

Loading, unloading and transfer operations are prone to accidents, and should be managed properly.

- Safe work procedures (SWP) should also be established and carried out in order to avoid unnecessary risks.
- Control measures such as understanding of SWP and conducting RA (Risk Assessment) should be implemented to reduce the risks.

***Storage***

- All hazardous substances will be stored separately
- Installed fire extinguisher.
- Flammable substances must be stored in cool condition and away from the direct sunlight.
- All hazardous substances inventory must be maintained to-date. (e.g., Daily Production Report and Chemical inventory list).
- Design of storage facilities are based on statutory requirements, safety data or other technical information (International standards should be followed where applicable).

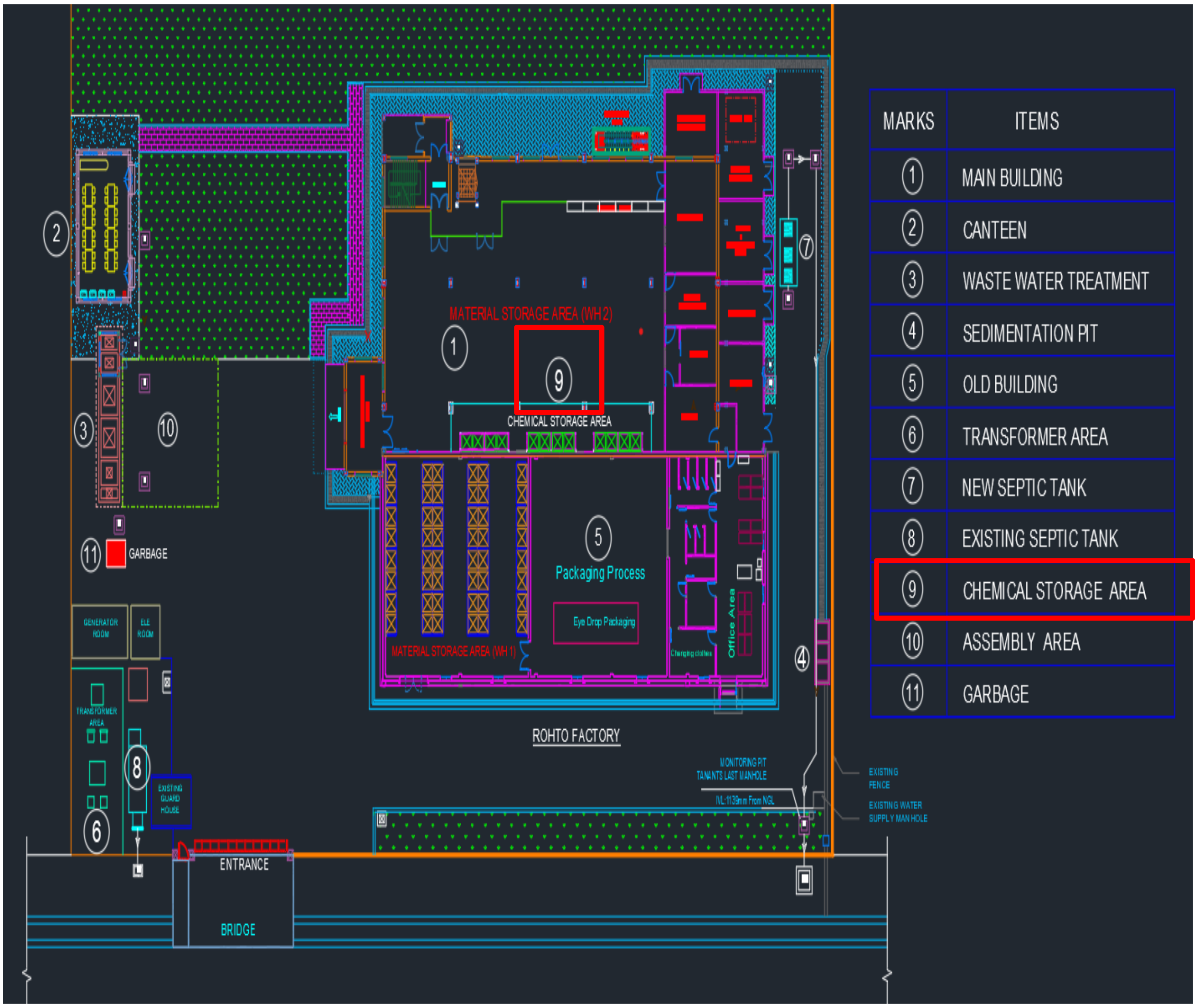



Figure 6.1 Chemical Raw Storage Area

### 6.2.4 Identification of Hazardous Chemicals

Most of the chemicals used in this factory are liquid and powder. The hazardous identification, type, location used and CAS Registry Number (CASRN) are described in following table.

Table 6.4 Identification of Hazardous Chemicals

| No. | Brand Name | Chemical Name | CAS No. | Type | Hazard | Non-Hazard | Quantity (Kg/ year) | Location used |
|---|---|---|---|---|---|---|---|---|
| 1 | 1,3-Butylene Glycol[1,3-BG] Cosmetic quality/ 1-3-butylene Glycol P | Butylene Glycol | 107-88-0 | Liquid | - | X | 11,686 | Warehouse II |
| 2 | AEROSIL® 200 | Silica | 7631-86-9 (Silica) 112945-52-5 | Powder | - | X | 30 | Warehouse II |
| 3 | AJIDEW® ZN-100 | Zinc PCA | 15454-75-8 | Powder | Hazard - Corrosive | - | 1 | Warehouse II |
| 4 | Alpiniawhite | Butylene Glycol 69.9%, Water (Aqua) 29.9%, Alpinia Katsmadai Seed Extract 0.2%. | 107-88-0, 7732-18-5, 1002122-29-3 | Liquid | - | X | 1 | Warehouse II |
| 5 | AMILITE® GCK-12H | Potassium Cocoyl Glycinate 20%, Potassium Cocoate10%, Water 70% | 301341-58-2, 61789-30-8 | Liquid | - | X | 3,540 | Warehouse II |
| 6 | AMILITE® GCS-12K | Sodium N-Cocoyl Glycinate 30%, Water 70% | 90387-74-9, 7732-18-5 | Liquid | - | X | 1,560 | Warehouse II |
| 7 | AMISOFT® LK-11 (F) | Potassium Lauroyl Glutamate | 89187-78-0 | Flake | - | X | 1,397 | Warehouse II |
| 8 | AMISOL LDE-G | LAURAMIDE DEA | 120-40-1 | Waxy mass | Hazard - Health | - | 1,862 | Warehouse II |
| 9 | AMPHITOL 20HD | Lauryl hydoxysultaine 30%, sodium chloride and water | - 13197-76-7<br>- 76447-14-5 | Liquid | Hazard - Irritation and environment | - | 140 | Warehouse II |
| 10 | Bengara T-1000 | CI77492 | - 51274-00-1 | Powder | Hazard - Health | - | 1 | Warehouse II |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 11 | Dibutylhydroxytoluene (BHT) | Dibutylhydroxytoluene (BHT) | 128-37-0 | Powder | Hazard - irritation & environment | - | 5 | Warehouse II |
| 12 | CARBOPOL(R) AQUA SF-1 POLYMER | Acrylate copolymer 30%, Water 70% | Mixture | Liquid | - | X | 1,320 | Warehouse II |
| 13 | Caustic Soda Micropearls | Sodium Hydroxide | 1310-73-2, 497-19-8, 7732-18-5 | Hygroscopic solid | Hazard - Corrosive | - | 447 | Warehouse II |
| 14 | Citric Acid Anhydrous BP98 (100-300 Mesh) | Citric Acid | 77-92-9 | Crystalline solid | Hazard - irritation | - | 12 | Warehouse II |
| 15 | C-MATE / C-MATE (EXP-J) | Magnesium Ascorbyl Phosphate | 113170-55-1 | Powder | Hazard - Health | - | 6 | Warehouse II |
| 16 | CUTINA® AGS | Glycol Distearate | 91031-31-1 | Beads | - | X | 180 | Warehouse II |
| 17 | Dehyton KE T | Cocamidopropyl Betaine, Preservatives (Methylchloroisothiazolinone (and) Methylisothiazolinone: approx. 8ppm) | 147170-44-3 | Liquid | Hazard - corrosive | - | 1 | Warehouse II |
| 18 | Dehyton® KE-AS | Cocamidopropyl Betaine 30%, Water 70% | Mixture | Liquid | Hazard - corrosion | - | 3,120 | Warehouse II |
| 19 | DERMALCARE(R) MAP L-213/K | Potassium Laureth Phosphate 40%, Water 60% | **Mixture** Poly,alpha.-dodecyl-.,omega.-hydroxy-,phosphate,potassium salt - 58318-92-6 Tripotassiumphosphate - 7778-53-2 | Liquid | Hazard - corrosion | - | 720 | Warehouse II |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2-(Dodecyloxy)ethanol - 4536-30-5 | | | | | |
| 20 | DIPOTASSIUM GLYCYRRHIZINATE | Dipotassium glycyrrhizinate | 272-296-1 | Powder | - | X | 78 | Warehouse II |
| 21 | Clewat N | Disodium EDTA | 139-33-3 | Powder | Hazard - irritation/ Environment | - | 33 | Warehouse II |
| 22 | DL-alpha-Tocopheryl Acetate | Tocopheryl Acetate | 7695-91-2 | Liquid | - | X | 339 | Warehouse II |
| 23 | Palmac 98-16 Flakes (Palmitic acid) | Palmitic acid ($C_{16}H_{32}O_2$) | 57-10-3 | Solid | - | X | 15,573 | Warehouse II |
| 24 | Lauric Acid Palmac 98-12 (Flakes) | Lauric acid ($C_{12}H_{24}O_2$) 99-100% | 143-07-7 | Solid | Hazard - Irritation | - | 7,796 | Warehouse II |
| 25 | Myristic Acid Palmac 98-14 (Flakes) | Myristic acid($C_{14}H_{28}O_2$) | 544-63-8 | Solid | - | X | 11,583 | Warehouse II |
| 26 | Stearic Acid Palmac 98-18 (Flakes) | Stearic acid($C_{18}H_{36}O_2$) | 57-11-4 | Waxy solid | - | X | 5,784 | Warehouse II |
| 27 | EMERSENSE® AM 8025 | Palmkernelamide DEA | Mixture | Liquid | Hazard - Corrosive, Environment | - | 480 | Warehouse II |
| 28 | Escalol™ 567 UV filter | Oxybenzone | 205-031-5 (EC no.) | Powder | Hazard - Physical (Combustible) | - | 6 | Warehouse II |
| 29 | Ethanol (Absolute/ 99.5%) | Ethanol (Absolute) | 925-93-9 | Liquid | Hazard - Health, Physical & Irritation | - | 466 | Warehouse II |
| 30 | FD & C Red No.40 Powder (Allura Red) | CI 16035 | Substance 25956-17-6 | Powder | - | X | 1 | Warehouse II |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 31 | FD & C Yellow No.5 Powder | CI 19140 | 1934-21-0 | Powder | - | X | 1 | Warehouse II |
| 32 | Fragrance Citrus 046.623 | Benzyl Acetate | 140-11-4 | Liquid | Hazard - Health, irritation, physical and environment | - | 140 | Warehouse II |
| 33 | Fragrance Pure Green Tiv 11-4955 | Fragrance | | Liquid | Hazard - Environment | | 30 | Warehouse II |
| 34 | Frangrance Elcondor 0518 | Fragrance | | Liquid | Hazard - Health, irritation | | 18 | Warehouse II |
| 35 | Frangrance Lovely Cream R0760660 | Fragrance | | Liquid | Hazard - Health, irritation | | 240 | Warehouse II |
| 36 | Glycerine 99.5% USP / Refined Glycerine 99.7% min USP37, Kosher Certified | Glycerin | Mono-constituent substance | Liquid | - | X | 26,290 | Warehouse II |
| 37 | Green No.501 (Oxide Green SC) | CI77288 | | Powder | - | X | 5 | Warehouse II |
| 38 | HYALURONSAN HA-LQ RS/ Hyaluronate IW120B | Sodium Hyaluronate | 9067-32-7 | Powder | Hazard - Health | - | 96 | Warehouse II |
| 39 | Isopropylmethylphenol | Isopropyl methylphenol | 3228-02-2 | Granular crystal | Hazard - irritation | - | 81 | Warehouse II |
| 40 | Merquat™ 550 polymer | Polyquaternium-7 | Mixture | Liquid | - | X | 384 | Warehouse II |
| 41 | Metabeads Microwax Green 28/60 | Cera Microcristallina | 63231-60-7 | Solid | - | X | 30 | Warehouse II |
| 42 | Methyl paraben / Ueno Methyl Paraben NF | Methyl Paraben | 99-76-3 | Powder | Hazard - Environment | - | 100 | Warehouse II |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 43 | Niacinamide PC | Niacinamide | 98-92-0 | Powder | Hazard - irritation | - | 1,201 | Warehouse II |
| 44 | NIKKOL MGS-ASEV | Glyceryl Monosterate | 11099-07-3 | Solid | Hazard - Health | - | 480 | Warehouse II |
| 45 | NIKKOL MYS-2V | PEG-2 Stearate | 106-11-6 | Solid | - | X | 7,543 | Warehouse II |
| 46 | OLIVE OIL | Olea Europaea (Olive) Fruit Oil | 8001-25-0 | Liquid | - | X | 2,940 | Warehouse II |
| 47 | ORAMIX™ L 30 | Water 68.7%, Sodium Lauroyl Sarcosinate 30%, Lauric acid 1%, sodium benzoate 0.1%, Sodium Chloride 0.1%, Tetra Sodium EDTA 0.1% | Mixture | Liquid | Hazard - Irritation, corrosive | - | 300 | Warehouse II |
| 48 | Panthenol (Dexpanthenol)/ D-Panthenol (EXP-J) | Panthenol | 81-13-0 | Liquid | - | X | 1 | Warehouse II |
| 49 | Potassium Chloride | Potassium Chloridde | 7447-40-7 | Powder | - | X | 279 | Warehouse II |
| 50 | Potassium Hydroxide Flake 90% | Potassium hydroxide 90%, Water 10% | KOH - 1310-58-3<br>H20 - 7732-18-5 | Solid | Hazard - Toxic, Corrosive, Physical hazard - elease of heat. Environmental hazard. | - | 8,821 | Warehouse II |
| 51 | Propyl paraben / Ueno Propyl Paraben NF | Propyl Paraben | 94-13-3 | Powder | Hazard - environment (acute) | - | 33 | Warehouse II |
| 52 | PURAC® BF/P41 | L-lactic acid 19.5%, Sodium lactate 46%, | **Mixture**<br>S-lactic acid - | Liquid | Hazard - Irritation | - | 12 | Warehouse II |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Water 34.5% | 79-33-4 (W=18 - 61%) Sodium (S)-Lactate - 867-56-1 (W=18 - 39%) ***or*** Potassium (S)-Lactate - 996-31-6 (W=45-47%) | | | | | |
| 53 | PURAC® HiPure 90 | L-lactic acid | 79-33-4 | Liquid | Hazard - Corrosion | - | 1 | Warehouse II |
| 54 | Pyridoxine Hydrochloride | Pyridoxine Hydrochloride | 58-56-0 | Powder | - | X | 1 | Warehouse II |
| 55 | REWODERM LI S 80 | PEG 200 Hydrogenated Glyceryl Palmmate 50%, PEG 7 Glyceryl Cocoate 20%, Water 30% | Mixture | Liquid | - | X | 300 | Warehouse II |
| 56 | Salicylic Acid | Salicylic Acid | 69-72-7 | Solid | Hazard - Health, corrosion, irritation | - | 1 | Warehouse II |
| 57 | Sodium Ascorbyl Phosphate | Sodium Ascorbyl Phosphate | 66170-10-3 | Powder | - | X | 1 | Warehouse II |
| 58 | Sodium Chloride | Sodium chloride | 7647-14-5 | Solid | Hazard - Irritation | - | 270 | Warehouse II |
| 59 | Sodium Metabisulfite | Sodium Metabisulfite | 7681-57-4 (Sodium metabisulfite), 7631-90-5 | Crystalline granules | Hazard - Health, Irritation | - | 6 | Warehouse II |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | (Sodium bisulfite) | | | | | |
| 60 | SORBITOL KAO (Sorbitol solution 70%) | Sorbitol 70%, Water 30% | Mixture D-Sorbitol - 50-70-4 Water - 7732-18-5 | Liquid | - | X | 660 | Warehouse II |
| 61 | Stearyl Glycyrrhetinate | Stearyl Glycyrrhetinate | 13832-70-7 | Powder | - | X | 1 | Warehouse II |
| 62 | Superox-C™ AF | Glycerin 22.5%, Water 75%, Terminalia Ferdinandiana Fruit Extract 2.5% | Glycerin - 56-81-5, Water - 7732-18-5, Terminalia Ferdinandiana Fruit Extract - 1176234-54-0 | Liquid | - | X | 1 | Warehouse II |
| 63 | TEXAPON® N 70 T | *Sodium Laureth Sulfate 70%, Water 30%* | Mixture | Paste | Hazard - corrosion | - | 1,560 | Warehouse II |
| 64 | TINOGARD® TL | *Benzotriazolyl Dodecyl p-Cresol* | 2440-22-4 | Liquid | Hazard - Environment | - | 3 | Warehouse II |
| 65 | MG-60 (Tornare) | *Maltooligosyl Glucoside 47%*<br>*Hydrogenated Starch Hydrolysate27%*<br>*Water 26%* | | Liquid | - | X | 420 | Warehouse II |
| 66 | Vitamin A Oil (Vitamin A-Palmitate 1.0 Mio IU/G stabilized with Tocopherol) | Retinyl Palmitate, Helianthus Annuus (Sunflower) Seed Oil, BHT | Mixture Vitamin A palmitate - 79-81-2 D,L-alpha-Tocopherol - 10191-41-0 Sunflower oil - | Liquid | Hazard - Health, irritation | - | 1 | Warehouse II |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 8001-21-6 | | | | | |
| 67 | Yukinoshita Liquid MB | Saxifraga Sarmentosa Extract 2.5%, Butylene Glycol, Water | Mixture<br>Water - 7732-18-5<br>1,3-Butanedial - 107-88-0<br>Saxifraga stolonifera, ext. - 164288-53-3 | Liquid | - | X | 1 | Warehouse II |
| 68 | Zinc Gluconate | Zinc Gluconate | | Powder | - | X | 1 | Warehouse II |

### 6.2.5 Chemicals Risk Control Measure

It is imperative to conduct risk analysis for all the projects where hazardous materials, either as raw material or the product are handled. In regard to chemicals, a hazard is a set of properties that are associated with the chemical that may cause adverse effects to organisms or the environment.

Hazardous chemicals pose many risks upon the people, property and environment of the workplace and it is very important that a methodical risk management process is in place to mitigate the risks associated with hazardous chemicals. The risk assessment is required for use and storage of large quantities of hazardous substances to establish health and safety zones to prevent knock-on effects of neighboring hazardous installations and protect the public from fire, explosion, toxic fumes dispersal hazards, detrimental effects on health and chemical contamination.

***Administrative Control***

No hazardous substances or dangerous goods is authorized to be purchased or used

- The proposed uses and storage of each substance has been risk assessed and approved in accordance with national rules and regulation.
- The risk assessment is documented and its recommendations for management are implemented through incorporation into standard operation procedures and other internal documents, where appropriate.
- Chemicals and fuels are reassessed based on the certain conditions and/ or changes.
- Control measures identified by the risk assessments are to be implemented.
- Where a significant risk is identified, the control measures must be implemented prior to use of the chemicals.
- Labeling is an important control measure for the transportation, storage, handling and disposing of chemicals. All containers of chemicals, products and waste materials are to be labeled correctly.

Furthermore, dangerous goods cabinets are to be kept in good condition and appropriately signed. The following requirements must be met or exceeded.

- Storage base is impermeable
- Storage is away from storm-water drains, pits and surface waters
- Storage is undercover, wherever practicable and
- Equipment is in place to allow immediate recovery of spilt material.
- Installation of adequate firefighting system.
- Spill kits are to be regularly checked to ensure they are restocked in a timely manner. The type of spill kits prescribed is to be appropriate for the chemicals, fuels and classes of dangerous goods stored at the location.

***Engineering Control***

Rohto will install and control the pollution control facilities. There are:

1) Dust collector with activated carbon filter for the dust and VOC emission control.
2) Wastewater treatment plant for the industrial wastewater quality control
3) Fire extinguishers, hose reel, hydrant, alarm system, smoke detector and automatic firefighting pump for the fire protection.
4) Forklift, Hand Pallet, trolley, cargo lift are used for chemical handling

### 6.2.6 Safe Work Procedures (SWP) and Personal Protective Equipment (PPE)

The Head of Sections and Supervisors (Person In-charge) are responsible to develop and maintain the SWP such as to follow the existing emergency response plan, evacuation plan, etc, but employees executing the works are to report for any work deficiency in the SWP for continuous improvement purposes. It includes the safety and health precautions which are to be taken during the course of work, and the use of personal protective appliances.

The primary objective of using PPE is to protect the employees against the entry of hazardous chemicals into the body through inhalation or through skin contact. It is supplementary to engineering control measures. PPE should be selected appropriate to the hazardous nature of the chemical operation, and should be properly used and maintained. Inappropriate PPE, or PPE improperly used or maintained may do more harm than good.

Rohto's Management are responsible for ensuring their employees are provided with appropriate PPE and received appropriate training in the use, maintenance and replacement of the PPE.

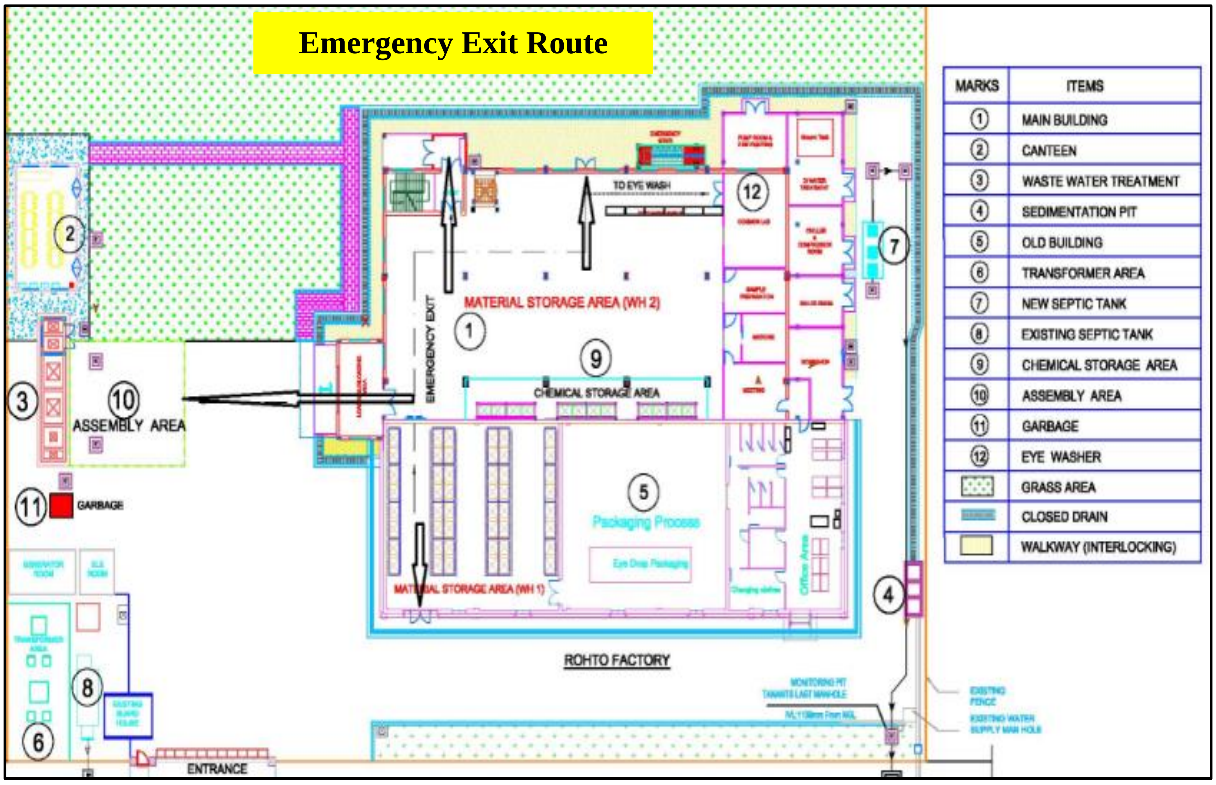



Figure 6.2 Emergency Route Map

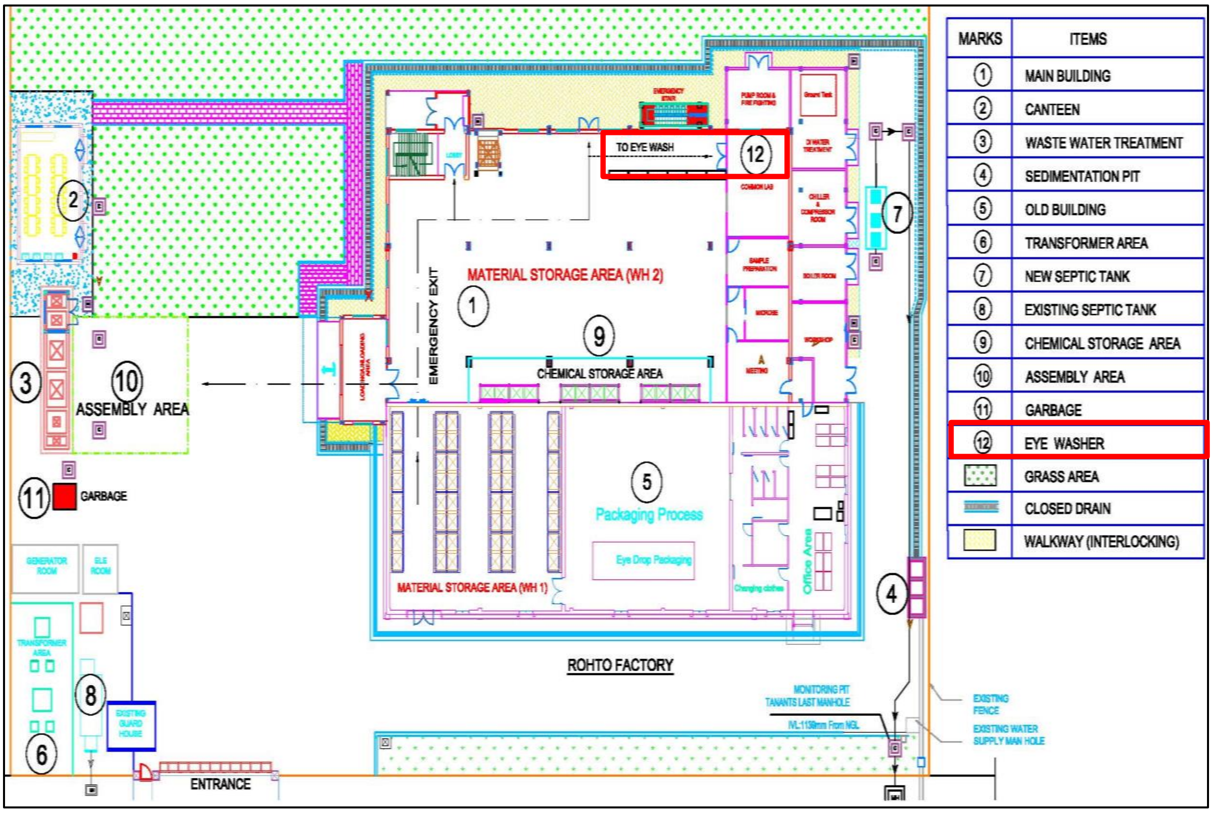



Figure 6.3 Location of Eye Washer, Chemical Spill Kit

## 5.3 Adverse Impacts and Mitigation Measures

According to the production process steps such as Mixing, compounding, granulation, formulation and filling, the following are the impacts may be caused.

(a) Impact on Air Quality,

(b) Impact of Noise,

(c) Impact on Water Quality,

(d) Impact on Land Contamination

(e) Impact of Waste Disposal

(f) Impact of Transporation, Storage, Handling, Utlizing and Disposal System of Chemicals

(g) Impact of Occupational Health and Safety

(h) Impact of Communities Health and Safety

(i) Energy Consumption

(j) Water Consumption

(k) Emergency Risk

All of the impacts during operation phase are not affected directly to local communities.

Moreover, closing activites such as wall and floor destroying, steel structure take off, take off material transport and the equipment will be in modular form which will be

assembled on-site with the help of cranes and special trucks. The following are the impacts may be caused.

(a) Impact on Air Quality,
(b) Impact of Noise,
(c) Impact on Water Quality,
(d) Impact on Land Contamination
(e) Impact of Waste Disposal
(f) Impact of Occupational Health and Safety
(g) Impact of Communities Health and Safety
(h) Emergency Risk

Table 6.5 Summary of Adverse Environmental Impacts and Mitigation Measures for Operation Phase

| Impacts | Sources | Components | Impact Significant (D+S+M)xP=S | Mitigation Measures | Residual Impact (D+S+M)xP=S |
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| **Operation Phase** | | | | | |
| Impacts on Air Quality | Manufacturing process | VOC, PM | (4+1+6)x5 = 55 (Moderate) | **Mitigation Measures for Emission from Manufacturing Process**<br>To reduce odor and volatile emissions to prevent environmental nuisance:<br>• Maintain adequate ventilation and hygiene to reduce the generation of odor.<br>• Control any exhaust emissions from vehicles to prevent objectionable odors / fumes off-site.<br>• Maintain good housekeeping and cleaning practices.<br>• Use mechanical ventilation systems and activated carbon filters or scrubbers to prevent the release of any uncontrolled and objectionable odors from buildings or rooms.<br>• Volatile liquids (solvents or oil) must be stored in a covered container and kept cool to prevent evaporation into the environment.<br>• Regularly maintain any emission control equipment such as bag filter as per manufacturers' instructions.<br>• Immediately replace or repair any emission control equipment that is blocked, frayed, leaking or not functioning within specifications. Spare bags and filters must be kept on-site.<br>To maintain dust emission<br>• Control dust generation so that particles do not move off- | (4+2+2)x2 = 14 (Negligible) |
| | Auxiliary Diesel Engine, Boiler and Vehicles | CO, $CO_2$, $SO_2$, $NO_x$, PM | (1+2+2)x5 = 25 (Low) | | (1+1+2)x2 = 8 (Negligible) |
| | Wastewater Treatment Plant | VOC, Odor | (4+1+6)x4 = 44 (Moderate) | | (4+1+2)x2 = 14 (Negligible) |
| | Fugutive Source (Storage Area and Cleaning Proccess) | VOC, Odor and PM | (4+1+6)x5 = 55 (Moderate) | | (4+1+2)x2 = 14 (Negligible) |

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| | | | | site. Dusts may also contain hazardous materials and contaminate air, soil and waters.<br>• Immediately clean up material spilt on traffic areas before vehicle movement can move it.<br>• Regularly collect and place in a sealed bag any floor sweepings (including spectator areas), dust, powder waste or absorbent clean up materials, before disposing in a covered waste bin.<br>• Use wet/dry vacuum cleaners with dust filters for general cleaning of the factory floors instead of sweeping and hosing with water.<br>• To minimize dust emissions and potential contaminants from exposed surfaces<br>**Mitigation Measures for Emission from Auxiliary Diesel Generator, Boiler and Vehicles**<br>• Regular check and maintenance the D.G, boiler & Vehicles and use premium grade diesel to reduce the gas pollution.<br>• And D.G is only used for temporary electricity back such as the emergency lighting, fire pump running and CCTV if the electricity temporary off.<br>• Boiler will be regularly meintenacne and checking and testing the gases emission.<br>• Boiler should be equipped gases control equipement such as water sprinklier.<br>**Mitigation Measures for Emission from Wastewater Treatment Plant**<br>• Operate the wastewater treatment plant to meet applicable national requirements and internationally accepted guidelines; | |

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| | | | | • Where necessary, consider alternate aeration technologies or process configurations to reduce volatilization.<br>• The design and operation of the selected wastewater treatment technologies should avoid uncontrolled air emissions of volatile chemicals from wastewaters.<br>**Control System for Fugitive Emission of the Project**<br>• Storage of all solvents / liquid chemicals/ oil/ fuel will be in drums only Hence storage area will not be a source of fugitive emission.<br>• Fugitive emission due to traffic movement will be controlled by providing paved internal roads, regular cleaning of internal roads, proper maintenance of vehicles, etc. | |
| Impact of Noise Level | Manufacturing process | Noise level, dB (A) | (4+2+2)x5 = 40 (Moderate) | • A high standard of maintenance will be practiced for plant machinery and equipment, which helps to avert potential noise problems.<br>• All preventive measures such as regular operation and maintenance of pumps, motors, and compressor should be carried out and enclosures will be provided to abate noise levels at source.<br>• Compliance with noise control norms will be given due importance at the time of purchase of various equipment and it will be mentioned while placing the purchase orders and guarantee for noise standards will be sought from suppliers.<br>• Toconstruct sound proof wall for boiler room<br>• All the noise generating equipment will be designed / operated to ensure that noise level does not exceed 70 dB (A) at plant boundary as per the requirement of NEQG Standard. | (4+1+2)x2 = 14 (Negligible) |
| | Auxiliary Diesel Engine and Boiler | Noise level, dB (A) | (1+2+6)x5 = 45 (Moderate) | | (1+2+2)x4 = 20 (Low) |

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| | | | | • Noise monitoring will be done on yearly basis to evaluate the noise level in premises and near the equipment.<br>• And D.G is used the emergency fire pump running and CCTV if the electricity temporary off.<br>• And then monitoring must carry out with NEQG standard. | |
| Impacts on Water Quality | Storm Water | TSS, metals, petroleum hydrocarbons, Polycyclic Aromatic Hydrocarbons, coliform, etc. | (4+2+6)x5 = 60 (Moderate) | • An appropriate water management system is used, including, for example, sustainable drainage systems for receiving site runoff to reduce the impact of runoff on nearby water courses of retaining cannel;<br>• Hazardous or potentially polluting materials (such as fuel, oil or chemicals used or produced by the process) are sited on an impervious base away from water, properly bundled and kept locked when unattended;<br>• Separate containment and drainage provided for site runoff, loading/unloading and processing areas (the latter in particular may need specialized treatment before release);<br>• Oil interceptors or drip trays are used in vehicle parking areas, and are inspected and cleaned regularly;<br>• A risk assessment is carried out for each substance to be used, produced or stored on site, and the appropriate containment measures installed; and<br>• An Emergency Plan is formulated and tested through exercises to ensure that procedures to prevent or mitigate impacts due to accidents or spillages are in place and operate effectively.<br>• Where storm water treatment is deemed necessary to protect the quality of receiving water bodies, priority should be given to managing and treating the first flush of storm water runoff where the majority of potential | (1+1+6)x2 =16 (Negligible) |
| | Industrial Wastewater | BOD, COD, TDS, TSS, Oil and Grease | (4+2+6)x5 = 60 (Moderate) | | (1+1+6)x2 =16 (Negligible) |
| | Sewage Water | Ground and Surface Water | (4+2+6)x12 = 24 (Low) | | (1+1+6)x1 =8 (Negligible) |

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| | | | | contaminants tend to be present;<br>• When water quality criteria allow, storm water should be managed as a resource for meeting water needs at the facility;<br>• Sludge from storm water catchments or collection and treatment systems may contain elevated levels of pollutants and should be disposed in compliance with ECD or zone management committee's regulatory requirements, in the absence of which disposal has to be consistent with protection of public health and safety, and conservation and long-term sustainability of water and land resources.<br>• And then monitoring must carry out with NEQG standard. | |
| Impact of Land Contamination | Manufacturing process | Soil and ground water pollution | (3+2+6)x2 = 26 (Low) | Contamination of land should be avoided by preventing or controlling the release of hazardous materials, hazardous wastes, or oil to the environment.<br>• appropriate designs for buildings/structures on site;<br>• appropriate screening for visual impacts;<br>• effective stabilization of altered landforms so as to minimize soil erosion and the potential for water pollution from suspended solids;<br>• adequate bunding or containment measures are installed throughout the site, particularly in chemical storage and transfer areas, to minimize risk of soil contamination;<br>• use of drip trays under stationary machinery to prevent oil and grease contaminating soil and groundwater<br>Concrete flooring will be over laid with epoxy flooring which is a non-porous self-leveling material which will prevent any spillage from penetrating the floor surface. Factory had covered concrete floor. | (1+1+2)x2 = 8 (Negligible) |
| | Storage areas | Soil and ground water pollution | (3+2+6)x2 = 26 (Low) | | (1+1+2)x2 = 8 (Negligible) |

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| Impacts of Waste Disposal | Hazardous Wastes | Water and soil pollution | (4+2+6)x5 = 60 (Moderate) | ***Collection***<br>Hazardous wastes or non-hazardous waste are collected by using about 200 Lit Mild Steel Bins which are arrange with different color for the different type of wastes collection.<br>***Storage***<br>Above stated solid wastes will be stored separately in the "Solid Waste Storage Area" within the factory premises. All wastes, hazardous or not, must be contained to prevent it from blowing away and from leaching into surface or groundwater.<br>- **On-Site Hazardous Waste Storage**<br>Hazardous waste must be in containers or tanks clearly labeled with the words "Hazardous Waste". Volumes and time limits for storing hazardous waste on-site vary by generator category.<br>- **On-Site Nonhazardous Waste Storage**<br>Non-hazardous waste needs to be removed from on-site at regular intervals to prevent release to the environment, and to avoid additional permit requirements. Nonhazardous waste and unused product must be contained to prevent discharge to the air, or runoff to surrounding land or water.<br>***Disposal***<br>Hazardous waste will be handed over to agencies authorized by ECD or Zone Mangemnt Team monthly such as DOWA/ YCDC. Nonhazardous waste will be handed over to solid waste collection agencies authorized by ECD or Zone Mangemnt Team monthly such as YCDC. | (1+1+2)x4 = 16 (Negligible) |
| | Non-Hazardous Wastes | Water and soil pollution | (4+2+6)x5 = 60 (Moderate) | | (1+1+2)x4 = 16 (Negligible) |
| | Domestic Wastes | Water and soil pollution | (4+2+6)x5 = 60 (Moderate) | | (1+1+2)x4 = 16 (Negligible) |

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| Impact of Chemicals Transportation, Storage, Using, Handling and Disposing | Transportation | Spillage and explosion | (3+3+2)x2 = 16 (Negligible) | • Hazardous chemicals must be stored and transported carefully according to specific regulatory requirements covered by transport legislation, and work health and safety (WHS) legislation.<br>• avoid transporting with food, water or other reactive chemicals<br>• follow the separation and segregation rules for transporting mixed classes of hazardous chemicals (those classified as dangerous goods)<br>• secure hazardous chemicals on the vehicle so they can't move or fall<br>• keep a record of the chemicals you are carrying<br>• separate foodstuffs from chemicals<br>• make sure you have the required signs and equipment for the vehicle<br>• make sure the driver of the vehicle has the correct license and is trained in emergency procedures<br>• To carry the chemicals with authorized cargo company and to follow the transportation instruction stated in MSDS.<br>• To take care of loading and unloading.<br>• Provide the Personal Protective Equipment (PPE) such as glass, gloves and carbon filter mask for chemicals handling workers and production workers and also provide training and other awareness programs.<br>• Install the adequate ventilation systems.<br>• Install dust collector with activated carbon systems | (1+3+2)x2 = 12 (Negligible) |
| | Manufacturing process | OHS for Handling and Using, VOC, PM | (5+1+8)x4 = 56 (Moderate) | | (3+1+2)x4 = 24 (Low) |
| | Storage Area | OHS for Handling, VOC, PM, Soil contamination, explosion | (5+1+8)x4 = 56 (Moderate) | | (3+1+2)x4 = 24 (Low) |
| | Disposal | Soil contamination, VOC, PM | (5+1+8)x4 = 56 (Moderate) | | (3+1+6)x4 = 40 (Moderate) |

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| | | | | • Factory coated concrete floor to protect leakage and spillage all around the Factory Area.<br>• Installed effective own WWTP<br>• Need permit from authorized committee to storage or transport chemicals by air, sea, inland waterways, road or rail.<br>• Store raw materials separately according to explosion hazardous (EH) level and install effective firefighting system such as overheard automatic water sprinkler, smoke detector and self standalone type fire extinguisher with powder or foam.<br>• Observe according to the material safety data sheet (MSDS). | |
| Impact on Occupational Health and Safety | Manufacturing process & storage | Occupational Health and Safety | (5+1+8)x4 = 56 (Moderate) | **Materials handling**<br>• Precautions include engineering/ergonomic controls such as materials handling aids (rollers, jacks and platforms) and mechanical equipment (conveyors, hoists and fork-lift trucks), non-skid floors, personal protective equipment (PPE) such as safety shoes and proper training in manual lifting and other materials handling techniques.<br>**Chemical hazards**<br>• Install effective exhaust ventilation to prevent air contamination<br>• Install effective exhaust ventilation to prevent air contamination; if necessary, use respiratory protection.<br>• Protect the skin of the hands (with chemical-resistant gloves) when contact with solvents and chemicals; use soaps for cleaning the skin of the hands, at the end of the | (3+1+6) x2 = 20 (Low) |
| | In the lacquer preparation | Exposure to high temp. & heat-stress | (5+1+8)x4 = 56 (Moderate) | | (3+1+6) x2 = 20 (Low) |
| | Grinding and mixing, | Chemicals | (5+1+8)x4 = 56 (Moderate) | | (3+1+6) x2 = 20 (Low) |
| | Solvent storage and handling | Fire | (5+1+8)x4 = 56 (Moderate) | | (3+1+6) x2 = 20 (Low) |
| | Pigments /dyes storage area | Dust Explosion | (5+1+8)x4 = 56 (Moderate) | | (3+1+6) x2 = 20 (Low) |

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| | | | | work.<br>• Get medical aid if skin rashes develop; consult an allergy specialist on how to deal with sensitivity to solvents, chemicals, etc.<br>• Install eye washer at every nearest chemical using area and first aid room.<br>• Install effective firefighting equipment such as extinguisher, alarm system, hose wheel and hydrant at everywhere, pump house and fire alarm control panel.<br>**Physical Agents**<br>• Precautions include vibration isolators and other engineering controls, replacing noisy equipment, good equipment maintenance, isolation of noise source and a hearing conservation program where excessive noise is present.<br>**Accident**<br>• First aid equipment should be available at the site. A number of the permanent personnel on the site should have the skills necessary to use the equipment.<br>• Factory has separately arranged walking way and production area with yellow line. | |
| Impact on Community Health and Safety | Manufacturing process | Community Health and Safety | (3+1+6)x1 = 10 (Negligible) | Traffic safety should be promoted by all project personnel during displacement to and from the workplace, and during operation of project equipment on private or public roads. The following measures must implement to- | (1+1+2)x1 = 4 (Negligible) |

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| | Transportation vehicle | Community Health and Safety | (3+3+6)x2 = 24 (Low) | • Emphasize the safety aspects among drivers;<br>• Improve the driving skills and requiring licensing of drivers;<br>• Adopt the limits for trip duration and arranging driver rosters to avoid overtiredness;<br>• Avoid dangerous routes and times of day to reduce the risk of accidents;<br>• Use the speed control devices (governors) on trucks, and remote monitoring of driver actions. (if possible and needed)<br>• To carry the chemicals with authorized cargo company and to follow the transportation instruction stated in MSDS. | (1+3+2)x2 = 12 (Negligible) |
| Impact of Energy Consumption | Manufacturing Process | High electricity consumption | (4+3+6)x5 = 65 (High) | ***Conservation of Electricity***<br>There are several methods that can be employed to help conserve electricity and these include:<br>• Install energy and water meters to measure and control consumption throughout the facility;<br>• Implementing good housekeeping measures such as turning off equipment and lights when not in use;<br>• Use LED lights and/ or lower wattage lamps;<br>• Using more efficient equipment when replacing old equipment (such as motors and heating units);<br>• Installation of inverter<br>• Installation of timers and thermostats to control heating and cooling; and<br>• Preventative maintenance of operational processes and pipes so as to improve efficiency and minimize losses. | (4+2+6)x2 = 24 (Low) |
| | D.G Set | Diesel fuel consumption | (4+3+2)x5 = 45 (Moderate) | | (4+2+2)x2 = 16 (Negligible) |

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| | | | | ***Minimizing Diesel Fuel Consumption***<br>Minimizing of diesel fuel consumption can also reduce the emission of gases, solid waste and as well as operation cost. Diesel fuel consumption can be reduced by the use of high efficiency diesel generator sets. | |
| Impact of Water Consumption | Manufacturing Process | High water consumption | (4+3+2)x4 = 36 (Moderate) | ***Reducing Process Water Used***<br>The several production modifications that may be employed to reduce water consumption are as follows.<br>• allow the storage level of recovered water tanks to fluctuate, thereby using storage capacity and maintaining full tanks may be lead to overflow and waste;<br>• recover water from process stages and reuse where possible;<br>• installation, monitoring and control of water meters at various sections of the operation;<br>• stopping water flow during breaks;<br>• installation of flow control valves and an automatic valve to interrupt the water supply when there is production stoppage;<br>• All staff should be trained and made aware of water conservation practices, and a management system implemented to continue to review and improve water consumption.<br>***Reducing Clean in Place (CIP) Water Used***<br>Washing of equipment is a significant use of water. Methods for optimizing CIP may include:<br>• use a closed system for cleaning operations;<br>• use low-volume high-pressure washers, or use equipment | (3+2+2)x4 = 28 (Low) |
| | Drinking and other | High water consumption | (4+3+2)x2 = 18 (Negligible) | | (1+2+2)x2 = 10 (Negligible) |

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| | | | | for mixing water jet and a compressed air stream which will reduce water consumption by 50-75% when compared to a low-pressure system;<br>• controlling the rinsing water flow, which is often higher than specified or may vary due to pressure fluctuations in the water supply system;<br>• Optimize cleaning-in-place (CIP) plants and procedures to avoid unnecessary losses of water and cleaning chemicals (e.g. by saving water from the last rinse for use as the first rinsing water in the next CIP cycle). | |
| Emergency Risk | Plant Site | Flood Risk | (1+2+2) x1 = 5 (Negligible) | • Regular training and exercises for all staff regarding firefighting and other emergency response.<br>• The propose project is designed in compliance with relevant rules and regulations for emergency risk of fire. And then, emergency exits, fire hydrants and extinguisher boxes in a certain distance are considered in design of those facilities.<br>• To check firefighting equipment regularly.<br>• To prevent major accidents related to the fires and explosions at the facility, Fire Safety Master Plan identifying major fire risks, applicable codes, standards and regulations, and mitigation measures should be prepared by a suitably qualified professional. This Master Plan should include fire prevention, detection and alarm systems, compartment plan, fire suppression and control, emergency response plan, and operation and maintenance plan. | (1+1+2) x1 = 4 (Negligible) |
| | | Fire Risk | (1+2+6) x4= 36 (Low) | | (1+2+2) x2 = 8 (Negligible) |
| | | Earthquake Risk | (1+2+2) x1 = 5 (Negligible) | | (1+1+2) x1 = 4 (Negligible) |

Table 6.6 Summary of Adverse Environmental Impacts and Mitigation Measures for Closing Phase

| Impacts | Sources | Components | Impact Significant (D+S+M)xP=S | Mitigation Measures | Residual Impact (D+S+M)xP=S |
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| **Closing Stage** | | | | | |
| Impacts on Air Quality | Plant site | TSP, PM | (1+1+6)x5 = 40 (Moderate) | **Generation of Dust (TSP & PM)**<br>The following dust control measures are recommended during the construction phase of the project:<br>***Site Boundary and Entrance***<br>• Vehicle washing facilities including a high pressure water jet shall be provided at every discernible or designated vehicle exit point; and<br>• The area at which vehicle washing takes place and the section of the road between the washing facilities and the exit point shall be paved with concrete, bituminous or hard core material.<br>***Loading, unloading or transfer of dusty materials***<br>• All dusty materials should be sprayed with water immediately prior to any loading or transfer operation so as to maintain the dusty material wetting.<br>***Debris Handling***<br>• Any debris should be covered entirely by impervious sheeting or stored in a debris collection area sheltered on the top and the three sides.<br>• Before debris is dumped into a truck, water should be sprayed so that it remains wet when it is dumped.<br>***Site Clearance***<br>• All demolished items shall be covered by impervious sheeting or placed in an area sheltered on the top and the | (1+1+6)x4 = 32 (Low) |

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| | | | | three sides within a day of demolition. | |
| | Vehicles, heavy machine and diesel generator running | $NO_x$, $SO_2$, CO, $CO_2$, PM | (1+1+2)x5 = 20 (Low) | **Generation of Gases and Particulates**<br>***Vehicles and D.G Set Running***<br>• All vehicles have their engines turned off while parked on the site or unnecessary conditions.<br>• Regularly check and well-maintained the engine of vehicles and other machines.<br>• Use fuel oil with low sulfur content. | (1+1+2)x2 = 8 (Negligible) |
| Impacts of Noise | Closing activities such as wall and floor destroying | Noise | (1+2+6)x5 = 45 (Moderate) | ***Mitigation at Working Time***<br>(4) Limiting site construction activities/ closing activities to the working hours (7:00 am to 4:00 pm) and noisy activities to morning hours (8:00 am to 12:00 am).<br>(5) Whenever feasible, schedule different noisy activities (e.g., blasting and earthmoving) to occur at the same time, since additional sources of noise generally do not add a significant amount of noise.<br>***(6)*** Avoid nighttime activities.<br>***Mitigation at the Source***<br>(4) Usage of quiet, properly maintained equipment or machinery in good condition.<br>(5) All noisy machines and equipment should be fitted with noise muffler or silencers.<br>(6) Sensitization of truck drivers to switch off vehicle engines while offloading materials avoid running of vehicle engines or hooting especially.<br>***Mitigation along the Path***<br>(3) Install temporary noise barrier - a 2 m high temporary wall or pile of excavated material between noisy activities | (1+2+6)x4 = 36 (Low) |
| | Vehicles Movements, heavy machine and diesel generator running | Noise | (1+2+2)x5 = 25 (Low) | | (1+2+2)x4 = 20 (Low) |

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| | | | | and noise-sensitive receivers during construction work.<br>(4) Provide adequate PPE such as ear muffs, ear plugs etc. to workers at all activities/ locations. | |
| Impact of Vibration | Closing activities such as wall, floor destroying, heavy machine and diesel generator running | Vibration | (1+1+2)x5 = 20 (Low) | ***Mitigation at Design Consideration***<br>(3) Route heavily loaded trucks away from residential streets, if possible. Select streets with fewest homes, if no alternatives are available.<br>(4) Operate earthmoving equipment on the construction/ closing lot as far away from vibration-sensitive sites as possible.<br>***Mitigation at Operation Sequences***<br>(3) Earthmoving and ground-impacting operations so as not to occur in the same time period. Unlike noise, the total vibration level produced could be significantly less when each vibration source operates separately.<br>(4) Avoid nighttime activities. People are more aware of vibration in their homes during the nighttime hours.<br>***Mitigation by using Alternative Methods***<br>(3) Avoid impact pile driving where possible in vibration-sensitive areas. Drilled piles or the use of a sonic or vibratory pile driver causes vibration levels where the geological conditions permit their use.<br>(4) Avoid vibratory rollers and packers near sensitive areas. | (1+1+2)x4 = 16 (Negligible) |
| Impacts on Surface Water Quality | Wastewater dispose from Closing work Temporary Septic Tank, Chemical and | suspended sediments, metals, petroleum hydrocarbons, Polycyclic | (1+2+6)x5 = 45 (Moderate) | Muddy water that is generated as a result of closing activities will be managed through site contractor. As a part of the contract it will be mandatory for the contractor to ensure that any dewatering/ discharge or other activity that has the potential to impact storm water is approved prior to commencement of closing activities. It will be ensured that | (1+2+2)x4 = 20 (Low) |

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| | Oil/Lubricant storage area due to leakage and spillage | Aromatic Hydrocarbons, coliform, etc. | | dewatering/ discharges will be collected, as possible, and utilized for dust suppression to reduce the need for other water.<br>The contractor must ensure potential pollutant sources including material stockpiles, oil or chemical loading/ unloading and storage areas, fuelling tanks, and equipment maintenance, washing and storage areas are properly managed to prevent discharge into the storm water system. Stockpiles must be protected by use of silt fencing, covers, or other appropriate containment to prevent the migration of sediment into the storm water system.<br>Oil and chemical storage, as well as fuel tanks, must be properly contained to prevent the migration of contaminants into the storm water. Equipment will be routinely inspected for leaks and any spills shall be properly cleaned so as not to impact the storm water. Any unplanned discharge events or spills must be reported according to the monitoring plan and the contractor will do the cleanup, disposal and notification events.<br>Discharging sanitary waste to the ground is prohibited, and therefore suitable facilities or portable toilets will be provided. | |
| Impact on Contamination of Soil and Ground Water | Wastewater dispose from closing work, Temporary Septic Tank, Chemical and | Soil | (1+2+6)x5 = 45 (Moderate) | Maintain all vehicles and machinery to prevent spill of fuel oil and hydraulic oil. Avoid washing down oil spill with water because this will only help percolate oil underground. Soak oil spill and then dispose the soak at approved disposal site. Pave vehicles and cranes parks and | (1+2+2)x4 = 20 (Low) |

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| | Oil/Lubricant storage area due to leakage and spillage Closing Activities | Ground water | (1+2+2)x5 = 20 (Low) | collect run off; bund the fuel depot to prevent spreading of spilled oil.<br>For disposal of domestic wastewater construct a small septic tank together with soak pit to collect the sewage. | (1+2+2)x2 = 10 (Negligible) |
| Impact of Waste Disposal | Temporary Septic Tank, Waste Disposal Yard, Waste such as trim waste, plastic bags | Waste disposal | (1+2+6)x5 = 45 (Moderate) | All unused or surplus building materials can be sold to other who needs it. The large majority of debris can be also put up for sale since most can be reused or recovered. Even left over broken bricks, gravel, sand etc. can be sold and then structure steel frame and roof material from closing work. Avoid open burning of debris. Discipline workers for good house-keeping practice; demand the building contractor to do this and ask him to take responsibility for the conducts of his construction workers.<br>Best practices for waste disposal are to store the waste in the designated area, to strict the schedule of disposing solid waste, to use the solid waste in the land level adjustments in the landfill area, to provide the facilities for proper handling and storage of construction materials, and to use the durable, long-lasting materials that will not need to be replaced as often, to purchase of perishable construction materials such as paints incrementally, to use the building materials that have minimal packaging and also to use the materials containing recycled content. And then, contractor must do the following activities<br>• Waste stored in designated area.<br>• Strict schedule of disposing the water.<br>• Can be used in the land level adjustments in the landfill area.<br>• All wastes must disposed belong to ECD or Zone Mangmement Committee's regulation. | (1+2+6)x2 =18 (Moderate) |

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| | | | | The construction contractor has been carries out solid waste collecting at every morning 8:30 to 10:00 and temporary disposed designed area. Finally, temporary stored wastes are disposed to Yangon city development committee every week. | |
| Impact on Occupational Health and Safety | Closing activities such as wall and floor destroying, material cutting, Heavy machine running, Chemical handling | Occupational Health and Safety, Accident | (1+1+8)x4 = 40 (Moderate) | ***Air Pollution Affect***<br>• Providing the PPE<br>• Water spraying, to reduce speed of vehicles and machines running for the reducing the particulates matters<br>• Air Quality measuring<br>• Regular maintenance of vehicles and machines<br>***Nosie and Vibration Affect***<br>• Providing the PPE<br>• Providing the shift working system for worker working near the noisy<br>• Noise and Vibration measuring<br>• Regular maintenance of vehicles and machines<br>• D.G set will be placed with the Sound proof wall<br>• Vibrated machines will be placed with solid concrete foundation.<br>***Protection the Working Area Accident***<br>• Providing the First Aid, medicines and training<br>• Providing the PPE and Giving the PPE using training<br>• Assigning the Safety Officer who systematically implement OHS plan to protect the OHS for workers.<br>• Providing the emergency contact phone number<br>• Designation the speed limit for vehicles and machines<br>• Installing the eyes washer for contacting the hazardous materials.<br>• Providing the safety sign and give training for the | (1+1+6)x2 = 16 (Negligible) |

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|---|---|---|---|---|---|
| | | | | worker for understanding this sign purposes.<br>***Protecting infectious Diseases***<br>• Systematically cleaning for Toilets and septic tanks and regular disposing to City Development Committee<br>• Systematically disposing the food waste at designated area, designated waste disposal yard, covering the waste bin and regularly disposing City Development Committee<br>• Providing the dinning area and give instruction to eat the designated area<br>• Providing the medical check-up and appropriate medicals for worker to protect infectious diseases | |
| Impact on Community Health and Safety | Decommission material transport vehicles come and go | Community Health and Safety, Accident | (1+3+6)x4 = 40 (Moderate) | ***Air Pollution Affect***<br>• Water spraying the project site<br>• Raw material transportation is systematically covering,<br>• Water spraying the vehicles wheel before leave from the project site<br>• Regular maintenance of vehicles and machines<br>***Noise and Vibration Affect***<br>• Avoiding the noisy work activities at night time<br>• Noise and Vibration measuring<br>• Regular maintenance of vehicles and machines<br>• D.G set will be placed with the Sound proof wall<br>• Vibrated machines will be placed with solid concrete foundation.<br>***Protection the Working Area Acident***<br>• Providing the First Aid, medicines and training at nearest local residents.<br>• Providing the emergency contact phone number at | (1+3+2)x2 = 12 (Negligible) |

| | | | | | |
|---|---|---|---|---|---|
| | | | | nearest local residents.<br>• Designation the speed limit for vehicles and machines<br>• Inspection the driver license have or not and drivers are driving the car types according to their licenses types.<br>• Avoiding transportation of construction and closing materials at the traffic peak hours and school starting and ending times.<br>***Protecting infectious Diseases***<br>• Systematically cleaning for Toilets and septic tanks and regular disposing to City Development Committee<br>• Avoiding the waste disposal at nearest villages waste disposal yard and regularly disposing City Development Committee<br>• Providing the dinning area and give instruction to eat the designated area<br>• Providing the medical check-up and appropriate medicals for worker to protect infectious diseases | |
| Emergency Risk | Closings site | Flood Risk | (1+2+2)x1 = 5 (Negligible) | • Regular training and exercises for site staff regarding firefighting and other emergency response.<br>• The propose project is designed in compliance with relevant rules and regulations for emergency risk of fire. And then, emergency exits, fire hydrants and extinguisher boxes in a certain distance are considered in design of those facilities.<br>• To check firefighting equipment daily. | (1+1+2)x1 =4 (Negligible) |
| | | Fire Risk | (1+2+6)x2 = 18 (Negligible) | | (1+1+2)x2 = 4 (Negligible) |
| | | Earthquake Risk | (1+2+2)x1 = 5 (Negligible) | | (1+1+2)x1 =4 (Negligible) |

### 6.2.7 Waste Disposal

- All Managers/Department Head/Supervisors shall be responsible for ensuring that all hazardous substances are disposed in an appropriate manner as required by regulations and the SDS.
- Improper handling of waste may cause pollution an endanger the safety and health of the workers.
- Work practices and procedures shall comply with local regulations or EMP report for the disposal of solid, liquid and/or gas wastes.
- Documentation must be maintained for waste collection, storage, recycling /disposal and frequency in each of the waste categories identified, if available.
- All employees will be provided with suitable PPE that will adequately control exposure to injury or harm from waste material.
- The hazardous waste that generate from operation shall be governed by a hazardous waste management system. This includes:
- proper labeling of waste according to the national codes,
- proper waste
- storage and treatment facilities,
- proper waste transport
- disposal facilities by licensed or toxic waste collectors, and
- proper emergency action plan to deal with any accidental release of hazardous waste.

### 6.2.8 Training

Employees undergo an internal SDS training and seven waste training. Due to the nature of the business, Best Management Practices (BMP) structures are in constant need of repair, replacement, inspection and cleanup. Employees must be aware of the purpose of BMP procedures or structures and how they should be implemented or maintained. To have educated and trained employees who are familiar with BMPs for the facility and understand the purpose of BMPs and prevention of pollution.

- Management should provide all employees with regularly scheduled Best Management Practices seminars and discussions relating to pollutants and pollution prevention.
- The training should emphasize procedures, BMP techniques and supervisory responsibility and accountability.
- Subcontracting firms should be strongly encouraged to participate in the BMP training program.
- New employees should be made aware of BMPs on the first day of work and be regularly reminded of them.

| No. | Training Course | Target Group | Frequency |
|---|---|---|---|
| 1 | Basic firefighting | All employee | Annually |
| 2 | How to handle with the chemicals substances (Storage, Handing, Spill | Manager/ Supervisor/ Operator | Occasionally |

| | | | |
|---|---|---|---|
| | Control, Disposal) | | |
| 3 | Emergency case response | Manager/ Supervisor | Monthly |
| 5 | HSE for Management | Manager and HSE team | Annually |
| 6 | Related Laws and Regulations about HSE | Manager and HSE team | Annually |
| 7 | Safety knowledge about working with electrical equipment | Operator/ Supervisor | Occasionally |
| 8 | Forklift driving safety | Forklift driver/ Supervisor | Occasionally |
| 9 | Truck driver safety | Truck driver | Occasionally |
| 10 | Personal protective equipment (PPE): Type and their function | All employee | Annually |
| 11 | Fist aids | All employee | Annually |
| 12 | Technique for control zero accident in the workplace (SS, KYT, SOP) | Manager/ Supervisor/ Operator | Annually |
| 13 | Yearly evacuation training | All employee | Annually |

***SDS Training***

Employees in Rohto undergo an internal SDS training by U Naing Aye (Factory Manager). The training course includes -

- Hazardous chemical safety knowledge, control, storage and handling of chemical
- Brief explanation the information for all 16 sections included in SDS
- Explain the Chemical information (plan to use) reflected with SDS

Figure 6.4 Photo Record of SDS Training

RMM

ROHTO-MENTHOLATUM (MYANMAR) Page 1 of 2

## *TRAINING RECORD*

*Reported date:* 17/08/2020
*Reported by:* [signature]

*Lecturer:* U Maung Aye
*Sign:* [signature]

*Training date:* 14.08.2020
*Training time: From* 1:30 *To* 3:00

*Training place:* RMM-Canteen

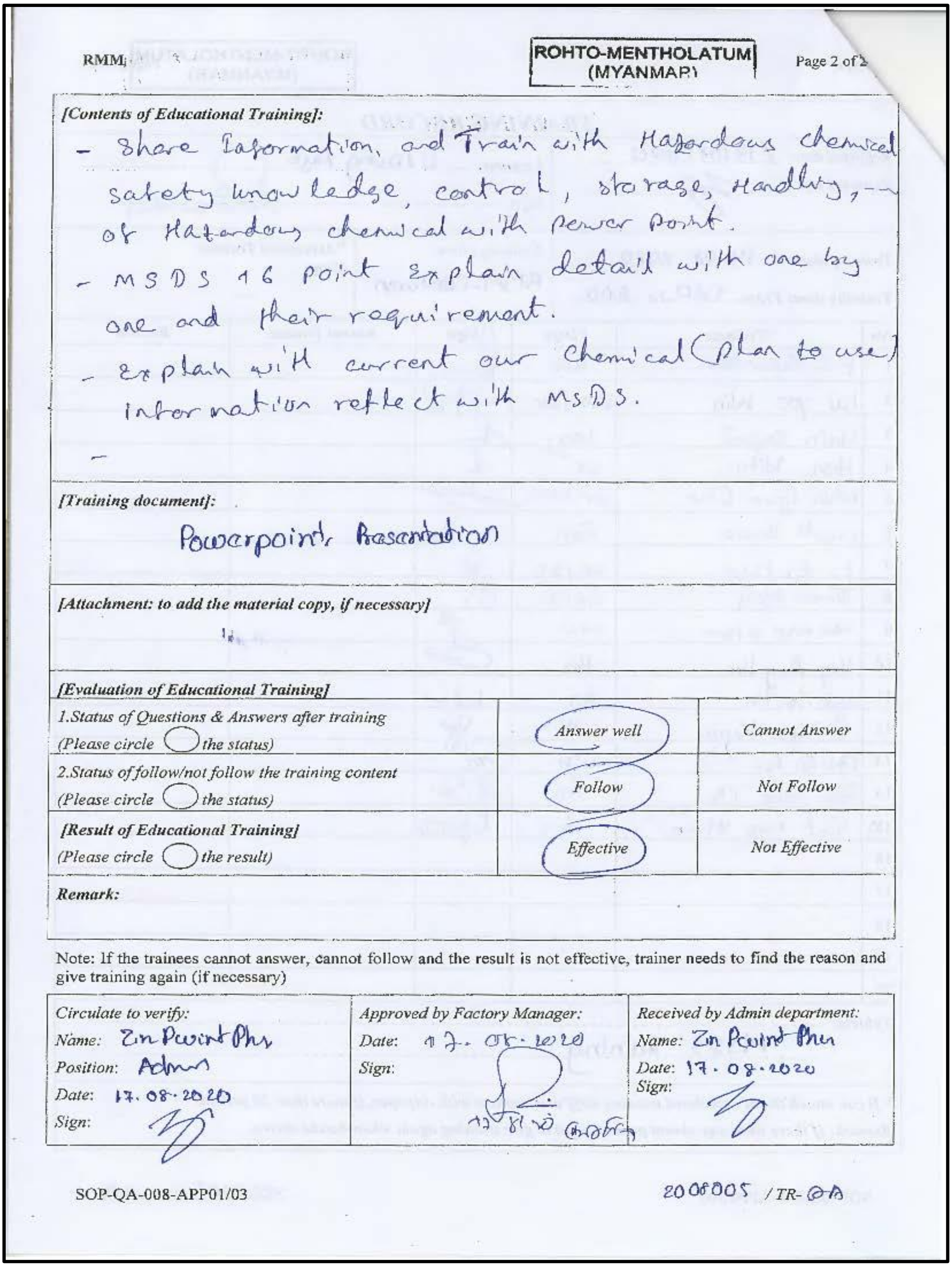
[1]*Associated Trainer:*
*Sign:* —

| *No* | [1]*Trainee:* | [1]*Dept.* | *Sign* | *Absent Trainee* | *Reason* |
|---|---|---|---|---|---|
| 1 | Ei Ei Kyaw Khin | Log: | [signature] | | |
| 2 | Lai Yee Hlin | QA/QC | [signature] | | |
| 3 | Hnin Sapal | Log: | [signature] | | |
| 4 | Hnin Witye | QC | [signature] | | |
| 5 | Khin Pyone Cho | QA/QC | [signature] | | |
| 6 | Myat Honore | Pro: | [signature] | | |
| 7 | Ei Ei Phyo | QA/QC | [signature] | | |
| 8 | Thazar Htay | QA/QC | [signature] | | |
| 9 | HLA MYO WIN | [illegible] | [signature] | | |
| 10 | May Aung Lin | Pro | [signature] | | |
| 11 | Nyein Chan Lin | Pro | [signature] | | |
| 12 | Ye Kyaw Kyaw | WH | [signature] | | |
| 13 | Phyo Ko Ko | WH | [signature] | | |
| 14 | Saw Nwe Oo | Pro: | [signature] | | |
| 15 | Thet Myo Htike | Eng | [signature] | | |
| 16 | | | | | |
| 17 | | | | | |
| 18 | | | | | |
| 19 | | | | | |
| 20 | | | | | |

*Subject:* MSDS Training

[1] *It can attach list of associated training staff and trainees with A4paper, if more than 20 person.*
*Remark: If there were any absent person, need to give training again when he/she arrive.*

SOP-QA-008-APP01/03 2008005/*TR*-QA



RMM: ROHTO-MENTHOLATUM (MYANMAR) Page 2 of 2

*[Contents of Educational Training]:*
- Share Information, and Train with Hazardous chemical safety knowledge, control, storage, Handling, of Hazardous chemical with power point.
- MSDS 16 point explain detail with one by one and their requirement.
- Explain with current our Chemical (Plan to use) information reflect with MSDS.
-

*[Training document]:*
Powerpoint Presentation

*[Attachment: to add the material copy, if necessary]*

*[Evaluation of Educational Training]*

| | | |
|---|---|---|
| 1.Status of Questions & Answers after training (Please circle ◯ the status) | Answer well (circled) | Cannot Answer |
| 2.Status of follow/not follow the training content (Please circle ◯ the status) | Follow (circled) | Not Follow |
| *[Result of Educational Training]* (Please circle ◯ the result) | Effective (circled) | Not Effective |

*Remark:*

Note: If the trainees cannot answer, cannot follow and the result is not effective, trainer needs to find the reason and give training again (if necessary)

| Circulate to verify: | Approved by Factory Manager: | Received by Admin department: |
|---|---|---|
| Name: Zin Pwint Phu | Date: 17.08.2020 | Name: Zin Pwint Phu |
| Position: Admin | Sign: | Date: 17.08.2020 |
| Date: 17.08.2020 | | Sign: |
| Sign: | | |

SOP-QA-008-APP01/03 200805 / TR-QA

Figure 6.5 SDS Training Course and Attendance List

### *Waste Training*

Employees in Rohto undergo an internal waste training by U Naing Aye (Factory Manager). The training course includes –

- Share the 7 waste (Mudra) procedures with power point.
- Share the topic with respective examples.

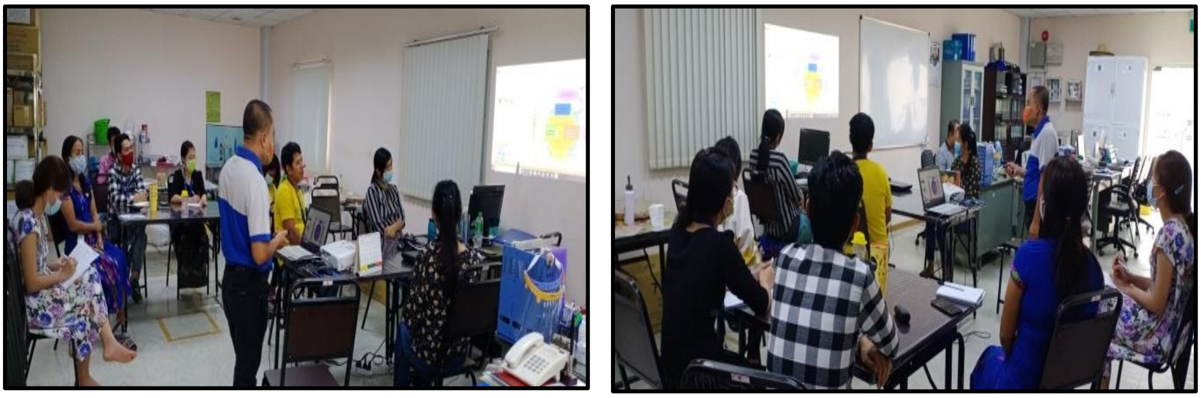
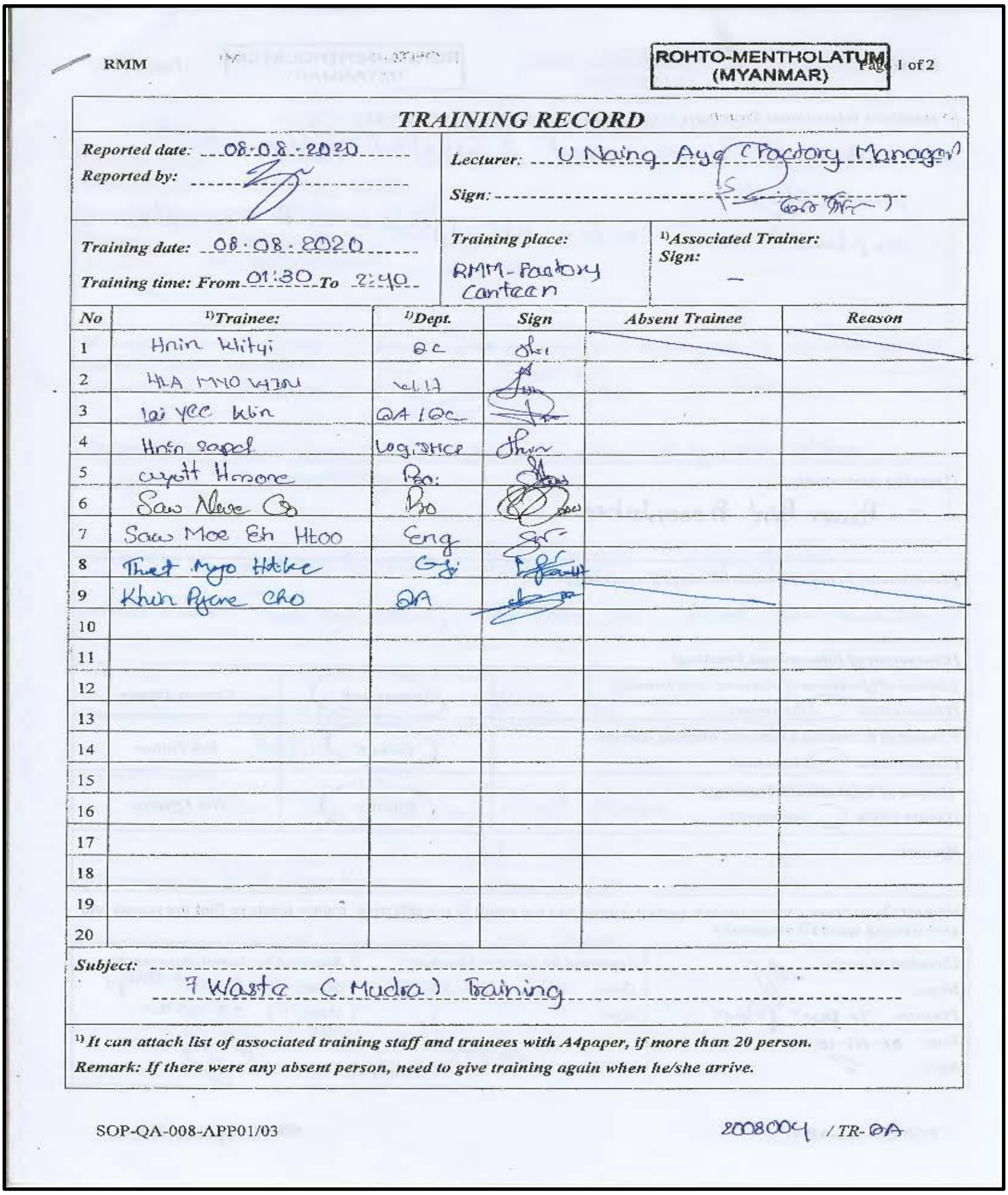


Figure 6.6 Photo Record of Seven Waste (Mudra) Training



RMM

ROHTO-MENTHOLATUM (MYANMAR)

Page 1 of 2

***TRAINING RECORD***

*Reported date:* 08.08.2020

*Reported by:*

*Lecturer:* U Naing Aye (Factory Manager)

*Sign:*

*Training date:* 08.08.2020

*Training time: From* 01:30 *To* 2:40

*Training place:* RMM-Factory Canteen

[1]*Associated Trainer:*
*Sign:* –

| *No* | [1]*Trainee:* | [1]*Dept.* | *Sign* | *Absent Trainee* | *Reason* |
|---|---|---|---|---|---|
| 1 | Hnin Khityi | QC | | | |
| 2 | HLA MYO WIN | W.H | | | |
| 3 | Lai Yee Khin | QA/QC | | | |
| 4 | Hnin Sapel | Logistice | | | |
| 5 | Myatt Hmone | Pro: | | | |
| 6 | Saw Nwe Oo | Pro | | | |
| 7 | Saw Moe Eh Htoo | Eng | | | |
| 8 | Thet Myo Htike | G.A | | | |
| 9 | Khin Pyae Cho | QA | | | |
| 10 | | | | | |
| 11 | | | | | |
| 12 | | | | | |
| 13 | | | | | |
| 14 | | | | | |
| 15 | | | | | |
| 16 | | | | | |
| 17 | | | | | |
| 18 | | | | | |
| 19 | | | | | |
| 20 | | | | | |

*Subject:* 7 Waste (Mudra) Training

[1] *It can attach list of associated training staff and trainees with A4paper, if more than 20 person.*
*Remark: If there were any absent person, need to give training again when he/she arrive.*

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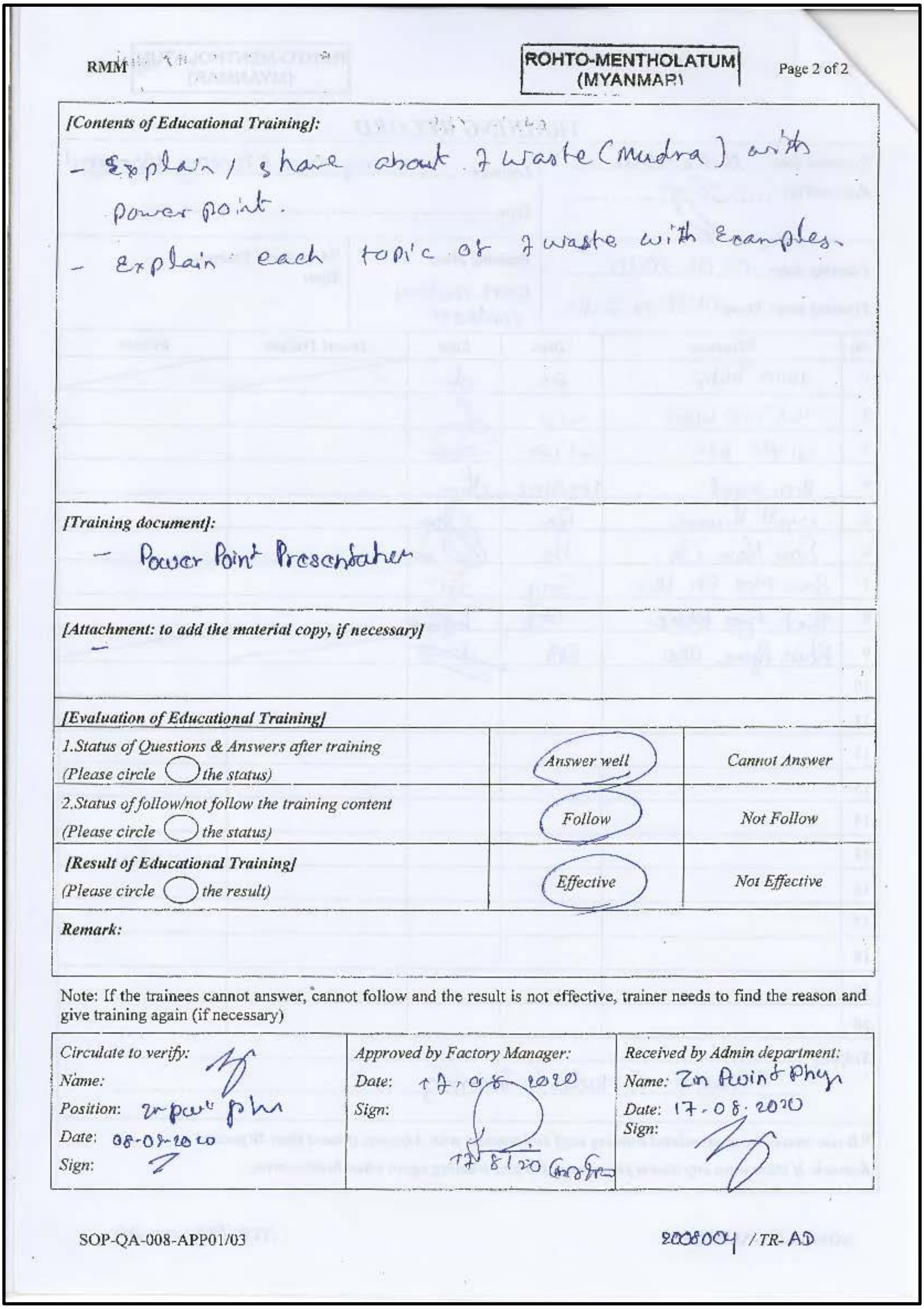
2008004 / TR-QA



RMM | ROHTO-MENTHOLATUM (MYANMAR) | Page 2 of 2

*[Contents of Educational Training]:*

- explain / share about 7 waste (Mudra) with power point.
- explain each topic of 7 waste with Examples.

*[Training document]:*

- Power Point Presentation

*[Attachment: to add the material copy, if necessary]*

-

*[Evaluation of Educational Training]*

| | | |
|---|---|---|
| *1.Status of Questions & Answers after training (Please circle ◯ the status)* | *Answer well* (circled) | *Cannot Answer* |
| *2.Status of follow/not follow the training content (Please circle ◯ the status)* | *Follow* (circled) | *Not Follow* |
| ***[Result of Educational Training]*** *(Please circle ◯ the result)* | *Effective* (circled) | *Not Effective* |
| ***Remark:*** | | |

Note: If the trainees cannot answer, cannot follow and the result is not effective, trainer needs to find the reason and give training again (if necessary)

| | | |
|---|---|---|
| *Circulate to verify:* | *Approved by Factory Manager:* | *Received by Admin department:* |
| *Name:* | *Date:* 17.08.2020 | *Name:* Zin Point Phyu |
| *Position:* Zin Point Phyu | *Sign:* | *Date:* 17.08.2020 |
| *Date:* 08-08-2020 | 17/8/20 | *Sign:* |
| *Sign:* | | |

SOP-QA-008-APP01/03 2008004 / TR-AD

Figure 6.7 Waste Training Course and Attendance List

## 6.3 Greenbelt Development

The greenbelt is a strip of land provided on the periphery of a factory for the special purpose of limiting the impact of a factory on the surrounding area. Thus, promotion of tree

plantation around industrial establishment came to be known as green belt. The land contained in the green belt is to be used for carrying out the agricultural activities.

There will be all efforts for improving the environmental quality of the plant through tree planting in organized manner. The trees will be planted inside the plant in vacant areas, along the boundary walls in rows to develop a wide green belt and also in dust- prone area along with vacant area for landscaping including gardening.

**Purposes:**

1. Protect and develop natural or semi natural environments; and
2. Improve air quality within industrial areas.
3. To protect the Noise dispersion from the factory premise.

**Advantages**:

1. Green belts are compensatory plantation to restore the ecological balance.
2. Green belts insure a minimum distance between the industrial sources of pollution and the receptors/ residential areas, prone to the health hazards of industrial pollution.
3. Green belts can absorb the air and water pollution caused by the industry. For example, Noise can be decreased by up to 10 decibels by green belts.
4. Trees not only assimilate carbon dioxide and release oxygen but also play an important role in trapping some obnoxious gases and particulate matters in the air. Hence green belt functions both as filter and sink for contaminants.
5. Green belts can improve the local microclimate. These occur mainly through their influence on wind, temperature and humidity.

**Plants / trees selected for green belt area**

For the development of greenbelt, plants having simple big leaves are preferred with compound or pinnate leaves. Native trees are preferable.

The plants are suitable for green belt development based on gaseous exchange capacity of foliage which is ascertained by various characteristics and hence the following aspects are important while selecting the plant species:

1. The species should be fast growing and having thick canopy cover
2. It should be perennial and evergreen and should have large area index
3. It should be indigenous and suitable to local climatic conditions
4. It should be efficient in absorbing pollutants without significant effects on plant growth
5. It should be fruit yielding trees, if possible, especially in wasteland areas.

## 6.4 Occupational Health and Safety

The manufacture of OTC medicines and cosmetic involves a variety of processes that present with medical hazards. Safety initiatives are hence introduced to limit hazard exposures and promote workplace safety. Occupational hazard is the risk, harm, or danger that an individual is exposed to at the workplace, whereas occupational diseases result from such exposures to the individual. During work periods, workers are faced with a variety of

hazards almost as numerous as the different types of work, including chemicals, biological agents, physical factors, and adverse ergonomic conditions. These are responsible for a variety of health consequences. The utilization of chemical substances and their derivatives has brought immense benefits to manking. However, the production, storage and transportation of these substances can pose risks to people and the environment, and at the same time it has had negative impacts on human health and safety.

### 6.4.1 Hazards and Their Prevention of the Factory

In general, the major hazards associated with the paint and coatings manufacture involve:

- materials handling;
- toxic, flammable or explosive substances; and
- physical agents such as electrical shock, noise, heat and cold

#### 6.4.1.1 Materials Handling

The manual handling of boxes, barrels, containers and so forth which contain the raw materials and finished products are major sources of injury due to improper lifting, slips, falls, dropping containers and so on. Precautions include ngineering/ergonomic controls such as materials handling aids (rollers, jacks and platforms) and mechanical equipment (conveyors, hoists and fork-lift trucks), non-skid floors, personal protective equipment (PPE) such as safety shoes and proper training in manual lifting and other materials handling techniques.

#### 6.4.1.2 Chemical Hazards

| Chemical Hazards | Preventative Plan |
|---|---|
| • Exposure to vapors of oil, chemcials and related powder can cause irritation and demerge to eyes and mucous membranes, to the respiratory and digestive tracts, and to the skin. Exposure to organic substances may damage the nervous system | • Install effective exhaust ventilation and ear conditioning to prevent air contamination and heat stress; if necessary, use odor neutralizing chemicals.<br>• Install effective exhaust ventilation to prevent air contamination; if necessary, use respiratory protection. |
| • exposure to VOC in storage areas and/or during the cleaning of the manufacturing installations | • Install effective exhaust ventilation and air conditioning to prevent air contamination and heat stress; if necessary, use odor neutralizing chemicals. |
| • Exposure to various components of paints may cause irritation of eyes and the respiratory tract. | • Install effective exhaust ventilation to prevent air contamination; if necessary, use respiratory protection. |
| • Skin exposure through contact with solvents and various components of paints can cause dermatitis. Hazard of dermatitis or eczema when working with pigments that contain chrome and cobalt. | • Protect the skin of the hands and eyes with chemical-resistant gloves and glasses respectively when in contact with solvents and chemicals; use soaps for cleaning the skin of the hands, at the end of the work. |

| | |
|---|---|
| • Exposure to pigment dust during grinding and mixing, while preparing the paints. | • Install effective exhaust ventilation and air conditioning to prevent air contamination; if necessary, use respiratory protection. |
| • Exposure to organic substances may cause allergic reactions such as irritation of the respiratory tract and of eyes and skin. | • Install effective exhaust ventilation and air conditioning to prevent air contamination and heat stress; if necessary, use odor neutralizing chemicals.<br>• Install effective exhaust ventilation to prevent air contamination; if necessary, use respiratory protection<br>• Protect the skin of the hands and eyes with chemical-resistant gloves and glasses respectively when in contact with solvents and chemicals; use soaps for cleaning the skin of the hands, at the end of the work.<br>• Get medical aid if skin rashes develop; consult an allergy specialist on how to deal with sensitivity to solvents, chemicals, etc. |

#### 6.4.1.3 Physical Agents

Noise hazards can be associated with the use of ball and pebble mills, high-speed dispersers, vibrating screens used for filtering and so forth. Precautions include vibration isolators and other engineering controls, replacing noisy equipment, good equipment maintenance, isolation of noise source and a hearing conservation program where excessive noise is present. Other hazards include inadequate machine guarding, a common source of injuries around machinery. Electrical hazards are a particular problem if there is not a proper lockout/tagout program for equipment maintenance and repair. Burns can result from hot varnish cooking vessels and spattering materials and from hot melt glues used for packages and labels.

The consequences of not following these practice guidelines can be fatal as control of these occupational hazards present at work and the safety measures necessary in paint production factories is the key to reducing the risk of injury, the common negative health symptoms and illness among workers in this industry.

#### 6.4.1.4 Ventilation

Ventilation is an example of an engineering control method in which workplace hazard can be eliminated or reduced to acceptable levels. The use of personal protective equipment should not be the primary means to control exposure to paint and other material, unless substitution, engineering or administrative controls are not feasible.

A wide variety of volatile solvents are used in paint manufacture, including aliphatic and aromatic hydrocarbons, alcohols, ketones and so forth.

Exposure to solvent vapors can occur during thinning in solvent-based paint manufacture; during can filling in all solvent-based coatings; and during manual cleaning of process equipment with solvents. Precautions include enclosure of process equipment, LEV for thinning and can filling operations and respiratory protection and confined-space procedures for cleaning vessels.

Ventilation is one of the most effective methods for controlling solvent vapors and dusts generated by paint manufacturing by either supplying or exhausting air. There are two main types of ventilation methods:

- general ventilation (or dilution ventilation) and
- local exhaust ventilation

***General Ventilation***

The term general ventilation is used to describe a ventilation system that supplies and exhausts large volumes of air from work areas. This method is effective when you want to dilute low concentrations of vapor or dust to acceptable levels. Examples of general ventilation systems are the use of natural drafts through open windows and doors, roof ventilators, or mechanical fans or blowers mounted in roofs, walls or windows.

General ventilation should only be considered in the following situations to control for air contaminants generated during operation:

- When small quantities of air contaminants are being released into the work environment at fairly uniform rates;
- When there is sufficient distance between worker and the contaminant source to allow sufficient air movement to dilute the contaminant to safe levels;
- When only contaminants of low toxicity are being used;
- When there is no need to collect or filter the contaminants before the exhaust air is discharged to the outside;
- When there is no possibility of corrosion or other damage to equipment from the diluted contaminants in the work environment air.

One disadvantage of general ventilation is that it is very difficult to provide sufficient dilution where the worker is performing the work. For this reason, local exhaust ventilation is the better choice for controlling exposure to toxic substances. General ventilation should not be used to control activities that generate toxic dusts, vapors or fumes. Designing general ventilation for a work area will require careful planning and assistance from a ventilation engineer or a health and safety professional.

***Local Exhaust Ventilation***

The term local exhaust ventilation refers to a ventilation method that contains or "captures" contaminants at their source of generation before they escape into the work environment and to the worker. A typical local exhaust ventilation system consists of a hood (captures the contaminant), ducts

(transports the contaminant away from the work area), an air cleaner if required (cleans the contaminants from the air) and a fan (moves the air with the contaminant away from the work area to outside). Paint spray booths and dust collection systems are good examples of local exhaust ventilation.

Local exhaust ventilation system is used to control hazardous substances in paint. Even with local exhaust ventilation, the use of personal protective equipment, such as a respirator, may still be required when the ventilation is not adequately controlling the exposure.

## 6.5 Natural Hazards Preventation

### 6.5.1 Earthquake

***Earthquake Prevention***

Earthquakes cannot be prevented but can be reduced the potential damages:

- Development of possible warning indicators.
- Land-use regulations.
- Building regulations.
- Relocation of communities.
- Public awareness and education programs.

***Education Program***

The program aims to promote a nationwide culture of mitigation, by

- providing people with basic information on earthquake risk,
- demonstrating how to secure potentially dangerous objects in workplaces, and
- outlining key safety actions in the event of disaster.

***Measures for Earthquake Risk Reduction***

For better understanding of all the possibilities of earthquake risk reduction, it is important to classify them in terms of the role that each one of them could play.

Therefore, in the pre-earthquake phase, preparedness, mitigation and prevention are concepts to work on. Post-disaster, immediate rescue and relief measures including temporary sheltering soon after an earthquake until about 3 months later and re-construction and re-habilitation measures for a period of about six months to three years need to follow.

To encapsulate, the most effective measures of risk reduction are pre-disaster mitigation, preparedness and preventive measures to reduce vulnerability and expeditious, effective rescue and relief actions immediately after the occurrence of the earthquake.

Depending upon the calamity and its consequences, strategies can also be divided into long term (five to fifteen years), medium term (one to five years) and short term (to be taken up immediately in high risk areas).

Since it has been realized that earthquakes kill people mostly because of faulty constructed buildings, the task of reducing vulnerability of structures and buildings will be the key to earthquake risk reduction. Also, pre-disaster

preparedness through a post-earthquake response plan, including training of the concerned personnel in various roles, is considered essential for immediate and effective response after an earthquake occurrence. The major action points are highlighted in the following paragraphs.

**Pre-Disaster Preventive Measures**

**a) Long-term measures**

- Re-framing buildings' codes, guidelines, manuals and byelaws and their strict implementation.
- Tougher legislation for highly seismic areas.
- Incorporating earthquake resistant features in all buildings at high-risk areas.
- Making all public utilities like water supply systems, communication networks, electricity lines etc. earthquake-proof.
- Creating alternative arrangements to reduce damages to infrastructure facilities.
- Constructing earthquake-resistant community buildings and buildings (used to gather large groups during or after an earthquake) like schools, hospitals, prayer halls, etc., especially in seismic zones of moderate to higher intensities.
- Supporting R&D in various aspects of disaster mitigation, preparedness and prevention and post-disaster management.
- Evolving educational curricula in architecture and engineering institutions and technical training in polytechnics and schools to include disaster related topics.

**b) Medium term measures**

- Retrofitting of weak structures in highly seismic zones.
- Preparation of disaster related literature in local languages with dos and don'ts for construction.
- Getting communities involved in the process of disaster mitigation through education and awareness.
- Networking of local NGOs working in the area of disaster management.

***Earthquake Emergency Action Plan***

<u>Preparing for an Earthquake:</u>

Earthquakes cannot be predicted. The following are best practices to prepare for earthquakes.

- Pick "safe places". A safe place could be under a sturdy table or desk or against an interior wall away from windows, bookcases or tall furniture that could fall on you.
- Practice drop, cover, and hold-on in each safe place. Drop under a sturdy desk or table and hold on to one leg of the table or desk. Protect your eyes by keeping your head down. Practice these actions so that they become an automatic response.

- Practice these safe earthquake procedures (i.e., drop, cover, and hold-on) at least twice a year. Frequent practice will help reinforce safe behavior. When an earthquake or other disaster occurs, many people hesitate, trying to remember what they are supposed to do. Responding quickly and automatically may help protect you from injury.
- Make a plan for workers to follow in the event of an earthquake and be sure that it includes the following precautions:
  - Wait in your safe place until the shaking stops, then check to see if you are hurt. You will be better able to help others if you take care of yourself first, and then check the people around you. Move carefully and watch out for things that have fallen or broken, creating hazards. Be ready for aftershocks.
  - Be on the lookout for fires. Fire is the most common earthquake-related hazard, due to broken gas lines, damaged electrical lines or appliances, and previously contained fires or sparks being released.
  - If you must leave a building after the shaking stops, use the stairs, not the elevator, and look for falling debris. Earthquakes can cause fire alarms and fire sprinklers to go off. You will not be able to rule out whether there is a real threat of fire, and the elevators may have been compromised. Always use the stairs.
  - If you're outside in an earthquake, stay outside. Move away from buildings, trees, streetlights and overhead lines. Crouch down and cover your head. Many injuries occur within ten feet of the entrance to buildings. Bricks, roofing and other materials can fall from buildings, injuring persons nearby. Trees, streetlights and overhead lines may also fall, causing damage or injury.
- Inform workers of the plan and discuss earthquakes with workers. Everyone in your workplace should know what to do if an earthquake occurs. Discussing earthquakes ahead of time helps reduce fear and anxiety and lets everyone know how to respond.
- Get training. Take a first-aid class. Get training on how to use a fire extinguisher. Keep your training current. Training will help you to keep focused and know what to do when an earthquake occurs.
- Perform a workplace survey, especially if you are in an area with a high risk of earthquakes, to identify potential hazards to workers if an earthquake occurs. Look for furniture or materials that could fall and strike workers or block means of egress, or cause a release of hazardous materials, or otherwise affect the health and safety of workers as a result of utility loss or system/structural failure.

**Equipping**

- Get emergency supply kits and keep them in shelter locations.

**Training and Exercises**

- Ensure that all workers know what to do in case of an earthquake.
- Practice earthquake and evacuation plans on a regular basis.
- Update plans and procedures based on lessons learned from exercises.

**<u>Develop an Emergency Action Plan</u>**

A disorganized evacuation can result in confusion, injury and property damage. An emergency action plan is critical. An emergency action plan checklist can assist this process.

When to evacuate:
If emergency response authorities indicate specifically to do so.
If emergency response authorities indicate there is time to do so.
If you can reach a safe location before an event is expected to occur.
When environmental conditions would not expose evacuees to a dangerous environment.

Evacuation plans should include:

- Conditions under which evacuation would be necessary (considering the above information);
- When sheltering in place may be a better alternative;
- A clear chain of command and designation of the person in workplace authorized to order an evacuation;
- Specific evacuation procedures, including routes and exits;
- Designation of which, if any, workers will remain after an evacuation alarm to shutdown critical operations or perform other duties before evacuating; and
- Special equipment for workers, including personal protective equipment and respiratory protection (e.g., escape respirators), if needed.

### 6.5.2 Flood Risks

***Flood Emergency Response Plans***

**(i) Plan Details and Operation**

Develop a tiered action plan for the Flood emergency response plan. Each level should be well developed and thought out as to the time frame and exposure that exists. Keep in mind time frames can change rapidly depending on threat development.

1. **Watch**
2. **Warning**
3. **Action**
4. **Recovery**

At each level develop actions, steps and activities that must be taken and assign those to specific individuals and teams.

1. **Watch**
   - Fill fuel tanks serving emergency generators and other vital services
   - Verify dewatering pumps are in service and working
   - Verify outside drains and catch basins are clean
   - Verifying all fire protection systems are in service
   - Inspect and ensure proper staging of emergency equipment in safe locations
   - Discuss with staff the flood potential ensure proper staffing and equipment

- Dry run critical tasks
- Check in with local emergency services and any recovery companies
- Stay in contact with service providers on status and potential future needs

**2. Warning**

- Protect or relocate vital business records
- Remove all loose outdoor storage or equipment
- Anchor portable buildings or trailers to the ground
- Secure outdoor storage or equipment that cannot be moved
- Start the installation of manual protection systems such as flood gates
- Raise critical equipment off floor
- Move critical equipment from below grade areas
- Initiate an orderly shutdown of equipment and systems that rely upon normal power.
- Turn off fuel gas services.
- Turn off non-essential electrical systems.

**3. Action**

- Monitor systems installed to prevent flooding
- Ensure fueling is maintained for pumps/generators
- Monitor drains for proper flow and remove blockage
- Monitor interior of buildings for water seepage or leaks
- Ensure back flow prevention is operating and valves are closed where needed.
- Maintain Safety of Staff

**4. Recovery**

- Work with service providers to aid in cleaning and recovery
- Survey extent of damage and develop a strategic plan or priorities to restore the most important areas or processes first.
- Initiate clean-up operations when safe to do so
- Utilize additional personnel and specialized contractors and vendors to help speed the clean-up and recovery operations.
- Have all utilities checked by qualified personnel before use
- Contact utility companies to restore services
- Verifying all fire protection systems are in service

***(ii)* Flood Protection**

**1. Ensure there is a reliable method of Receiving Flood Warnings**

Protection designed to mitigate flood hazards can be grouped into three categories:

- Passive
- Active
- Manual

- Examples of passive protection include:
  - Grading
  - Berms

- Fixed flood walls
- Permanent physical barriers to direct water away
- Automatic flood gates (hydrostatic)
- Levees

- Examples of active protection include:
  - Mechanical de-watering methods (e.g. sump pumps serving basement levels, truck docks, and similar low lying areas).
- Examples of manual protection include:
  - Flood gates/shields or flood barriers (set in place when heavy rain or storm is anticipated).
  - Sand bags

### 6.5.3 Fire Prevention and Control

In an industry the potential danger of fire breaking out is always there due to the handling of chemicals and other combustible / flammable substances. But for any fire to take place, the following three elements are essential:-

- Air
- Fuel (chemicals, combustible materials)
- Heat (spark, flame, etc.)

If any one of the elements is absent then a fire cannot take place. Under normal circumstances, air and fuel are bound to be present in a work area. As such, critical care should be exercised to see that no unauthorized source of ignition is present or allowed to be present in the work area. Following are few causes that can lead to fire:

- Incompatible chemicals reacting with each other producing heat
- Spontaneous ignition of some substances (e.g., oily rags exposed to sunlight)
- Runaway reactions
- Electrical short circuits
- Sparks generated due to static electricity
- Smoking at unauthorized places
- Storage of different kinds of wastes together.
- Maintain good housekeeping
- Prompt disposal of wastes without allowing them to accumulate
- Segregation of different types of wastes during storage
- Adherence to SOPs while handling flammable solvents and hazardous chemicals
- Proper earthing and bonding of equipment to dissipate static charges
- Carrying personal lighters, matches are strictly prohibited
- All hot work jobs to be carried out only when authorized on a work permit

***Storing Chemicals***

The products require special storage protocols so that they do not become a danger to those working with them, to those working near them or to the general public.

***Flammability***

Many of the substances used in the Paint production are flammable; therefore, the following general precautions should be taken when storing these products.

(1) Store products in a cool environment;
(2) Store products away from ignition sources;
(3) Seperately store raw material according to flammability
(4) Do not store incompatible products side by side;
(5) Mark storage locations with signs/warnings;
(6) Have easy access to fire extinguishers;
(7) Fire extinguishers should be appropriate for the products being stored (see MSDS);
(8) Stored products should not block isles or exits.

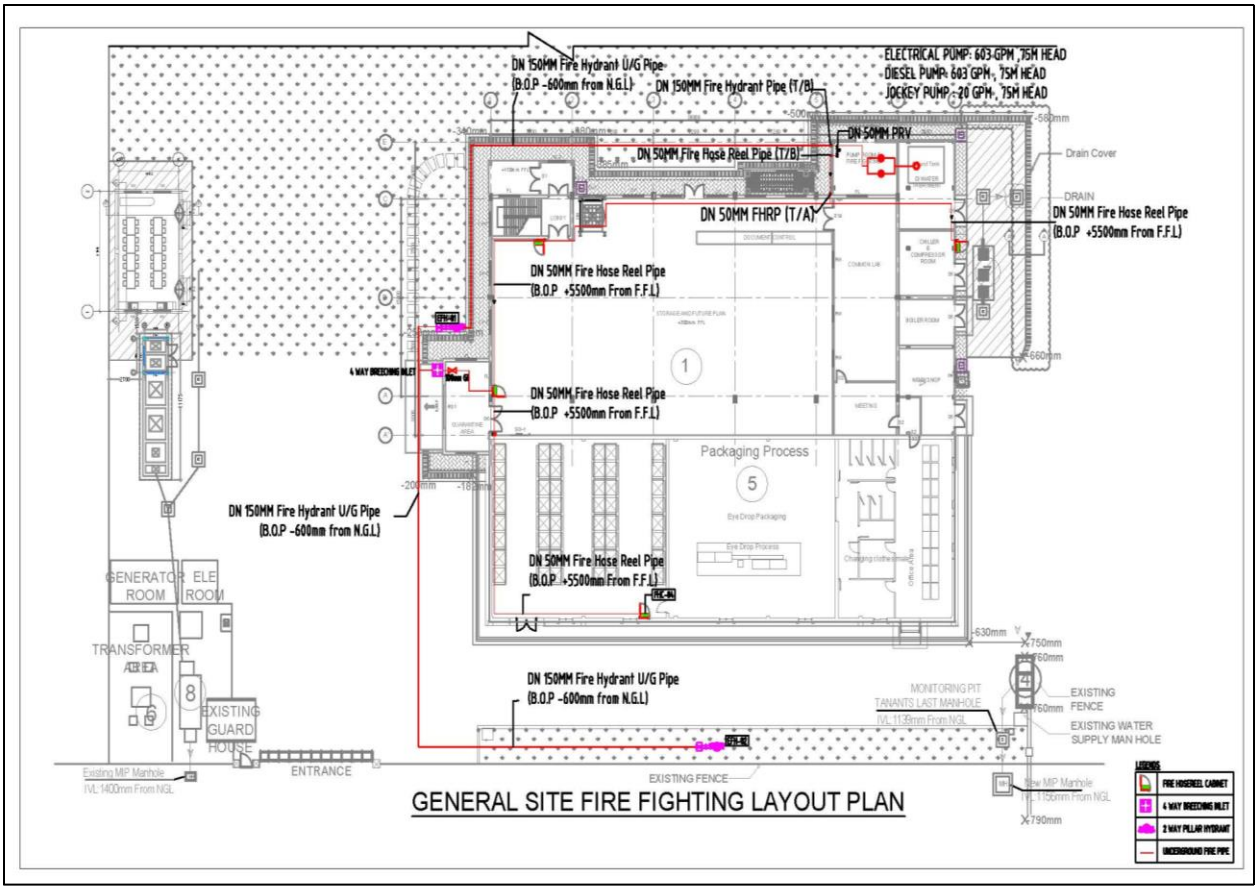
### 6.5.4 Fire Fighting and Control

The command structure will be set up for quick response and efficient handling of emergency and carrying out corrective emergency measures without panic and confusion.

The Site will be equipped with suitable type of fire extinguishers and after thorough assessment areas, activities will be earmarked and fire extinguishers will be provided at strategic locations. The contact number of nearest fire tender will be made available with security, and project manager and person responsible for Environment, Health and Safety (EHS). The escape and exit route for the plant will be marked and installed for proper directions. Regular training will be imparted to all the concerned so that in the event the fire occurrence, the concerned workers could assess type of fire and select appropriate type of extinguisher and extinguish the fire.

- Site is equipped with suitable type of fire extinguishers that are provided at strategic locations
- A fire hydrant network is also available to fight a major fire
- Get to know the location of the firefighting equipment in your department as well as escape route in case of an emergency
- When a fire occurs, assess type of fire and select appropriate type of extinguisher and put it off provided you are site's firefighting squad member or confident of using the extinguisher
- Do not forget simultaneously raise an alarm by shouting or through your colleague or by any other means (e.g., manual call point, fire bell, phone, etc.)
- Remember that speed is essential in fighting a fire. Most fires start small and are as confined if you act promptly and if you know what to do.

Rohto factory has provided fire extinguishers, fire hydrants, automic running firefighting pump and electrical alarm panel. The detail firefighting system layout plans of the Factory is as shown in following figures.



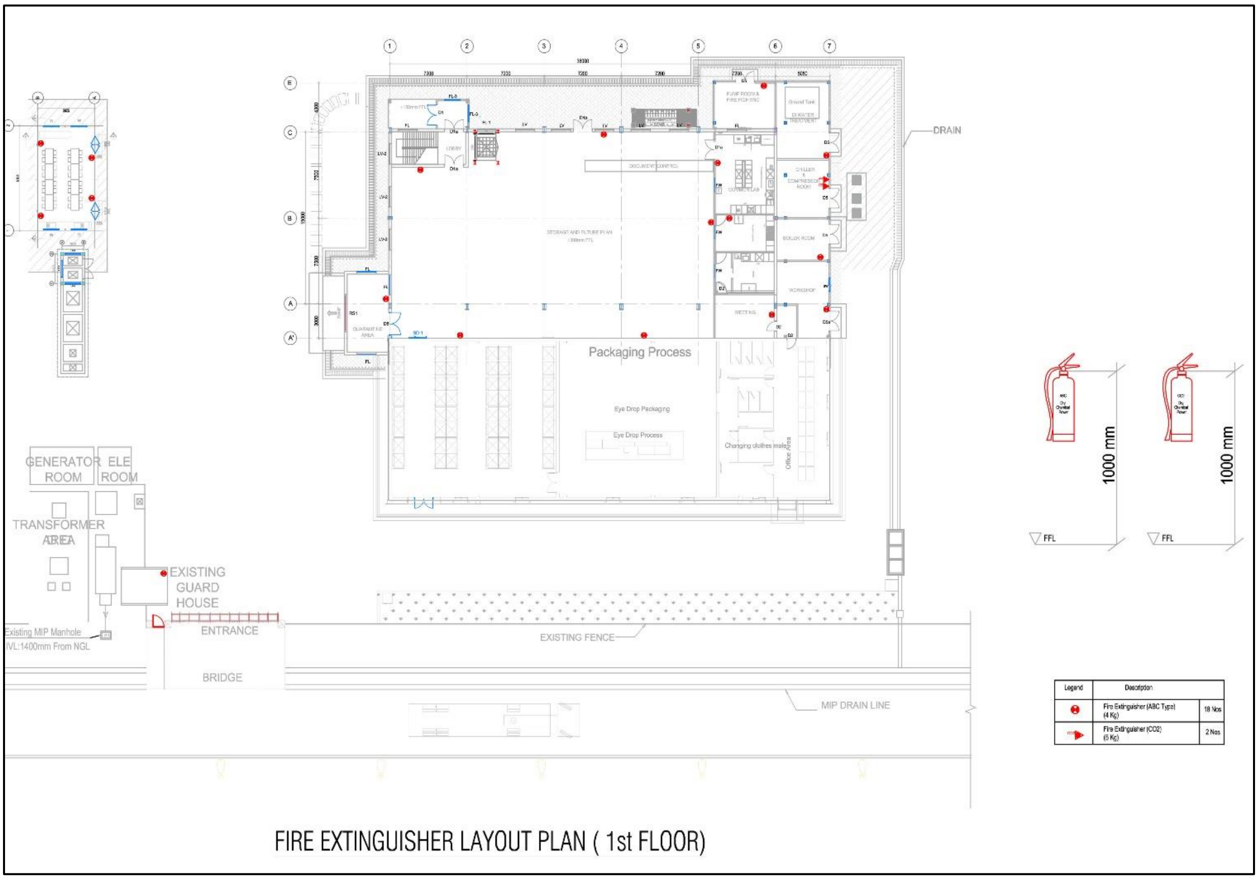




Figure 6.8 Firefighting Layout Plans

Figure 6.9 Firefighting Equipements and Installation Systems

## 6.6 Emergency Response Plan (ERP)

In order to reduce risks and dangers to employees, they must understand the Standard Operating Procedure of the equipment and facilities. In addition, the company has made the emergency plan to help reduce losses in individuals, properties, and environment after event of danger. The Personnel and Administration Department has been responsible for emergency plan preparation as well as specifying responsible persons in case of:

- fire incident,
- accidence from working, and
- chemical leakage
- flood and earthquake risks, etc.

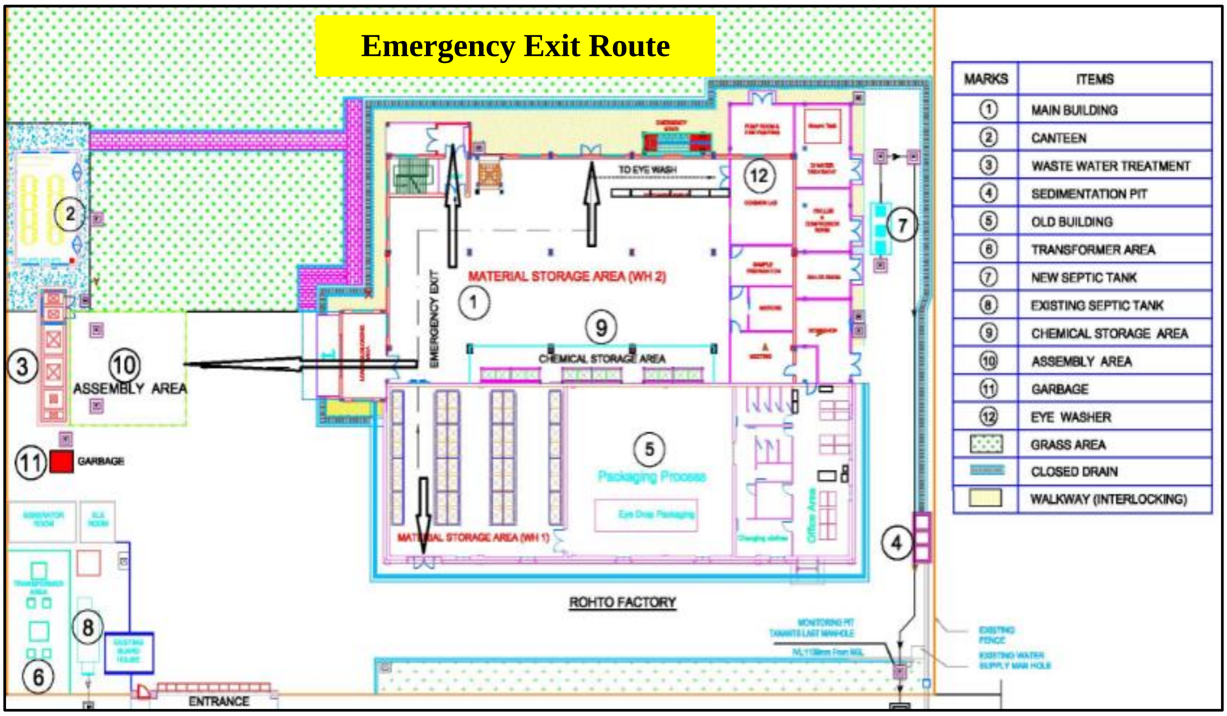
In determining this emergency plan, the company has set work team and Factory Manager is the team leader for cooperation and control of work team as follows:

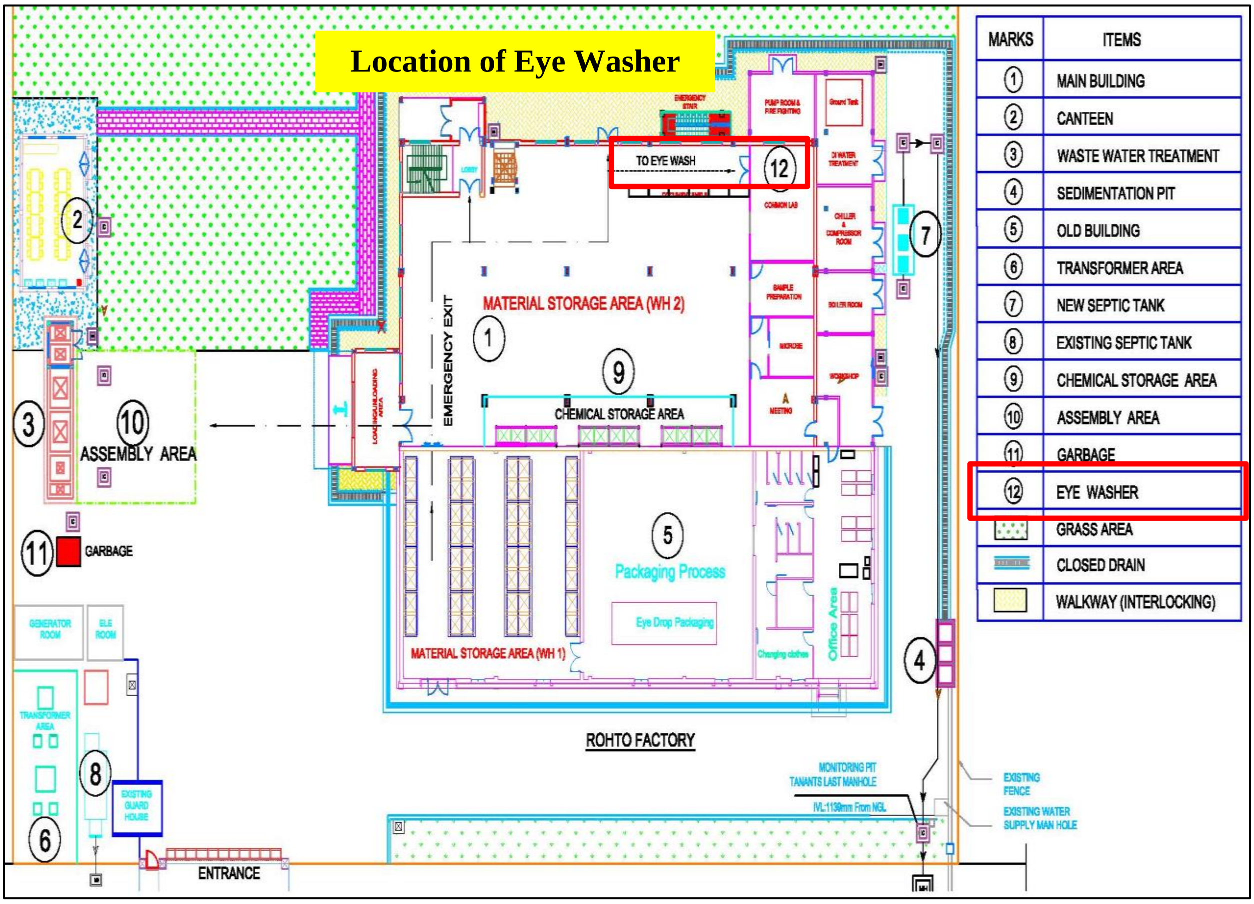
- Incident Alleviation Team
- Equipment Removing Team
- Electrical Equipment Control Team
- Employee Evacuation Team
- First-Aid Team
- Vehicle/Communication Team
- Environmental Impact Reduction Team

After the occurrence of accidence or emergency incident, the meeting has been set to stipulate work plan in analysis, prevention and recovery as follows:

1. Plan of Relief Work
2. Recovery and Transformation Plan
3. Accident Recurrence Prevention Plan
4. Employee Training Plan

From the guidelines for analysis, correction, prevention, alleviation of above emergency incident as well as inspection as determined in Occupational Health and Safety, the company has taken the testing result for analysis on the trend of pollution occurrence conditions. If the testing result tends to continuously approach the danger limit, the company will determine to create correction/improvement project for better working method as well as machines. In case that the neglect on use of personal protective equipment, the company will stipulate punishment measure as well as educate the employees on wearing necessity during operation. According to this execution, the company has realized on environmental protection for no impact from the company production process toward the community making co-existence of factory and community and creating stable growth on better living conditions. Workers will be made aware of who to contact in case of an emergency such as fire, accidents, explosion etc., these include;






## 6.7 Environmental Monitoring Plan

Environmental monitoring and audits will be undertaken during the operation and closing phase to check that the environmental management measures are being satisfactorily implemented and that they are delivering the appropriate level of environmental performance.

The proponent is committed to adhere to the environmental monitoring parameters in terms of location, schedule and responsibilities as provided in Table 6.5.

Table 6.7 Monitoring Parameters, Location and Schedules for Closing and Operation Phase

| Environmental Parameters | Monitoring Item | Location | Frequency | Responsibilities |
|---|---|---|---|---|
| **Closing Phase** | | | | |
| Air quality | • Recorded TSP, Particulate<br>• Recorded the machineries maintenance<br>• Recorded dust emission activities<br>• Recorded traffic | Closing site | Monthly | Construction Contractor |
| Soil quality | • Chemical and toxic material emission/ | Closing site | Monthly | Construction Contractor |

| | | | | |
|---|---|---|---|---|
| | leakage status from storage area<br>• Other possible leakage of chemicals due to the vehicular movement and bitumen mixing | | | |
| Water quality | Checking temporary septic tank and disposed system, temporary drain | Closing site | Monthly | Construction Contractor |
| Water Use | Daily amount of water use | Closing site | Daily Observation | Construction Contractor |
| Noise and Vibration | Intensity measurement | Closing site | Monthly | Construction Contractor |
| Waste Disposal | • Recorded disposal amount of solid wastes and sewage of the workers<br>• Checking the waste storage area | Areas around workers quarters | Daily Observation | Construction Contractor |
| | • Recorded disposal amount of construction wastes, compliance with the disposal requirements<br>• Separate hazardous and No-hazardous<br>• Checking the waste storage area | Closing site | Weekly | Construction Contractor |
| Employment | Number of people employed | Closing site | Monthly | Construction Contractor |
| Other Social Considerations | CSR activities record | Monitoring team | Monthly | Construction Contractor |
| Occupational Health and Safety | • Safety activities, Record of accident and OHS training and activities, | Workers | Monthly | Safety Supervisor |

| | | | | |
|---|---|---|---|---|
| | • Record of worker argument and conflict | | | |
| Community Health and Safety | • Record of accident on rord<br>• Recorded of training for driver and worker | Local residents | Upon conditions | Safety Supervisor |
| Emergency risk | • Accident record, safety, and its response plan,<br>• Training | Closing site | Monthly | Safety Supervisor |
| | | | | |
| **Operation Phase** | | | | |
| Air Quality | Particulate matter, TVOC, CO, $CO_2$, $NO_2$, $SO_2$ | Ambient air | Bi-annual | Factory Manager and HSE officer |
| | Particulate matters, TVOC | Processing area such as mixing area, WWTP, storage area, Exhaust stack | Bi-annual | Factory Manager and HSE officer |
| | Satck Emission Gases | Boiler and Generator Satck | Bi-annual | Factory Manager and HSE officer |
| Wastewater Quality | pH, oil & grease, suspended solid, BOD, COD, color and Temperature, | Surface sources (drains), EQ tank, sedimentation tanks, oil/ water separators, effluent, inlet and outlet of WWTP | Monthly (basic 7 parameters) | Factory Manager and HSE officer |
| | Recorded of Treated water quality of NGQG General Parameters | Outlet of WWTP | Bi-nnually | Factory Manager and HSE officer |
| Waste Disposal | • Recorded disposal amount | Plant premises | Monthly | Factory Manager and HSE officer |

| | | | | |
|---|---|---|---|---|
| | of plastic, drum, paper box, sludge from WWTP<br>• Check collection system<br>• Check storage<br>• Separation of waste type (Hazardous & No-hazardous) | | | |
| Soil Contamination | Spill and leakage of oil, chemical and fuel, wastewater treatment area | Plant premises, chemical storage area, fuel storage area, generator room, | Monthly | Factory Manager and HSE officer |
| Noise and Vibration | Noise & Vibration level | Plant premises, workplaces area | Bi-annually and upon complaint | Factory Manager and HSE officer |
| Odor | Inspection of ventilation condition | Factory and storage buildings | Monthly | Factory Manager and HSE officer |
| Hazardous and Chemical Substance | • Record of type hazardous/ chemical substance<br>• Check and record handling and using<br>• Check storage area<br>• Check disposal system<br>• Recod of the usuing amount | Factory and storage buildings | Monthly | Factory Manager and HSE officer |
| Greening Plan | Record of gardening area condition | Plant premises | Bi-annually | Factory Manager and HSE officer |
| Landscape | Record of landscape condition | Plant premises | Bi-annually | Factory Manager and HSE officer |
| Local Water Use | • Quality check Temp, pH, Oil & grease, SS, COD, BOD<br>• Record usage of water consumption | Inspection Pit | Monthly | Factory Manager and HSE officer |
| Occupational Health and Safety | • Record of accident and record of occupation/ safety training, | Plant premises | Occasionally weekly and as occasionally | HSE officer |

| | | | | |
|---|---|---|---|---|
| | • Check PPE and safety plan<br>• Record complaints from workers | | monthly | |
| | • Each employee medical checkup record.<br>• Medical checkup plan | Plant premises | Annually | HSE officer |
| Machineries Maintenance | • WWTP<br>• Dust and VOC control equipment and their related equipment such as pumps, pipeline, filters<br>• D.G set and Chiller and Air Con<br>• Transportation vehicles such as loader, forklift and other<br>• Recorded the maintenance activities<br>• Recorded the machineries using time | Plant premise and all working area | Monthly and necessary time | Factory Manager and maintenance employee |
| Community Health and Safety | • Record of accident<br>• Record of complaints from communities<br>• Training record for drivers and security | Local residents | Occasionally | HSE officer |
| Other Social Considerations | • Recod CSR plan<br>• Record local employment status | Monitoring team | Annually | HR Manger |
| Emergency Risks | • Record of emergency case of accident and its response plan<br>• Check the Hazordous chemical handling and its managment<br>• Check fire safety facilities<br>• Firefighting | Plant premise | As occasionally monthly | HSE officer |

| | | | | |
|---|---|---|---|---|
| | Training | | | |
| Transboundary or Global issues | Activity Implement | Plant premise | Annually | All responsible person |

The Project will carry out impact monitoring at the end of project period to assess the implementation of mitigation measures and check their effectiveness.

Monitoring of emissions plays an important part in environmental management. It can be beneficial in some instances to perform continuous monitoring. This can lead to rapid detection and recognition of irregular conditions and can give the operating staff the possibility to correct and restore the optimum standard operating conditions as quickly as possible.

Emission monitoring by regular spot checking in other cases will suffice to survey the status and performance of equipment and to record the emission level. In general, the frequency of monitoring depends on the type of process and the process equipment installed, the stability of the process and the reliability of the analytical method. The frequency will need to be balanced with a reasonable cost of monitoring.

## 6.8 Corporate Social Responsibilities

CSR budget will be based on the profitability or financial performance of the company and is allotted as some percentage (%) of the annual profit. According to the financial policy of the company, the company will use for it.

The company will allocate the following activities for CSR budget.

- Scholarship Program for Education and Knowledge Sharing Program
- Social Welfare
- Vocational Training for Job Opportunities
- Health and Safety Sector
- Road and Infrastructural sector
- Environmental Management and Monitoring Program

## 6.9 Environmental Budget

The project is going in operation phase when this EMP report was prepared. Thus estimated environmental budget was more emphasized for operation phase. Cost for implementation of EMP is included in the project cost. The Project will carry out impact monitoring during operation. The budget for these phases was estimated based on annually and also current servicing price (2022). Table 6.6 is presenting an estimated cost required for operation phase monitoring.

Table 6.8 Estimated Costs for Operation Phase Monitoring

| No. | Environmental Measures | Responsible Agency | Executing Agency | Cost Estimate LS or per unit (Kyats) | Total Cost per year (Kyats) |
|---|---|---|---|---|---|
| **Measures During Operation Phase** | | | | | |
| 1 | Water quality monitoring<br>Number of locations: 2<br>Measurements per year: 2<br>Total Quantity of units = 2 x | Rohto | Laboratory | 300,000 | 1,200,000 |

| | | | | | |
|---|---|---|---|---|---|
| | 2 = 4 | | | | |
| 2 | Ambient air quality monitoring<br>Number of locations: 1<br>Measurements per year: 2<br>Total Quantity of units = 1 x 2 = 2 | Rohto | Third Party | 1,000,000 | 2,000,000 |
| 3 | Workplace air quality monitoring<br>Number of locations: 4<br>Measurements per year: 2<br>Total Quantity of units = 4 x 2 = 8 | Rohto | Third Party | 800,000 | 6,400,000 |
| 4 | Stack Emission<br>Number of locations: 2<br>Measurements per year: 2<br>Total Quantity of units = 2 x 2 = 4 | Rohto | Third Party | 350,000 | 1,400,000 |
| 5 | Workplace and Ambient Noise monitoring<br>Number of locations: 5<br>Measurements per year: 2<br>Total Quantity of units = 5x 2 = 10 | Rohto | Third Party | 100,000 | 1,000,000 |
| 6 | Vibration monitoring<br>Number of locations: 1<br>Measurements per year: 2<br>Total Quantity of units = 1x 2 = 2 | Rohto | Third Party | 500,000 | 1,000,000 |
| | | | | Sub-total | 13,000,000 |
| | | **Miscellaneous** | | | |
| 1 | Wastewater Management | | | Lump sum | 500,000 |
| 2 | Air Pollution Control | | | Lump sum | 500,000 |
| 3 | Solid Waste Management | | | Lump sum | 700,000 |
| 4 | Noise Pollution Control | | | Lump sum | 2,000,000 |
| 5 | Greening Plan | | | Lump sum | 200,000 |
| 6 | Sign board on safety | | | Lump sum | 1,000,000 |
| 7 | Emergency safety measures | | | Lump sum | 100,000 |
| 8 | Fire safety measures | | | Lump sum | 500,000 |
| 9 | Personal Protective Equipment | | | Lump sum | 500,000 |
| 10 | Training | | | Lump sum | 500,000 |
| | | | | Sub-total | 6,500,000 |
| | | | | **Total = Sub-total + Sub-total** | **19,500,000** |

# 7.0 PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

## 7.1 Purpose

Public consultations on environmental management programs are designed to provide a real understanding of industry issues and the aim is to make the public aware of the environmental impact of industrial operations and the increase in job opportunities caused by industry. By participating in the consultation process with anyone affected by the proposed project, the business community will be able to resolve any issues that may arise in advance.

## 7.2 Methodology and Approach

Green Myanmar Environmental Services Co., Ltd. has taken the meeting with the relevant government organizations and the vicinity of the factory.

## 7.3 Consultation Meeting with Relevent Government Organization and Negibouring Factory

For the reporting of environmental management plan, the purpose of consultation meeting is to inform and request comments about of the project to the local community. There were 16 persons attended to the meeting, responsible person of Industry Zone Management Committee, relevant to the government organization, responsible person from the vicinity of the factory, responsible persons of the factory and third party organization at 16.10.2021. There were received 6 comments in the meeting. The facts of public consultation meeting were shown in Table 7.2. The attendance lists are attached in Appendix (11) and also suggestion sheets in Appendix (12).

Figure 7.1 Consultation meeting with the relevant government organization and the vicinity of the factory

Table 7.1 Summary of discussion in the meeting

| No. | Participants | Explanations/ Responses of Factory |
|---|---|---|
| 1 | **Daw Nyo Lin Htet –** Deputy Officer Yangon Region (North district), Environmental Conservation Department<br>• An environmental team must be formed at the factory.<br>• There should be providing Trainings Program and the environmental awareness to the workers by the team.<br>• For more information on environmental conservation, please visit the Department of Environmental Conservation's website and social media pages.<br>• The guidelines set by the Department of Environmental Conservation should be followed.<br>• Emphasis should be placed on health care for employees working in the factory.<br>• It is recommended that the required business licenses for the factory business be submitted to the relevant department for approval. | **U Kyaw Soe Win**- Managing Director (Green Myanmar Environmental Services Co., Ltd)<br>• There were need to hire skilled staff such as Pollution Control Manager or Safety Officer in their factories.<br>• These employees need to take care of the occupational safety and environmental protection of the employees in the relevant factories.<br>• Participants were also encouraged to submit comments on the suggestion letter if they did not wish to do so in person. |

Table 7.2 Description of suggestion letter from the meeting

| No. | Comments |
|---|---|
| 1 | U Aung Thu<br>• Good environmental management arrangements. |
| 2 | Daw May Myo Shwe<br>• It is good to run no plastic programs and CSR activities. |
| 3 | U Thet Myo Htike<br>• In the future plan, the waste water treatment system should be regularly maintained as there will be mixing process and cleaning process in the production of facial wash products. |
| 4 | Daw Zin Mar Hlaing<br>• No comments |
| 5 | Ma May Chan Khaing<br>• Follow to the laws and regulations issued by the government. |
| 6 | Daw Nyo Lin Htet<br>• There should be described to the staff health planning in the CSR process of the EMP report<br>• Disseminate environmental awareness to staff and access to environmental awareness on the Environmental Conservation Department - Yangon Region Facebook. |

## 7.4 Recommendations on Suggestions and Comments from the Rohto-Mentholatum (Myanmar) Co., Ltd.

The following responses from the factory to public comments are shown in Table 7.3 below. The Rohto-Mentholatum (Myanmar) Co., Ltd. Recommendationson the suggestions and comments are set out in Appendix (13) of the Environmental Management Plan Report.

Table 7.3 Summary of Comments and Recommendation

| No. | Comments | Recomendation |
|---|---|---|
| 1 | • An environmental team must be formed at the factory.<br>• There should be providing Trainings Program and the environmental awareness to the workers by the team. | • Educating factory workers about environmental issues. Trainings are being provided. |
| | • For more information on environmental conservation, please visit the Department of Environmental Conservation's website and social media pages.<br>• The guidelines set by the Department of Environmental Conservation should be followed. | • We are following the guidelines set by the Environmental Conservation Department. |
| | • Emphasis should be placed on health care for employees working in the factory. | • We have been providing care in conjunction with local clinics and social welfare clinics for the health of the staff working in the factory. |

| | | |
|---|---|---|
| | • It is recommended that the required business licenses for the factory business be submitted to the relevant department stores for approval. | • Business licenses required for the factory business, depending on the township; By region It is being submitted to the relevant departments for permission and is being implemented. |
| 2 | • Good environmental management arrangements. | • True |
| 3 | • It is good to run no plastic programs and CSR activities. | • Our company provides CSR activities; No plastic programs are being implemented. |
| 4 | • In the future plan, the waste water treatment system should be regularly maintained as there will be mixing process and cleaning process in the production of facial wash products. | • Waste water treatment system is being implemented and detailed procedures and guidelines will be developed and followed to prevent environmental damage when producing facial wash products. |
| 5 | • Follow to the laws and regulations issued by the government. | • Comply with government laws and regulations. |
| 6 | • There should be described to the staff health planning in the CSR process of the EMP report<br>• Disseminate environmental awareness to staff and access to environmental awareness on the Environmental Conservation Department - Yangon Region Facebook. | • We will follow.<br>• Employees will be encouraged to share this information. We will also visit the Environmental Conservation Department - Yangon Region Facebook. |

# 8.0 CONCLUSION AND RECOMMENDATION

So recapitulate it can be said that the Environmental Management Plan (EMP) of Rohto-Meantholatum (Myanmar) Co., Ltd., focuses specifically on the required environmental management measures or creating environmentally friendly workplace. An EMP has been carried out for the factory according to the requirement of the proponent as it has been made mandatory but MONREC.

The important output is presented in the EMP of Rohto-Meantholatum (Myanmar) Co., Ltd. thus the factory management can take proper mitigation steps against adverse environmental impacts by following this EMP. The necessary measure to mitigate impact regarding different environmental parameter such as Air, Water, waste chemical, handling, noise level has been proposed in this EMP.

However, in the case of Rohto-Meantholatum (Myanmar) Co., Ltd. all necessary implementation measures to mitigate adverse environmental and health and safety impacts have already been taken to meet National Environmental Quality Standards. On the other, the plant has positive impacts in terms of employment in the operation phase. Further, this will indirectly help in boosting up the national economic condition through foreign investment. An outline of EMP has been given in the present report to mitigate/ enhance the impacts, which occurs during operation phase of the plant.

According to the impact evaluation, all of the impacts are localized. Based on the evaluation of the significance of impacts, these are the summary of findings.

For ***operational phase***, most of the activities and their impacts could result moderate and minor risks, except fire hazard. Although the final plastic product poses a little danger, the raw plastic materials are highly flammable and high risk of fire.

But after implementation of mitigation measures, the residual risk of fire is low and it would be acceptable. For ***decommissioning phase***, the only concern is noise pollution and it could pose as major risk. But after implementing the mitigation measures, the residual impact will likely to be low risk and it would be acceptable.

## 8.1 Recommendation

This is recommendation that:

- All appropriate environmental management measures detailed in this report, together with any other environmental management commitments should be implemented throughout the entire life of the factory.
- Solid wastes (waste food) & liquid wastes need to dispose according to rules and regulation.
- Workers should be provided proper training & it should be ensured that workers use PPE during plant operation.

The proponent is devoted to implement and follow Environmental Management Plan and Monitoring Plan is approved by the relevant authorities. The implementation of the EMP will be followed by annual environmental review and necessary corrective action. As a result of this, the implementation of the proposed project could not deteriorate the environment in any ways.

# APPENDICES

## Appendix (1): Instruction Letter of Environmental Conservation Depertment Letter to take Environemnntal Compliance Report

Environmental Conservation Department
ECD

**တိုင်းဒေသကြီးညွန်ကြားရေးမှူးရုံး**
**ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန**
**ရန်ကုန်တိုင်းဒေသကြီး**
**ရန်ကုန်မြို့**

အမှတ် ၁၀(ဂျေ)၊ ၅၅ လမ်း( ကုန်သည်လမ်း နှင့် ကမ်းနားလမ်းကြား)၊ ဗိုလ်တထောင်မြို့နယ်၊ Post Code-11161
ဖုန်း – ၀၁ ၈၂၀၃၈၃၈၊ ဖက်စ် – ၀၁ ၈၂၀၃၈၃၉၊ အီးမေးလ် – ygnecd.moecaf@gmail.com

စာအမှတ်၊ရကာ–၁/၃/၄(အီးအိုင်အေ)( ၂၀၅၃ /၂၀၂၀)
ရက်စွဲ၊ ၂၀၂၀ ပြည့်နှစ်၊ ဇူလိုင်လ ၂၇ ရက်

သို့

မန်နေဂျာ
Rohto – Mentholatum (Myanmar) Co., Ltd.
အမှတ် (ဒီ–၅)၊ မင်္ဂလာဒုံစက်မှုဇုန်
မင်္ဂလာဒုံမြို့နယ်၊ ရန်ကုန်တိုင်းဒေသကြီး

အကြောင်းအရာ။ Rohto – Mentholatum (Myanmar) Co., Ltd. ၏ ဓာတုပစ္စည်းနှင့်ဆက်စပ်ပစ္စည်းများ သိုလှောင်ခြင်း၊ တင်သွင်းခြင်း၊ သယ်ယူပို့ဆောင်ခြင်း၊ လက်ဝယ်ထားရှိခြင်း၊ အသုံးပြုခြင်း လုပ်ငန်းများနှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ဆိုင်ရာ သဘောထားမှတ်ချက် ပြန်ကြားခြင်း

ရည်ညွှန်းချက်။ Rohto – Mentholatum (Myanmar) Co., Ltd. ၏ ၁၄–၇–၂၀၂၀ ရက်စွဲပါ စာအမှတ်၊ RMM– Fact; 011/ 2020

၁။ အကြောင်းအရာပါကိစ္စနှင့်ပတ်သက်၍ Rohto – Mentholatum (Myanmar) Co., Ltd. မှ ရန်ကုန်တိုင်းဒေသကြီး၊ မင်္ဂလာဒုံမြို့နယ်၊ မင်္ဂလာဒုံစက်မှုဇုန်၊ အမှတ် (ဒီ–၅) တွင် အကောင်အထည်ဖော်ဆောင်ရွက်လျက်ရှိသည့် ဓာတုပစ္စည်းနှင့်ဆက်စပ်ပစ္စည်းများ သိုလှောင်ခြင်း၊ တင်သွင်းခြင်း၊ သယ်ယူပို့ဆောင်ခြင်း၊ လက်ဝယ်ထားရှိခြင်း၊ အသုံးပြုခြင်း လုပ်ငန်းများနှင့်ပတ်သက်၍ လုပ်ငန်းလိုင်စင်လျှောက်ထားနိုင်ရေးအတွက် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၏ ပတ်ဝန်းကျင်ဆိုင်ရာ သဘောထားမှတ်ချက် ရယူရန် လိုအပ်ပါသဖြင့် ပတ်ဝန်းကျင်ဆိုင်ရာ သဘောထားမှတ်ချက် ပြန်ကြားပေးနိုင်ပါရန် ရည်ညွှန်းပါစာဖြင့် ရန်ကုန်တိုင်းဒေသကြီး၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနသို့ တင်ပြတောင်းခံလာပါသည်။

၂။ ရည်ညွှန်းပါစာဖြင့် တင်ပြလာသည့် စီမံကိန်းအဆိုပြုလွှာအပေါ် စိစစ်တွေ့ရှိချက်များအရ Rohto – Mentholatum (Myanmar) Co., Ltd. ၏ OTC Medicine နှင့် ဆေးဘက်ဝင်အလှကုန်ပစ္စည်းများ ထုတ်လုပ်ခြင်းလုပ်ငန်းအတွက် ဓာတုဗေဒလုပ်ငန်းလိုင်စင် လျှောက်ထားခြင်းဖြစ်ကြောင်း စိစစ်တွေ့ရှိရပါသဖြင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်းအပိုဒ် (၂၄)အရ စီမံကိန်းအဆိုပြုသူအနေဖြင့် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် (Environmental Management Plan – EMP) ရေးဆွဲဆောင်ရွက်ရန် လိုအပ်ကြောင်း စိစစ်တွေ့ရှိရပါသည်။

၂

၃။ သို့ဖြစ်ပါ၍ ရန်ကုန်တိုင်းဒေသကြီး၊ မင်္ဂလာဒုံမြို့နယ်၊ မင်္ဂလာဒုံစက်မှုဇုန်၊ အမှတ် (ဒီ-၅) တွင် အကောင်အထည်ဖော် ဆောင်ရွက်လျက်ရှိသည့် Rohto–Mentholatum (Myanmar) Co., Ltd. အနေဖြင့် အောက်ဖော်ပြပါအချက်များအား လိုက်နာအကောင်အထည်ဖော် ဆောင်ရွက်ရန် လိုအပ်ပါကြောင်း သဘောထားမှတ်ချက် ပြန်ကြားအပ်ပါသည် -

(က) Rohto – Mentholatum (Myanmar) Co., Ltd. ၏ OTC Medicine နှင့် ဆေးဘက်ဝင် အလှကုန်ပစ္စည်းများ ထုတ်လုပ်ခြင်းလုပ်ငန်း စီမံကိန်းတစ်ခုလုံးအတွက် **ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအစီအစဉ် (Environmental Management Plan – EMP)** ရေးဆွဲရန်နှင့် အဆိုပါအစီရင်ခံစာအတွင်း အဆိုပြုလုပ်ငန်းတွင် ထည့်သွင်းအသုံးပြုမည့် ဓာတုပစ္စည်း နှင့် ဆက်စပ်ပစ္စည်းများကို သိုလှောင်ခြင်း၊ တင်သွင်းခြင်း၊ သယ်ယူပို့ဆောင်ခြင်း၊ လက်ဝယ်ထားရှိခြင်း၊ အသုံးပြုခြင်း လုပ်ငန်းများကြောင့် ဖြစ်ပေါ်လာနိုင်သည့် ပတ်ဝန်းကျင်နှင့်လူမှုရေးထိခိုက်မှုများနှင့် ၎င်းထိခိုက်မှုများအားအနည်းဆုံးဖြစ်စေရေး အတွက် ဆောင်ရွက်ထားရှိမည့် အစီအစဉ်များအား **တပေါင်းတစည်းတည်း** ထည့်သွင်း ရေးဆွဲ၍ ရန်ကုန်တိုင်းဒေသကြီး၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနသို့ ပေးပို့တင်ပြရန်၊

(ခ) ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် (EMP) အစီရင်ခံစာပြုစုခြင်းကို စီမံကိန်းအဆိုပြုသူ (လုပ်ငန်းရှင်) ကိုယ်တိုင် (သို့မဟုတ်) တတိယပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်းကို ခန့်အပ်ဆောင်ရွက်နိုင်ရန်၊

(ဂ) တတိယပုဂ္ဂိုလ် (သို့မဟုတ်) အဖွဲ့အစည်းအား ခန့်အပ်၍ ဆောင်ရွက်မည်ဆိုပါက ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနတွင် လုပ်ငန်းလိုင်စင် ရယူထားသော ပုဂ္ဂိုလ် (သို့မဟုတ်) အဖွဲ့အစည်းစာရင်းအား www.ecd.gov.mm/?q=third-party တွင် ဝင်ရောက်ကြည့်ရှု ခန့်အပ်ဆောင်ရွက်နိုင်ရန်၊

(ဃ) စီမံကိန်းနှင့်ပတ်သက်သည့် ပိုင်ရှင်ပြောင်းလဲခြင်း၊ အစီရင်ခံစာတွင် ဖော်ပြပါရှိသည့် ထုတ်လုပ်မှုပမာဏထက် ပိုမိုထုတ်လုပ်ခြင်း၊ လုပ်ငန်းလည်ပတ်မှု ဒီဇိုင်းများ ပြောင်းလဲခြင်း၊ လုပ်ငန်းတည်နေရာ ပြောင်းလဲခြင်း၊ လုပ်ငန်းရပ်ဆိုင်းခြင်း (သို့မဟုတ်) ပိတ်သိမ်းခြင်းများ ပြုလုပ်မည်ဆိုပါက မပြုလုပ်မီ ရန်ကုန်တိုင်းဒေသကြီး၊ ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဦးစီးဌာနသို့ တင်ပြသွားရန်၊

(င) စီမံကိန်းဝန်းကျင်တွင် နေထိုင်သော ဒေသခံပြည်သူများ၏ ဆန္ဒနှင့်သဘောထားများ ကို ရယူဆောင်ရွက်ရန်။

ခင်သီတာတင်

(ခင်သီတာတင်)
ညွှန်ကြားရေးမှူး
ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန
ရန်ကုန်တိုင်းဒေသကြီး

မိတ္တူကို

တိုင်းဒေသကြီးဦးစီးဌာနမှူး၊ စက်မှုကြီးကြပ်ရေးနှင့်စစ်ဆေးရေးဦးစီးဌာန၊ ရန်ကုန်တိုင်းဒေသကြီး
ရုံးလက်ခံ၊ မျှောစာတွဲ၊ အမှုတွဲချုပ်

# Appendix (2): MIC Permit

Form (2)

Sr. No. 18012
Dated 31·12·2012

The Myanmar Investment Commission

PERMIT

Permit No. 532/ 2012 Date 31st December, 2012

The Myanmar Investment Commission issues this Permit under Section 10 of the Republic of the Union of Myanmar Foreign Investment Law -

(a) Name of Promoter MR. MASAYA SAITO

(b) Citizenship JAPANESE

(c) Address 1-7-25-914, HIRANO-HIGASHI, HIRANO-KU, OSAKA, JAPAN

(d) Name and Address of principal organization ROHTO PHARMACEUTICAL CO.,LTD. 1-8-1, TATSUMI-NISHI, IKUNO-KU, OSAKA 544-8666, JAPAN

(e) Place of incorporation JAPAN

(f) Type of business in which investment is to be made MANUFACTURING AND MARKETING OF OTC MEDICINES & COSMETICS

(g) Place(s) at which investment is permitted PLOT NO. D-5, MINGALADON INDUSTRIAL PARK , MIGALADON TOWNSHIP, YANGON REGION

(h) Amount of foreign capital US $ 12.438 MILLION

(i) Period for bringing in foreign capital WITHIN TEN YEARS FROM THE DATE OF ISSUANCE OF MIC PERMIT

(j) Total amount of capital (Kyat) EQUIVALENT IN KYAT OF US $ 12.438 MILLION

(k) Permitted duration of investment 36 YEARS

(l) Name of the economic organization to be formed in Myanmar ROHTO-MENTHOLATUM (MYANMAR) CO.,LTD.

Chairman
The Myanmar Investment Commission

ပုံစံ (၂)

ပြည်ထောင်စုသမ္မတ မြန်မာနိုင်ငံတော် မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှုကော်မရှင်
စာအမှတ် ၁၃၀၁၂
ရက်စွဲ ၃၁.၁၂.၂၀၁၂

**မြန်မာနိုင်ငံ ရင်းနှီးမြှုပ်နှံမှု ကော်မရှင်**
**ခွင့်ပြုမိန့်**

ခွင့်ပြုမိန့်အမှတ် ၅၃၂/၂၀၁၂ ၂၀၁၂ ခုနှစ်၊ ဒီဇင်ဘာလ ၃၁ ရက်

ပြည်ထောင်စုသမ္မတ မြန်မာနိုင်ငံတော် နိုင်ငံခြား ရင်းနှီးမြှုပ်နှံမှု ဥပဒေ ပုဒ်မ (၁၀) အရ ဤခွင့်ပြုမိန့်ကို မြန်မာနိုင်ငံ ရင်းနှီးမြှုပ်နှံမှု ကော်မရှင်က ထုတ်ပေးလိုက်သည် -

(က) **ကမကထပြုသူ၏အမည်** MR. MASAYA SAITO

(ခ) **မည်သည့် နိုင်ငံသား** JAPANESE

(ဂ) **နေရပ်လိပ်စာ** 1-7-25-914, HIRANO-HIGASHI, HIRANO-KU, OSAKA, JAPAN

(ဃ) **ပင်မအဖွဲ့အစည်းအမည်နှင့် လိပ်စာ** ROHTO PHARMACEUTICAL CO.,LTD. 1-8-1, TATSUMI-NISHI, IKUNO-KU, OSAKA 544-8666, JAPAN

(င) **ဖွဲ့စည်းရာအရပ်** JAPAN

(စ) **ရင်းနှီးမြှုပ်နှံမှုပြုလုပ်မည့်လုပ်ငန်းအမျိုးအစား** ဆေးဘက်ဝင်အလှကုန်ပစ္စည်းများ ထုတ်လုပ်ခြင်းနှင့် ဖြန့်ဖြူးရောင်းချခြင်းလုပ်ငန်း

(ဆ) **ရင်းနှီးမြှုပ်နှံမှုပြုလုပ်ခွင့်ပြုသည့်အရပ်ဒေသ(များ)** မြေကွက်အမှတ် ဒီ-၅ မင်္ဂလာဒုံစက်မှုဇုန်၊ မင်္ဂလာဒုံမြို့နယ်၊ ရန်ကုန်တိုင်းဒေသကြီး

(ဇ) **နိုင်ငံခြားမတည်ငွေရင်း** အမေရိကန်ဒေါ်လာ ၁၂.၄၃၈ သန်း

(ဈ) **နိုင်ငံခြားမတည်ငွေရင်းယူဆောင်လာရမည့်ကာလ** ကော်မရှင်ခွင့်ပြုမိန့် ရရှိပြီး (၁၀)နှစ်အတွင်း

(ည) **စုစုပေါင်း မတည်ငွေရင်းပမာဏ(ကျပ်)** အမေရိကန် ဒေါ်လာ ၁၂.၄၃၈ သန်း နှင့် ညီမျှသော မြန်မာကျပ်ငွေ

(ဋ) **ရင်းနှီးမြှုပ်နှံခွင့်ပြုသည့် သက်တမ်း** ၃၆ နှစ်

(ဌ) **မြန်မာနိုင်ငံတွင်ဖွဲ့စည်းမည့်စီးပွားရေးအဖွဲ့အစည်းအမည်** ROHTO-MENTHOLATUM (MYANMAR) CO.,LTD.

ဥက္ကဋ္ဌ
မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှု ကော်မရှင်

# Appendix (3): Company Registration

ကုမ္ပဏီမှတ်ပုံတင်လက်မှတ်

Certificate of Incorporation

**ရိုဟ်တို မန်သိုလတမ်(မြန်မာ) ကုမ္ပဏီလီမိတက်**

**ROHTO-MENTHOLATUM (MYANMAR) COMPANY LIMITED**

Company Registration No. 106149046

မြန်မာနိုင်ငံကုမ္ပဏီများအက်ဥပဒေ ၁၉၁၄ ခုနှစ် အရ
**ရိုဟ်တို မန်သိုလတမ်(မြန်မာ) ကုမ္ပဏီလီမိတက်**
အား ၂၀၁၂ ခုနှစ် စက်တင်ဘာလ ၁၄ ရက်နေ့တွင်
အစုရှယ်ယာအားဖြင့် တာဝန်ကန့်သတ်ထား သည့် အများနှင့်မသက်ဆိုင်သောကုမ္ပဏီ
အဖြစ် ဖွဲ့စည်းမှတ်ပုံတင်ခွင့် ပြုလိုက်သည်။

This is to certify that
**ROHTO-MENTHOLATUM (MYANMAR) COMPANY LIMITED**
was incorporated under the Myanmar Companies Act 1914 on 14 September 2012 as a Private Company Limited by Shares.

ကုမ္ပဏီမှတ်ပုံတင်အရာရှိ
Registrar of Companies
ရင်းနှီးမြှုပ်နှံမှုနှင့်ကုမ္ပဏီများညွှန်ကြားမှုဦးစီးဌာန
Directorate of Investment and Company Administration

Former Registration No. 106FC/2012-2013

DIRECTORATE OF INVESTMENT AND COMPANY ADMINISTRATION

## Myanmar Companies Online Registry - Company Extract

**Company Name (English)**
ROHTO-MENTHOLATUM (MYANMAR) COMPANY LIMITED

**Company Name (Myanmar)**
ရိုဟ်တို မန်သိုလာတမ်(မြန်မာ) ကုမ္ပဏီလီမိတက်

### Company Information

| | | |
|---|---|---|
| **Registration Number**<br>106149046 | **Registration Date**<br>14/09/2012 | **Status**<br>Registered |
| **Company Type**<br>Private Company Limited by Shares | **Foreign Company**<br>Yes | **Small Company**<br>No |
| **Principal Activity**<br>- | **Date of Last Annual Return**<br>- | **Previous Registration Number**<br>106FC/2012-2013 |

### Addresses

| | |
|---|---|
| Registered Office In Union | Room (1110) 11th floor, Yuzana Tower, Shwegondaing road<br>YANGON, Bahan TOWNSHIP<br>YANGON, Myanmar 11201 |
| Principal Place Of Business In Union | Plot No. D 5, Mingalardon insdustrial Park, , Corner of No. 3 Highway road & Khayabin road<br>Yangon, Mingalardon Township<br>Yangon, Myanmar 11021 |

### Officers

| | | | |
|---|---|---|---|
| Name: | SANDA SHWE | Type: | Director |
| Date of Appointment: | 01/08/2018 | Date of Birth: | 10/03/1964 |
| Nationality: | Myanmar | N.R.C./Passport: | 12/MAYAKA(N)106275 |
| Gender: | Female | Business Occupation: | - |
| Name: | SHUNSUKE SHINODA | Type: | Director |
| Date of Appointment: | 01/08/2018 | Date of Birth: | 02/02/1982 |
| Nationality: | Japan | N.R.C./Passport: | TZ1325033 |
| Gender: | Male | Business Occupation: | Director |
| Name: | TAKAKO HIRATA | Type: | Director |
| Date of Appointment: | 01/08/2018 | Date of Birth: | 04/05/1970 |
| Nationality: | Japan | N.R.C./Passport: | TK2047792 |
| Gender: | Female | Business Occupation: | Director |
| Name: | HIROFUMI SHIRAMATSU | Type: | Director |
| Date of Appointment: | 01/08/2018 | Date of Birth: | 26/11/1964 |
| Nationality: | Japan | N.R.C./Passport: | TZ1273086 |
| Gender: | Male | Business Occupation: | Chairman |

### Ultimate Holding Company

Page 1 of 2
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DIRECTORATE OF INVESTMENT AND COMPANY ADMINISTRATION

## Myanmar Companies Online Registry - Company Extract

**Company Name (English)**
ROHTO-MENTHOLATUM (MYANMAR) COMPANY LIMITED

**Company Name (Myanmar)**
ရိုဟ်တို မန်သိုလတမ်(မြန်မာ) ကုမ္ပဏီလီမိတက်

| Name of Ultimate Holding Company | Jurisdiction of Incorporation | Registration Number |
|---|---|---|
| Rohto Pharmaceutical Company Limited | Japan | 120001019253 |

### Share Capital Structure

**Total Shares Issue by Company**
41,323

**Currency of Share Capital**
MMK

| Class | Description | Total Number | Total Amount Paid | Total Amount Unpaid |
|---|---|---|---|---|
| ORD | Ordinary | 41,323 | 4,132,300,000 | 0 |

### Members

Name of Company: ROHTO-MENTHOLATUM (VIETNAM) COMPANY LIMITED
Registration Number: 370023769 Jurisdiction of Incorporation: Viet Nam

| Class | Description | Total Number | Total Amount Paid | Total Amount Unpaid |
|---|---|---|---|---|
| ORD | Ordinary | 826 | 82,600,000 | 0 |

Name of Company: ROHTO PHARMACEUTICAL COMPANY LIMITED
Registration Number: 120001019253 Jurisdiction of Incorporation: Japan

| Class | Description | Total Number | Total Amount Paid | Total Amount Unpaid |
|---|---|---|---|---|
| ORD | Ordinary | 40,497 | 4,049,700,000 | 0 |

### Mortgages and Charges

| Form / Filing Type | Effective Date |
|---|---|
| *No records available* | |

*Details about all mortgages and charges can be accessed from the Company Profile Filing History at no charge.*

### Filing History

| Form/ Filing Type | Effective Date |
|---|---|
| B-1 \| Application for re-registration of a private company limited by shares | 19/12/2018 |

Page 2 of 2
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# Appendix (4): Company Registration of Green Myanmar Environmental Services Co., Ltd.

ကုမ္ပဏီမှတ်ပုံတင်လက်မှတ်

Certificate of Incorporation

**စိမ်းလန်းမြန်မာ ပတ်ဝန်းကျင်ဆိုင်ရာ ဝန်ဆောင်မှု ကုမ္ပဏီလီမိတက်**

**GREEN MYANMAR ENVIRONMENTAL SERVICES COMPANY LIMITED**

Company Registration No. 110299931

မြန်မာနိုင်ငံကုမ္ပဏီများအက်ဥပဒေ ၁၉၁၄ ခုနှစ် အရ

**စိမ်းလန်းမြန်မာ ပတ်ဝန်းကျင်ဆိုင်ရာ ဝန်ဆောင်မှု ကုမ္ပဏီလီမိတက်**

အား ၂၀၁၂ ခုနှစ် အောက်တိုဘာလ ၃ ရက်နေ့တွင်

အစုရှယ်ယာအားဖြင့် တာဝန်ကန့်သတ်ထား သည့် အများနှင့်မသက်ဆိုင်သောကုမ္ပဏီ

အဖြစ် ဖွဲ့စည်းမှတ်ပုံတင်ခွင့် ပြုလိုက်သည်။

This is to certify that

**GREEN MYANMAR ENVIRONMENTAL SERVICES COMPANY LIMITED**

was incorporated under the Myanmar Companies Act 1914 on 3 October 2012 as a Private Company Limited by Shares.

ကုမ္ပဏီမှတ်ပုံတင်အရာရှိ

Registrar of Companies

ရင်းနှီးမြှုပ်နှံမှုနှင့်ကုမ္ပဏီများညွှန်ကြားမှုဦးစီးဌာန

Directorate of Investment and Company Administration

Former Registration No. 2744/2012-2013

# Appendix (5): Certificate for Transitional Consultant Registration of Organization

REPUBLIC OF THE UNION OF MYANMAR

**Ministry of Natural Resources and Environmental Conservation**

CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION

(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 0006 Date 01 JUL 2017

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the organization under Environmental Impact Assessment Procedure, Notification No. 616/2015.

(ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၅၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို အဖွဲ့အစည်းအား ထုတ်ပေးလိုက်သည်။)

| | | |
|---|---|---|
| (a) | Name of Organization (အဖွဲ့အစည်းအမည်) | Green Myanmar Environmental Services Co., Ltd. |
| (b) | Name of the representative in the organization (အဖွဲ့အစည်းကိုယ်စားလှယ်၏ အမည်) | Engr. U Sein Thaung Oo |
| (c) | Citizenship of the representative in the organization (အဖွဲ့အစည်းကိုယ်စားလှယ်၏ နိုင်ငံသား) | Myanmar |
| (d) | Identity Card /Passport Numberof the representative person in the organization (အဖွဲ့အစည်းကိုယ်စားလှယ်၏ မှတ်ပုံတင်/နိုင်ငံကူးလက်မှတ် အမှတ်) | 12/ Ma Ya Ka (N) 082871 |
| (e) | Address of organization (ဆက်သွယ်ရန်လိပ်စာ) | 115, Kanaung Min Thargyi Road, Hlaing Thar Yar Industrial City, Zone (1), Hlaing Thar Yar Township, Yangon. gmescompany@gmail.com , 09 5122448 |
| (f) | Type of Consultancy (အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား) | Organization |
| (g) | Duration of validity (သက်တမ်းကုန်ဆုံးရက်) | 31 March 2018 |

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended for one year from (1.4.2018) to (31.3.2019)
ဤလက်မှတ်အား (၁-၄-၂၀၁၈) ရက်နေ့မှ (၃၁-၃-၂၀၁၉) ရက်နေ့အထိ တစ်နှစ်သက်တမ်း တိုးမြှင့်သည်။
Soe Naing 14.9.2018
For Director General
(Soe Naing, Director)
Environmental Conservation Department

Director General
Environmental Conservation Department
Ministry of Natural Resources and Environmental Conservation

**Areas of Expertise Permitted**
(ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. Air Pollution Control
2. Facilitation of meeting
3. Meteorology, Modeling for Air Quality
4. Risk Assessment and Hazard Management
5. Socio-Economy
6. Water Pollution Control
7. Waste Management
8. Chemical Engineering Plant Design
9. Chemical Engineering Process Design
10. Chemical Engineering, Laboratory Analysis for water and waste water
11. Environmental Management
12. Industrial Management

**EXTENSION** (သက်တမ်းတိုးမြှင့်ခြင်း)
The VALIDITY of this certificate is extended for one year from (1.1.2022) to (31.12.2022)
ဤလက်မှတ်အား(၁-၁-၂၀၂၂) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၂) ရက်နေ့အထိ တစ်နှစ် သက်တမ်းတိုးမြှင့်သည်။
Soe Naing
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended for nine months from (1.4.2019) to (31.12.2019)
ဤလက်မှတ်အား(၁-၄-၂၀၁၉) ရက်နေ့မှ (၃၁-၁၂-၂၀၁၉) ရက်နေ့အထိ (၉)လ သက်တမ်းတိုးမြှင့်သည်။
Soe Naing 12.6.2019
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended for six month from (1.1.2021) to (30.6.2021)
ဤလက်မှတ်အား(၁-၁-၂၀၂၁) ရက်နေ့မှ (၃၀-၆-၂၀၂၁) ရက်နေ့အထိ (၆)လ သက်တမ်းတိုးမြှင့်သည်။
Soe Naing
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended for one year from (1.1.2020) to (31.12.2020)
ဤလက်မှတ်အား(၁-၁-၂၀၂၀) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၀) ရက်နေ့အထိ တစ်နှစ်သက်တမ်းတိုးမြှင့်သည်။
Soe Naing
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended for six months from (1.7.2021) to (31.12.2021)
ဤလက်မှတ်အား(၁-၇-၂၀၂၁) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၁) ရက်နေ့အထိ (၆)လ သက်တမ်းတိုးမြှင့်သည်။
Soe Naing
For Director General
(Soe Naing, Director)
Environmental Conservation Department

## Appendix (6): Certificate for Transitional Consultant Registration of Personal

REPUBLIC OF THE UNION OF MYANMAR

Ministry of Natural Resources and Environmental Conservation

CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION

(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 0019 Date 7 JUL 2017

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the person under Environmental Impact Assessment Procedure, Notification No. 616/2015.

(ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၆၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို လူပုဂ္ဂိုလ်အားထုတ်ပေးလိုက်သည်။)

| | | |
|---|---|---|
| (a) | Name of Consultant (အကြံပေးပုဂ္ဂိုလ်အမည်) | Engr. U Kyaw Soe Win |
| (b) | Citizenship (နိုင်ငံသား) | Myanmar |
| (c) | Identity Card / Passport Number (မှတ်ပုံတင်/နိုင်ငံကူးလက်မှတ် အမှတ်) | 12/ Ou Ka Ta (Naing) 038453 |
| (d) | Address (ဆက်သွယ်ရန်လိပ်စာ) | No. 155, Kanaung Min Thargyi Road, Hlaing Thar Yar Industrial City, Zone(1), Hlaing Thar Yar Township, Yangon<br>gmescompany@gmail.com<br>ksw1963@gmail.com , 09 5081451 |
| (e) | Organization (အဖွဲ့အစည်း) | Green Myanmar Environmental Services Company Limited |
| (f) | Type of Consultancy (အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား) | Person |
| (g) | Duration of validity (သက်တမ်းကုန်ဆုံးရက်) | 31 March 2018 |

EXTENSION
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended for one year from (1.4.2018) to (31.3.2019)
ဤလက်မှတ်အား (၁-၄-၂၀၁၈) ရက်နေ့မှ (၃၁-၃-၂၀၁၉) ရက်နေ့အထိ တစ်နှစ်သက်တမ်း တိုးမြှင့်သည်။
Soe Naing 14.9.2018
For Director General
(Soe Naing, Director)
Environmental Conservation Department

Director General
Environmental Conservation Department
Ministry of Natural Resources and Environmental Conservation

## Areas of Expertise Permitted
## (ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. Facilitation of meeting

2. Industrial Management

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended
for nine months from (1.4.2019) to (31.12.2019)
ဤလက်မှတ်အား (၁-၄-၂၀၁၉) ရက်နေ့မှ (၃၁.၁၂.၂၀၁၉)
ရက်နေ့အထိ (၉)လသက်တမ်း တိုးမြှင့်သည်။
Soe Naing 12.6.2019
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended
for six month from (1.1.2021) to (30.6.2021)
ဤလက်မှတ်အား(၁-၁-၂၀၂၁) ရက်နေ့မှ (၃၀-၆-၂၀၂၁)
ရက်နေ့အထိ (၆)လ သက်တမ်းတိုးမြှင့်သည်။
Soe Naing
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended
for one year from (1.1.2020) to (31.12.2020)
ဤလက်မှတ်အား(၁-၁-၂၀၂၀) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၀)
ရက်နေ့အထိ တစ်နှစ်သက်တမ်းတိုးမြှင့်သည်။
Soe Naing 16.1.2020
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended
for six months from (1.7.2021) to (31.12.2021)
ဤလက်မှတ်အား(၁-၇-၂၀၂၁) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၁)
ရက်နေ့အထိ (၆)လ သက်တမ်းတိုးမြှင့်သည်။
Soe Naing
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION** (သက်တမ်းတိုးမြှင့်ခြင်း)
The VALIDITY of this certificate is extended
for one year from (1.1.2022) to (31.12.2022)
ဤလက်မှတ်အား(၁-၁-၂၀၂၂) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၂)
ရက်နေ့အထိ တစ်နှစ်သက်တမ်းတိုးမြှင့်သည်။
Soe Naing 25.3.2022
For Director General
(Soe Naing, Director)
Environmental Conservation Department

# REPUBLIC OF THE UNION OF MYANMAR

## Ministry of Natural Resources and Environmental Conservation

### CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION

(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 0023 Date [illegible]

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the person under Environmental Impact Assessment Procedure, Notification No. 616/2015.

(ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၆၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို လူပုဂ္ဂိုလ်အားထုတ်ပေးလိုက်သည်။)

| | | |
|---|---|---|
| (a) | Name of Consultant<br>(အကြံပေးပုဂ္ဂိုလ်အမည်) | Engr. U Sein Thaung Oo |
| (b) | Citizenship<br>(နိုင်ငံသား) | Myanmar |
| (c) | Identity Card / Passport Number<br>(မှတ်ပုံတင်/နိုင်ငံကူးလက်မှတ်အမှတ်) | 12/ Ma Ya Ka (N) 082871 |
| (d) | Address<br>(ဆက်သွယ်ရန်လိပ်စာ) | No. 17/D, Aung Theikdi Yeik Thar, Mayangone Township, Yangon.<br>gmescompany@gmail.com , seinthaungoo@gmail.com<br>09 5122448 |
| (e) | Organization<br>(အဖွဲ့အစည်း) | Green Myanmar Environmental Services Co.,Ltd. |
| (f) | Type of Consultancy<br>(အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား) | Person |
| (g) | Duration of validity<br>(သက်တမ်းကုန်ဆုံးရက်) | 31 March 2018 |

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
**The VALIDITY of this certificate is extended for one year from (1.4.2018) to (31.3.2019)**
ဤလက်မှတ်အား (၁-၄-၂၀၁၈) ရက်နေ့မှ (၃၁-၃-၂၀၁၉) ရက်နေ့အထိ တစ်နှစ်သက်တမ်း တိုးမြှင့်သည်။
Soe Naing 14.9.2018
**For Director General**
**(Soe Naing, Director)**
**Environmental Conservation Department**

Director General
Environmental Conservation Department
Ministry of Natural Resources and Environmental Conservation

## Areas of Expertise Permitted
## (ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. Air Pollution Control

2. Chemical Engineering Process Design, Industrial Management

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended
for nine months from (1.4.2019) to (31.12.2019)
ဤလက်မှတ်အား (၁-၄-၂၀၁၉) ရက်နေ့မှ (၃၁.၁၂.၂၀၁၉)
ရက်နေ့အထိ (၉)လသက်တမ်း တိုးမြှင့်သည်။
Soe Naing 12.6.2019
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended
for six month from (1.1.2021) to (30.6.2021)
ဤလက်မှတ်အား(၁-၁-၂၀၂၁) ရက်နေ့မှ (၃၀-၆-၂၀၂၁)
ရက်နေ့အထိ (၆)လသက်တမ်းတိုးမြှင့်သည်။
Soe Naing
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended
for one year from (1.1.2020) to (31.12.2020)
ဤလက်မှတ်အား(၁-၁-၂၀၂၀) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၀)
ရက်နေ့အထိ တစ်နှစ်သက်တမ်းတိုးမြှင့်သည်။
Soe Naing 16.1.2020
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended
for six months from (1.7.2021) to (31.12.2021)
ဤလက်မှတ်အား(၁-၇-၂၀၂၁) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၁)
ရက်နေ့အထိ (၆)လ သက်တမ်းတိုးမြှင့်သည်။
Soe Naing
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION** (သက်တမ်းတိုးမြှင့်ခြင်း)
The VALIDITY of this certificate is extended
for one year from (1.1.2022) to (31.12.2022)
ဤလက်မှတ်အား(၁-၁-၂၀၂၂) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၂)
ရက်နေ့အထိ တစ်နှစ်သက်တမ်းတိုးမြှင့်သည်။
Soe Naing 25-3-2022
For Director General
(Soe Naing, Director)
Environmental Conservation Department

## REPUBLIC OF THE UNION OF MYANMAR

### Ministry of Natural Resources and Environmental Conservation

CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION
(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 0021 Date [illegible]

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the person under Environmental Impact Assessment Procedure, Notification No. 616/2015.
(ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၅၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို လူပုဂ္ဂိုလ်အားထုတ်ပေးလိုက်သည်။)

| | | |
|---|---|---|
| (a) | Name of Consultant<br>(အကြံပေးပုဂ္ဂိုလ်အမည်) | Engr. Daw Khin Swe Aye |
| (b) | Citizenship<br>(နိုင်ငံသား) | Myanmar |
| (c) | Identity Card / Passport Number<br>(မှတ်ပုံတင်/နိုင်ငံကူးလက်မှတ် အမှတ်) | 12/Sa Kha Na (N) 017708 |
| (d) | Address<br>(ဆက်သွယ်ရန်လိပ်စာ) | 14 B, Wai Lu Wun Main Street, Sanchaung, Yangon.<br>khinsweaye.daw@gmail.com , 09 5015475 |
| (e) | Organization<br>(အဖွဲ့အစည်း) | Green Myanmar Environmental Services Co.,Ltd. |
| (f) | Type of Consultancy<br>(အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား) | Person |
| (g) | Duration of validity<br>(သက်တမ်းကုန်ဆုံးရက်) | 31 March 2018 |

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended for one year from (1.4.2018) to (31.3.2019)
ဤလက်မှတ်အား (၁-၄-၂၀၁၈) ရက်နေ့မှ (၃၁-၃-၂၀၁၉) ရက်နေ့အထိ တစ်နှစ်သက်တမ်း တိုးမြှင့်သည်။
Soe Naing 14.9.2018
For Director General
(Soe Naing, Director)
Environmental Conservation Department

Director General
Environmental Conservation Department
Ministry of Natural Resources and Environmental Conservation

Areas of Expertise Permitted
(ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. Air Pollution Control

2. Waste Management

EXTENSION
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended for nine months from (1.4.2019) to (31.12.2019)
ဤလက်မှတ်အား (၁-၄-၂၀၁၉) ရက်နေ့မှ (၃၁.၁၂.၂၀၁၉) ရက်နေ့အထိ (၉)လသက်တမ်း တိုးမြှင့်သည်။
12.6.2019
For Director General
(Soe Naing, Director)
Environmental Conservation Department

EXTENSION
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended for six month from (1.1.2021) to (30.6.2021)
ဤလက်မှတ်အား (၁-၁-၂၀၂၁) ရက်နေ့မှ (၃၀-၆-၂၀၂၁) ရက်နေ့အထိ (၆)လ သက်တမ်းတိုးမြှင့်သည်။
For Director General
(Soe Naing, Director)
Environmental Conservation Department

EXTENSION
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended for one year from (1.1.2020) to (31.12.2020)
ဤလက်မှတ်အား (၁-၁-၂၀၂၀) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၀) ရက်နေ့အထိ တစ်နှစ်သက်တမ်းတိုးမြှင့်သည်။
16.1.2020
For Director General
(Soe Naing, Director)
Environmental Conservation Department

EXTENSION
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended for six months from (1.7.2021) to (31.12.2021)
ဤလက်မှတ်အား (၁-၇-၂၀၂၁) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၁) ရက်နေ့အထိ (၆)လ သက်တမ်းတိုးမြှင့်သည်။
For Director General
(Soe Naing, Director)
Environmental Conservation Department

EXTENSION (သက်တမ်းတိုးမြှင့်ခြင်း)
The VALIDITY of this certificate is extended for one year from (1.1.2022) to (31.12.2022)
ဤလက်မှတ်အား (၁-၁-၂၀၂၂) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၂) ရက်နေ့အထိ တစ်နှစ်သက်တမ်းတိုးမြှင့်သည်။
25-3-2022
For Director General
(Soe Naing, Director)
Environmental Conservation Department

REPUBLIC OF THE UNION OF MYANMAR

Ministry of Natural Resources and Environmental Conservation

CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION

(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 00028 Date 01 JUL 2017

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the person under Environmental Impact Assessment Procedure, Notification No. 616/2015.

(ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၅၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို လူပုဂ္ဂိုလ်အားထုတ်ပေးလိုက်သည်။)

| | | |
|---|---|---|
| (a) | Name of Consultant<br>(အကြံပေးပုဂ္ဂိုလ်အမည်) | Prof. Engr. Daw Tin May Soe |
| (b) | Citizenship<br>(နိုင်ငံသား) | Myanmar |
| (c) | Identity Card / Passport Number<br>(မှတ်ပုံတင်/နိုင်ငံကူးလက်မှတ် အမှတ်) | 12/ Ka Ma Ya (N) 016072 |
| (d) | Address<br>(ဆက်သွယ်ရန်လိပ်စာ) | 115, Kanaung Min Thargyi Road, Hlaing Thar Yar Industrial City, Zone (1), Hlaing Thar Yar Township, Yangon.<br>tinmaysoe949@gmail.com , 09 5077081 |
| (e) | Organization<br>(အဖွဲ့အစည်း) | Green Myanmar Environmental Services Co., Ltd. |
| (f) | Type of Consultancy<br>(အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား) | Person |
| (g) | Duration of validity<br>(သက်တမ်းကုန်ဆုံးရက်) | 31 March 2018 |

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended for one year from (1.4.2018) to (31.3.2019)
ဤလက်မှတ်အား (၁-၄-၂၀၁၈) ရက်နေ့မှ (၃၁.၃.၂၀၁၉) ရက်နေ့အထိ တစ်နှစ်သက်တမ်း တိုးမြှင့်သည်။
Soe Naing 14.9.2018
For Director General
(Soe Naing, Director)
Environmental Conservation Department

Director General
Environmental Conservation Department
Ministry of Natural Resources and Environmental Conservation

## Areas of Expertise Permitted
## (ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. Water Pollution Control

2. Chemical Engineering Process Design

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended for six month from (1.1.2021) to (30.6.2021)
ဤလက်မှတ်အား(၁-၁-၂၀၂၁) ရက်နေ့မှ (၃၀-၆-၂၀၂၁) ရက်နေ့အထိ (၆)လ သက်တမ်းတိုးမြှင့်သည်။
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended for nine months from (1.4.2019) to (31.12.2019)
ဤလက်မှတ်အား (၁-၄-၂၀၁၉) ရက်နေ့မှ (၃၁-၁၂-၂၀၁၉) ရက်နေ့အထိ (၉)လသက်တမ်း တိုးမြှင့်သည်။
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended for six months from (1.7.2021) to (31.12.2021)
ဤလက်မှတ်အား(၁-၇-၂၀၂၁) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၁) ရက်နေ့အထိ (၆)လ သက်တမ်းတိုးမြှင့်သည်။
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended for one year from (1.1.2020) to (31.12.2020)
ဤလက်မှတ်အား(၁-၁-၂၀၂၀) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၀) ရက်နေ့အထိ တစ်နှစ်သက်တမ်းတိုးမြှင့်သည်။
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION** (သက်တမ်းတိုးမြှင့်ခြင်း)
The VALIDITY of this certificate is extended for one year from (1.1.2022) to (31.12.2022)
ဤလက်မှတ်အား(၁-၁-၂၀၂၂) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၂) ရက်နေ့အထိ တစ်နှစ်သက်တမ်းတိုးမြှင့်သည်။
For Director General
(Soe Naing, Director)
Environmental Conservation Department

REPUBLIC OF THE UNION OF MYANMAR

Ministry of Natural Resources and Environmental Conservation

CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION

(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 0026 Date 07 JUL 2017

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the person under Environmental Impact Assessment Procedure, Notification No. 616/2015.

(ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၆၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို လူပုဂ္ဂိုလ်အားထုတ်ပေးလိုက်သည်။)

| | | |
|---|---|---|
| (a) | Name of Consultant<br>(အကြံပေးပုဂ္ဂိုလ်အမည်) | U Myo Myint |
| (b) | Citizenship<br>(နိုင်ငံသား) | Myanmar |
| (c) | Identity Card / Passport Number<br>(မှတ်ပုံတင်/နိုင်ငံကူးလက်မှတ်အမှတ်) | 12/ Pa Ba Ta (N) 015315 |
| (d) | Address<br>(ဆက်သွယ်ရန်လိပ်စာ) | 115, Kanaung Min Thargyi Road, Hlaing Thar Yar Industrial City, Zone (1), Hlaing Thar Yar Township, Yangon.<br>gmescompany@gmail.com , 09 2012723 |
| (e) | Organization<br>(အဖွဲ့အစည်း) | Green Myanmar Environmental Services Co.,Ltd. |
| (f) | Type of Consultancy<br>(အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား) | Person |
| (g) | Duration of validity<br>(သက်တမ်းကုန်ဆုံးရက်) | 31 March 2018 |

EXTENSION
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended for one year from (1.4.2018) to (31.3.2019)
ဤလက်မှတ်အား (၁-၄-၂၀၁၈) ရက်နေ့မှ (၃၁-၃-၂၀၁၉) ရက်နေ့အထိ တစ်နှစ်သက်တမ်း တိုးမြှင့်သည်။
Soe Naing 14.9.2018
For Director General
(Soe Naing, Director)
Environmental Conservation Department

3.7.2017

Director General
Environmental Conservation Department
Ministry of Natural Resources and Environmental Conservation

## Areas of Expertise Permitted
## (ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. Chemical Engineering, Laboratory Analysis for Water and Wastewater

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended
for six month from (1.1.2021) to (30.6.2021)
ဤလက်မှတ်အား(၁-၁-၂၀၂၁) ရက်နေ့မှ (၃၀-၆-၂၀၂၁)
ရက်နေ့အထိ (၆)လ သက်တမ်းတိုးမြှင့်သည်။
Soe Naing
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended
for nine months from (1.4.2019) to (31.12.2019)
ဤလက်မှတ်အား (၁-၄-၂၀၁၉) ရက်နေ့မှ (၃၁.၁၂.၂၀၁၉)
ရက်နေ့အထိ (၉)လသက်တမ်း တိုးမြှင့်သည်။
Soe Naing 12.6.2019
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended
for six months from (1.7.2021) to (31.12.2021)
ဤလက်မှတ်အား(၁-၇-၂၀၂၁) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၁)
ရက်နေ့အထိ (၆)လ သက်တမ်းတိုးမြှင့်သည်။
Soe Naing
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended
for one year from (1.1.2020) to (31.12.2020)
ဤလက်မှတ်အား(၁-၁-၂၀၂၀) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၀)
ရက်နေ့အထိ တစ်နှစ်သက်တမ်းတိုးမြှင့်သည်။
Soe Naing 15.1.2020
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION** (သက်တမ်းတိုးမြှင့်ခြင်း)
The VALIDITY of this certificate is extended
for one year from (1.1.2022) to (31.12.2022)
ဤလက်မှတ်အား(၁-၁-၂၀၂၂) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၂)
ရက်နေ့အထိ တစ်နှစ်သက်တမ်းတိုးမြှင့်သည်။
Soe Naing 25.3.2022
For Director General
(Soe Naing, Director)
Environmental Conservation Department

# REPUBLIC OF THE UNION OF MYANMAR

## Ministry of Natural Resources and Environmental Conservation

### CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION

(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 0022    Date 11 JUL 2017

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the person under Environmental Impact Assessment Procedure, Notification No. 616/2015.

(ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၆၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို လူပုဂ္ဂိုလ်အားထုတ်ပေးလိုက်သည်။)

| | | |
|---|---|---|
| (a) | Name of Consultant<br>(အကြံပေးပုဂ္ဂိုလ်အမည်) | Daw Khin Shwe Htay |
| (b) | Citizenship<br>(နိုင်ငံသား) | Myanmar |
| (c) | Identity Card / Passport Number<br>(မှတ်ပုံတင်/နိုင်ငံကူးလက်မှတ် အမှတ်) | 12/ Tha Ga Ka (N) 008808 |
| (d) | Address<br>(ဆက်သွယ်ရန်လိပ်စာ) | No. 115, Kanaung Min Thargyi Road, Hlaing Thar Yar Industrial City, Zone (1), Hlaing Thar Yar Township, Yangon<br>shwehtay.khin@gmail.com , 09 5032910 |
| (e) | Organization<br>(အဖွဲ့အစည်း) | Green Myanmar Environmental Services Co.,Ltd. |
| (f) | Type of Consultancy<br>(အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား) | Person |
| (g) | Duration of validity<br>(သက်တမ်းကုန်ဆုံးရက်) | 31 March 2018 |

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
**The VALIDITY of this certificate is extended for one year from (1.4.2018) to (31.3.2019)**
ဤလက်မှတ်အား (၁-၄-၂၀၁၈) ရက်နေ့မှ (၃၁-၃-၂၀၁၉) ရက်နေ့အထိ တစ်နှစ်သက်တမ်း တိုးမြှင့်သည်။
Soe Naing 14.9.2018
For Director General
(Soe Naing, Director)
Environmental Conservation Department

Director General
Environmental Conservation Department
Ministry of Natural Resources and Environmental Conservation

## Areas of Expertise Permitted
## (ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. Water Pollution Control

2. Waste Management

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended
for nine months from (1.4.2019) to (31.12.2019)
ဤလက်မှတ်အား (၁-၄-၂၀၁၉) ရက်နေ့မှ (၃၁.၁၂.၂၀၁၉)
ရက်နေ့အထိ (၉)လသက်တမ်း တိုးမြှင့်သည်။
12.6.2019
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended
for six month from (1.1.2021) to (30.6.2021)
ဤလက်မှတ်အား(၁-၁-၂၀၂၁) ရက်နေ့မှ (၃၀-၆-၂၀၂၁)
ရက်နေ့အထိ (၆)လ သက်တမ်းတိုးမြှင့်သည်။
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended
for one year from (1.1.2020) to (31.12.2020)
ဤလက်မှတ်အား(၁-၁-၂၀၂၀) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၀)
ရက်နေ့အထိ တစ်နှစ်သက်တမ်းတိုးမြှင့်သည်။
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended
for six months from (1.7.2021) to (31.12.2021)
ဤလက်မှတ်အား(၁-၇-၂၀၂၁) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၁)
ရက်နေ့အထိ (၆)လ သက်တမ်းတိုးမြှင့်သည်။
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION** (သက်တမ်းတိုးမြှင့်ခြင်း)
The VALIDITY of this certificate is extended
for one year from (1.1.2022) to (31.12.2022)
ဤလက်မှတ်အား(၁-၁-၂၀၂၂) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၂)
ရက်နေ့အထိ တစ်နှစ်သက်တမ်းတိုးမြှင့်သည်။
25.3.2022
For Director General
(Soe Naing, Director)
Environmental Conservation Department

# REPUBLIC OF THE UNION OF MYANMAR

## Ministry of Natural Resources and Environmental Conservation

### CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION

(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 00025　　　　Date [illegible]

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the person under Environmental Impact Assessment Procedure, Notification No. 616/2015.
(ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၆၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို လူပုဂ္ဂိုလ်အားထုတ်ပေးလိုက်သည်။)

| | | |
|---|---|---|
| (a) | Name of Consultant<br>(အကြံပေးပုဂ္ဂိုလ်အမည်) | U Khin Aung |
| (b) | Citizenship<br>(နိုင်ငံသား) | Myanmar |
| (c) | Identity Card / Passport Number<br>(မှတ်ပုံတင်/နိုင်ငံကူးလက်မှတ်အမှတ်) | 12/ Ma Ya Ka (N) 047032 |
| (d) | Address<br>(ဆက်သွယ်ရန်လိပ်စာ) | 115, Kanaung Min Thargyi Road, Hlaing Thar Yar Industrial City, Zone (1), Hlaing Thar Yar Township, Yangon.<br>khinaung1@gmail.com , 09 43066741 |
| (e) | Organization<br>(အဖွဲ့အစည်း) | Green Myanmar Environmental Services Co.,Ltd. |
| (f) | Type of Consultancy<br>(အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား) | Person |
| (g) | Duration of validity<br>(သက်တမ်းကုန်ဆုံးရက်) | 31 March 2018 |

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
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Soe Naing 14.9.2018
For Director General
(Soe Naing, Director)
Environmental Conservation Department

Director General
Environmental Conservation Department
Ministry of Natural Resources and Environmental Conservation

**Areas of Expertise Permitted**
**(ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)**

1. Socio-Economy

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended
for nine months from (1.4.2019) to (31.12.2019)
ဤလက်မှတ်အား (၁-၄-၂၀၁၉) ရက်နေ့မှ (၃၁.၁၂.၂၀၁၉)
ရက်နေ့အထိ (၉)လသက်တမ်း တိုးမြှင့်သည်။
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended
for one year from (1.1.2020) to (31.12.2020)
ဤလက်မှတ်အား(၁-၁-၂၀၂၀) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၀)
ရက်နေ့အထိ တစ်နှစ်သက်တမ်းတိုးမြှင့်သည်။
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended
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ဤလက်မှတ်အား(၁-၁-၂၀၂၁) ရက်နေ့မှ (၃၀-၆-၂၀၂၁)
ရက်နေ့အထိ (၆)လ သက်တမ်းတိုးမြှင့်သည်။
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION**
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended
for six months from (1.7.2021) to (31.12.2021)
ဤလက်မှတ်အား(၁-၇-၂၀၂၁) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၁)
ရက်နေ့အထိ (၆)လ သက်တမ်းတိုးမြှင့်သည်။
For Director General
(Soe Naing, Director)
Environmental Conservation Department

**EXTENSION** (သက်တမ်းတိုးမြှင့်ခြင်း)
The VALIDITY of this certificate is extended
for one year from (1.1.2022) to (31.12.2022)
ဤလက်မှတ်အား(၁-၁-၂၀၂၂) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၂)
ရက်နေ့အထိ တစ်နှစ်သက်တမ်းတိုးမြှင့်သည်။
For Director General
(Soe Naing, Director)
Environmental Conservation Department

# Appendix (7): Calibration Certificates of Instruments

## Haz-Scanner (EPAS)

### Certificate of Calibration

*Certificate Number: EDCQP200-4.11.5*

**Environmental Devices Corporation** certifies the Haz-Scanner model EPAS is calibrated to published specifications and NIST traceable.

Calibration Dust Specifications are NIST traceable using Coulter Mutisizer II e. ISO12103 –1 A2 Fine Test Dust and is designed to agree with EPA Class I and Class III FRM and FEM particulate samplers and monitors and EN 12341 and EN 14907 standards.

Gas sensors are Calibrated against NIST/EPA traceable Calibration Gas using NIST primary Flow Standard: LFE774300 to ISO 17025 and EPA Instrumental Test Methods as defined by 40 CFR Part 60.

Quality system standard to meet the requirements of ANSI/ASQC standard Q9000-1994 (ISO 9001), MIL-STD 45662A, and customer's specification if required.

**Temperature = 22°C**
**Relative Humidity = 30%**
**Atmospheric Pressure = 760 mmHg**
**Measurement Uncertainty Estimated @ 95% Confidence Level (k=2) using ISO 17025 guidelines.**

| Model | Serial Number | Calibration Date | Next Calibration Due |
|---|---|---|---|
| EPAS | 919223 | June 24, 2019 | June 2020 |

| Calibration Span Accessory if purchased | Sensor A | Sensor B | Model : |
|---|---|---|---|
| | K=19500 | K=12500 | CS-105 |

| Technician | Supervisor |
|---|---|
| Dan Okuniewicz | Mark Sullivan |

Environmental Devices Corporation
4 Wilder Drive Building #15
Plaistow, NH 03865
ISO-9001 Certified

## Noise Level Meter

Trust, only one you can find here!

**Amigos**
International Co., Ltd.

Head Office - SH- B5(4), Malikha Housing, Yadanar Road, 14/ Bawamyint Quarter, Thingangyun Township, Yangon, Myanmar.
Ph : 01-856 6717, 856 0135, 856 9732, 09 - 502 5972, Hot Line : 09 - 730 87709, 09 - 492 25984, 09-261 [illegible], 09-252 429734, 09-[illegible]9735, Fax : 01 - 856 6717
Branch Office - No.(13/7), Mya Sandar Road, Between 26 x 27 & 62 x 63 Street, Mandalay. Ph: 09-261 [illegible], 09-250 678 505

AMIGOS INTERNATIONAL CO., LTD. MYANMAR
No ....................
Date ..................

To

Green Myanmar Environmental Service

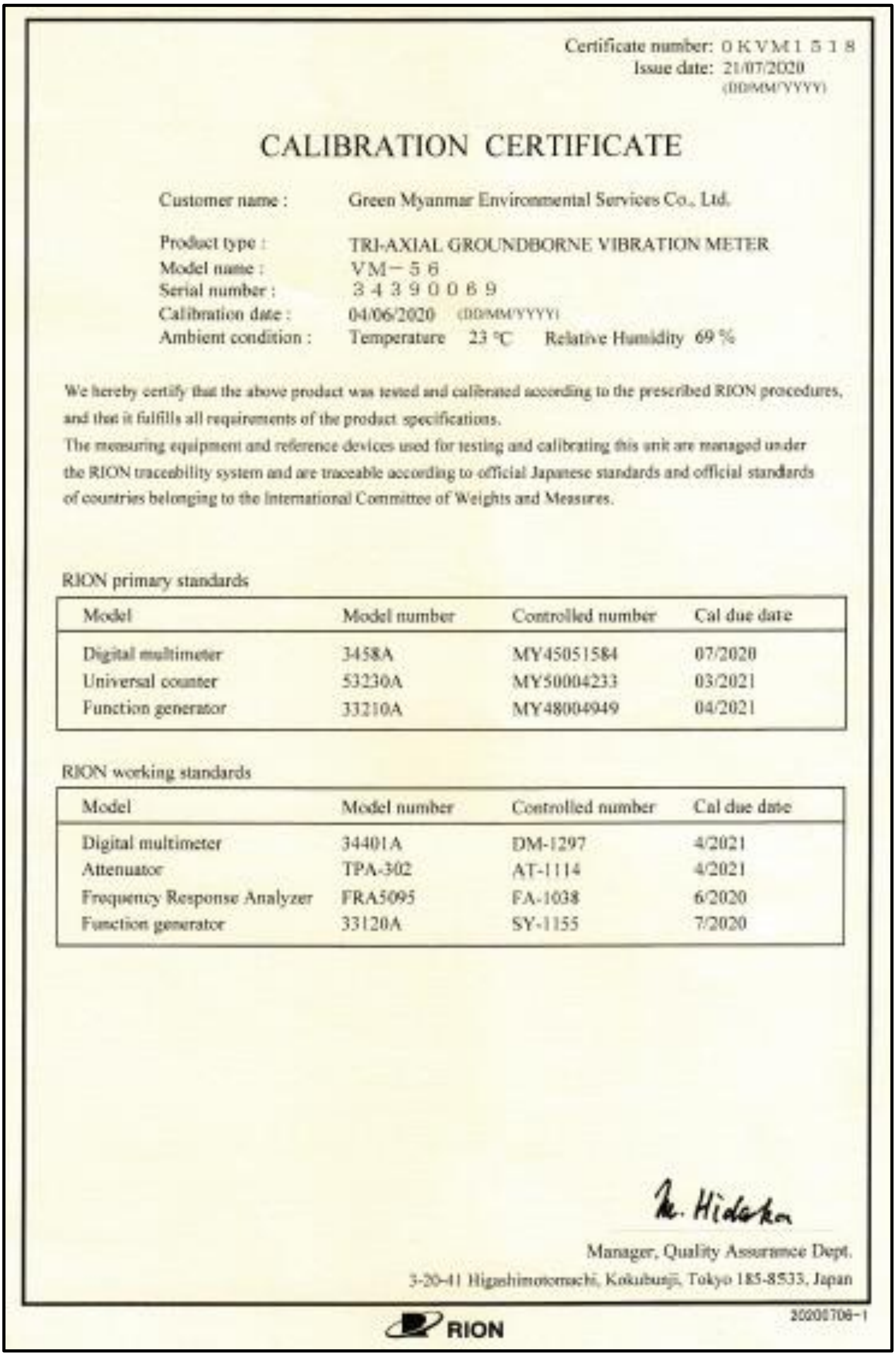
Calibration Date : 18/2/2019

### Service Certificate

We here by certified that Sound Level Meter, GM 1356, S/N- CX : 1294184 is servicing by Amigos Service and Technical Support Department( Amigos International Co.,Ltd ).

Ywet Nu Nge
Senior Engineer(Incharge)
Amigos International Co., Ltd

## Vibration Meter



Certificate number: 0KVM1518
Issue date: 21/07/2020 (DD/MM/YYYY)

# CALIBRATION CERTIFICATE

Customer name : Green Myanmar Environmental Services Co., Ltd.

Product type : TRI-AXIAL GROUNDBORNE VIBRATION METER
Model name : VM−56
Serial number : 34390069
Calibration date : 04/06/2020 (DD/MM/YYYY)
Ambient condition : Temperature 23 ℃ Relative Humidity 69 %

We hereby certify that the above product was tested and calibrated according to the prescribed RION procedures, and that it fulfills all requirements of the product specifications.
The measuring equipment and reference devices used for testing and calibrating this unit are managed under the RION traceability system and are traceable according to official Japanese standards and official standards of countries belonging to the International Committee of Weights and Measures.

RION primary standards

| Model | Model number | Controlled number | Cal due date |
|---|---|---|---|
| Digital multimeter | 3458A | MY45051584 | 07/2020 |
| Universal counter | 53230A | MY50004233 | 03/2021 |
| Function generator | 33210A | MY48004949 | 04/2021 |

RION working standards

| Model | Model number | Controlled number | Cal due date |
|---|---|---|---|
| Digital multimeter | 34401A | DM-1297 | 4/2021 |
| Attenuator | TPA-302 | AT-1114 | 4/2021 |
| Frequency Response Analyzer | FRA5095 | FA-1038 | 6/2020 |
| Function generator | 33120A | SY-1155 | 7/2020 |

M. Hidaka
Manager, Quality Assurance Dept.
3-20-41 Higashimotomachi, Kokubunji, Tokyo 185-8533, Japan

RION
20200706−1

## MIX-6

# Calibration Certificate

Pangolin Protective Equipment Company Limited. ★ No: Date:

Instrument SN: 1807109-001
Calibration Date: 12/9/2021
Part Number: MX6-000DR211
Job Number: 180710
Setup Date: 7/12/2018
Setup Technician: IW
Created By: iNet
Battery: 3-Cell Lithium Battery Pack
Assigned User: Green Myanmar Environmental Services

| Sensor SN | Sensor Type | Gas Type | Factor | Span Gas | Span Reserve | Passed/Failed | Gas Alert | Alarm Low | Alarm High | Alarm TWA | Alarm STEL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 170907H079 | LEL | Pentane | Pentane | 25.00 | 136.00% | Passed | 0.00 | 10.00 | 20.00 | N/A | N/A |
| 1806060033 | PID | Isobutylene | | 100.00 | 193.60% | Passed | 0.00 | 100.00 | 200.00 | 100.00 | 200.00 |

| Sensor SN | Sensor Type | Cal Date/Time | Cylinder ID | Cylinder Exp | Zero Cylinder Id | Zero Cylinder Exp |
|---|---|---|---|---|---|---|
| 170907H079 | LEL | 12/9/2021 1:21:22 PM (GMT+06:30) | 236817BC318096 | 2/26/2022 | Fresh Air | N/A |
| 1806060033 | PID | 12/9/2021 1:19:23 PM (GMT+06:30) | 1114354-105 | 4/29/2024 | Fresh Air | N/A |

: Green Myanmar Co.,Ltd. Next Calibration Due Date is June 2022. Email: saikhinnyunt@pangolin.com.mm. Contact Number: 01-667159, 09-401624520

1807109-001

**Combustion Analyzer**

KANE

www.kane.co.uk
**Kane International Ltd**
Kane House, 11 Bessemer Road,
Welwyn Garden City, Hertfordshire, AL7 1GF, UK
UK: 0800 069 0800 Int: +44 (0) 1707 375550
Fax: +44 (0) 1707 393277 Email: sales@kane.co.uk

# Certificate of Calibration

Issued by: **Kane International Limited**

Date of Issue: 19/11/2019 Certificate No: **T1233A**

***Ambient Conditions:***
Temperature: ***21.9*** ℃. Humidity: ***46.0***%R.H. Barometric Pressure: ***1014.1*** mbar.

***Customer:*** *Lee Hung Scientific Pte Ltd*

***Description:*** Kane945

***Serial No./Ident:*** 094619400

***Our ref:*** 332391-1-1

| Equipment Traceability | Certificate No. | Dated |
|---|---|---|
| CO Gas 980 ppm | 143485SG | 25/01/19 |
| $O_2$ Gas 0.0% | 1196099 | 24/07/18 |
| $O_2$ Gas 10.04% | 145377 | 05/01/18 |
| NO Gas 977 ppm | 19/032354 | 17/10/19 |
| $SO_2$ Gas 1504 ppm | 256006 | 15/01/18 |
| Pressure DWT 15-1000 mbar | K16314 | 26/03/19 |
| Thermocouple Simulator TS2 | T1022A | 14/06/19 |

***TEST METHOD***

**Gas**: The test gas from a certified cylinder is delivered via a nominal 5mbar regulator to the analyser with the analyser pump on.

**Pressure**: The applied pressure signal is generated by a dead-weight tester with measurements taken at increasing pressure.

**Temperature**: The test signal is a voltage generated from a thermocouple simulator with values taken from the International Thermocouple Reference Tables, BS EN 60584-1:1996.

KANE

www.kane.co.uk
Kane International Ltd
Kane House, 11 Bessemer Road,
Welwyn Garden City, Hertfordshire, AL7 1GF, UK
UK: 0800 050 0800 Int: +44 (0) 1707 375550
Fax: +44 (0) 1707 393277 Email: sales@kane.co.uk

# Certificate of Calibration

Issued by: **Kane International Limited**

Certificate No: **T1233A**

| | Applied Gas Value | Instrument Reading |
|---|---|---|
| CO | 0 ppm | 0 ppm |
| | 980 ppm | 981 ppm |
| $O_2$ | 0 % | 0.0 % |
| | 10.0 % | 10.0 % |
| NO | 0 ppm | 0 ppm |
| | 977 ppm | 976 ppm |
| $SO_2$ | 0 ppm | 0 ppm |
| | 1504 ppm | 1501 ppm |
| | **Applied Pressure Value** | **Instrument Reading** |
| P1 | 0 mbar | 0.00 mbar |
| | 100 mbar | 100.0 mbar |
| | **Applied Temperature Value** | **Instrument Reading** |
| Flue (T1) | 0 °C | 0.2 °C |
| | 100 °C | 100.3 °C |
| | 500 °C | 500.3 °C |

Uncertainties assigned to the above measurements are:
**Gas**: ±2 % of reading +2 LSD. **Pressure**: ±0.05 % of reading +1 LSD **Temperature**: ±1 °C.

**Signature:**

**Date:** 19/11/2019

# Aeroquel

aeroqual

Aeroqual Limited
460 Rosebank Road, Avondale, Auckland 1026, New Zealand.
Phone: +64-9-623 3013 Fax: +64-9-623 3012
www.aeroqual.com

**Calibration Certificate No. 46372**

**Calibration Date: 19 Oct 2020 10:26**

**Model:** Carbon Monoxide 0-100ppm GSE

**Serial No: ECN-1510201-007**

**Environmental Conditions**

Temperature 25.2 °C

Relative Humidity 25.0 %

**Measurements**

| | | | | |
|---|---|---|---|---|
| Calibration Standard /ppm | 0.0 | 50.0 | 0.0 | 0.0 |
| AQL Sensor (Mean) /ppm | 0.0 | 50.2 | 0.0 | 0.0 |
| AQL Sensor (Std. Dev) /ppm | 0.000 | 0.060 | 0.000 | 0.000 |

*The Mean and Standard Deviation are calculated from three consecutive readings.

**Calibration Standard**

This sensor was calibrated against a certified mixture of carbon monoxide in synthetic air diluted with zero air using mass flow controllers with calibrations traceable to the National Institute of Standards and Technology (NIST).

**QC Approval:** **Takao Yamasaki**

**Date:** **19 Oct 2020**

# Appendix (8): Land Lease Agreement

## Sub-Lease Agreement

## Mingaladon Industrial Park

This Sub-Lease Agreement (hereinafter referred to as the "Agreement") is made at Yangon , on the 31 day of December, 2012 between;

1. **Mingaladon Industrial Park Co., Ltd.,** located at Corner of No. 3 Highway Road and Khayebin Road, Mingaladon Township, Yangon, The Republic of the Union of Myanmar. (hereinafter referred to as the "Lessor") on the one part.

and,

2. **ROHTO PHARMACEUTICAL CO., LTD.,** located at 1-8-1, Tatsuminishi, Ikuno-ku,, Osaka, Japan.(hereinafter referred to as the "Lessee") on the other part;

(The Lessor and the Lessee are hereinafter jointly referred to as the "Parties", including any successors by law to replace the "Parties" independently referred to as the "Party".)

**NOW, HEREBY MUTUALLY AGREES AS FOLLOWS;**

**Chapter 1. The Scope of the Agreement**

**Clause 1.** **1.1** The Lessor agrees to lease, and the Lessee agrees to take on the lease, **Plot No.D-5** as per the plan attached hereto as Exhibit A, which shall be deemed as an integral part hereof, the land with the total area of **10,004.00 square-meter** (hereinafter referred to as the "Land"),in the Mingaladon Industrial Park (hereinafter referred to as "MIP"), for the purpose of Manufacturing of Cosmetics & other health care products for the period commencing from the issuing date of the Physical Delivery Receipt pursuant to Clause 1.2 below and ending on the date 7th February, 2048 (hereinafter referred to as the "Lease Period").

*Mingaladon Industrial Park Co., Ltd* 1

**1.2** Subject to the full payment by the Lessee of the Land Use Premium under Clause 3.1 and **Myanmar Investment Commission's permit**, the land shall be delivered to the Lessee by issuing the Physical Delivery Receipt (hereinafter referred to as the "Receipt") attached hereto as **Exhibit B** by the Lessor provided that the Lessor have confirmed that the Lessee has satisfied all of its obligations stipulated within this Agreement.

**1.3** Any costs and expenses, which relates to the execution of this Agreement, of the Land and/or the Lessee's business in the MIP shall be borne by the Lessee.

**Chapter 2. Warranty and Representation**

**Clause 2.** Each Party represents and warrants to the other Party that it is a legal person duly authorised under the relevant laws and has the right power, sound financial standing and authority to enter into this Agreement.

**Chapter 3. Payment Terms**

**Clause 3.** **3.1** In consideration for the Lessee's right to take on the lease of the Land, the Lessee shall pay the Lessor land use premium (hereinafter referred to as the "Land Use Premium") totally amounting to **US$ 480,192.00 (United States Dollars Four Hundred and Eighty Thousand One Hundred and Ninety Two only)** as follows:-

**a. FIRST INSTALMENT**
The booking fee which has already been received by the Lessor under the Provisional Allotment amounting to **US$ 48,019.20 (United States Dollars Forty Eight Thousand Nineteen and Cents Twenty only)** (hereinafter referred to as the "First Instalment") shall be paid appropriated for the First Instalment of 10% (ten percent) of the Land Use Premium on the date of signing of this Agreement.

**b. SECOND INSTALMENT**
Within 30 days after signing of this Agreement, 50% (fifty percent) of the Land Use Premium amounting to **US$ 240,096.00 (United States Dollars Two Hundred and Forty Thousand Ninety Six only)** shall be paid to the Lessor (hereinafter referred to as the "Second Instalment") failing which Lessor shall have the right to terminate this Agreement at its own discretion and the First Instalment shall be forfeited.

*Mingaladon Industrial Park Co., Ltd* 2

**c. FINAL INSTALMENT**
40% (forty percent) of the Land Use Premium amounting to **US$ 192,076.80 (United States Dollars One Hundred and Ninety Two Thousand Seventy Six and Cents Eighty only)** (hereinafter referred to as the "Final Instalment") shall be paid to the Lessor by the Lessee either within 4 (four) months after signing of the Agreement or upon the Lessor's issuing of the Receipt whichever comes earlier, failing which the Lessor shall have the right to terminate this Agreement at its own discretion and the First Instalment and the Second Instalment shall be forfeited.

**3.2** Each instalment of the Land Use Premium shall only be deemed to be received by the Lessor after the said amounts in full had been remitted and credited to the bank account of the Lessor at the bank designated by the Lessor.

**Chapter 4. Annual Land Rent and Other Fees**

**Clause 4.** In addition to the above consideration, the Lessee shall pay the annual land rent (hereinafter referred to as the "Land Rent") on yearly basis at the rate of **US$ 0.30** (thirty cents)per year per one square meter, i.e. **US$ 3,001.20 (United States Dollars Three Thousand One and Cents Twenty only)** stipulated in Clause 1 herewith as well as the Management Fees and Utility Charges (hereinafter collectively referred to as the "Fees") to be paid in accordance with the estate conditions of the Mingaladon Industrial Park (hereinafter referred to as the "Additional Conditions") attached hereto as **Exhibit C.** The Lessee shall pay the Land Rent to the Lessor each year not later than the 5th day of December of the preceding year.

**Clause 5.** The Lessee hereby acknowledges and accepts the right of the Lessor to review and change the rate of the Land Rent at the end of every 5 (five) year period at a rate of no more than 15% (fifteen percent) of the previous rate.

**Clause 6.** **6.1** Whenever the cadastral surveying has been done and found that there is a change of area of the Land which does not conform to the area as stipulated in the Agreement, the Lessor shall inform the Lessee thereof to pay and the Lessee agrees to pay the new amount of the Land Use Premium, the Land Rent and the Fees, based on the adjusted area of the Land from the subsequent date of such notification.

**6.2** Subject to Clause 4 hereof, the Lessee and the Lessor agree that the balance of the Land Use Premium, the Land Rent and the Fees for the adjusted part of Land

*Mingaladon Industrial Park Co., Ltd* 3

measured by the Lessor during the period from the commencement date of the Lease Period to the date of the notification by the Lessor to the Lessee pursuant to the first paragraph of this Clause 4 shall not be paid or reimbursed.

**Chapter 5. Event of Default**

**Clause 7.** If at any time and for any reason, the Lessee be in default in any payment of the Land Use Premium, the Land Rent and the Fees, the Lessee agrees to pay the Lessor the delayed interest at the rate of 18% (eighteen percent) per year for the unpaid portion of the Land Use Premium, the Land Rent and the Fees, as the case may be, until the date on which the payment is actually remitted and credited to the bank account of the Lessor stipulated in Clause 3.2.

**Chapter 6. Security of Annual Land Rent**

**Clause 8.** **8.1** The Lessee agrees to provide a security deposit (hereinafter referred to as the "Security") to the Lessor on the date of the signing of this Agreement by means of cash deposit (hereinafter referred to as the "Cash Deposit") equivalent to the amounts of the Land Rent stipulated in Clause 4.1 and Clause 5 amounting to **US$ 3,001.20 (United States Dollars Three Thousand One and Cents Twenty only).**

**8.2** If the Lessee, having received the Lessor's notice after causing any damages and/or losses to the Lessor or being in default of the Land Rent and the Fees caused by the Lessee, the Lessee agrees that the Lessor is entitled to deduct the amount due from the Cash Deposit.

**8.3** If the amount of the Cash Deposit falls below the full amount as prescribed in Clause 8.1 for whatsoever reason, the Lessee shall increase the amount of the Cash Deposit to attain such full amount within 45 (forty five) days from the date of the notification by the Lessor.

**8.4** If the Land Rent is changed by the Lessor pursuant to Clause 5 of the Agreement, the Lessee shall increase the amount of the Cash Deposit to attain such full amount within 45 (forty five) days from the date of the notification by the Lessor.

**8.5** The Security shall be returned to the Lessee with no interest thereon only if and when this Agreement expires or is terminated and all of the obligations of the Lessee have been deemed to be completed by the Lessee.

*Mingaladon Industrial Park Co., Ltd* 4

**Chapter 7. Ownership of Constructed Property and the Lessee's Duties**

**Clause 9.** All facilities and materials on the Land brought by the Lessee shall belong to the Lessee (hereunder referred to as the "Lessee's Properties").

**Clause 10.** The Lessor acknowledges that the Lessee's Properties except immovable assets may be mortgaged, pledged, or guaranteed against the Lessee's debts with financial institutions or any third parties. The Land lease right granted to the Lessee under this Agreement shall not be mortgaged, pledged or guaranteed for any purpose no matter whatsoever reasons or at any event.

**Clause 11.** Under Clause 10, the Lessee shall not assign or transfer the right to lease the Land to other persons nor transfer to other persons, in whole or in part, its rights or obligations hereunder nor do anything to endanger the Lessor's rights to the Land nor sublease the Land, without the Lessor's prior written approval which shall be issued at the Lessor's sole discretion and subject to the approval of the Myanmar Investment Commission. In such case, the Lessee shall abide by the Myanmar Companies Act, and other applicable Laws, rules and regulations stipulated by the Government and the relevant authorities.

**Clause 12.** **12.1** The Lessee shall strictly comply with the laws, rules, and regulations of the government and local authorities and observe the order of the Lessor or the Lessor's agent, relating to compliance with this Agreement.

**12.2** The Lessee shall ensure that his and/or her foreign personnel and their families shall abide by the Laws of The Republic of the Union of Myanmar and they shall not interfere in the internal affairs of The Republic of the Union of Myanmar.

**Clause 13.** Within the Lease Period, the Lessee permits the Lessor to inspect the factory building and any other building on the Land with the full cooperation of the Lessee.

**Clause 14.** The Lessee must keep the Land in good condition at his own expense throughout the Lease Period. The Lessee shall be responsible for any damage and losses occasioned to the Lessor from loss of possession of the Land due to intrusion by outsiders, *or* lose of any right and interest of the Lessor in respect of the Land due to negligence, default or wilful act of the Lessee, and the Lessee shall accordingly compensate the Lessor in full for such damages and losses.

*Mingaladon Industrial Park Co., Ltd* 5

**Clause 15.** The Lessee shall bear all taxes, duties and fees charged by the government or local authorities throughout the Lease Period on or relating to the payment of the Land Use Premium, the Land Rent or the Fees and/or its business on the Land.

**Clause 16.** Should the Lessor suffer damages for whatever reason, directly or indirectly, arising from the performance or non-performance by the Lessee, or its employees, agents, servants or visitors in relation to its business in MIP, the Lessee shall be liable for and shall make full compensation for such damages of whatsoever kind to the Lessor.

**Clause 17.** **17.1** The Lessee shall complete the construction of the factory building on the Land within the period of 2 (two) years or any longer period approved by the Lessor from the date of the commencement of the Lease.

**17.2** Should the Lessee fail to complete the construction work within such period, the Lessee agrees that this event shall constitute a breach of this Agreement, and the Lessor reserves the right to terminate this Agreement pursuant to Chapter 9 set out below and the Lessor shall have the right to re-enter into the said Land.

**Clause 18.** During the construction of the factory building on the Land, the Lessee shall agree to permit the Lessor or his agent to inspect the construction at all times. The Lease shall provide convenience and cooperative support and follow the Lessor's advice. Should the Lessor consider that any construction is not in accordance with the detailed Additional Conditions, the Lessor is entitled to instruct the Lessee to correct the construction and the Lessee shall make best efforts to observe the Lessor's instruction. If the Lessor considers that the said faults involve an essential element, the Lessor shall have the right to instruct the Lessee to stop the construction immediately. Any delay or damage arising therefrom cannot be claimed by any event for the extension of the construction period and/ or for reimbursement by the Lessor. Should the plan or the details of construction involve any fault the Lessee agree to let the Lessor decide and such decision shall be final.

**Clause 19.** The Lessee shall strictly abide by the Additional Conditions and other rules and conditions which shall be attached as an integral part of this Agreement. The Lessee shall comply in full with all the clauses contained therein. In the event of the Lessee's failing to do so, the Lessor shall serve a notice demanding the Lessee to observe and perform in accordance with the Agreement and the Additional Conditions within a specified period, and if the Lessee still fails to perform fully within that period, the Lessor shall sanction the Lessee in accordance with the codes mentioned in the Additional Conditions, and the Lessor shall have the right to terminate the Agreement at its sole discretion and to claim and receive from the Lessee all damages incurred directly or indirectly therefrom.

*Mingaladon Industrial Park Co., Ltd* 6

**Clause 20.** In the event of Lessee's failing to perform in accordance with any clause, apart from default of payment as specified in Chapter 5, the Lessor shall send a letter of notice to the Lessee demanding observance of the agreement within a specified period, and if the Lessee still does not fully perform within such period, then the Lessor shall have the right to terminate the Agreement at its sole discretion and to claim and receive from Lessee all damages incurred directly or indirectly therefrom.

**Chapter 8. Arbitration**

**Clause 21.** **21.1** If any dispute arises out of this Agreement or any other agreement or document executed in connection with this Agreement, the Parties hereto shall consult with each other in good faith in order to settle such dispute amicably.

**21.2** In the event that such dispute can not be settled amicably, it shall be settled in The Republic of the Union of Myanmar by Arbitration, through two arbitrators, each one of whom shall be appointed by each Party. Should the arbitrators fail to reach an agreement, then such dispute shall be referred to an Umpire nominated by those arbitrators. The decision of the arbitrators or the Umpire shall be final and binding upon both Parties.

**21.3** The Arbitration proceedings shall in all respects conform to the Myanmar Arbitration Act, 1944 (Myanmar Act IV, 1944) or any subsisting statutory modification thereof. The venue of Arbitration shall be in Yangon, The Republic of the Union of Myanmar. The Arbitration fees shall be borne by the losing Party.

**Chapter 9. Termination**

**Clause 22.** **22.1** Should the Agreement be terminated for one of the following reasons;

(a) Breach of condition of this Agreement by the other Party without rectification within 30 (thirty) days from the written notification of the other Party,
(b) Force Majeure persisting for more than 6 (six) months after the occurrence thereof,
(c) Incapability of implementing the original aims and object of the Lessee,

the Lessee agrees to stop operations immediately and remove all Lessee's Properties mentioned in Chapter 7 from the Land within 30 (thirty) days from the date of termination and return the Land to the Lessor in good condition. If the Lessee fails to do so, the Lessee agrees to pay the Lessor daily damages calculated as follows;

*Mingaladon Industrial Park Co., Ltd* 7

$$\frac{\text{Land Rent per year at the time of the termination x 20}}{365}$$

Until the Lessee shall have duly completed such removal and return. Regarding removal of the Lessee's Properties, the Lessee shall bear all related costs of such removal.

**22.2** If the Lessee fails to remove such Lessee's Properties or cannot complete the removal, the Lessee shall permit the Lessor to remove such Lessee's Properties and the Lessee shall bear all expenses and damages as mentioned in Clause 22.1 until the day which is deemed by the Lessor as the day of complete removal. In no event shall the Land Use Premium specified in Clause 3 be decreased or refunded due to the termination of the Agreement.

**Chapter 10. Notice**

**Clause 23.** Any notice or other communication required to be given or sent hereunder shall be in English and be left or sent by prepaid registered post (airmail, if overseas) or telex or electronic mail or facsimile transmission or international courier to the Party concerned at its address given underneath describing the names and addresses or such address as the Party concerned shall have notified in concurrence with this Clause to the other Party.

Lessor : Name : **Mingaladon Industrial Park Co., Ltd.**
Address : Corner of No.3 Highway Road and Khayebin Road, Mingaladon Township, Yangon, The Republic of the Union of Myanmar.

Lessee : Name: **ROHTO PHARMACEUTICAL CO., LTD.**
Address: 1-8-1, Tatsuminishi, Ikuno-ku, Osaka, Japan.

*Mingaladon Industrial Park Co., Ltd* 8

**Chapter 11. Governing Law**

**Clause 24.** **24.1** This Agreement shall be governed by and construed under the Laws of The Republic of the Union of Myanmar and the Parties hereby submit to the jurisdiction of the relevant Court of Myanmar and all Courts competent to hear appeals therefrom.

**24.2** .In the event that any provision of the Agreement is deemed invalid, unlawful or unenforceable under any applicable law, the validity, legality or enforceability of the remaining provisions of this Agreement shall not be affected or impaired and this Agreement shall be construed as if such invalid, unlawful or unenforceable provision had never been contained in this Agreement.

**Chapter 12. Force Majeure**

**Clause 25.** **25.1** If either Party is temporarily rendered unable wholly or partly by Force Majeure to perform its duties or accept the performance by the other Party under this Agreement, it is agreed that the affected Party shall give notice to the other Party within 14 (fourteen) days after the occurrence of the cause relied upon, giving full particulars in writing of such Force Majeure. The duties of such Party as are effected by such Force Majeure shall, with the approval of the other Party, be suspended during the continuance of the disability so caused, as far as possible, be removed with all reasonable dispatch. Neither Party shall be responsible for delay damage or loss caused by Force Majeure.

**25.2** The term, Force Majeure shall mean Acts of God, wars, strikes, lock outs, industrial disturbances, explosions, earthquakes, floods, typhoons, fires, storms or other causes similar to the kind herein enumerated which are beyond the control of either Party and which by exercise of due care and diligence, either Party is unable to overcome.

**Chapter 13. Mineral Resources and Treasures**

**Clause 26.** Mineral resources, treasure, gems and other natural resources discovered unexpectedly from, in or under the Land during the Lease Period of the Agreement shall be the property to the Government of The Republic of the Union of Myanmar and the Government of The Republic of the Union of Myanmar shall be at liberty to excavate the aforesaid at any time.

*Mingaladon Industrial Park Co., Ltd* 9

**Chapter 14. Protection of Environment**

**Clause 27.** The Lessee shall be responsible for the protection and preservation of the environment in and around the Land, and shall be able to control pollution of air, water and land and not to cause any environmental degradation. The Lessee shall also take necessary measures in order to make environmental protection such as installation of the waste water treatment plant and other treatment procedures to keep the Land environmental friendly.

**Chapter 15. Modification of the Agreement**

**Clause 28.** In the event that any situation or condition arises due to circumstances not envisaged in this Agreement and that it warrants amendments to this Agreement, the Parties hereto shall make necessary negotiations with a view to making such necessary amendments.

**Chapter 16. Retransfer of the Land**

**Clause 29.** **29.1** At the end of the Lease Period, the Lessee shall transfer the Land to Lessor within 3 (three) months in good condition, ground damages having been refilled or repaired.

**29.2** The Lessee shall have the right to be in possession and ownership of all movable properties which shall be removed at its own costs and/or disposed of within 3 (three) months, not affecting the Lessor's right to claim for the rent up to the date of complete evacuation and damages caused to the Land by the Lessee.

**29.3** Notwithstanding the above Clause 29.1, a new agreement for further period may be negotiated and agreed upon between the Parties before the expiry of the Lease Period upon the request of the Lessee.

**Chapter 17. Condition Precedent**

**Clause 30.** This Agreement shall become valid upon signing by the Parties hereof and validity of this Agreement shall be subject to and conditional upon receipt of the approval from Myanmar Investment Commission.

*Mingaladon Industrial Park Co., Ltd* 10

This Lease Agreement is made in triplicate having the same contents. Both Parties have read and thoroughly understood this document and the accompanying Additional Conditions of the MIP, and hereunto affix their signatures. Each Party shall keep one copy and the remaining one will be submitted to the official for registration.

**The Lessor:** On and behalf of
**Mingaladon Industrial Park Co., Ltd.**

| | |
|---|---|
| Win Zaw | Shigeo HANA |
| Chairman | Managing Director |

**The Lessee:** On the behalf of
**ROHTO PHARMACEUTICAL CO., LTD.**

Name : Masaya SAITO
Title : Director
In the present of

| | |
|---|---|
| Name : Myint Naing | Name: Sandar Shwe |
| Designation :Director(Admin & Estate) | Designation : Vice President |
| Address: Department of Human Settlement and Housing Development | Address: |

**EXHIBITS**
A:SITE PLAN OF MINGALADON INDUSTRIAL PARK
B:PHYSICAL DELIVERY RECEIPT
C:ADDITIONAL CONDITIONS FOR LEASE OF MINGALADON INDUSTRIAL PARK

*Mingaladon Industrial Park Co., Ltd* 11

## Appendix (9): Electrical Inspection License

စက်မှုဝန်ကြီးဌာန
ရန်ကုန်တိုင်းဒေသကြီး စက်မှုကြီးကြပ်ရေးနှင့်စစ်ဆေးရေးဦးစီးဌာန
လျှပ်စစ် - စစ်ဆေးရေးဌာန
အမှတ် - ၁၉၂၊ ကမ္ဘာအေးဘုရားလမ်း၊ ဗဟန်းမြို့နယ်၊ ရန်ကုန်မြို့

**လျှပ်စစ်ဓာတ်အားအသုံးပြုခြင်းဆိုင်ရာ အန္တရာယ်ကင်းရှင်းကြောင်းလက်မှတ်**

လက်မှတ်အမှတ်စဉ် EI/YD- ၆၄၅ /10-2021

၂၀၁၄ ခုနှစ် လျှပ်စစ်ဥပဒေ ပုဒ်မ ၃၂(ဃ) တွင် ပြဋ္ဌာန်းချက်အရ လျှပ်စစ်ဓာတ်အား အသုံးပြုခြင်းလုပ်ငန်းကို စစ်ဆေးရာတွင် လျှပ်စစ်ဥပဒေ ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းများနှင့် ကိုက်ညီကြောင်း စစ်ဆေးတွေ့ရှိရသဖြင့် အောက်ဖော်ပြပါ နေရာဒေသ၌ လျှပ်စစ်ဓာတ်အားအသုံးပြုခြင်း လုပ်ငန်းကို အန္တရာယ်ကင်းရှင်းကြောင်း လက်မှတ် ထုတ်ပေးလိုက်သည်။

၁။ လျှပ်စစ်ဓာတ်အားအသုံးပြုခြင်း

(က) သတ်မှတ်ဗို့အား — ၄၀၀/၂၃၀ ဗို့

(ခ) လုပ်ငန်းအမျိုးအမည် — ဆေးနှင့်အလှကုန်ပစ္စည်းထုတ်လုပ်ငန်း
Rohto Mentholatum (Myanmar) Co.,Ltd

(ဂ) ခွင့်ပြုဝန်အား — 172 HP+ 50 KVA (Generator)

၂။ နေရာဒေသ — ဒေါ်စန္ဒာရွှေ
အမှတ်(ဒီ-၅)၊ မင်္ဂလာဒုံစက်မှုဇုန်၊
မင်္ဂလာဒုံမြို့နယ်၊

(၃) လက်မှတ်ထုတ်ပေးသည့်ရက် — ၂၆ . ၁၀ . ၂၀၂၁

(၄) လက်မှတ်ကုန်ဆုံးသည့်ရက် — ၂၅ . ၁၀ . ၂၀၂၂

(ကျောဘက်တွင် ဖော်ပြထားသော စည်းကမ်းချက်များကို လိုက်နာရပါမည်။)

မှတ်ချက်။

စစ်ဆေးရေးမှူး
ရန်ကုန်တိုင်းဒေသကြီး လျှပ်စစ်စစ်ဆေးရေးဌာန

## Appendix (10): Retail and Whole Sale License

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်
ကျန်းမာရေးနှင့်အားကစားဝန်ကြီးဌာန

မြန်မာနိုင်ငံအစားအသောက်နှင့်ဆေးဝါးအာဏာပိုင်အဖွဲ့

ဆေးဝါး လက်လီ/လက်ကား ရောင်းချသူလိုင်စင်

အမျိုးသားဆေးဝါးဥပဒေပုဒ်မ(၅) ပုဒ်မခွဲ (ခ)အရ

ကျွမ်းကျင်သူများ [illegible] (Rohto Mentholatum) ၏

ကြီးကြပ်ကွပ်ကဲမှုဖြင့် [illegible] တွင် ပူးတွဲပါ စာရင်းဇယား၌ ဖော်ပြထား

သော ဆေးဝါးများကို လက်လီ/လက်ကား ရောင်းချနိုင်ရန် [illegible] D.5

[illegible] ၌ နေထိုင်သော

[illegible] (Rohto Mentholatum) အား ဆေးဝါး လက်လီ/လက်ကား ရောင်းချသူ

လိုင်စင် ထုတ်ပေးလိုက်သည်။

ဤလိုင်စင်သည် ရုပ်သိမ်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်းမခံရပါက [illegible]

နေ့အထိ အတည်ဖြစ်သည်။

လိုင်စင်အမှတ် [illegible]

ထုတ်ပေးသည့်ရက်စွဲ [illegible]

လက်မှတ် [signature]

အမည် Dr. [illegible]
SAMA.1204

ရာထူး

ရုံးတံဆိပ် [stamp]

## Appendix (11): Attendee list of Public Consultation Meeting

**Green Myanmar**
Environmental Services Co., Ltd
No.115, Kanaung Min Thar Gyi Road, Industrial Zone (1), Hlaing Thar Yar Industrial City, Yangon, Myanmar
Tel: 09 897 978 296, 09-5081451 E-mail: gmescompany@gmail.com, info@gmes-mm.com

ရန်ကုန်တိုင်းဒေသကြီး၊ မင်္ဂလာဒုံမြို့နယ်၊ မင်္ဂလာဒုံစက်မှုဇုန်ရှိ ...............အကွက်အမှတ် (ဒီ-၅)..................တွင်
လုပ်ကိုင်ဆောင်ရွက်လျက်ရှိသည့်

...........................................................................................................

...........................................................................................................

...ဆေးဝါးနှင့်အလှကုန်ပစ္စည်းများထုတ်လုပ်ခြင်းနှင့် ဖြန့်ဖြူးရောင်းချခြင်း... လုပ်ငန်း" အတွက်
ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်
**အစီရင်ခံစာရေးဆွဲခြင်းနှင့်ပတ်သက်၍ ဆွေးနွေးပွဲသို့တက်ရောက်သူများစာရင်း**

ရက်စွဲ ။ ။ ၂၀၂၀ ခုနှစ်၊ အောက်တိုဘာလ (၁၆)ရက်

| စဉ် | အမည် | ရာထူး/ဌာနရုံးအမည်/လိပ်စာ | လက်မှတ် |
|---|---|---|---|
| ၁ | ဒေါ်ညီညီလင်းသက် | [illegible] ၊ ရန်ကုန်မြောက်ပိုင်းခရိုင် ၊ ECD | [signature] |
| ၂ | [illegible] | CSR coordinator Foxlink Myanmar | [signature] |
| ၃ | [illegible] | CSR Foxlink Myanmar | [signature] |
| ၄ | [illegible] | EHS Foxlink Myanmar | [signature] |
| ၅ | [illegible] | (M) Asia Optical | [signature] |
| ၆ | [illegible] | (M) Asia optical. | [signature] |
| ၇ | [illegible] | (M) Asia optical. | [signature] |
| ၈ | ခင်ခင်ဝင်း | (M) Asia Optical | [signature] |
| ၉ | Thet Myo Htike | Snr Engineer, Rohto Factory | [signature] |
| ၁၀ | | | |
| ၁၁ | | | |
| ၁၂ | | | |
| ၁၃ | | | |

# Green Myanmar

## Environmental Services Co., Ltd

No.115, Kanaung Min Thar Gyi Road, Industrial Zone (1), Hlaing Thar Yar Industrial City,
Yangon, Myanmar
Tel: 09 897 978 296, 09-5081451 E-mail: gmescompany@gmail.com, info@gmes-mm.com

ရန်ကုန်တိုင်းဒေသကြီး၊ မင်္ဂလာဒုံမြို့နယ်၊ မင်္ဂလာဒုံစက်မှုဥယျာဉ်ရှိ ....................အကွက်အမှတ် (ဒီ-၅)..........တွင်
လုပ်ကိုင်ဆောင်ရွက်လျက်ရှိသည့်

..........................................................................................................................................

..........................................................................................................................................

...ဆေးဘက်ဝင်အလှကုန်ပစ္စည်းများထုတ်လုပ်ခြင်းနှင့် ဖြန့်ဖြူးရောင်းချခြင်း.. လုပ်ငန်း" အတွက်

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်

**အစီရင်ခံစာရေးဆွဲခြင်းနှင့်ပတ်သက်၍ ဆွေးနွေးပွဲသို့တက်ရောက်သူများစာရင်း**

*ရက်စွဲ ၊ ၂၀၂၀ ခုနှစ်၊ အောက်တိုဘာလ (၁၆)ရက်*

| စဉ် | အမည် | ရာထူး/စက်ရုံအမည်/လိပ်စာ | လက်မှတ် |
|---|---|---|---|
| ၁ | Su Su Hlaing | Asia Optical, Team Leader | [illegible] |
| ၂ | Zao xue lei | Asia Optical, ရုံး General ရေးရာ | [illegible] |
| ၃ | he ge ni | Asia Optical Team leader | HE GE NI |
| ၄ | Thet Myo Htike | Snr, Engineer, Rohto Mentholatum Myanmar | [illegible] |
| ၅ | U Naing Aye | Factory Manager (Rohto) | [illegible] |
| ၆ | Khin Pyone Cho | QA Supervisor (Rohto) | [illegible] |
| ၇ | Hnin Zabai | logistics (Rohto) | [illegible] |
| ၈ | | | |
| ၉ | | | |
| ၁၀ | | | |
| ၁၁ | | | |
| ၁၂ | | | |
| ၁၃ | | | |

## Appendix (12): Suggestion ltter from Public Consultation Meeting

**Green Myanmar**
Environmental Services Co., Ltd

ROHTO-MENTHOLATUM (MYANMAR) CO., LTD

(EMP)

CSR

Environmental Conservation Department - Yangon Region Facebook

09-5182798

ROHTO-MENTHOLATUM (MYANMAR) CO., LTD ၏ ရန်ကုန်တိုင်းဒေသကြီး မင်္ဂလာဒုံမြို့နယ်၊ မင်္ဂလာဒုံစက်မှုဇုန်၊ အကွက်အမှတ် (၁-၅) တွင် လုပ်ကိုင်ဆောင်ရွက်လျက်ရှိသည့် "ဆေးဝါးနှင့်အလှကုန်ပစ္စည်းများထုတ်လုပ်ခြင်းနှင့်ဖြန့်ဖြူးရောင်းချခြင်းလုပ်ငန်း" အတွက်

**ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် (EMP) အစီရင်ခံစာရေးဆွဲခြင်းနှင့်ပတ်သက်၍ အကြံပြုစာ**

ရင်းနှီးပွင့်လင်းစွာ အကြံပြုရေးသားနိုင်ပါကြောင်းနှင့်လူကြီးမင်းတို့၏ အကြံပြုချက်များကို တက်ရောက်လာသူများနှင့် တင်ပြဆွေးနွေး ပေးသွားမည်ဖြစ်ပါသည်။

| စဉ် | ဆွေးနွေးအကြံပြုချက် |
|---|---|
| | မရှိပါ. |

လက်မှတ် ..........................................

အမည် ..........................................

ဖုန်းနံပါတ် ..........................................

ဆက်သွယ်ရန်လိပ်စာ ..........................................

..........................................

ROHTO-MENTHOLATUM (MYANMAR) CO., LTD ၏ ရန်ကုန်တိုင်းဒေသကြီး မင်္ဂလာဒုံမြို့နယ်၊ မင်္ဂလာဒုံစက်မှုဇုန်၊ အကွက်အမှတ် (၁-၅) တွင် လုပ်ကိုင်ဆောင်ရွက်လျက်ရှိသည့် "ဆေးဝါးနှင့်အလှကုန်ပစ္စည်းများထုတ်လုပ်ခြင်းနှင့်ဖြန့်ဖြူးရောင်းချခြင်းလုပ်ငန်း" အတွက်

**ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် (EMP) အစီရင်ခံစာရေးဆွဲခြင်းနှင့်ပတ်သက်၍ အကြံပြုစာ**

ရင်းနှီးပွင့်လင်းစွာ အကြံပြုရေးသားနိုင်ပါကြောင်းနှင့်လူကြီးမင်းတို့၏ အကြံပြုချက်များကို တက်ရောက်လာသူများနှင့် တင်ပြဆွေးနွေး ပေးသွားမည်ဖြစ်ပါသည်။

| စဉ် | ဆွေးနွေးအကြံပြုချက် |
|---|---|
| | - [illegible] |

လက်မှတ် [illegible]

အမည် [illegible]

ဖုန်းနံပါတ် ..........................................

ဆက်သွယ်ရန်လိပ်စာ ..........................................

..........................................

ROHTO-MENTHOLATUM (MYANMAR) CO., LTD ၏ ရန်ကုန်တိုင်းဒေသကြီး၊ မင်္ဂလာဒုံမြို့နယ်၊
မင်္ဂလာဒုံစက်မှုဥယျာဉ်၊ အကွက်အမှတ် (ဒီ-၅) တွင် လုပ်ကိုင်ဆောင်ရွက်လျက်ရှိသည့်
"ဆေးဝါးအလှကုန်ပစ္စည်းများထုတ်လုပ်ခြင်းနှင့်ဖြန့်ဖြူးရောင်းချခြင်းလုပ်ငန်း" အတွက်

**ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် (EMP)အစီရင်ခံစာရေးဆွဲခြင်းနှင့်ပတ်သက်၍ အကြံပြုစာ**

ရင်းနှီးပွင့်လင်းစွာ အကြံပြုရေးသားနိုင်ပါကြောင်းနှင့်လူကြီးမင်းတို့၏ အကြံပြုချက်များကို စက်ရုံတာဝန် ရှိသူများနှင့် တင်ပြဆွေးနွေး ပေးသွားမည်ဖြစ်ပါသည်။

| စဉ် | ဆွေးနွေးအကြံပြုချက် |
|---|---|
| | မရှိပါ။ |

လက်မှတ် ---------- [illegible] ----------
အမည် ---------- [illegible] ----------
ဖုန်းနံပါတ် ---------- [illegible] ----------
ဆက်သွယ်ရန်လိပ်စာ ---------- [illegible] ----------

---

ROHTO-MENTHOLATUM (MYANMAR) CO., LTD ၏ ရန်ကုန်တိုင်းဒေသကြီး၊ မင်္ဂလာဒုံမြို့နယ်၊
မင်္ဂလာဒုံစက်မှုဥယျာဉ်၊ အကွက်အမှတ် (ဒီ-၅) တွင် လုပ်ကိုင်ဆောင်ရွက်လျက်ရှိသည့်
"ဆေးဝါးအလှကုန်ပစ္စည်းများထုတ်လုပ်ခြင်းနှင့်ဖြန့်ဖြူးရောင်းချခြင်းလုပ်ငန်း" အတွက်

**ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် (EMP)အစီရင်ခံစာရေးဆွဲခြင်းနှင့်ပတ်သက်၍ အကြံပြုစာ**

ရင်းနှီးပွင့်လင်းစွာ အကြံပြုရေးသားနိုင်ပါကြောင်းနှင့်လူကြီးမင်းတို့၏ အကြံပြုချက်များကို စက်ရုံတာဝန် ရှိသူများနှင့် တင်ပြဆွေးနွေး ပေးသွားမည်ဖြစ်ပါသည်။

| စဉ် | ဆွေးနွေးအကြံပြုချက် |
|---|---|
| | |

လက်မှတ် ---------- [illegible] ----------
အမည် ---------- [illegible] ----------
ဖုန်းနံပါတ် ---------- [illegible] ----------
ဆက်သွယ်ရန်လိပ်စာ ---------- Foxlink Myanmar ----------

ROHTO-MENTHOLATUM (MYANMAR) CO., LTD ၏ ရန်ကုန်တိုင်းဒေသကြီး၊ မင်္ဂလာဒုံမြို့နယ်၊
မင်္ဂလာဒုံစက်မှုဇုန်၊ အကွက်အမှတ် (ဒီ-၅) တွင် လုပ်ကိုင်ဆောင်ရွက်လျက်ရှိသည့်
"ဆေးဘက်ဝင်အလှကုန်ပစ္စည်းများထုတ်လုပ်ခြင်းနှင့်ဖြန့်ဖြူးရောင်းချခြင်းလုပ်ငန်း" အတွက်

**ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် (EMP)အစီရင်ခံစာရေးဆွဲခြင်းနှင့်ပတ်သက်၍ အကြံပြုစာ**

ရင်းနှီးပွင့်လင်းစွာ အကြံပြုရေးသားနိုင်ပါကြောင်းနှင့်လူကြီးမင်းတို့၏ အကြံပြုချက်များကို စက်ရုံတာဝန် ရှိသူများနှင့် တင်ပြဆွေးနွေး ပေးသွားမည်ဖြစ်ပါသည်။

| စဉ် | ဆွေးနွေးအကြံပြုချက် |
|---|---|
| | မရှိပါ |

လက်မှတ် ............ [signature]
အမည် ............ [illegible]
ဖုန်းနံပါတ် ............
ဆက်သွယ်ရန်လိပ်စာ ............ [illegible]
............

ROHTO-MENTHOLATUM (MYANMAR) CO., LTD ၏ ရန်ကုန်တိုင်းဒေသကြီး၊ မင်္ဂလာဒုံမြို့နယ်၊
မင်္ဂလာဒုံစက်မှုဇုန်၊ အကွက်အမှတ် (ဒီ-၅) တွင် လုပ်ကိုင်ဆောင်ရွက်လျက်ရှိသည့်
"ဆေးဘက်ဝင်အလှကုန်ပစ္စည်းများထုတ်လုပ်ခြင်းနှင့်ဖြန့်ဖြူးရောင်းချခြင်းလုပ်ငန်း" အတွက်

**ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် (EMP)အစီရင်ခံစာရေးဆွဲခြင်းနှင့်ပတ်သက်၍ အကြံပြုစာ**

ရင်းနှီးပွင့်လင်းစွာ အကြံပြုရေးသားနိုင်ပါကြောင်းနှင့်လူကြီးမင်းတို့၏ အကြံပြုချက်များကို စက်ရုံတာဝန် ရှိသူများနှင့် တင်ပြဆွေးနွေး ပေးသွားမည်ဖြစ်ပါသည်။

| စဉ် | ဆွေးနွေးအကြံပြုချက် |
|---|---|
| 1. | Future Plan တွင် Facial wash product များ ထုတ်လုပ်မှု တွင် mixing process နှင့် cleaning process များ ရှိလာမည် ဖြစ်သဖြင့် waste water treatment system အား regular maintain လုပ်ဆောင်သွားရန် ပါသည် |

လက်မှတ် ............ [signature] 16/10/2021
အမည် ............ Thet Myo Htike
ဖုန်းနံပါတ် ............ 09795702471
ဆက်သွယ်ရန်လိပ်စာ ............ Rohto, MIP
............

## Appendix (13): Requesting Letter form GMES to Project Proponent for Suggestion Letter on Public Consultaion Meeting

**Green Myanmar**
**Environmental Services Co., Ltd.**
No.115, Kanaung Min Thar Gyi Road, Industrial Zone (1), Hlaing Thar Yar Industrial City,
Yangon, Myanmar
Tel: 09 897 978 296, 09-5081451 E-mail: info@gmes-mm.com, gmescompany@gmail.com

သို့

တာဝန်ခံ
ROHTO-MENTHOLATUM (MYANMAR) CO., LTD
အကွက်အမှတ် (ဒီ-၅)၊ မင်္ဂလာဒုံစက်မှုဥယျာဉ်၊
မင်္ဂလာဒုံမြို့နယ်၊
ရန်ကုန်တိုင်းဒေသကြီး။

ရက်စွဲ - ၂၀၂၁ ခုနှစ်၊ နိုဝင်ဘာလ (၂၆) ရက်

**အကြောင်းအရာ။** ။ **ROHTO-MENTHOLATUM (MYANMAR) CO., LTD ၏ "ဆေးဘက်ဝင် အလှကုန်ပစ္စည်းများထုတ်လုပ်ခြင်းနှင့်ဖြန့်ဖြူးရောင်းချခြင်းလုပ်ငန်း" စက်ရုံ အတွက် အများပြည်သူများ၏ အကြံပြုချက်များ ညှိနှိုင်းပြန်ကြား ပေးပါရန်ကိစ္စ။**

အထက်အကြောင်းအရာပါကိစ္စနှင့်စပ်လျဉ်း၍ Green Myanmar Environmental Services Co., Ltd. နှင့် ROHTO-MENTHOLATUM (MYANMAR) CO., LTD တို့သည် အကွက်အမှတ် (ဒီ-၅)၊ မင်္ဂလာဒုံစက်မှုဥယျာဉ်၊ မင်္ဂလာဒုံမြို့နယ်၊ ရန်ကုန်တိုင်းဒေသကြီးရှိ **"ဆေးဘက်ဝင် အလှကုန်ပစ္စည်းများ ထုတ်လုပ်ခြင်းနှင့်ဖြန့်ဖြူးရောင်းချခြင်းလုပ်ငန်း"** စက်ရုံအတွက် **ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်** (Environmental Management Plan - EMP) အစီရင်ခံစာ ရေးဆွဲပေးရန် သဘောတူစာချုပ် ချုပ်ဆိုခဲ့ကြပါသည်။ အစီရင်ခံစာတွင် အများပြည်သူသဘောထားရယူခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ပြန်ခြင်းခေါင်းစဉ်အတွက် ရေးသားဖော်ပြရန် ၂၀၂၁ ခုနှစ် အောက်တိုဘာလ (၁၆)ရက်နေ့တွင် အများပြည်သူများနှင့်ငင်း တွေ့ဆုံညှိနှိုင်း အကြံပြုချက်များ ရယူခဲ့ပါသည်။ ယင်းအကြံပြုချက်များကို ဖတ်ရှု လေ့လာခဲ့ရာတွင် ဖော်ပြပါ အချက်များကို ROHTO-MENTHOLATUM (MYANMAR) CO., LTD မှ ပြန်လည်ရှင်းလင်းပေးစေလိုပါသဖြင့် ဖြေရှင်းပေးရမည့် မေးခွန်းများကို အောက်တွင် ဖော်ပြထားပါသည်။

**(က) အများပြည်သူများနှင့်တွေ့ဆုံဆွေးနွေးပွဲမှအကြံပြုချက်များ**

- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဆိုင်ရာအဖွဲ့ကို စက်ရုံ တွင် ဖွဲ့စည်းထားရန်နှင့် ၎င်းအဖွဲ့အစည်း အနေဖြင့် ပတ်ဝန်းထိန်းသိမ်းစောင့်ရှောက်မှုဆိုင်ရာ များနှင့်ပတ်သက်၍ စက်ရုံဝန်ထမ်းများကို အသိ ပညာပေးခြင်း၊ သင်တန်းများ ပို့ချခြင်းများကို လုပ်ဆောင်သင့်ပါကြောင်း။
- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနမှ ချမှတ်ထားသော လမ်းညွှန်ချက်များအတိုင်း လိုက်နာဆောင်ရွက် သင့်ပါကြောင်း။
- စက်ရုံတွင် လုပ်ကိုင်နေကြသော ဝန်ထမ်းများအတွက် ကျန်းမာရေးစောင့်ရှောက်မှုဆိုင်ရာများကို အလေးထား ဆောင်ရွက်သင့်ပါ ကြောင်း။
- စက်ရုံလုပ်ငန်းအတွက် လိုအပ်သော လုပ်ငန်းလိုင်စင်များကို သက်ဆိုင်ရာဌာနဆိုင်များသို့ တင်ပြ၍ ခွင့်ပြုချက်တောင်းခံပြီး လိုက်နာ လုပ်ဆောင်သင့်ပါကြောင်း အကြံပြုအပ်ပါသည်။
- ပတ်ဝန်းကျင်ထိန်းသိမ်းမှုဆိုင်ရာစီစဉ် ဆောင်ရွက် ထားရှိမှုများကောင်းမွန်ပါသည်။

- Future plan တွင် Facial wash product များ ထုတ်လုပ်ရာတွင် Mixing process နှင့် cleaning process များ ရှိလာမည် ဖြစ်သဖြင့် waste water treatment system အား ပုံမှန်ပြုပြင်ထိန်းသိမ်းမှုများ လုပ်ဆောင်သင့် ပါသည်။
- CSR activities များ ၊ No plastic program များ လုပ်ဆောင်ခြင်းအားဖြင့် ကောင်းမွန်ပါသည်။
- အစိုးရမှထုတ်ပြန်ထားသော ဥပဒေနှင့်စည်းမျဉ်း များအတိုင်း လိုက်နာ ဆောင်ရွက်ပေးပါရန်။
- CSR လုပ်ငန်းစဉ်တွင် ဝန်ထမ်းများ၏ ကျန်းမာရေးဆိုင်ရာ စီစဉ် ဆောင်ရွက် ထားရှိမှုအား ထည့်သွင်းဖော်ပြရန်။
- ဝန်ထမ်းများအား ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဆိုင်ရာ အသိပညာများ ဖြန့်ဝေရန်နှင့် ပတ်ဝန်းကျင် ဆိုင်ရာ အသိပညာပေးများအား Environmental Conservation Department – Yangon Region Facebook တွင် ဝင်ရောက်လေ့လာနိုင်ပါကြောင်း ဆွေးနွေးအကြံပြုသည်။

လေးစားစွာဖြင့်

26/11/2021

Kyaw Soe Win
Managing Director
Green Myanmar
Environmental Services Co., Ltd.

မိတ္တူကို -
ရုံးလက်ခံ

# Appendix (14): Response and Recommendation on the Suggestion from PCM

ROHTO

ROHTO-MENTHOLATUM (MYANMAR) CO., LTD.

Room(1110), 11th Floor, Yuzana Tower,
Shwegonedine Road, Bahan Township,
Yangon, Myanmar.
Tel: (95) 1 546304, (95) 1 546305, (95) 9 798458487
E-mail: info@rohto.com.mm
Website: www.rohto.com.mm

Plot No. D-5, Mingalardon Industrial Park,
Corner of No.3 Highway Road & Khayebin Road,
Mingalardon Township, Yangon, Myanmar.
Tel: (95) 1 639 037, (95) 9 780645662

Rohto-Mentholatum (Myanmar) Co., Ltd. Common Seal

သို့

မန်နေဂျင်းဒါရိုက်တာ
စိမ်းလန်းမြန်မာပတ်ဝန်းကျင်ဆိုင်ရာဝန်ဆောင်မှုလုပ်ငန်းကုမ္ပဏီလီမိတက်
အမှတ်(၁၁၅)၊ ကနောင်မင်းသားကြီးလမ်း။
လှိုင်သာယာစက်မှုဇုန်(၁)၊ လှိုင်သာယာမြို့နယ်၊
ရန်ကုန်တိုင်းဒေသကြီး။

ရက်စွဲ - ၂၀၂၂ ခုနှစ်၊ နိုဝင်ဘာ လ (၂၇) ရက်

အကြောင်းအရာ။ ။ ROHTO-MENTHOLATUM (MYANMAR) CO., LTD ၏ "ဆေးဘက်ဝင် အလှကုန်ပစ္စည်းများထုတ်လုပ်ခြင်းနှင့်ဖြန့်ဖြူးရောင်းချခြင်းလုပ်ငန်း" စက်ရုံနှင့် ပတ်သက်၍ စက်ရုံဝန်ထမ်းများနှင့် အများပြည်သူများ၏ အကြံပြုချက်များ ဆောင်ရွက်ပေးသည့် ပြန်ကြားခြင်းကိစ္စ။

ရည်ညွှန်းချက်။ ။ ၂၀၂၂ ခုနှစ်၊ နိုဝင်ဘာ လ (၂၇)ရက်နေ့တွင် စိမ်းလန်းမြန်မာပတ်ဝန်းကျင်ဆိုင်ရာဝန်ဆောင်မှုလုပ်ငန်းကုမ္ပဏီလီမိတက်၏ ပေးပို့စာ။

အထက်ဖော်ပြပါကိစ္စနှင့်စပ်လျဉ်း၍ ရည်ညွှန်းပါစာဖြင့် ROHTO-MENTHOLATUM (MYANMAR) CO., LTD ၏ စက်ရုံလုပ်ငန်းနှင့်ပတ်သက်၍ စက်ရုံဝန်ထမ်းများနှင့် အများပြည်သူများ၏ ဆွေးနွေး အကြံပြုချက်များကို စက်ရုံဘက်မှဆောင်ရွက်ပေးမည့် အစီအစဉ်များကို ပြန်ကြားအပ်ပါသည်။

ပူးတွဲ။ ။ အကြံပြုချက်၊ ဆန္ဒသဘောထားများအပေါ် စက်ရုံမှ ဆောင်ရွက်ပေးမည့် အစီအစဉ်။

လက်မှတ် - [signature] 27/11/22
တာဝန်ခံအမည် - Naing Aye
ရာထူး - Factory Manager

ROHTO-MENTHOLATUM (MYANMAR) CO., LTD
အကွက်အမှတ် (ဒီ-၅)
မင်္ဂလာဒုံစက်မှုဥယျာဉ်၊ မင်္ဂလာဒုံမြို့နယ်၊
ရန်ကုန်တိုင်းဒေသကြီး။

ROHTO-MENTHOLATUM (MYANMAR) CO., LTD မှ အများပြည်သူများ၏ အကြံပြုချက်များအပေါ် ဆောင်ရွက်ပေးမည့်အစီအစဉ်

| အကြံပြုချက်ဆန္ဒသဘောထားများ | ဆောင်ရွက်ပေးမည့်အစီအစဉ် |
|---|---|
| (က) အများပြည်သူများနှင့်တွေ့ဆုံဆွေးနွေးပွဲမှအကြံပြုချက်များ | |
| • ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဆိုင်ရာအဖွဲ့ကို စက်ရုံ တွင် ဖွဲ့စည်းထားရန်နှင့် ၎င်းအဖွဲ့အစည်း အနေဖြင့် ပတ်ဝန်းထိန်းသိမ်းစောင့်ရှောက်မှုဆိုင်ရာ များနှင့်ပတ်သက်၍ စက်ရုံဝန်ထမ်းများကို အသိပညာပေးခြင်း၊ သင်တန်းများ ပို့ချခြင်းများကို လုပ်ဆောင်သင့်ပါကြောင်း။ | ပတ်ဝန်းကျင်ထိန်းသိမ်းစောင့်ရှောက်မှုဆိုင်ရာများနှင့်ပတ်သက်၍ စက်ရုံဝန်ထမ်းများကို အသိပညာပေးခြင်း၊ သင်တန်းများ ပို့ချပေးလျက်ရှိပါသည်။ |
| • ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနမှ ချမှတ်ထားသော လမ်းညွှန်ချက်များအတိုင်း လိုက်နာ ဆောင်ရွက် သင့်ပါကြောင်း။ | ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနမှ ချမှတ်ထားသော လမ်းညွှန်ချက်များအတိုင်း လိုက်နာကျင့်သုံးလျက်ရှိပါသည်။ |
| • စက်ရုံတွင် လုပ်ကိုင်နေကြသော ဝန်ထမ်းများ အတွက် ကျန်းမာရေးစောင့်ရှောက်မှုဆိုင်ရာ များကို အလေးထားဆောင်ရွက်သင့်ပါကြောင်း။ | စက်ရုံတွင်လုပ်ကိုင်လျက်ရှိသော ဝန်ထမ်းများ၏ ကျန်းမာရေးကို [illegible] ကျန်းမာရေးများနှင့်သက်ဆိုင်၍ ဆောင်ရွက်ပေးလျက်ရှိပါသည်။ |
| • စက်ရုံလုပ်ငန်းအတွက် လိုအပ်သော လုပ်ငန်းလိုင်စင်များကို သက်ဆိုင်ရာဌာန ဆိုင်များသို့ တင်ပြ၍ ခွင့်ပြုချက်တောင်းခံပြီး လိုက်နာ လုပ်ဆောင်သင့်ပါကြောင်း အကြံပြု အပ်ပါသည်။ | စက်ရုံလုပ်ငန်းအတွက်လိုအပ်သော လုပ်ငန်းလိုင်စင်များကို [illegible] သက်ဆိုင်ရာဌာနဆိုင်ရာများသို့ တင်ပြ၍ ခွင့်ပြုချက်တောင်းခံပြီး လိုက်နာကျင့်သုံးလျက်ရှိပါသည်။ |
| • ပတ်ဝန်းကျင်ထိန်းသိမ်းမှုဆိုင်ရာစီစဉ် ဆောင်ရွက်ထားရှိမှုများကောင်းမွန်ပါသည်။ | မှန်ကန်ပါသည်။ |
| • Future plan တွင် Facial wash product များ ထုတ်လုပ်ရာတွင် Mixing process နှင့် cleaning process များ ရှိလာမည် ဖြစ်သဖြင့် waste water treatment system အား ပုံမှန်ပြုပြင်ထိန်းသိမ်းမှုများ လုပ်ဆောင်သင့် ပါသည်။ | Waste water treatment system ကို [illegible] ဆောင်ရွက်လျက်ရှိပြီး Facial wash product များထုတ်လုပ်သည့်အခါတွင် ပတ်ဝန်းကျင်ထိန်းသိမ်းမှုဆိုင်ရာ [illegible] procedure များ guideline များ ချမှတ်၍ လိုက်နာဆောင်ရွက်သွားမည်ဖြစ်ပါသည်။ |
| • CSR activities များ ၊ No plastic program များ လုပ်ဆောင်ခြင်းအားဖြင့် ကောင်းမွန် ပါသည်။<br>• အစိုးရမှထုတ်ပြန်ထားသော ဥပဒေနှင့်စည်းမျဉ်း များအတိုင်း လိုက်နာ ဆောင်ရွက်ပေးပါရန်။<br>• CSR လုပ်ငန်းစဉ်တွင် ဝန်ထမ်းများ၏ ကျန်းမာ ရေးဆိုင်ရာ စီစဉ် ဆောင်ရွက်ထားရှိမှုအား ထည့်သွင်းဖော်ပြရန်။ | ရှေ့ဆက်ပြီး Company အနေဖြင့် CSR activities များ၊ No plastic program များ လုပ်ဆောင်လျက်ရှိပါသည်။<br>အစိုးရ ဥပဒေ နှင့် စည်းမျဉ်းများ အတိုင်း လိုက်နာဆောင်ရွက်လျက်ရှိပါသည်။<br>လိုက်နာကျင့်သုံးပါမည်။ |
| • ဝန်ထမ်းများအား ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဆိုင်ရာ အသိပညာများ ပြန့်ပွားရန်နှင့် ပတ်ဝန်းကျင်ဆိုင်ရာ အသိပညာပေးများအား Environmental Conservation Department – Yangon Region Facebook တွင် ဝင်ရောက်လေ့လာနိုင်ပါကြောင်း ဆွေးနွေး အကြံပြုသည်။ | ဝန်ထမ်းများအား ကျန်းမာရေး [illegible] များ ပြန်လည်မျှဝေ၍ [illegible] ပါမည်။ [illegible] Environmental Conservation Department - Yangon Region Facebook တွင် ဝင်ရောက်လေ့လာပါမည်။ |

# Appendix (15): Laboratory Analysis Reuslts of Water

**Green Myanmar**
Environmental Services Co., Ltd
No.115,Kanaung Min Thar Gyi Road, Industrial Zone (1),Hlaing Thar Yar Industrial City, Yangon, Myanmar
Tel: **09 897 978 296, 09-5081451** E-mail: info@gmes-mm.com

**Project Name: : Rohto-Mentholatum (Myanmar) Co., Ltd.**
**Sampling Location: Plot No. D-5, Mingaladon Industrial Park (MIP)**

**Sample ID: 1 Municipal water**
**Latitude: N 16˚ 56' 22.15"**
**Longitude: E 96˚ 9' 15.07"**

**Date of Collection: 27.5.2021**
**Date of Arrival at Lab: 27.5.2021**
**Date of Issue of Results: 10.6.2021**

## Laboratory Analysis Results of Ambient Water

| Sr. No. | Parameters | Unit | Analysis Value | Minimum Measurement Range of Method | National Environmental Quality (Emission) Guidelines (2015) General Application | National Environmental Quality (Emission) Guidelines (2015) Sugar Manufacturing |
|---|---|---|---|---|---|---|
| 1. | 5-day Biochemical Oxygen Demand | mg/l | <30 | **30** | **50** | **50** |
| 2. | Ammonia | mg/l | 0.34 | **0.01** | **10** | - |
| 3. | Arsenic | mg/l | 0 | **0.005** | **0.1** | - |
| 4. | Chemical Oxygen Demand | mg/l | <30 | **30** | **250** | **250** |
| 5. | Chromium (Hexavalent) | mg/l | 0.11 | **0.2** | **0.1** | - |
| 6. | Chromium (Total) | mg/l | 0.16 | **0.02** | **0.5** | - |
| 7. | Copper | mg/l | ND | **0.5** | **0.5** | - |
| 8. | Cyanide (Total) | mg/l | ND | **0.01** | **1** | - |
| 9. | Iron | mg/l | 0.1 | **0.1** | **3.5** | - |
| 10. | Nickel | mg/l | ND | **0.2** | **0.5** | - |
| 11. | Oil and Grease | mg/l | <5 | **5** | **10** | **10** |
| 12. | pH | - | 7.58 | **0.1** | **6~9** | **6~9** |
| 13. | Phenol | mg/l | 0.22 | **0.1** | **0.5** | - |
| 14. | Sulfide | mg/l | ND | **0.04** | **1** | - |
| 15. | Temperature | ˚C | 27 | **1** | **<35** | **<35** |
| 16. | Total Phosphorus | mg/l | 0.14 | **0.02** | **2** | **2** |
| 17. | Total Suspended Solids | mg/l | 24 | **1** | **50** | **50** |
| 18. | Zinc | mg/l | ND | **0.02** | **2** | - |

***ND-Not Detected**

**Analyzed By**

**Daw Tun Eaindra Soe**
**Technician (Laboratory)**

**Approved By**

**U Thet Min Paing**
**In-Charge (Laboratory)**

**Green Myanmar**
Environmental Services Co., Ltd
No.115,Kanaung Min Thar Gyi Road, Industrial Zone (1),Hlaing Thar Yar Industrial City, Yangon, Myanmar
Tel: **09 897 978 296, 09-5081451** E-mail: info@gmes-mm.com

**Project Name: Rohto-Mentholatum (Myanmar) Co., Ltd.**
**Sample ID: 1 Municipal water**
**Date of Collection: 27.5.2021**

**Sampling Location: Plot No. D-5, Mingaladon Industrial Park (MIP)**
**Latitude: N 16˚ 56' 24.36"**
**Date of Arrival at Lab: 27.5.2021**

**Longitude: E 96˚ 9' 17.17"**
**Date of Issue of Results: 10.6.2021**

## Laboratory Analysis Results of Water

| Sr. No. | Parameters | Unit | Analysis Value | Minimum Measurement Range of Methods | Drinking Water Standards | | |
|---|---|---|---|---|---|---|---|
| | | | | | WHO (2011) | EPA (Spring 2012) | Indian Specification(IS:10 500,2012) |
| 1. | Aluminum | mg/l | 0.09 | **0.01** | **0.2** | **0.2** | **0.03** |
| 2. | Arsenic | mg/l | 0 | **0.005** | **0.01** | **0.01** | **0.01** |
| 3. | Chloride | mg/l | 14 | **5** | **250** | **250** | **250** |
| 4. | Copper | mg/l | ND | **0.5** | **2** | **1** | **0.05** |
| 5. | Cyanide | mg/l | ND | **0.01** | **0.07** | **0.2** | **0.05** |
| 6. | Manganese | mg/l | ND | **0.2** | **0.4** | **0.05** | **0.1** |
| 7. | pH | - | 7.4 | **0.1** | **6.5~8.5** | **6.5~8.5** | **6.5~8.5** |
| 8. | Sulfate | mg/l | 4.2 | **2** | **250** | **250** | **200** |
| 9. | Total Alkalinity as $CaCO_3$ | mg/l | 68 | **5** | - | - | **200** |
| 10. | Total Dissolved Solids | mg/l | 260 | **1** | **600** | **500** | **500** |
| 11. | Total Hardness as $CaCO_3$ | mg/l | 61 | **5** | **500** | - | **200** |
| 12. | Total Iron | mg/l | 0.1 | **0.1** | **0.3** | **0.3** | **0.3** |
| 13. | Turbidity | NTU | 6.7 | **0.01** | **5** | - | **1** |

***ND-Not Detected**

**Analyzed By**

**Daw Tun Eaindra Soe**
**Technician (Laboratory)**

**Approved By**

**U Thet Min Paing**
**In-Charge (Laboratory)**

ISO TECH LABORATORY

Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E(Delft) Lecturer of YIT (Retd). Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

ISO 9001:2015 Cert. No. 688600

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 2 of 2

W0621 032

**WATER QUALITY TEST RESULTS FORM**

| | |
|---|---|
| Client | Mentho Latum (Myanmar) Co.,Ltd. |
| Nature of Water | Municipal Water |
| Location | N - 16°56' 24.36", E - 96°9' 17.17" |
| Date and Time of collection | 27.5.2021 |
| Date and Time of arrival at Laboratory | 2.6.2021 |
| Date and Time of commencing examination | 3.6.2021 |
| Date and Time of completing | 5.6.2021 |

**Results of Water Analysis** — **WHO Drinking Water Guideline (Geneva - 1993)**

| | | |
|---|---|---|
| Temperature (°C) | °C | |
| Fluoride (F) | mg/l | 1.5 mg/l |
| Lead (as Pb) | mg/l | 0.01 mg/l |
| Arsenic (As) | mg/l | 0.01 mg/l |
| Nitrate (N.$NO_3$) | mg/l | 50 mg/l |
| Chlorine (Residual) | mg/l | |
| Ammonia Nitrogen ($NH_3$) | mg/l | |
| Ammonium Nitrogen ($NH_4$) | mg/l | |
| Dissolved Oxygen (DO) | mg/l | |
| Chemical Oxygen Demand (COD) | mg/l | |
| Biochemical Oxygen Demand (BOD) (5 days at 20 °C) | mg/l | |
| Cyanide (CN) | Nil mg/l | 0.07 mg/l |
| Zinc (Zn) | mg/l | 3 mg/l |
| Copper (Cu) | Nil mg/l | 2 mg/l |
| Silica ($SiO_2$) | mg/l | |

**Remark: This certificate is issued only for the receipt of the test sample.**

**Tested by**
Signature:
Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr.Chemist
ISO TECH Laboratory

**Approved by**
Signature:
Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
ISO TECH Laboratory

(a division of WEG Co.,Ltd.)
No.18. Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.
Ph: 01-640955, 09-73225175, 09-30339681, 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com

ISO TECH LABORATORY

Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E(Delft) Lecturer of YIT (Retd). Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

ISO 9001:2015 Cert. No. 688600

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 1 of 2

W0621 032

**WATER QUALITY TEST RESULTS FORM**

| | |
|---|---|
| Client | Mentho Latum (Myanmar) Co.,Ltd. |
| Nature of Water | Municipal Water |
| Location | N - 16°56' 24.36", E - 96°9' 17.17" |
| Date and Time of collection | 27.5.2021 |
| Date and Time of arrival at Laboratory | 2.6.2021 |
| Date and Time of commencing examination | 3.6.2021 |
| Date and Time of completing | 5.6.2021 |

**Results of Water Analysis** — **WHO Drinking Water Guideline (Geneva - 1993)**

| | | | |
|---|---|---|---|
| pH | 7.4 | | 6.5 - 8.5 |
| Colour (True) | | TCU | 15 TCU |
| Turbidity | 9 | NTU | 5 NTU |
| Conductivity | | micro S/cm | |
| Total Hardness | 42 | mg/l as $CaCO_3$ | 500 mg/l as $CaCO_3$ |
| Calcium Hardness | | mg/l as $CaCO_3$ | |
| Magnesium Hardness | | mg/l as $CaCO_3$ | |
| Total Alkalinity | 58 | mg/l as $CaCO_3$ | |
| Phenolphthalein Alkalinity | | mg/l as $CaCO_3$ | |
| Carbonate ($CaCO_3$) | | mg/l as $CaCO_3$ | |
| Bicarbonate ($HCO_3$) | | mg/l as $CaCO_3$ | |
| Iron | 0.36 | mg/l | 0.3 mg/l |
| Chloride (as CL) | 12 | mg/l | 250 mg/l |
| Sodium Chloride (as NaCL) | | mg/l | |
| Sulphate (as $SO_4$) | 10 | mg/l | 500 mg/l |
| Total Solids | | mg/l | 1500 mg/l |
| Total Suspended Solids | | mg/l | |
| Total Dissolved Solids | 69 | mg/l | 1000 mg/l |
| Manganese | Nil | mg/l | 0.05 mg/l |
| Phosphate | | mg/l | |
| Phenolphthalein Acidity | | mg/l | |
| Methyl Orange Acidity | | mg/l | |
| Salinity | | ppt | |

**Remark: This certificate is issued only for the receipt of the test sample.**

**Tested by**
Signature: Zaw Hein Oo
Name: B.Sc (Chemistry)
Sr.Chemist
ISO TECH Laboratory

**Approved by**
Signature: Soe Thit
Name: B.E (Civil) 1980,
Technical Officer
ISO TECH Laboratory

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No.18. Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.
Ph: 01-640955, 09-73225175, 09-30339681, 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com

# ALARM Ecological Laboratory

## Water Testing Result Report

Report Number : EL-WR-21-01221 Date : June 9, 2021

**Client Information**

| | | |
|---|---|---|
| Client Name | : | Mentho Latum (Myanmar) Co.,Ltd |
| Organization | : | GMES Co.,Ltd |
| Client ID | : | - |
| Registration Date & Time | : | 2.6.2021 ; - |
| Contact | : | 09976543060 |
| Testing Purpose | : | For Standard |

**Sample Information**

| | | |
|---|---|---|
| Sample ID | : | 7150 |
| Sample Name | : | Municipal Water |
| Sample Type / Source | : | - |
| Sampling Date & Time | : | 27.5.2021 ; - |
| Sample Location | : | - |
| Latitude | : | 16° 56' 24.3" N |
| Longitude | : | 96° 9' 17.17" E |

### Testing Results

*This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.*
*This report shall not be reproduced except in full, without written approval of the laboratory*

| Sr. | Quality Parameters | Results | Units | Drinking Standards | Remarks |
|---|---|---|---|---|---|
| 1 | Aluminium[3] | 0.1 | mg/L | ≤0.2 [b] | Normal |
| 2 | Arsenic[8] | 0 | mg/L | ≤0.05[a] | Normal |

"ND" = Not Detected "LOD" = Lower limit of detection " - " = No Reference Standard

| Tested by | Checked by | Approved by |
|---|---|---|
| Daw May Myat Khine<br>Lab. Technician II<br>Ecological Laboratory<br>ALARM | Daw Lin Myat Myat Aung<br>Lab. Technician I<br>Ecological Laboratory<br>ALARM | Dr. Aye Aye Win<br>Laboratory In-Charge<br>Ecological Laboratory<br>(ALARM) |

Building A-2, Kan Street, Hlaing Tsp., Yangon. Tel: 01-503301, 01-503302, 09-407496078
Email: aelab@alarmmyanmar.org , websites: www.alarmmyanmar.org

# ALARM Ecological Laboratory

## Water Testing Result Report

Report Number : EL-WR-21-01222

Date : June 9, 2021

**Client Information**

| | | |
|---|---|---|
| Client Name | : | Mentho Latum (Myanmar) Co.,Ltd |
| Organization | : | GMES Co.,Ltd |
| Client ID | : | - |
| Registration Date & Time | : | 2.6.2021 ; - |
| Contact | : | 09976543060 |
| Testing Purpose | : | For Standard |

**Sample Information**

| | | |
|---|---|---|
| Sample ID | : | 7151 |
| Sample Name | : | Drain Water |
| Sample Type / Source | : | - |
| Sampling Date & Time | : | 27.5.22021 ; - |
| Sample Location | : | - |
| Latitude | : | 16° 56' 22.15" N |
| Longitude | : | 96° 9' 15.07" E |

### Testing Results

*This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.*

*This report shall not be reproduced except in full, without written approval of the laboratory*

| Sr. | Quality Parameters | Results | Units | Emission Standards | Remarks |
|---|---|---|---|---|---|
| 1 | pH[1] | 5.8 | S.U | 6.0 – 9.0[d] | In Acid Range |
| 2 | TSS[3] | 0 | mg/L | ≤50 [d] | Normal |
| 3 | $BOD_5$ [6] | 14 | mg/L | ≤ 50 [d] | Normal |
| 4 | COD[3] | < 30 | mg/L | ≤ 250 [d] | Normal |
| 5 | Arsenic[8] | 0 | mg/L | ≤ 0.1 [d] | Normal |
| 6 | Oil & Grease [9] | 3 | mg/L | ≤ 10 [d] | Normal |

"ND" = Not Detected  "LOD" = Lower limit of detection  " - " = No Reference Standard

| Tested by | Checked by | Approved by |
|---|---|---|
| Daw May Myat Khine<br>Lab. Technician II<br>Ecological Laboratory<br>ALARM | Daw Lin Myat Myat Aung<br>Lab. Technician I<br>Ecological Laboratory<br>ALARM | Dr. Aye Aye Win<br>Laboratory In-Charge<br>Ecological Laboratory<br>(ALARM) |

Building A-2, Kan Street, Hlaing Tsp., Yangon. Tel: 01-503301, 01-503302, 09-407496078
Email: aelab@alarmmyanmar.org , websites: www.alarmmyanmar.org

# Appendix (16): Laboratory Analysis Result of Soil

**Green Myanmar**
Environmental Services Co., Ltd
No.115,Kanaung Min Thar Gyi Road, Industrial Zone (1),Hlaing Thar Yar Industrial City,
Yangon, Myanmar
Tel: **09 897 978 296, 09-5081451** E-mail: info@gmes-mm.com

**Project Name: : Rohto-Mentholatum (Myanmar) Co., Ltd.**

**Sampling Location: Plot No. D-5, Mingaladon Industrial Park (MIP)**

**Sample ID: SS-1 ([illegible])**

**Latitude: N 16˚ 56' 23.7"**

**Longitude: E 96˚ 9' 18.3"**

**Date of Collection: 27.5.2021**

**Date of Arrival at Lab: 27.5.2021**

**Date of Issue of Results: 10.6.2021**

## Laboratory Analysis Results of Soil

| Sr. No. | Parameters | Unit | Analysis Value | Minimum Measurement Range of Methods |
|---|---|---|---|---|
| 1. | Aluminum | mg/kg soil | 0.1 | **0.05 mg/kg soil** |
| 2. | Arsenic | mg/kg soil | 0 | **0.025 mg/kg soil** |
| 3. | Chloride | g/kg soil | 0.675 | **0.025 mg/kg soil** |
| 4. | Copper | mg/kg soil | ND | **2.5 mg/kg soil** |
| 5. | Cyanide | mg/kg soil | ND | **0.05 mg/kg soil** |
| 6. | Extractable Acidity | cmol/kg soil | 4.25 | **0.25 cmol/kg soil** |
| 7. | Manganese | mg/kg soil | 2.85 | **1 mg/kg soil** |
| 8. | P - Alkalinity | mmol/l extract | 0 | **0.2 mmol/l extract** |
| 9. | pH | - | 6.42 | **0.1** |
| 10. | Total Alkalinity | mmol/l extract | 3.1 | **0.2 mmol/l extract** |
| 11. | Total Iron | g/kg soil | 0.0005 | **0.0005 g/kg soil** |

***ND-Not Detected**

**Analyzed By**

**Daw Tun Eaindra Soe**
**Technician (Laboratory)**

**Approved By**

**U Thet Min Paing**
**In-Charge (Laboratory)**

# Appendix (17): Safety Data Sheets of Using Chemicals in Rohto-Mentholatum (Myanmar) Co., Ltd.

1,3-Butylene Glycol[1,3-BG]. DAICEL CORPORATION. 13BG_E11. 2018/03/12. 1/7

Safety Data Sheet (SDS)

Preparation Date 2010/04/16
Revision Date 2018/03/12

Section 1 – CHEMICALS AND COMPANY IDENTIFICATION
Chemical Identifier: 1,3-Butylene Glycol[1,3-BG]
Product Code: OCP-OH-13BG-01
Reference Number: yuuki155-11
Company Name: DAICEL CORPORATION
Address: 2-18-1, Konan, Minato-ku, Tokyo 108-8230, Japan
Company Contact: Organic Chemical Products Company
Phone Number: +81-3-6711-8211
Fax Number: +81-3-6711-8218
Emergency Phone Number: Organic Chemical Products Company +81-3-6711-8211
Recommended Use and Restriction on Use: General industrial・cosmetic material
ID: 13BG_E11

Section 2 – HAZARDS IDENTIFICATION
GHS Classification
Physicochemical Hazards: Flammable liquids Not classified
Pyrophoric liquids Not classified
Health Hazards: Acute toxicity – oral Not classified
Skin corrosion/irritation Not classified
Serious eye damage/eye irritation Not classified
Sensitization – skin Not classified
Germ cell mutagenicity Not classified
Environmental Hazards: Hazard to the aquatic environment (acute hazard) Not classified
Hazard to the aquatic environment (long-term hazard) Not classified
Other hazards than mentioned above are Not applicable or No data available.

Section 3 – COMPOSITION / INFORMATION ON INGREDIENTS
Distinction of Substance or Mixture: Substance
Chemical name or generic name: 1,3-Butylene Glycol

| Chemical Name or Generic Name | Concentration or Its Ranges | Formula | CAS RN |
|---|---|---|---|
| 1,3-Butylene Glycol | ≧99% | $C_4H_{10}O_2$ | 107-88-0 |

Impurities and/or Stabilizing Additives which Contribute to the Classification: No information available

Section 4 – FIRST AID MEASURES
Inhalation: Remove person to fresh air and keep comfortable for breathing.
Immediately call a doctor.
IF exposed or concerned: Get medical advice and attention.

1,3-Butylene Glycol[1,3-BG]. DAICEL CORPORATION. 13BG_E11. 2018/03/12. 2/7

Skin Contact: Take off contaminated clothing and wash it before reuse.
Wash with soap and water.
Immediately call a doctor.
If skin irritation or rash occurs, get medical advice and attention.
Eye Contact: Rinse cautiously with water for several minutes.
Remove contact lenses, if present and easy to do.
Continue rinsing.
Immediately call a doctor.
Get medical advice and attention.
Ingestion: Rinse mouth. Do NOT induce vomiting.
Immediately call a doctor.
Get medical advice and attention.

Section 5 – FIRE FIGHTING MEASURES
Extinguishing Media: Small fires: Dry chemical, dry sand, alcohol-resistant foam.
Large fire: Dry chemicals, alcohol-resistance foam extinguishing agents and water sprinkling.
Unsuitable Extinguishing Media: Straight streams.
Specific Hazards: When heated, vapors from explosive mixtures with air; indoors, outdoors, and sewers explosion hazards.
May be ignited by heat, sparks or flames.
Specific Fire Fighting: Move containers from fire area if you can do it without risk.
Protection of Fire Fighter: In fire fighting, wear respiratory protection and chemical protective clothing.

Section 6 – ACCIDENTAL RELEASE MEASURES
Personal Precautions, Protective Equipment and Emergency Procedures: Keep unauthorized personnel away.
Wear appropriate personal protective equipment (Refer to "Section 8 – EXPOSURE CONTROLS / PERSONAL PROTECTION") and avoid inhalation or contact with eyes and skin.
Isolate the site as a leak area by providing a zone that has an appropriate width to all directions.
Keep out of low areas.
Stay upwind.
Do not touch or walk through spilled material.
Environmental Precautions: Pay attention not to cause the influence on the environment by discharging into rivers.
Methods and Equipment for Containment and Cleaning up: Stop leak if you can do it without risk.
A vapor suppressing foam may be used to reduce vapors.
All equipment used when handling the product must be grounded.
Small spills; absorb or cover with dry earth, sand or other non-combustible material and transfer to containers for later disposal.
Small spills; Use clean non-sparking tools to collect absorbed material.
Large spills; prevent flowing out with a dike and collect it at a safe place.

1,3-Butylene Glycol[1,3-BG]. DAICEL CORPORATION. 13BG_E11. 2018/03/12. 3/7

Prevention Measures for Secondary Accidents: Removes all ignition sources promptly. (Prohibition of smoking, sparks, and flames in the surrounding area).
Isolate flammables (such as wood, paper, and oil) from the leakage.
Prevent flowing into drain, sewage, basement, and closed area.

Section 7 – HANDLING AND STORAGE
Handling
Technical Measures: Provide ventilation system and use necessary personal protective equipment as described in "Section 8 – EXPOSURE CONTROLS / PERSONAL PROTECTION".
Precautions for Safe Handling: Do not handle until all safety precautions have been read and understood.
Evacuate area due to explosion risk in case of fire.
Handle at a well-ventilated place.
Avoid release to the environment.
Do not get in eyes, on skin or on clothing.
Ventilate the exhaust to keep the concentration in the air below the exposure limit.
Obtain special instructions before use.
Use properly by reading "Precautions for Use" labeled on the container before use or disposal.
Wash hand thoroughly after handling.
Prohibit use of heat, sparks, and fire in the surrounding area.
Do not contact, breathe or swallow.
Do not expose to temperatures exceeding appropriate temperature.
Do not breathe dust and fume.
Do not handle containers with such manners as tumbling down, falling, exposing to shock, or dragging.
Prevents Handling of Incompatible Substances or Mixtures: Refer to 'Section 10 – STABILITY AND REACTIVITY'.
Specific Hygiene Measures: Wash hand thoroughly after handling.
Storage Precautionary Statements
Conditions for Safe Storage: The storage facility should be provided with necessary lighting, lighting equipment, and ventilator to store and handle dangerous goods.
The storage floor should have penetration-proof construction against dangerous goods and be inclined adequately. A proper sump should be provided to catch any spills.
The roof of a storage facility should be made of a non-combustible material and use metals or other lightweight non-combustible materials. No ceiling should be installed.
The storage facility should be designed with fire-proof construction and beams should use a non-combustible material.

1,3-Butylene Glycol[1,3-BG]. DAICEL CORPORATION. 13BG_E11. 2018/03/12. 4/7

Refer to 'Section 10 – STABILITY AND REACTIVITY'.
Store away from incompatible materials.
Store locked up.
Have containers keep away from direct sunlight and heat.
Store in a well-ventilated and cool place keeping container tightly closed.
Material Used in Packaging/Containers: Use containers prescribed in the "Fire Service Law (Japan)" and the "UN Transport Regulations".

Section 8 – EXPOSURE CONTROLS / PERSONAL PROTECTION
Exposure Limits

| Chemical Name or Generic Name | Exposure Limits (ACGIH) |
|---|---|
| 1,3-Butylene Glycol | Not established |

Engineering Controls: Workplace storing or handling this product should be equipped with eye washing station and safety shower.
Use process enclosures, local exhaust ventilation, or other engineering controls.
Install ventilation system to keep exposure to airborne contaminants below the exposure limit if vapor, fume, mist generates in the process handling at elevated temperature.
Take precautionary measures against static discharge.
Use explosion-proof electrical, ventilating and lighting equipment.
Install explosion-proof local ventilation equipment.
Ground or bond container and receiving equipment.
Personal Protective Equipment
Respiratory Protection: Wear respiratory protection.
Hand Protection: Wear protective gloves.
Eye Protection: Protection glasses (ordinary glasses, ordinary glasses with side shields, and goggles).
Skin and Body Protection: Wear protective clothing and face protection.

Section 9 – PHYSICAL AND CHEMICAL PROPERTIES
Appearance – Form: Liquid
Appearance – Color: Clear
Odor: Slight odor
Odor threshold: No data available
pH: No data available
Melting Point/Freezing Point: -57℃
Initial Boiling Point and Boiling Ranges: 209℃
Flash Point: 122℃ (Cleveland Open Cup)
Evaporation Rate: No data available
Flammability (solid, gas): No data available
Flammability or Explosive Limits – Lower Limit: No data available
Flammability or Explosive Limits – Upper Limit: No data available
Vapor Pressure: 0.008kPa (20℃)
Vapor Density: 3.1 (air=1)

1.3-Butylene Glycol[1.3-BG]. DAICEL CORPORATION. 13BG_E11. 2018/03/12. 5/7

| | |
|---|---|
| Specific Gravity (Density) | 1.004g/cm3 (20℃) |
| Solubility | ≧50%(20℃, pH6.1) |
| Partition Coefficient : n-Octanol/Water | log Kow=-0.29(calculated) |
| Auto-Ignition Temperature | 394℃ |
| Decomposition Temperature | No data available |
| Viscosity | No data available |
| Kinematic viscosity | No data available |

Section 10 – STABILITY AND REACTIVITY

| | |
|---|---|
| Reactivity | No information available |
| Chemical stability | Stable under ordinary conditions of use and storage. |
| Possibility of Hazardous Reaction | Contact(React) with strong oxidizers may cause fire and explosions. |
| Conditions to Avoid | Fire, heat, incompatibles. |
| Incompatible Substances or Mixtures | Strong oxidizers, strong alkalis and chemicals react with hydroxyl groups (e.g. isocyanate). |
| Hazardous Decomposition Products | Carbon dioxide and carbon monoxide may form when heated to decomposition. |

Section 11 – TOXICOLOGICAL INFORMATION

| | |
|---|---|
| Acute Toxicity Oral | Not classified; LD50=22800mg/kg (Rat) |
| Skin Corrosion/Irritation | Not classified; Skin irritation test(4hr 0.5ml rabbit) : not irritating P.I.I=0 Cumulative skin irritation test(28-days, guinea pig) : not irritating |
| Serious eye damage/eye irritation | Not classified; Eye irritation test(0.1ml rabbit) : mild (Average score=0.3 (conjunctival redness, 1/3)) |
| Respiratory or Skin Sensitization | Respiratory sensitization: No data available. Skin sensitization: Not classified; skin sensitization test (Guinea Pig Maximization Test) : negative. Skin photosensitivity test(guinea pig) : negative |
| Germ Cell Mutagenicity | Ames test; negative, Dominant lethal test(rodents) (TG478) : negative |
| Carcinogenicity | No data available |
| Reproductive Toxicity | No data available |
| Specific target organ toxicity (single exposure) | No data available |
| Specific target organ toxicity (repeated exposure) | No data available |
| Aspiration Hazard | No data available |

Section 12 – ECOLOGICAL INFORMATION

| | |
|---|---|
| Hazard to the aquatic environment (acute hazard) | Not classified; LC50＞100mg/L (96hr, Oryzias latipes), EC50 ＞1000mg/L (48hr, Daphnia magna), EC50 ＞1070mg/L (72hr, Algae) |
| Hazard to the aquatic environment (long-term hazard) | Not classified; Since not water-insoluble (water solubility≧1mg/L), and acute toxicity is Not classified. |
| Ecotoxicity | LC50＞100mg/L(96hr, Oryzias latipes) |
| Persistence | (Degradability)Biodegradable(TG301B) |

1.3-Butylene Glycol[1.3-BG]. DAICEL CORPORATION. 13BG_E11. 2018/03/12. 6/7

| | |
|---|---|
| Bio accumulative Potential | Estimated that bio-accumulative is low(log Kow=-0.29(calculated value)) |
| Hazard to the ozone layer | No data available |

Section 13 – DISPOSAL CONSIDERATIONS

| | |
|---|---|
| Residual Waste | Commission a waste disposal company, or a local public body who are licensed by local or regional government, to dispose of the material.<br>Disposal should be in accordance with applicable regulations and standards by the respective local governments.<br>When commissioning the disposal to a disposal company, notify the danger and toxicity thoroughly to the company. |
| Contaminated Container and Packaging | In case of disposal of empty containers, remove the content thoroughly.<br>Recycle containers after cleansing, or carry out the disposal under the related laws and regulations and the standards of the local governments. |

Section 14 – TRANSPORT INFORMATION

| | | |
|---|---|---|
| International Regulations | Regulatory Information by Sea | Not applicable |
| | Marine Pollutant | Not applicable |
| | Transport in bulk according to MARPOL 73/78,Annex Ⅱ,and the IBC code | Applicable |
| | Regulatory Information by Air | Not applicable |
| Emergency Response Guide Number | | Not applicable |

Section 15 – REGULATORY INFORMATION

Details of international registration status:

ENCS(JP)
TSCA(US)
Reach(EU)
SWISS(CH)
DSL(CA)
ECL(KR)
IECSC(CN)
ECN(TW)
PICCS(PH)
NZIoC(NZ)
AICS(AU)

Section 16 – OTHER INFORMATION

| | |
|---|---|
| Information Contact | See Sec.1 (Company identification) |

1.3-Butylene Glycol[1.3-BG]. DAICEL CORPORATION. 13BG_E11. 2018/03/12. 7/7

| | |
|---|---|
| Other Property | Notice to Reader : To the best of our knowledge, the information contained herein is accurate.<br>However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of information contained herein.<br>Final determination of suitability of any material is the sole responsibility of the information contained herein.<br>All materials may present unknown hazards and should be used with caution.<br>Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist. |

SDS number: 1120002810 Revision date : 2017/08/21 Trade name : AEROSIL® 200 1/4

NIPPON AEROSIL

Creation date : 11/1/2004
Revision date : 8/21/2017

## SAFETY DATA SHEET

**1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY**

| | |
|---|---|
| **Trade name** | AEROSIL® 200 |
| **SDS number** | 1120002810 |
| **Company** | NIPPON AEROSIL CO., LTD |
| **Address** | P.O. Box 7015, Shinjuku-Monolith 13F<br>3-1, Nishi-Shinjuku 2-chome,<br>Shinjuku-ku, Tokyo 163-0913, Japan |
| **Section in Charge** | Quality Assurance Division |
| **Telephone No.** | +81-59-345-5291 |
| **FAX No.** | +81-59-346-4657 |

**2. HAZARDS IDENTIFICATION**

**GHS Classification**

| | | |
|---|---|---|
| **Physical Hazard** | Flammable Solids | not classified |
| | Spontaneous combustion solids | not classified |
| | Self-Heating Substances | not classified |
| | Substances which, in contact with water emit flammable gases | not classified |
| **Health Hazard** | Acute Toxicity (Oral) | not classified |
| | Acute Toxicity (Dermal) | not classified |
| | Serious Eye Damage/Eye Irritation | not classified |
| | Germ Cell Mutagenicity | not classified |
| | Carcinogenicity | not classified |
| **Environmental Hazard** | Hazardous to the aquatic environment (acute) | not classified |
| | Hazardousness to the ozone layer | not classified |

(hazards other than listed above are "not applicable" or "classification not possible")

| | |
|---|---|
| **Dust explosion class** | not dust explosive |

**3. Composition/information on ingredients**

| | |
|---|---|
| **Substance or Mixture** | Substance |
| **Chemical name** | Amorphous silica(Silicon Dioxide) |
| **CAS number** | 7631-86-9 (silica) , 112945-52-5 (Silica, amorphous, fumed, crystalline free) |
| **Information on ingredients** | ≧ 99.9% (Based on ignited material under 2hours at 1000℃) |

**4. FIRST AID MEASURES**

| | |
|---|---|
| **In case of inhalation** | In case product dust is released:<br>Possible discomfort: cough, sneezing<br>Move victims into the fresh air. |
| **In case of skin contact** | Wash off with plenty of water and soap. |
| **In case of eye contact** | Possible discomfort is due to foreign substance effect.<br>Rinse thoroughly with plenty of water keeping eyelid open.<br>In case of persistent discomfort: Consult an ophthalmologist. |
| **In case of ingestion** | Clean mouth with water and drink afterwards plenty of water.<br>After absorbing large amounts of substance.<br>In case of discomfort: Supply with medical care. |
| **Notes to physician** | No hazards which require special first aid measures. |

**5. FIRE-FIGHTING MEASURES**

**Suitable extinguishing media**

All extinguishing substances suitable.

**Specific hazards during fire fighting**

NIPPON AEROSIL CO., LTD

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None known

Further information

Water used to extinguish fire should not enter drainage systems, soil, or stretches of water.
Ensure there are sufficient retaining facilities for water used to extinguish fire.
Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

6. ACCIDENTAL RELEASE MEASURES

| | |
|---|---|
| Personal precautions | Use personal protective equipment. |
| Environmental precautions | Do not allow entrance in sewage water, soil stretches of water, groudwater, drainage systems. |
| Methods for cleaning up | Sweep up or vacuum up spillage and collect in suitable container for disposal. Avoid dust formation. |

7. HANDLING AND STORAGE

Handling

Safe handling advice — If necessary: Local ventilation.

Advice on protection against fire and explosion

Take precautionary measures against static discharges.

Storage

Requirements for storage areas and containers

Keep in a dry place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

| | |
|---|---|
| Limit Values | |
| ACGIH | TLV-TWA 10mg/m3 (2011) |
| Personal protective equipment | |
| Respiratory protection | No special protective equipment required.<br>If dust occurs: Dust mask with P2 particle filter |
| Hand protection | Wear protective gloves made of the following materials: material, rubber, leather.<br>The material thickness and rupture time data do not apply to non-solute solids / dusts. |
| Eye protection | Safety glasses with side-shields.<br>If dust occurs: basket-shaped glasses |
| Skin and Body protection | No special protective equipment required. |
| Hygiene measures | When using, do not eat, drink or smoke. Wash face and/or hands before break and end of work.<br>To ensure ideal skin protection: use super fatted soaps and skin cream for skin care.<br>Wash contaminated clothing before re-use. |
| Protective measures | Handle in accordance with good industrial hygiene and safety practices.<br>If there is the possibility of skin/eye contact, the indicated hand/eye/body protection should be used.<br>If workplace exposure limits are exceeded and/or larger amounts are released (leakage, spilling, dust) the indicated respiratory protection should be used. |

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

| | |
|---|---|
| Appearance | Form: powder / Color: white / Odor: odorless |
| Odour | odourless |
| Odour threshold | not applicable |
| pH | 4.0~4.5 (4% suspension) |
| Melting point / range | not applicable |

NIPPON AEROSIL CO., LTD

SDS number: 1120002810 Revision date : 2017/08/21 Trade name : AEROSIL® 200 3/4

| | |
|---|---|
| Boiling point / range | not applicable |
| Flash point | not applicable |
| Evaporation rate | not applicable |
| Flammability | not applicable |
| Upper explosion limit | not applicable |
| Lower explosion limit | not applicable |
| Vapor density | not applicable |
| Density | ca. 2.2 g/cm3 (20℃) |
| Water solubility | ＞1mg/l |
| Partition coefficient (n-octanol/water) | not applicable |
| Autoinflammability | not determined |
| Thermal decomposition | ＞2000℃ |
| Viscosity | not applicable |
| Other information | |
| Ignition temperature | not applicable |
| Minimum ignition energy | not determined |
| Maximum Explosion Pressure | not determined |

10. STABILITY AND REACTIVITY

| | |
|---|---|
| Reactivity | No dangerous reaction known under conditions of normal use. |
| Chemical reactivity | Stable under recommended storage conditions. |
| Condition to avoid | Operations that create dust. |
| Incompatible materials | Hydrofluoric acid and strong bases |
| Hazardous decomposition products | None known. |

11. TOXICOLOGICAL INFORMATION

| | |
|---|---|
| Acute oral toxicity | LD50(Rat) : ＞10,000 mg/kg<br>(method : literature) |
| Acute dermal toxicity | LD50(Rabbit) : ＞5,000 mg/kg<br>(method : literature) |
| Acute inhalation toxicity | LC0 (Rat) : 0.139 mg/l/4h<br>(method : literature/maximum concentration attainable in experiments) |
| Skin corrosion/irritation | corrosion : not determined<br>irritation : Rabbit / not irritating (method : literature) |
| Serious Eye Damage/Irritation | Rabbit / not irritating (method : literature) |
| Respiratory or Skin sensitization | respiratory : not determined<br>sensitization : not determined |
| Germ Cell Mutagenicity | not determined |
| Carcinogenicity | not determined |

NIPPON AEROSIL CO., LTD

SDS number: 1120002810 Revision date : 2017/08/21 Trade name : AEROSIL® 200 4/4

| | |
|---|---|
| Toxicity to reproduction | not determined |
| STOT - single exposure | not determined |
| STOT - repeated exposure | not determined |
| Absorption nespiratory organs toxicity | not determined |

12. ECOLOGICAL INFORMATION

Ecotoxicity effects

Hazardous to the aquaticenvironment, acute toxicity

| | |
|---|---|
| Toxicity to fish | LC50 : ＞10,000mg/ l /96h (Brachydanio rerio)<br>(method : OECD 203) |
| Toxicity in aquatic invertebrates | EC50 : ＞10,000mg/ l /24h (Daphnia magna)<br>(method : OECD 202) |
| Toxicity to algae | not determined |
| Hazardous to the aquaticenvironment, chronic | not determined |
| Perisistence and degradability | not applicable |
| Bioaccumulative potential | not determined |
| Mobility in soil | not determined |
| Hazardous to the ozone layer | not classified |

13. DISPOSAL CONSIDERATIONS

Product

Can be disposed of with domestic refuse in accordance with the necessary technical regulations following consultation with waste disposal expert(s) and the responsible authorities.

Uncleaned packaging

Offer rinsed packaging material to local recycling facilities.
Other countries: observe the national regulations.

14. TRANSPORT INFORMATION

Follow all regulations in your country or region.

UN Class — not applicable

15. REGULATORY INFORMATION

Follow all regulations in your country or region.

16. OTHER INFORMATION

References

2011 TLVs and BEIs (ACGIH)
JIS Z 7253 (2012): Hazard communication of chemicals based on GHS-Levelling and Safety Data
JIS Z 7252 (2014): Classification of chemical based on GHS
IUCLID Dataset (2000): Silicon dioxide, chemical prepared
IARC Monographs on the Evaluation of Carcinogenic Risks to Humans Volume 68 (1997)

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

NIPPON AEROSIL CO., LTD

Page 1 of 4

AJINOMOTO.

Revised: August 2, 2013
First issue: April, 2005
MSDS NO.: ZN-100-4kg-E-1.2

MATERIAL SAFETY DATA SHEET

**1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY / UNDERTAKING**

**Product name:** AJIDEW® ZN-100
**Chemical name or generic name:** Zinc salt of L-Pyrrolidone Carboxylate
**EINECS No:** 239-473-5
**REACH Registration notes:** Pre-registered
**CAS Registration No:** 15454-75-8
**General use:** Ingredient for cosmetics and toiletries
**Manufacturer: AJINOMOTO Co., Inc.**
15-1,KYOBASHI 1-CHOME, CHUO-KU,
TOKYO 104-8315, JAPAN
Telephone: 81-3-5250-8150 Fax: 81-3-5250-8259
**Emergency telephone number:**
AJINOMOTO CO., INC. (Specialty Chemicals Department)
Telephone: 81-3-5250-8152 Fax: 81-3-5250-8259

**2. HAZARDS IDENTIFICATION**

CLASSIFICATION (EC 1272/2008): "H318: Causes serious eye damage"
LABEL ELEMENTS IN ACCORDANCE WITH EC 1272/2008
HAZARD PICTOGRAM:

SIGNAL WORD: Danger
HAZARD STATEMENT: H318 Causes serious eye damage.
PRECAUTIONARY STATEMENT:
Prevention: P280 Wear eye protection/face protection.
Response:
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a doctor.

**3. COMPOSITION / INFORMATION ON INGREDIENTS**

CHEMICAL NAME OR GENERIC NAME: Zinc salt of L-Pyrrolidone Carboxylate
CONTENT: >98% (Dried Base)
CAS REGISTER No: 15454-75-8
PCPC INCI NAME: Zinc PCA

AJINOMOTO.

Revised: August 2, 2013
First issue: April, 2005
MSDS NO.: ZN-100-4kg-E-1.2

MATERIAL SAFETY DATA SHEET

**4. FIRST AID MEASURES**
INHALATION: Removal of exposed individual from area to air fresh
EYE CONTACT: Immediately rinse skin with plenty of water for at least 15 minutes. Call a physician.
SKIN CONTACT: Immediately wash skin with plenty of water.
INGESTION: Immediately rinse out the mouth with water
NOTE TO THE PHYSICIANS: Treat symptomatically.

**5. FIRE-FIGHTING MEASURES**
FLAMMABLE PROPERTIES: Not available.
EXPLOSIBLE PROPERTIES: Dust explosive property. Not observed under 2000mg/L.
EXTINGUISH MEDIA: Water, Carbon Dioxide, or Foam.
FIRE FIGHTING INSTRUCTIONS:
Keep personnel removes from and upwind of fire. Wear full firefighting turn-out gear (full bunker gear) and respiratory protection (self contained breathing apparatus). Cool container with water spray.

**6. ACCIDENTAL RELEASE MEASURES**
INITIAL CONTAINMENT: Dike spill. Prevent material from entering sewers, waterways, or low areas.
SPILL CLEAN UP: Vacuum or sweep material and place in a disposal container.

**7. HANDLING AND STORAGE**
HANDLING: Do not breathe dust. Minimize dust generation and accumulation.
STORAGE: Store at dark and cool places. Keep container tightly closed.

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**
ENGINEERING CONTROLS: Not specific controls are needed.
PERSONAL PROTECTIVE EQUIPMENT:
EYE / FACE PROTECTION: Safety glasses are recommended.
SKIN PROTECTION: No specific protections are needed.
RESPIRATORY PROTECTION: Not established exposure limits.
GENERAL: No specific protections are needed.
EXPOSURE GUIDELINES: Lower explosion limit is more than 2000(g/cm$^3$).

**9. PHYSICAL AND CHEMICAL PROPERTIES**
APPEARANCE: White to light yellow powder.
PHYSICAL STATE: Solid (at room temperature).
MELTING POINT: Not available.
VAPOR PRESSURE: Not available.
SOLUBILITY IN WATER (20°C): Soluble at 15%
TRUE DENSITY: 1760 Kg/m$^3$



AJINOMOTO.

Revised: August 2, 2013
First issue: April, 2005
MSDS NO.: ZN-100-4kg-E-1.2

MATERIAL SAFETY DATA SHEET

BULK DENSITY: 660 Kg/m$^3$

**10. STABILITY AND REACTIVITY**
CHEMICAL STABILITY: Stable.
DECOMPOSITION: Decomposes with heat under strong alkaline condition.
INCOMPATIBILITY WITH OTHER MATERIALS: Not available.
HAZARDOUS DECOMPOSITION PRODUCTS: Not available.
HAZARDOUS POLYMERIZATION: Polymerization will not occur.

**11. TOXICOLOGICAL INFORMATION**
ACUTE ORAL TOXICITY: LD50>2.0g/Kg (Rat)
PRIMARY SKIN IRRITATION: Not irritating to skin (Rabbit, OECD 404)
SKIN SENSITIZATION: Negative (Guinea pig, Maximization test)
PRIMARY EYE IRRITATION: Risk of serious damage to eyes (Rabbit, OECD 405)
*1% aqueous solution; Non-irritating to eye (Rabbit, Draize test)
*5% aqueous solution; Mildly irritating to eye (Rabbit, Draize test)
BACTERIAL REVERSE MUTATION TEST: *S. typhimurium* TA98, TA100, TA1535, TA1537; Negative
*E. coli WP2 uvrA*: Negative
IN VITRO MAMMALIAN CHROMOSOME ABERRATION TEST: Positive (CHL/IU cells)
MAMMALIAN ERYTHROCYTE MICRONUCLEUS TEST: Negative (Male ICR Mice)

**12. ECOLOGICAL INFORMATION**
ENVIRONMENTAL FATE: Not available

**13. DISPOSAL CONSIDERATIONS**
Comply with all federal, state and local regulations.
Do not dump this material into sewers, on the ground or into any body of water.

**14. TRANSPORT INFORMATION**
UN DEPARTMENT OF TRANSPORTATION
Hazardous Materials: Not Applicable
Sea Transport (IMDG): Not Applicable
Air Transport (ICAO/IATA): Not Applicable

**15. REGULATORY INFORMATION**
Please refer to national measures that may be relevant.

**16. OTHER INFORMATION**



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Revised: August 2, 2013
First issue: April, 2005
MSDS NO.: ZN-100-4kg-E-1.2

MATERIAL SAFETY DATA SHEET

This information is based on the knowledge of the material at the date: August 2, 2013.
This information is furnished without warranty, express or implied, except that it is accurate to the best knowledge of AJINOMOTO CO., INC. it relates only to the specific material designated herein, and does not relate to use in combination with any other material or in any process. AJINOMOTO CO., INC. assumes no legal responsibility for use of or reliance upon this information.

First issue: 2010/02/16
Revised: 2018/03/21

# SAFETY DATA SHEET

## 1. IDENTIFICATION

| | | |
|---|---|---|
| Product Name | : | Alpiniawhite |
| Company / Supplier Name | : | ICHIMARU PHARCOS CO.,LTD. |
| Address | : | 318-1 Asagi, Motosu-shi, Gifu 501-0475 JAPAN |
| Telephone number | : | (81) 58-320-1032 |
| Fax number | : | (81) 58-320-1039 |
| Emergency telephone number | : | (81) 58-320-1032 |
| Emergency fax number | : | (81) 58-320-1039 |
| E-mail address | : | info@ichimaru.co.jp |
| Recommended use of this product and restrictions on use | : | Ingredient for cosmetic etc. |

## 2. HAZARD IDENTIFICATION

| | | |
|---|---|---|
| Adverse Human Health Effects and symptoms | : | There is no information. |
| Adverse Environmental Effects and symptoms | : | There is no information. |
| GHS Classification | | |
| Flammable Liquids | : | Not classified |
| Acute toxicity (Oral) | : | Not classified |
| Skin corrosion/irritation | : | Not classified |
| Serious eye damage/eye irritation | : | Not classified |
| Skin sensitization | : | Not classified |
| Label Element | | |
| Pictogram or symbol | : | No pictogram |
| Signal word | : | No signal words |
| Hazard statement | : | No hazard statement |
| Precautionary statement | : | No precautionary statements |
| Other hazards | : | There is no information. |

## 3. COMPOSITION / INFORMATION ON INGREDIENTS

| | | |
|---|---|---|
| Substance / Mixture | : | Mixture |
| INCI Name [EU Trivial Name] | : | Butylene Glycol, Water [Aqua], Alpinia Katsumadai Seed Extract |
| Latin Name of the Plant | : | Alpinia katsumadai Hayata (Zingiberaceae) |

| Chemical Name | % | Chemical Formula | CAS No. | EC No. |
|---|---|---|---|---|
| 1,3-Butanediol | 69.9 | C4H10O2 | 107-88-0 | 203-529-7 |
| Water | 29.9 | H2O | 7732-18-5 | 231-791-2 |
| Alpinia katsumadai. ext. | 0.2 | NA | 1002122-29-3 | 483-930-3 |

| Chemical Name | TSCA | UN Class | UN Number |
|---|---|---|---|
| 1,3-Butanediol | Listed | NA | NA |
| Water | Listed | NA | NA |
| Alpinia katsumadai. ext. | Not listed | NA | NA |

## 4. FIRST-AID MEASURES

| | | |
|---|---|---|
| Effects and Symptoms | | |
| Inhalation | : | There is no information. |
| Skin Contact | : | There is no information. |
| Eye Contact | : | There is no information. |

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Ingestion : There is no information.
First aid measures
Inhalation : Remove the victim from the contamination area immediately to fresh air. Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible, if necessary.
Skin Contact : Wash the affected area under running water using a mild soap. If irritation persists, arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.
Eye Contact : Gently rinses the affected eyes, including under the eyelids, with clean water for at least 15 minutes. Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.
Ingestion : Rinse mouth with water. If the victim is responsive, give the person one or two glasses of water, try to get the victim to vomit by having the victim touch the back of their throat with a finger. Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.
Most important symptoms/ effects, acute and delayed : There is no information.
Indication of immediate medical attention and special treatment needed, if necessary : There is no information.

## 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media : In case of fire, use water spray, foam, dry chemical powder, dry sand or carbon dioxide.
Unsuitable extinguishing media : There is no information.
Specific hazards arising from this product : There is no information.
Special protective equipment and precautions for fire fighters : Firefighters should wear proper protective equipment. Keep personnel removed from and upwind of fire. Move container from fire areas if it can be done without risk. Apply water from a safe distance to cool and protect surrounding area.

## 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : Wear proper protective equipment (see Section 8). Evacuate non essential personnel. Eliminate all sources of ignition and ventilate the area.
Environmental precautions : Treat using the best available techniques before discharging into drains or the aquatic environment.
Methods and materials for containment and cleaning up : Absorb spill with inert material (e.g., dry sand, sawdust or dustcloth), then place in a chemical waste container. Flush residual spill area with copious amounts of water. For large spills, dike for later disposal.

## 7. HANDLING AND STORAGE

Handling
Precautions for safe handling : Use in the well-ventilated areas. Shut off all pilot burner and electrical (spark or hot wire) igniters and other sources of ignition during use and until all odors are gone. Protect against physical damage, do not drop onto, or slide across sharp objects
Storage
Conditions for safe storage, including any incompatibilities : Store in a dry, ventilated location. Keep away from high temperature and sun light, store in the closed containers.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guideline : - ACGIH (TLV) : Not Established
- OSHA (PEL) : Not Established
Appropriate engineering controls : Good general ventilation should be sufficient for most conditions.
Personal protective equipment
Respiratory Protection : Wear chemical cartridge respirator with an ethanol vapor cartridge, if necessary.
Hand Protection : To prevent any contact, wear impervious clothing such as gloves, as appropriate.
Eye Protection : Wear safety glasses, safety goggle, face shield.
Skin Protection : To prevent any contact, wear impervious clothing such as gloves, apron, boots or wholebody suits, as appropriate.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance (physical state, color etc) : Light yellow liquid
Odor : Characteristic odor
pH : 4.5 to 6.5
Flash point : >93℃ / 200° F Tag Closed Cup (limit of detection) / Non-flammable
Specific Gravity d20/20 : Not performed
Solubility in Water : Very soluble
Auto-ignition temperature : Not performed

## 10. STABILITY AND REACTIVITY

Reactivity : There is no information.
Chemical stability : This product is considered a stable material under normal and anticipated storage and handling conditions.
Possibility of hazardous reactions : There is no information.
Conditions to avoid : There is no information.
Incompatible materials : There is no information.
Hazardous decomposition products : This product will not produce hazardous decomposition.

## 11. TOXICOLOGICAL INFORMATION

Acute toxicity : 【The information related to 1,3-Butanediol】
Out of category (rat LD50 = 22800mg/kg)
Skin corrosion / irritation : 【The information related to 1,3-Butanediol】
Skin irritation test (24hr 500mg rabbit) : Out of Category
Serious eye damage / irritation : 【The information related to 1,3-Butanediol】
Eye irritation test (0.1ml rabbit) : Out of Category
Respiratory or skin sensitization : 【The information related to 1,3-Butanediol】
Skin sensitization test (Maximization Method guinea pig) : negative
Germ cell mutagenicity : 【The information related to 1,3-Butanediol】
Ames test and Rodent dominant lethal test : negative
Carcinogenicity : There is no information.
Reproductive toxicity : There is no information.
Specific target organ systemic toxicity - single exposure : There is no information.
Specific target organ systemic toxicity - repeated exposure : There is no information.
Aspiration hazard : There is no information.

【We show the toxicological information of this product as follows】

Single Dose Toxicity : ALD : Not less than 5mL/kg (Oral, Mice)
Primary Skin Irritation : No Irritation (Undiluted, Guinea pigs)
Cumulative Skin Irritation : No Irritation (Undiluted, Guinea pigs)
Skin Sensitization (+Adjuvant) : No Sensitization (Undiluted, Guinea pigs)
Phototoxicity : Not Performed
Photosensitization (+Adjuvant) : No Sensitization (Undiluted, Guinea pigs)
Ocular Irritation : Almost no Irritation (Undiluted, Rabbits)
Single Dose Toxicity (Alternative method) : Not Performed
Primary Skin Irritation (Alternative method) : Not Performed
Cumulative Skin Irritation (Alternative method) : Not Performed
Skin Sensitization (Alternative method) : Not Performed
Phototoxicity (Alternative method, *) : Almost no effects
Photosensitization (Alternative method) : Not Performed
Ocular Irritation (Alternative method) : Not Performed
Mutagenicity (Reverse mutation) : Reverse mutation was negative.
Mutagenicity (Chromosomal aberration) : Chromosomal aberration was negative.

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Human Patch Test :

| Dosing Concentration | Undiluted | | | | | |
|---|---|---|---|---|---|---|
| | − | ± | + | ++ | +++ | ++++ |
| 24 hours | 39 | 1 | 0 | 0 | 0 | 0 |
| 48 hours | 40 | 0 | 0 | 0 | 0 | 0 |

*: Performed the test under NR method using Balb/c 3T3.

## 12. ECOLOGICAL INFORMATION

Ecotoxicity : 【The information related to 1,3-Butanediol】
Fish Toxicity / Other Toxicity
LC50 96(hr) Oryzias latipes > 100mg/L
EC50 48(hr) Daphnia magna > 1000mg/L
EC50 72(hr) Algae > 1070mg/L
Persistence and degradability : 【The information related to 1,3-Butanediol】
Biodegradable
Bioaccumulative potential : There is no information.
Mobility in soil : There is no information.
Other adverse effects : 【The information related to 1,3-Butanediol】
Hazardous to Aquatic Environment - Chronic Hazard
Acute toxicity (Out of category) + water solubility ≧ 1mg/L

## 13. DISPOSAL CONSIDERATIONS

Method of Disposal : Comply with all EU, national and local regulations.
Do not dump this product material into sewers, on the ground or into any body of water.
Treat using the best available techniques before discharging into drains or the aquatic environment.
Follow all regulations in your country.

## 14. TRANSPORT INFORMATION

UN Class : NA
UN Number : NA
Land-Road/Railway
Proper shipping name : NA
ADR/RID Class : NA
Packing Group : NA
Classification Code : NA
Sea
Proper shipping name : NA
IMDG Class : NA
Packing Group : NA
Air
Proper shipping name : NA
IATA DGR Class : NA
Packing Group : NA

## 15. REGULATORY INFORMATION

There is no information.

## 16. OTHER INFORMATION

References : Supplier's Safety Data Sheet etc.

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Disclamation : To the best of our knowledge, the information contained herein is accurate. However, neither ICHIMARU PHARCOS CO.,LTD. nor any of our distributors assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used in caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards which exist.

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**Specialty Chemicals Department**
AJINOMOTO CO., INC.

Page: 1/4
PRODUCT NAME: AMILITE® GCS-12K
Revised: January 11, 2019
Version: GCS12K_SDS_EN_5.1

## Safety Data Sheet

**1. Identification**
Product name: AMILITE® GCS-12K
Supplier's name: AJINOMOTO CO., INC.
Specialty Chemicals Department, AminoScience Division
Address: 15-1, Kyobashi 1-chome, Chuo-ku, Tokyo 104-8315, JAPAN
Phone number: +81-3-5250-8111 (main number)
e-mail address: kj_pci@ajinomoto.com

**2. Hazard(s) identification**
GHS classification of the substance/mixture (classified according to GHS Rev.4)
Physical hazards: No special notes (Please refer to below note)
Health hazards: No special notes (Please refer to below note)
Environmental hazards: No special notes (Please refer to below note)
Note) Items not described above correspond to "Not classified" or "Classification not possible." For details, see Sections 9 to 12 and Section 16.

GHS label elements
Symbol: None
Signal words: None
Hazard statements: None
Precautionary statements
Prevention: None
Response: None
Storage: None
Disposal: None

**3. Composition/information on ingredients**
Classification of substance/mixture: Mixture

| Component | Concentration *1 | Chemical formula | CAS Number |
|---|---|---|---|
| Sodium N-Cocoylglycinate | 30% | R-CO-NH-$CH_2$-$COO^-$·$Na^+$<br>R-CO: Cocoyl | 90387-74-9 |
| Water | 70% | $H_2O$ | 7732-18-5 |

*1 Typical concentration

| Component | PCPC INCI Name |
|---|---|
| Sodium N-Cocoylglycinate | Sodium Cocoyl Glycinate |
| Water | Water |

**4. First-aid measures**
Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call doctor if you feel unwell.
Skin contact: Wash thoroughly with water and soap. If skin irritation occurs: Get medical advice/attention.
Eye contact: Rinse cautiously with water for several minutes. If eye irritation persists: Get medical advice/attention.
Ingestion: Rinse mouth. Call doctor if you feel unwell.

**5. Fire-fighting measures**
Extinguishing media: Small fires: Carbon dioxide ($CO_2$), pressurized dry chemical and dry sand.
Large fires: Use foam extinguishers to separate the flame/ignition source from the product surface.
Unsuitable extinguishing media: Straight stream.
Specific hazards: Burning may generate harmful gases such as carbon monoxide and/or nitrogen oxides. Be careful not to breathe in harmful gases.
Special protective actions for fire-fighters: Fire-fighting should be done from the windward side.
Wear suitable protective equipment.

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Version: GCS12K_SDS_EN_5.1

**6. Accidental release measures**
Personal precautions, protective equipment and emergency procedures: Wear suitable protective equipment (see Section 8 of this document) to prevent contacts on eyes and skin, and inhalation. Stay on the windward side of the leak.
Environmental precautions: Discharge into the environment must be avoided.
Methods and materials for containment and cleaning up: Prevent further leakage if safe to do so.
Containment and neutralization: Contain spillage and collect with non-combustible absorbent material (e.g. sand, earth). Transfer to a tightly-closed container for disposal according to the local regulations.
Prevention of a secondary disaster: Do not let the product enter drains, basements and enclosed spaces.

**7. Handling and storage**
Precautions for safe handling
Technical measures: Places for storing or utilizing this product should be equipped with facilities for washing eyes and bodies of workers.
Hygiene measures: Wash hands thoroughly after handling this product.
Conditions for safe storage, including any incompatibilities: Places for storage should be equipped with lighting and ventilation.
Keep the product away from oxidizing agents.
Containers should be tightly-closed.
Do not keep this product in a container after opening, microorganisms may grow.

**8. Exposure controls/personal protection**
Control parameters: USA. ACGIH Threshould Limit Values (2009) No settings
Occupational exposure limit values (biological limit values): No data available.

Appropriate engineering controls: When vapors are generated, use a local exhaust ventilation etc. according to the situation.

Individual protection measures
Respiratory protection: Wear respiratory protection when ventilation is insufficient.
Hand protection: Wear protective gloves.
Eye protection: Wear safety glasses, goggles etc.
Skin/body protection: Wear suitable protective clothings.

**9. Physical and chemical properties**
Appearance
Physical state: Liquid
Colour: Colorless to pale yellow
Odour: A slightly characteristic odor
pH: 7.0 – 9.0 [Neat, 20°C]
Melting point/freezing point: No data available.
Initial boiling point and boiling range: No data available.
Flash point: No data available.
Upper/lower flammability or explosive limits: No data available.
Vapour pressure: No data available.
Relative density: No data available
Partition coefficient: n-octanol/water: No data available.
Auto-ignition temperature: No data available.
Decomposition temperature: No data available.
Viscosity: No data available.

**10. Stability and reactivity**
Reactivity: Stable under normal conditions.
Chemical stability: Decomposes with heat under strong alkaline condition.
Possibility of hazardous reactions: No special notes.
Conditions to avoid: No special notes
Incompatible materials: Strong oxidizing agents.
Hazardous decomposition products: Burning can generate carbon monoxide, nitrogen oxides.

Page: 3/4
Version: GCS12K_SDS_EN_5.1

**11. Toxicological information**
Acute toxicity
Oral: Please refer to Section 16.
Dermal: No data available.
Gases / vapours: No data available.

Skin corrosion / irritation: Please refer to Section 16.

Serious eye damage / eye irritation: Please refer to Section 16.

Respiratory sensitization: No data available.

Skin sensitization: Please refer to Section 16.

Germ cell mutagenicity: Please refer to Section 16.

Carcinogenicity: No data available.

Reproductive toxicity: No data available.

Specific target organ toxicity (Single exposure): No data available.

Specific target organ toxicity (Repeated exposure): No data available.

Aspiration hazard: No data available.

**12. Ecological information**
Ecotoxicity
Acute aquatic toxicity: No data available.
Chronic aquatic toxicity: No data available.
Persistence and degradability: Please refer to Section 16.
Hazardous to the ozone layer: None of the controlled substances listed in Annexes to the Montreal Protocol is contained at a concentration of 0.1% or more, thus classification is not possible.

**13. Disposal considerations**
Residual waste: Dispose product and packaging material according to local regulations. On entrusting waste disposal to a licensed disposal company, notify a company of the danger and hazard.
Packaging material: Packaging materials should be cleaned with contents completely removed, when recycling or disposal.

**14. Transport information**
International regulations
Marine pollutant: No
Transport in bulk: No
IMDG: No special notes.
ICAO/IATA: No special notes.
Safety precautions during transportation: Make sure that there is no breakage or corrosion of the container, no leakage of contents, before transportation.
Avoid direct sunlight. Load the containers not to overturn, fall, break and leak the contents during transportation. Prevent the load collapse. Do not put heavy loads on top of this product.

**15. Regulatory information**
No information available.

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Version: GCS12K_SDS_EN_5.1

**16. Other information**
The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions.

This product is intended for use as a cosmetic ingredient, thus test methods are different in conditions from those of OECD's test guidelines etc. in some cases, and some tests are not followed for GLP compliance.
Although we don't use those results for GHS classification, they are shown here as reference.

The data shown here are those of "AMILITE® GCS-12," a similar product of AMILITE® GCS-12K.
Primary skin irritation (Rabbits): Mild irritant (5% solution: Draize test)
Cumulative skin irritation (Guinea-pigs): Non irritating (5%, 2.5%, 1% solution: Open application, 14 days)
Primary eye irritation (Rabbits): Moderately irritating (5% solution; Draize test)
Skin sensitization (Guinea-pigs): Negative (Maximization test)
Bacterial reverse mutation test: Negative (Pre-incubation method)
(*S. typhimurium* TA98, TA100, TA1535, TA1537)
(*E. coli* WP2 *uvrA*)
*In vitro* mammalian chromosome aberration test (Cell line: CHL/IU): Positive (structural chromosome aberrations)
Mammalian erythrocyte micronucleus test (Mice): Negative
For details of the tests described in this section, please refer to "Safety data summary (AMILITE GCS-12)."

Persistence and degradability (data of "AMILITE® GCS-11," a similar product of AMILITE® GCS-12K.)
Biodegradability study: 80%-BOD degraded after 28 days.

References
・ACGIH-TLV (2009)

**Specialty Chemicals Department**
**AJINOMOTO CO., INC.**

## Safety Data Sheet

**1. Identification**

| | |
|---|---|
| Product name | AMISOFT® LK-11(F) |
| Supplier's name | AJINOMOTO CO., INC. Specialty Chemicals Department, AminoScience Division |
| Address | 15-1, Kyobashi 1-chome, Chuo-ku, Tokyo 104-8315, JAPAN |
| Phone number | +81-3-5250-8111 (main number) |
| e-mail address | kj_pci@ajinomoto.com |

**2. Hazard(s) identification**

GHS classification of the substance/mixture (classified according to GHS Rev.4)

| | |
|---|---|
| Physical hazards | No special notes (Please refer to below note) |
| Health hazards | No special notes (Please refer to below note) |
| Environmental hazards | No special notes (Please refer to below note) |

Note) Items not described above correspond to "Not classified" or "Classification not possible." For details, see Sections 9 to 12 and Section 16.

GHS label elements

| | |
|---|---|
| Symbol | None |
| Signal words | None |
| Hazard statements | None |
| Precautionary statements | |
| Prevention | None |
| Response | None |
| Storage | None |
| Disposal | None |

**3. Composition/information on ingredients**

Classification of substance/mixture: Substance

| Component | Concentration *1 | Chemical formula | CAS Number |
|---|---|---|---|
| Potassium N-Lauroyl-L-glutamate | 100% | $CH_3-(CH_2)_{10}-CO-NH-CH(CH_2CH_2COOH)-COO^- \cdot K^+$ | 89187-78-0 |

*1 Typical concentration

| Component | PCPC INCI Name |
|---|---|
| Potassium N-Lauroyl-L-glutamate | Potassium Lauroyl Glutamate |

**4. First-aid measures**

| | |
|---|---|
| Inhalation | Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call doctor if you feel unwell. |
| Skin contact | Wash thoroughly with water and soap. If skin irritation occurs: Get medical advice/attention. |
| Eye contact | Rinse cautiously with water for several minutes. If eye irritation persists: Get medical advice/attention. |
| Ingestion | Rinse mouth. Call doctor if you feel unwell. |

**5. Fire-fighting measures**

| | |
|---|---|
| Extinguishing media | Small fires: Carbon dioxide ($CO_2$), pressurized dry chemical and dry sand.<br>Large fires: Use foam extinguishers to separate the flame/ignition source from the product surface. |
| Unsuitable extinguishing media | Straight stream. |
| Specific hazards | Burning may generate harmful gases such as carbon monoxide and/or nitrogen oxides. Be careful not to breathe in harmful gases. |
| Special protective actions for fire-fighters | Fire-fighting should be done from the windward side.<br>Wear suitable protective equipment. |



**6. Accidental release measures**

| | |
|---|---|
| Personal precautions, protective equipment and emergency procedures | Wear suitable protective equipment (see Section 8 of this document) to prevent contacts on eyes and skin, and inhalation. Stay on the windward side of the leak. |
| Environmental precautions | Discharge into the environment must be avoided. |
| Methods and materials for containment and cleaning up | Prevent further leakage if safe to do so. |
| Containment and neutralization | Collect spills in empty containers and dispose according to the local regulations. |
| Prevention of a secondary disaster | Spills left on the floor should be removed away, as it may be slippery when wet. |

**7. Handling and storage**

| | |
|---|---|
| Precautions for safe handling | |
| Technical measures | Places for storing or utilizing this product should be equipped with facilities for washing eyes and bodies of workers. |
| Hygiene measures | Wash hands thoroughly after handling this product. |
| Conditions for safe storage, including any incompatibilities | Places for storage should be equipped with lighting and ventilation.<br>Keep the product away from oxidizing agents.<br>Containers should be tightly-closed. |

**8. Exposure controls/personal protection**

| | |
|---|---|
| Control parameters | USA. ACGIH Threshould Limit Values (2009) No settings |
| Occupational exposure limit values (biological limit values) | No data available. |
| Appropriate engineering controls | Take care not to make dust especially within doors, and use a local exhaust ventilation etc. according to the situation. Devices should be explosion-proof and antistatic. |
| Individual protection measures | |
| Respiratory protection | Wear respiratory protection when ventilation is insufficient. |
| Hand protection | Wear protective gloves. |
| Eye protection | Wear safety glasses, goggles etc. |
| Skin/body protection | Wear suitable protective clothings. |

**9. Physical and chemical properties**

| | |
|---|---|
| Appearance: Physical state | Solid |
| Form | Flake |
| Colour | White to pale yellow |
| Odour | A slightly characteristic odor |
| Melting point/freezing point | No data available. |
| Initial boiling point and boiling range | No data available. |
| Flash point | No data available. |
| Flammability | No data available. |
| Upper/lower flammability or explosive limits | No data available. |
| Vapour pressure | No data available. |
| Relative density | No data available. |
| Solubility | No data available. |
| Partition coefficient: n-octanol/water | No data available. |
| Auto-ignition temperature | No data available. |
| Decomposition temperature | No data available. |

**10. Stability and reactivity**

| | |
|---|---|
| Reactivity | Stable under normal conditions. |
| Chemical stability | Decomposes with heat under strong alkaline condition. |
| Possibility of hazardous reactions | No special notes. |
| Conditions to avoid | No special notes. |
| Incompatible materials | Strong oxidizing agents. |
| Hazardous decomposition products | Burning can generate carbon monoxide, nitrogen oxides. |
| Dust explosion hazard | No data available. |



**11. Toxicological information**

| | |
|---|---|
| Acute toxicity: Oral | Please refer to Section 16. |
| Dermal | No data available. |
| Gases / vapours | No data available. |
| Skin corrosion / irritation | Please refer to Section 16. |
| Serious eye damage / eye irritation | Please refer to Section 16. |
| Respiratory sensitization | No data available. |
| Skin sensitization | Please refer to Section 16. |
| Germ cell mutagenicity | Please refer to Section 16. |
| Carcinogenicity | No data available. |
| Reproductive toxicity | No data available. |
| Specific target organ toxicity (Single exposure) | No data available. |
| Specific target organ toxicity (Repeated exposure) | No data available. |
| Aspiration hazard | No data available. |

**12. Ecological information**

| | |
|---|---|
| Ecotoxicity | |
| Acute aquatic toxicity | No data available. |
| Chronic aquatic toxicity | No data available. |
| Persistence and degradability | No data available. |
| Hazardous to the ozone layer | None of the controlled substances listed in Annexes to the Montreal Protocol is contained at a concentration of 0.1% or more, thus classification is not possible. |

**13. Disposal considerations**

| | |
|---|---|
| Residual waste | Dispose product and packaging material according to local regulations. On entrusting waste disposal to a licensed disposal company, notify a company of the danger and hazard. |
| Packaging material | Packaging materials should be cleaned with contents completely removed, when recycling or disposal. |

**14. Transport information**

| | |
|---|---|
| International regulations | |
| Marine pollutant | No |
| Transport in bulk | No |
| IMDG | No special notes. |
| ICAO/IATA | No special notes. |
| Safety precautions during transportation | Make sure that there is no breakage or corrosion of the container, no leakage of contents, before transportation.<br>Avoid direct sunlight. Load the containers not to overturn, fall, break and leak the contents during transportation. Prevent the load collapse. Do not put heavy loads on top of this product. |

**15. Regulatory information**

No information available.



**16. Other information**

The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions.

The data shown here are those of "AMISOFT® LK-11," a similar product of AMSOFT® LK-11(F).

| | |
|---|---|
| Acute oral toxicity (Mice) | $LD_{50}$ > 2.0 g/kg (No death occurred in all groups) |
| Primary skin irritation (Rabbits) | Mild irritant (5% solution, 1% solution; Draize test) |
| Primary eye irritation (Rabbits) | Mildly irritating (5% solution; Draize test) |
| Skin sensitization (Guinea-pigs) | Negative (Maximization test) |
| Bacterial reverse mutation test | Negative (Pre-incubation method) (*S. typhimurium* TA98, TA100) |

For details of the tests described in this section, please refer to "Safety data (AMISOFT LK-11)."

References
・ACGIH-TLV (2009)

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## SAFETY DATA SHEET

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

・*Chemical product name* : AMISOL LDE-G
・*Name of manufacturer/supplier* : Kawaken Fine Chemicals Co., Ltd.
・*Head office*
  ・*Name of section* : Household Chemicals Business Unit
  ・*Address* : 2-3-3, Nihombashi Horidome-cho, Chuo-ku, Tokyo, 103-0012 Japan
  ・*Telephone number* : +81-3-3663-9521
  ・*Fax number* : +81-3-3661-5630
・*Osaka branch*
  ・*Address* : 1-2-6, Awaji-machi, Chuo-ku, Osaka, 541-0047 Japan
  ・*Telephone number* : +81-6-6201-1631
  ・*Fax number* : +81-6-6227-0755

2. HAZARD IDENTIFICATION

・*GHS classification*
Pyrophoric solids : Not classified.
Acute toxicity oral : Not classified
Skin corrosion/irritation : Category 3
Eye damage/irritation : Category 2B
Sensitization skin : Not classified
Specific target organ systemic toxicity single exposure
: Category 1 (liver), Category 3 (anesthetic action)
Specific target organ systemic toxicity repeated exposure
: Category 2(liver, kidneys, blood, central nervous system)

・Pictogram :

・Symbol : Health hazard
・Signal word : Danger
・Hazard statement : Causes mild skin irritation
Causes damage to organs (liver)
Causes eye irritation
May cause drowsiness and dizziness
May cause damage to organs (liver, kidneys, blood, central nervous system) through prolonged or repeated exposure

・Precautionary statement
・Prevention : Do not breathe vapours.
Wash hands thoroughly after handling.
Do not eat, drink or smoke when using this product.

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・Response : If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If skin irritation occurs: Get medical advice/attention.
If exposed: Call a POISON CENTER or doctor/physician.
If inhaled : Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Get medical advice/attention if you feel unwell.
・Storage : Keep container tightly closed.
・Disposal : Dispose of contents or container to in accordance with local, regional, national, international regulation.

3. COMPOSITION/INFORMATION ON INGREDIENTS

・Substance/Mixture : Substance
・Chemical name(Generic name) : N,N-Bis-(2-hydroxyethyl)-lauramide.
・Synonym : Lauric acid diethanolamide.
・INCI name : LAURAMIDE DEA
・Composition/CAS registry number
  ・Content(%) : More than 95%
  ・CAS registry number : 120-40-1
  ・TSCA master inventory : Registered.
  ・EINECS number : 204-393-1
・Chemical formula : $C_{11}H_{23}CON(CH_2CH_2OH)_2$
・Impurities and stabilizing additives : Diethanolamine : max 5%

4. FIRST-AID MEASURES

・Inhalation :
Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
・Skin contact :
Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Take off contaminated clothing and wash before reuse. If skin irritation occurs: Get medical advice/attention.
・Eye contact :
Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
・Ingestion :
Rinse mouth. Call a POISON CENTER or doctor/physician if you feel unwell.

5. FIRE-FIGHTING MEASURES

・Extinguishing media :
In case of fire: Use Dry chemical powder, Carbon dioxide, Foam and Water spray for extinction.
At small fire, use Dry chemical powder, Carbon dioxide, Form.
At large fire, use Water spray.
・Specific hazards with regard to fire-fighting measures
The carbon monoxide and the carbon dioxide are generated by the combustion.
・Specific fire fighting method ・Protection of fire-fighter
Move containers from fire area if it can be done without risk, it not possible, apply water from a safe distance to cool and protect surrounding area.
Breathing protection, Protective clothing, Heat-insulating gloves, Face shield or Safety goggles.

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6. ACCIDENTAL RELEASE MEASURES

・Personal precautions, protective equipment and emergency procedures
Do not contact with leakage or walk in the area of leakage. Immediately enclose the area as the leakage area, with appropriate distance in all directions from the leakage location. Restrict the area to associated personnel. Worker should wear appropriate protective equipment (Refer to 8. Exposure control/personal protection) and avoid contact with eye, skin or inhalation of gas. Wear air tight and impermeable protective clothing when leaked and no fire. Do not contact with broken container or leakage when not wearing appropriate protective equipment. Stay at windward. Leave lower area. Ventilate closed place before entering.
・Environmental precautions
Pay attention not to flow into river etc. and affect environment. Do not release to the environment.
・Collecting and neutralization
Absorb leakage by inactive material (for example dry sand or soil) and recover into container for chemical waste.
・Methods and equipment for containment and cleaning up
Stop leakage if not dangerous.
・Prevention of secondary disaster
Remove all ignition source promptly (Prohibit smoking, spark or flame at surrounding area).
Prevent from flow into drain, sewage, basement or closed area.

7. HANDLING & STORAGE

・Handling :
Engineering measures
Install facilities as described in "8. Exposure control/personal protection", and wear protective equipment.
This material has solidified at the normal temperature. Please avoid rapid heating, and dissolve calmly at 50-60℃.
Local exhaust/total ventilation
Install local exhaust, total ventilation as described in "8. Exposure control/personal protection".
・Measures for safe handling
Do not handle until all safety precautions have been read and understood. Keep away from ignition sources such as open flame/heat. No smoking. Wash hands thoroughly after handling. Do not breathe mist/vapours/spray. Avoid contacting with skin. Do not contact with eye. Use only outdoors or in a well ventilated area. Do not eat, drink or smoke when using this product.
Contact avoidance: Refer to "10. Stability and reactivity".
・Storage
Engineering measures: Comply with Fire Service Law.
Incompatible materials: Refer to "10. Stability and reactivity".
Storage condition
Store away from oxidizing agent.
Store away flame and high temperature surface.
Keep away from direct sunlight and fire.
Store container tightly closed in well-ventilated place
Sore locked up.
Packaging materials: Store in a closed container.
・Others
Since there is a risk of bacterial contamination, use as soon as possible after opened.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION
・Control concentration: Not established
・Acceptable concentration limit
The Japan Society for Occupational Health: Not established

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ACGIH(2008) : TWA 1 mg/m3(IFV) (Diethanolamine)
・Facility measures
Install eye wash and safety shower in the area where this product is stored or handled.
Seal the equipment or install local exhaust to prevent exposure.
・Protective equipment
Respiratory protection : Ventilation, local exhaust, or breathing protection.
Hand protection : Protective gloves.
Eye protection : Safety goggles or Safety spectacles
Skin and body protection : Protective clothing.
・Hygienic measures
Do not eat or drink when using this product. Wash hand thoroughly after handling.

9. PHYSICAL & CHEMICAL PROPERTIES

・Physical state : Waxy mass
・Color : White to light yellow
・Odor : Slight characteristic odor
・pH : 9.0-10.7 (1%)
・Melting point : No data.
・Boiling point : No data.
・Flash point : 191℃ (Cleveland open-cup)
・Evaporation rate : No data.
・Explosion characteristics
  Explosion limit : No data.
・Vapor pressure : No data.
・Vapor density : No data.
・Bulk density : No data.
・Specific gravity : d(50/4)=0.967
・Solubility in water : Sparingly Soluble
  / organic solvents : Very soluble in Ethyl alcohol and Ether.
・log Pow : No data.
・Auto ignition temperature : No data.
・Decomposition temperature : No data.
・Viscosity : 173mPa・s(50℃)

10. PHYSICAL HAZARD (Stability & Reactivity)

・Reactivity : Stable under normal usage.
・Chemical stability : No data.
・Possibility of hazardous reaction : No data.
・Incompatible materials : No data.
・Hazardous decomposition products : No data.

11. TOXICOLOGICAL INFORMATION

・Acute toxicity(oral) : rat LD60 7760mg/kg (1)
・Acute toxicity(dermal) : No data.
・Acute toxicity(vapours) : No data.
・Acute toxicity(dust and mists) : No data.
・Skin corrosion / Irritation : Guinea pig, 2%, mild irritation.( Category 3) (2)
・Serious eye damage / Eye irritation : Rabbit, 5%, Causes eye irritation. ( Category 2B) (3)

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- Respiration or skin sensitization : Negative. (4)
- Germ cell mutagenicity : No data.
- Carcinogenicity : No data.
- Reproductive toxicity : No data.
- Specific target organ systemic toxicity single exposure : By oral administration test of rats, within the dose of guidance value of Category 1, an anesthetic actions (a sedative action, ataxia) and a liver damage (the increase in weight, the increase of serum transaminase and other liver enzyme, opacity swelling and vacuolar degeneration, damage of endoplasmic reticulum and mitochondria) was seen. (Diethanolamine)
- Specific target organ systemic toxicity repeated exposure : Liver and kidney weights gain and nephropathy are observed in the dosage of guidance value within the limits of Category 2 to a rat, the data of anemia, such as decrease of red blood cell, hemoglobin concentration, and hematocrit value, and demyelinate in brain and spine are observed, and affecting liver and kidney is observed in humans. (Diethanolamine)
- Aspiration hazard : No data.

**12. ECOLOGICAL INFORMATION**

- Bioaccumulation : No data.
- Biodegradability : Biodegradation rate 98.0% (5)
- Fish Toxicity : No data.
- Others : No information.

**13. DISPOSAL CONSIDERATIONS**

- Remaining waste

  Comply with relevant regulations and standard of municipality. Commission the container and content waste disposer licensed by regional authority or commission to local government if it treat waste. Notify waste disposer of hazard of the waste when commission disposal.
- Contaminated container and packing

  Clean and recycle container or dispose appropriately complying with standard of local government.
  Remove all the residual when disposing container.

**14. TRANSPORT INFORMATION**

- International regulations

  Marine regulations(IMO/IMDG)
  - UN No. : Not applicable.
  - Proper Shipping Name : Not restricted.
  - Class : No classification.
  - Sub Risk : No classification.
  - Packing Group : Not applicable
  - Marine Pollutant : Not applicable

  Air regulations(ICAO/IATA)
  - UN No. : Not applicable.
  - Proper Shipping Name : Not restricted.
  - Class : No classification.
  - Sub Risk : No classification.
  - Packing Group : Not applicable

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Special safety measures

Load dangerous goods or container so as not to fall, tumble or break. Transport not to cause friction or shake. Take precautionary measures to prevent accident and report to local fire department or other relevant organization when there is a possibility of accident such as significant leakage of dangerous goods during transportation. Keep away from direct sunlight and load not to cause breakage or corrosion of container or leakage and make sure to take measurement to prevent collapse when transporting. Do not transport together with foods. Do not place heavy things on the product.

**15. REGULATORY INFORMATION**

European/International Regulations
European Labeling in Accordance with EC Directives
- Hazard Symbols : No data.
- Risk Phrases : No data.
- Safety Phrases : No data.

| | |
|---|---|
| Australia - Inventory of Chemical Substances (AICS) | : Registered. |
| Canada - Domestic Substances List (DSL) | : Registered. |
| Canada - Non-Domestic Substances List (NDSL) | : - |
| China - Inventory of Existing Chemical Substances (IECSC) | : Registered. |
| European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) | : 204-393-1 |
| European Union - European List of Notified Chemical Substances (ELINCS) | : - |
| Japan - Existing and New Chemical Substances (ENCS) | : (2)-2503 |
| Japan - Industrial Safety and Health Law Substances (ISHL) | : - |
| Existing Chemicals Inventory (KECI/KECL) | : KE-03194 |
| New Zealand - Inventory of Chemicals (NZIoC) | : HSR003478 |
| Philippines - Inventory of Chemicals and Chemical Substances (PICCS) | : Registered. |
| United States - Section 8(b) Inventory (TSCA) | : Registered. |

**16. OTHER INFORMATION**

- *References* :
  1) Bozo Research Center Inc. (August, 1973)
  2) Drug Safety Testing Center Co., Ltd. (December 5, 2011)
  3) Drug Safety Testing Center Co., Ltd. (February 23, 2012)
  4) Drug Safety Testing Center Co., Ltd. (January 12, 2012)
  5) Japan Oilstuff Inspectors' Corporation. (December 26, 1973)

To the best of our knowledge, the information contained herein is accurate. However, neither Kawaken Fine Chemicals Co., Ltd. nor any subsidiaries assumes any liability what so ever for the accuracy or completeness of the information contained herein. The final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used in caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards, which exist.

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AMPHITOL 20HD
Kao Corporation
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Revised Date July 02, 2014
Set Up Date March 13, 1997

## SAFETY DATA SHEET

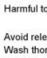
[1.PRODUCT AND COMPANY IDENTIFICATION]

- PRODUCT NAME : AMPHITOL 20HD
- SUPPLIER : Kao Corporation
- ADDRESS : 1-3,Bunka 2-chome,Sumida-ku,Tokyo 131-8501 Japan
- DIVISION : Global Chemical Business
- TELEPHONE NUMBER : 81-3-5630-7700
- FAX NUMBER : 81-3-5630-7889
- E-MAIL ADDRESS : chemical@kao.co.jp
- EMERGENCY TELEPHONE NUMBER : 81-3-5630-7700
- RECOMMENDED USE AND RESTRICTIONS ON USE :

[2.HAZARDS IDENTIFICATION]

GHS CLASSIFICATION
- PHYSICAL AND CHEMICAL HAZARDS : Not classified
- HEALTH HAZARDS
  - ACUTE TOXICITY (Oral) : Not classified
  - ACUTE TOXICITY (Dermal) : Not classified
  - ACUTE TOXICITY (Inhalation) : Not applicable(Vapours)
  - SKIN CORROSION / IRRITATION : Not classified
  - SERIOUS EYE DAMAGE / EYE IRRITATION : Category 2A
  - RESPIRATORY SENSITIZATION : Classification not possible
  - SKIN SENSITIZATION : Not classified
  - GERM CELL MUTAGENICITY : Classification not possible
  - CARCINOGENICITY : Classification not possible
  - REPRODUCTIVE TOXICITY : Classification not possible
  - SPECIFIC TARGET ORGAN TOXICITY
  - - SINGLE EXPOSURE : Classification not possible
  - - REPEATED EXPOSURE : Classification not possible
  - ASPIRATION HAZARD : Classification not possible
- ENVIRONMENTAL HAZARDS
  - HAZARDOUS TO THE AQUATIC ENVIRONMENT
  - - ACUTE HAZARD : Category 3
  - - LONG-TERM HAZARD : Classification not possible
  - - HAZARDOUS TO THE OZONE LAYER : Classification not possible

GHS LABEL ELEMENTS
- PICTOGRAMS OR SYMBOLS :



- SIGNAL WORD : Warning
- HAZARD STATEMENTS : Causes serious eye irritation
  Harmful to aquatic life
- PRECAUTIONARY STATEMENTS
  - PREVENTION : Avoid release to the environment.
    Wash thoroughly after handling.
    Wear eye protection/face protection.
  - RESPONSE : IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

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If eye irritation persists: Get medical advice/attention.
IF ON SKIN: Gently wash with plenty of water and soap.
Call a POISON CENTER or doctor if you feel unwell.

- STORAGE :
- DISPOSAL : Passed to a licensed waste contractor.
- SAFE HANDLING ADVICE : Refer to SDS.

[3.COMPOSITION / INFORMATION ON INGREDIENTS]

- SUBSTANCE OR MIXTURE : Mixture
- INGREDIENTS AND CONCENTRATION RANGE

| Ingredients | Concentration Range(%) | CAS RN |
|---|---|---|
| Lauryl hydroxysultaine | 30 | 13197-76-7 |
| Sodium chloride | Confidential | 7647-14-5 |
| Water, other components | Confidential | |

[4.FIRST-AID MEASURES]

- IN CASE OF INHALATION : Remove person to fresh air and keep comfortable for breathing.
- IN CASE OF SKIN CONTACT : Gently wash with plenty of soap and water.
- IN CASE OF EYE CONTACT : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  If eye irritation persists: Get medical advice/attention.
- IN CASE OF INGESTION : Call a POISON CENTER or doctor if you feel unwell.

[5.FIRE-FIGHTING MEASURES]

- EXTINGUISHING MEDIA : Powder, alcohol-resistant foam, water spray, carbon dioxide,sand
- NOT SUITABLE EXTINGUISHING MEDIA : No information available
- SPECIFIC HAZARDS : Produce irritating or toxic gases in a fire.
- SPECIFIC METHODS : Keep away from sources of ignition and use appropriate extinguishing media.Fight fire from upwind position if possible.
  Product itself is non-combustible.
  Do not flow the materials causing adverse effects into the environment with effluent fire extinguishing agents.
- PROTECTION OF FIRE FIGHTERS : Use goggles in combination with dust mask, and other protections as appropriate to situation.
  Risk of producing harmful gases such as carbon monoxide and sulfur oxides. Avoid inhalation of smoke or gases.

[6.ACCIDENTAL RELEASE MEASURES]

- PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURE : Use goggles and protective gloves.
  Large spills : Remove person to safety.
  Ensure adequate ventilation.
- ENVIRONMENTAL PRECAUTIONS : Avoid release to the environment.
- METHODS FOR CLEANING UP : Small spills: Absorb spills with sand, inert absorbent, waste cloth or sawdust. Then wipe up remainder in waste cloth.
  Large spills: Dike spills and dispose of in safe area.
- PREVENTION OF SECONDARY HAZARDS : No information available

[7.HANDLING AND STORAGE]

- HANDLING

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TECHNICAL MEASURES : Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.
PRECAUTIONS : No information available
SAFE HANDLING ADVICE : Use an adequate ventilation.
Wash thoroughly after handling.
Use personal protective equipment as required.
STORAGE
SUITABLE STORAGE CONDITIONS : Store container tightly closed in well-ventilated place.
SAFE PACKAGING MATERIALS : No information available

[8.EXPOSURE CONTROLS / PERSONAL PROTECTION]
ENGINEERING MEASURES : Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.
Use an adequate ventilation.
LIMIT VALUES
ACGIH (TLV) : Not established
OSHA (PEL) : Not established
PERSONAL PROTECTIVE EQUIPMENT
RESPIRATORY PROTECTION : Use as appropriate to situation.
HAND PROTECTION : Rubber gloves
EYE PROTECTION : Safety glasses
SKIN AND BODY PROTECTION : Full-body suit
HYGIENE MEASURES : No information available

[9.PHYSICAL AND CHEMICAL PROPERTIES]
APPEARANCE
PHYSICAL STATE : Liquid
COLOUR : Light yellow clear
ODOUR : Characteristic odour
pH : 6 - 8 (1% solution)
SPECIFIC TEMPERATURES / TEMPERATURE RANGES AT WHICH CHANGES IN PHYSICAL STATE OCCUR
BOILING POINT : No information available
MELTING POINT : -10.5 °C ( 13.1 °F)
FLASH POINT : Not applicable
FLAMMABILITY OR EXPLOSIVE PROPERTIES
FLAMMABILITY OR EXPLOSIVE LIMITS : UPPER LIMIT : No information available LOWER LIMIT : No information available
VAPOUR PRESSURE : No information available
VAPOUR DENSITY : No information available
DENSITY (SPECIFIC GRAVITY) : 1.108 g/mL ( 25 °C) ( 77 °F)
1.098 g/mL ( 40 °C) ( 104 °F)
1.087 g/mL ( 60 °C) ( 140 °F)
SOLUBILITY
WATER SOLUBILITY : Soluble
SOLVENT SOLUBILITY : No information available
PARTITION COEFFICIENT: n-OCTANOL / WATER (log Pow) : No information available
AUTO-IGNITION TEMPERATURE : No information available
DECOMPOSITION TEMPERATURE : No information available
ODOUR THRESHOLD : No information available

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EVAPORATION RATE : No information available
FLAMMABILITY (SOLID,GAS) : No information available
VISCOSITY : 29 mPa.s ( 25 °C) ( 77 °F)
24 mPa.s ( 40 °C) ( 104 °F)
19.5 mPa.s ( 60 °C) ( 140 °F)
OTHER DATA : No information available

[10.STABILITY AND REACTIVITY]
CHEMICAL STABILITY : No information available
POSSIBILITY OF HAZARDOUS REACTIONS : No self-reactivity.
CONDITIONS TO AVOID : No information available
INCOMPATIBLE MATERIALS : No information available
HAZARDOUS DECOMPOSITION PRODUCTS : No information available
OTHERS : No information available

[11.TOXICOLOGICAL INFORMATION]
ACUTE TOXICITY
Oral
INFORMATION ON PRODUCT : Rat, LD50 : > 2000 mg/kg
Dermal
INFORMATION ON PRODUCT : No information available
INFORMATION ON INGREDIENTS : No information available
Inhalation
INFORMATION ON PRODUCT : No information available
INFORMATION ON INGREDIENTS : No information available
SKIN CORROSION / IRRITATION
INFORMATION ON PRODUCT : Rabbit, undiluted, 4 hours semi-occluded application test (OECD404) : Not classified
SERIOUS EYE DAMAGE / IRRITATION
INFORMATION ON PRODUCT : Rabbit, undiluted, OECD405 : Category 2A
RESPIRATORY OR SKIN SENSITIZATION
RESPIRATORY
INFORMATION ON PRODUCT : No information available
INFORMATION ON INGREDIENTS : No information available
SKIN
INFORMATION ON PRODUCT : Guinea pig, Guinea Pig Maximization Test : Negative
MUTAGENICITY (GERM CELL MUTAGENICITY)
INFORMATION ON PRODUCT : Ames test (TA98,TA100,TA1535,TA1537,TA1538, WP2uvrA) : Negative
INFORMATION ON INGREDIENTS : No information available
CARCINOGENICITY
INFORMATION ON PRODUCT : No information available
INFORMATION ON INGREDIENTS : No information available
IARC : Not listed
NTP : Not listed
EU : Not listed
OSHA : Not listed
REPRODUCTIVE TOXICITY
INFORMATION ON PRODUCT : No information available

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INFORMATION ON INGREDIENTS : No information available
SPECIFIC TARGET ORGAN TOXICITY
- SINGLE EXPOSURE
INFORMATION ON PRODUCT : No information available
INFORMATION ON INGREDIENTS : No information available
- REPEATED EXPOSURE
INFORMATION ON PRODUCT : No information available
INFORMATION ON INGREDIENTS : No information available
ASPIRATION HAZARD
INFORMATION ON PRODUCT : No information available
INFORMATION ON INGREDIENTS : No information available
OTHER INFORMATION : Phototoxicity, Guinea pig : Negative
Photosensitization, Adjuvant-Strip test : Negative

[12.ECOLOGICAL INFORMATION]
ECOTOXICITY : Rainbow trout, OECD203, 96h, LC50 : 13 mg/L
Daphnia magna, OECD202, 48h, EC50 : 16 mg/L
PERSISTENCE / DEGRADABILITY : Closed bottle test (OECD301D) : 78 % (28 days)
MOBILITY IN SOIL : No information available
BIOACCUMULATIVE POTENTIAL : No information available
OTHER ADVERSE EFFECTS : BOD5 : 0.017 g/g

[13.DISPOSAL CONSIDERATIONS]
Review "HANDLING AND STORAGE (Section 7)".
Passed to a licensed waste contractor.
Incinerate with little portions.
Risk of producing harmful gases such as carbon monoxide and sulfur oxides.
Dispose of waste in accordance with local,state and federal regulations.

[14.TRANSPORT INFORMATION]
Follow all regulations in your country or region
INTERNATIONAL REGULATIONS
UN CLASS / UN NUMBER : Not applicable (IMDG, IATA)
SPECIAL PRECAUTIONS FOR USER : Review "ACCIDENTAL RELEASE MEASURES (Section 6)".
Review "HANDLING AND STORAGE (Section 7)".
Ensure containers without breakage or leakage.
Ensure containers tightly fixed.
Follow all regulations in your country or region.

[15.REGULATORY INFORMATION]
Follow all regulations in your country or region.

| | | |
|---|---|---|
| INVENTORIES : | ENCS(Japan) | Yes |
| | TSCA(USA) | Yes |
| | EINECS(EU) | Yes |
| | AICS(Australia) | No |
| | DSL(Canada) | Yes |
| | ECL(Korea) | No |
| | PICCS(Philippines) | No |
| | IECSC(China) | Yes |

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Kao Corporation Revised Date July 02, 2014

KAO Corporation is not able to check up the regulatory information in regard to the substances in your country or region,therefore,we request this matter would be filled by your responsibility.

[16.OTHER INFORMATION]
REFERENCE : -Safety data sheet for chemical products - Part 1: Content and order of sections(ISO 11014-1)
-International Chemical Safety Cards(ICSC) (Compiler's Guide)(1994)

To the best of the manufacturer's knowledge,the information contained herein is accurate. However, neither the manufacturer, nor any of its affiliates, make any representations or warranties (expressed or implied), nor assumes any liability(including liability for any direct, incidental, consequential, or other damages) with respect to the accuracy or completeness of the information contained herein. Such information may be (without limitation) invalid if the specified material is used in combination with another ,in a particular process, or under unusual conditions. Determination of suitability of any material for any given purpose is the sole responsibility of the user who assumes all risk and responsibility therefore. All materials may present unknown hazards and should be used with appropriate caution. The manufacturer cannot and does not guarantee that the hazards described herein are the only ones that exist.

Kingfisher® Colours Ltd.
10/12 Deacon Way
Tilehurst
Reading, RG30 6QQ
Berkshire, England
Tel: (0)118 943 2000
Fax: (0)118 943 3334

## SAFETY DATA SHEET

**Section 1 Identification of the substance/mixture and of the company undertaking**

**1.1 Product Identifier**

- Trade Name A407 TUDOR WILLOW
- Identification Number CAS 51274-00-1
  EINECS 257-098-5
- Registration Number
- Synonyms – Pigment Yellow 42; C.I. 77492; E172 (Europe)

**1.2 Relevant identified uses of substance/mixture and uses advised against**

- Identified uses – Cosmetics, food, pharmaceuticals.
- Uses advised against

**1.3 Details of the supplier of the safety data sheet**

| | | |
|---|---|---|
| Kingfisher Colours Ltd | Telephone | +44 1189432000 |
| 10/12 Deacon Way | Fax | +44 1189433334 |
| Tilehurst | Email | sales@kingfishercoloursltd.co.uk |
| Reading, Berkshire RG30 6QQ | | |
| England | | |

**1.4 Emergency telephone** As above (office hours only)

**Section 2 Hazards Identification**

**2.1 Classification of the substance/mixture**

| 67/548 EC | 1999/45 EC | 2008/1272 EC |
|---|---|---|
| Not classified | Not classified | Not classified |

(Full text of all R-phrases is given in section 16)
Hazards summary

- Physical hazards – Prolonged contact may cause mechanical skin and eye irritation.
- Health hazards – Repeated and prolonged inhalation of iron oxide fume has been reported to produce changes in lung X-rays of exposed individuals (siderosis). This is a benign pneumoconiosis that exhibits no adverse health effects.
- Environmental hazards - Not expected to be a hazard to the environment.
- Specific hazards
- Main symptoms – Inhalation causes coughing, sneezing and respiratory problems. Ingestion may cause stomach ache, vomiting and diarrhoea.

**2.2 Label elements (according to 2008/1272 EC)**

Signal word

Hazard statements

Precautionary statements
Prevention
Response
Storage
Disposal
Supplementary precautionary statements

**2.3 Other hazards**

Page **1** of **5**

Registered in England number 1498605

**Section 3 Composition/information on ingredients**

Substance

| Chemical Name | % Range | CAS Number EINECS Number | CLP Identifier | DSD Classification | Notes |
|---|---|---|---|---|---|
| Pigment Yellow 42 | 100 | 51274-00-1 257-098-5 | | | E172 |
| | | | | | |
| | | | | | |

DSD Directive 67/548/EC
CLP Regulation 2008/1272 EC
# This substance has specific workplace exposure limits

**Section 4 First aid measures**

**4.1 Description of first aid measures**

- Inhalation – Remove to fresh air. Get medical attention if any discomfort persists.
- Skin contact – Remove from contact. Remove contaminated clothing. Wash with soap and water. Get medical attention if any discomfort persists.
- Eye contact – Wash with clean water holding eyelids open for at least 15 minutes. Get medical attention if any discomfort persists.
- Ingestion – Never induce vomiting if patient is unconscious. Rinse mouth with water. Get medical attention if any discomfort persists.

**4.2 Most important symptoms and effects, both acute and delayed** – Mechanical irritation to skin and eyes (soreness, redness). Frequent inhalation over a long time may lead to lung diseases.

**4.3 Indication of immediate medical attention and special treatment** – No specific treatment. Treat symptomatically.

**Section 5 Fire fighting measures**

General fire hazard

**5.1 Extinguishing media**

☐ Water mist ☐ $CO_2$
☐ Foam ☐ Dry powder
☑ Media suitable for the surrounding materials
(✓ recommended ✗ must not be used)

**5.2 Special hazards arising**

☐ May produce toxic fumes CO
☐ May produce oxides of sulphur and nitrogen
☐ Other

**5.3 Advice for fire fighters**

- Special protective equipment – No special equipment. Use equipment appropriate to surrounding materials.
- Special fire fighting procedures

**Section 6 Accidental release measures**

**6.1 Personal precautions, protective equipment and emergency procedures**

Use PPE recommended in section 8 of this SDS. Provide adequate ventilation and keep all non-emergency personnel away. Warn everybody of any potential hazard and evacuate if necessary.

- Environmental precautions – Bund drains and avoid contamination of drains and water supply.
- Methods and materials for containment and clean up – Avoid dust formation. Vacuum up into closed container.

(For personal protection see section 8. For waste disposal see section 13.)

**Section 7 Handling and storage**

**7.1 Precautions for safe handling**

Wash thoroughly after handling. Wear appropriate PPE. Use only with adequate ventilation. Do not eat, drink or smoke in work areas. Replace any contaminated clothing and PPE.

**7.2 Conditions of safe storage, including any incompatibilities**

No special storage conditions. Store locked up. Keep container closed. Store away from foodstuffs and at room temperature (15-25ºC recommended). Protect from direct heat, sunlight and moisture.
Other specific conditions:

**7.3 Specific end uses**

**Section 8 Exposure controls/personal protection**

**8.1 Control parameters**

Page **2** of **5**

UK EH40 Workplace Exposure Limits (WEL'S)

| Components | Type | Value |
|---|---|---|
| Dust | TWA 8h Long term exposure | |
| | Total inhalable | 10 mg/m³ |
| | Respirable | 4 mg/m³ |

**8.2 Exposure controls**

Where user operations are likely to generate dust, fume or mist spray, LEV should be employed.
Personal protection equipment

- Eye/face protection. Wear chemical splash goggles, face shield or safety glasses as appropriate for risk.
- Skin protection. Wear appropriate chemical resistant gloves, barrier cream, footwear and protective clothing for risk of exposure.
- Respiratory protection. If engineering controls do not keep airborne concentrations below recommended exposure limits, an approved respirator must be worn which is appropriate for the airborne concentration levels encountered.
- Thermal hazards. Not applicable.
- Hygienic measures. Always observe good hygienic measures. Wash after handling material before eating, drinking or smoking. Routinely wash work clothing and PPE to remove contaminants. Powder colours often have a de-moisturising action on skin. It is recommended that workers use a good quality moisturiser after work.
- Environmental exposure control. Fume scrubbers, filters or other engineering controls may be necessary to ensure that processing equipment complies with the requirements of environmental protection legislation. Pigments are generally not classified for environmental effects due to low water solubility.

**Section 9 Physical and chemical properties**

**9.1 Information on basic physical and chemical properties**

Appearance – Yellow powder
Odour – Musty odour
Odour threshold
pH (10% dispersion) 3.5-7.0
Melting/freezing point - NA
Initial boiling point - ND
Flash point - NA
Evaporation rate - NA
Flammability (solid, gas) – NA
Flammability limit (lower %) - NA
Flammability limit (upper %) - NA
Vapour pressure - NA
Vapour density - NA
Relative density – Approx. 4 g/ml
Solubility (water) - Insoluble
Partition coefficient (n-octanol/water) - NK
Auto-ignition temperature - NA
Decomposition temperature - 180°C
Viscocity - NA
Explosive properties - NA
Oxidising properties - ND

**9.2 Other information** – Bulk density approx.. 400 kg/m³

**Section 10 Stability and Reactivity**

**10.1 Reactivity** – Above 180°C begins transition to red iron oxide

**10.2 Chemical stability**

Material is stable under normal conditions.

**10.3 Possibility of hazardous reactions** None known

**10.4 Conditions to avoid** – None known

**10.5 Incompatible materials** – Aluminium dust, calcium hypochlorite, hydrazine, ethylene oxide, caesium carbide.

**10.6 Hazardous decomposition products** – None known

**Section 11 Toxicological information**

**11.1 Information on toxicological effects**

Substance

- Acute toxicity – See specific data.
- Skin corrosion/irritation – See specific data – test results on analogous product.
- Serious eye damage - See specific data – test results on analogous product.

Page **3** of **5**

- Respiratory/skin sensitisation – See specific data.
- Germ cell mutagenicity - ND
- Carcinogenicity - ND
- Reproductive toxicity - ND
- STOT-single exposure - ND
- STOT-repeated exposure - ND
- Aspiration hazard - ND
- Information on likely routes of exposure
  Ingestion
  Inhalation – Main route of exposure. Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation.
  Skin contact
  Eye contact - Dust may irritate the eyes.
- Symptoms
- Specific data

| Components | Test results |
|---|---|
| Yellow Iron Oxide | Acute oral $LD_{50}$ > 5000 mg/kg (rat) |
| | Inhalation $LC_{50}$ (2 weeks) > 195 mg/m³ (rat) |
| | Skin/eye irritation. Non irritating. |
| | Skin sensitization. Non sensitizing (guinea pig) |

**Section 12 Ecological Information**

**12.1 Toxicity** – Aquatic toxicity (fish) $LC_{50}$ > 1000 mg/l (Leuciscus idus); OECD202 Acute $EC_{50}$ > 100 mg/l (Daphnia magna 48h)

**12.2 Persistance and degradability** – Not expected to be biodegradable.

**12.3 Bioaccumulative potential** - ND

**12.4 Mobility in soil** - Insoluble in water, so mobility will be low.

**12.5 Results of PBT or vPvB assessment** – Does not contain any PBT or vPvB substances.

**12.6 Other adverse effects** – None known

**Section 13 Disposal considerations**

**13.1 Waste treatment methods**

- Product waste. Dispose of in accordance with local regulations.
- Contaminated packaging. Follow warning labels even after container is empty. Empty containers should be taken to an approved waste handling site for recycling or disposal.
- EU Waste Code. This product has no waste code. If a waste code is assigned by the end user (see EU Waste type list 2000/532/EC), disposal should be in cooperation with the disposal firm/producing firm/official authority.

**Section 14 Transport information**

General comments - Not considered dangerous for transport purposes.

| | |
|---|---|
| ADR | IMDG |
| RID | ICAO |
| ADN | UN Number |
| IATA | UN Proper shipping name |
| Environmental pollutant | Packaging Group |
| Other | |

**Section 15 Regulatory information**

**15.1 Safety, health, environmental regulation/legislation specific for substance/mixture**

- Regulation (EC) Nº 2000/2037 Substances that deplete the ozone layer. Not listed.
- Regulation (EC) Nº 2004/856 Persistent organic pollutants. Not listed.
- Regulation (EC) Nº 2008/689 Export/import of dangerous chemicals. Not listed.
- Regulation (EC) Nº 2006/1907 REACH. Listed
- Regulation (EC) Nº 2006/1907 Article 59(1) SVHC candidate list. – Not listed

**15.2 Chemical safety assessment**

**Section 16 Other Information**

- List of abbreviations
  NA Not applicable ND No data at this time NK Not known ✱Most recent revision
  PPE Personal protective equipment LEV Local exhaust ventilation
- References
- Full text of any statements or R-phrases or H-phrases
- Issue Date March 2013

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- Revision Date (Revision )
- Disclaimer. The information in this SDS relates only to the material listed and may not be valid for such material when used in combination with other materials in process. It is provided to the best of the company's knowledge and belief, as being accurate and reliable. However, we accept no warranties as to its accuracy, reliability or completeness, given the variety of factors that can affect the use or application of the product. The user is strongly advised to thoroughly evaluate the product before use or application. Appropriate warnings and safe handling procedures should be provided to handlers and users. No information provided in this SDS is to be taken as part of the product specification. The product specification is provided separately.

End of Safety Data Sheet

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A&C AMERICAN CHEMICALS LTD.
3010 Rue De Baene, Montréal
Quebec, Canada, H4S 1L2
Telephone: 1-800-361-9234
www.acggp.com

## SAFETY DATA SHEET

### BUTYLATED HYDROXYTOLUENE NF (BHT)

### 1. PRODUCT IDENTIFICATION

24 Hr Emergency Telephone Number:

CANUTEC: 1-888-226-8832 within US and Canada
For Outside US and Canada: (1-613)-996-6666

CHEMTREC: 1-800-424-9300 within US
*Please refer to Sec.16 for Authorized Distributors

| | |
|---|---|
| Product Code: | B4695 |
| CAS number: | 128-37-0 |
| Molecular Weight : | 220.36 |
| Formula: | $C_{15}H_{24}O$ |
| Synonyms: | 2,6-Di-tert-butyl-4-methylphenol; BHT; DBPC; 2,6-Di-tert-butyl-p-cresol; Butylhydroxytoluene; Butylated hydroxytoluene |

### 2. HAZARD(S) IDENTIFICATION

**Emergency Overview**

**HMIS Classification**

Health hazard: 2
Flammability: 1
Physical hazards: 0

**Potential Health Effects**

Inhalation May be harmful if inhaled. Causes respiratory tract irritation.
Skin Harmful if absorbed through skin. Causes skin irritation.
Eyes Causes eye irritation.
Ingestion Harmful if swallowed.

**GHS Classification**

Acute Toxicity, Oral (Category 4)
Acute aquatic toxicity(Category 1)
Chronic aquatic toxicity (Category 1)

**Pictogram**

Signal Word: Warning

Hazard Statement(s)
Harmful if swallowed. Very toxic to aquatic life with long lasting effects.

Precautionary Statement(s)
Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product. Avoid release to the environment. IF SWALLOWED: call a POISON CENTER or doctor/ physician IF you feel unwell. Rinse mouth. Collect spillage. Dispose of contents/container in accordance with local/ regional/ national/ international regulations.

### 3. COMPOSITION / INFORMATION ON INGREDIENTS

BUTYLATED HYDROXYTOLUENE NF (BHT)
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| CAS No. | EC No. | Index No. | Concentration |
|---|---|---|---|
| Butylated Hydroxytoluene (128-37-0) | 204-881-4 | --- | >99% |

### 4. FIRST-AID MEASURES

General Advice:
Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

Inhalation:
If breathed in, move person into fresh air. If not breathing give artificial respiration. Consult a physician.

Skin Contact:
Immediately flush skin with plenty of water and soap while removing contaminated clothing and shoes. Consult a physician.

Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Consult a physician.

Ingestion:
If ingested, give plenty of water to drink and rinse mouth with. Never give anything by mouth to an unconscious person. Consult a physician.

### 5. FIRE-FIGHTING MEASURES

Flash point: 117.8°C (244.0°F) - closed cup.
Autoignition Temperature: No data available.

Conditions of Flammability:
Not flammable or combustible.

Suitable Extinguishing Media:
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Hazardous Combustion Products:
Hazardous decomposition products formed under fire conditions; carbon oxides.

Special Protective Equipment for Fire-Fighters:
In the event of a fire, wear full protective clothing and NIOSH-approved selfcontained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

Explosion data - sensitivity to mechanical impact:
No data available

Explosion data - sensitivity to static discharge:
No data available

### 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions:
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up:
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

### 7. HANDLING AND STORAGE

Precautions for safe handling:
Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. Avoid breathing dust.

BUTYLATED HYDROXYTOLUENE NF (BHT)
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Conditions for safe storage:
Keep container tightly closed in a dry and well-ventilated place.

### 8. EXPOSURE CONTROL/ PERSONAL PROTECTION

Airborne Exposure Limits:
Canada - NIOSH Threshold limit values: 10 mg/m³ (TWAEV)
ACGIH Threshold limit values: 2 mg/m³ (TWA)

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, "Industrial Ventilation, A Manual of Recommended Practices", most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half facepiece particulate respirator (NIOSH type N95 or better filters) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece particulate respirator (NIOSH type N100 filters) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

### 9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|---|---|
| Appearance: White powder or crystalline. | pH: No data available. |
| Melting Point: 69 - 73°C (156 - 163°F) | Boiling Point: 265°C (509°F). |
| Ignition Temperature: 470°C (878°F). | Vapor Pressure: 0.01 hPa (0.01 mmHg) at 20.0 °C (68.0 °F). |
| Lower Explosion Limit: No data available. | Upper Explosion Limit: No data available. |
| Water Solubility: No data available. | Density: No data available. |
| Relative Vapor Density: No data available. | Odor: Characteristic. |
| Odour Threshold: No data available. | Evaporation Rate: No data available. |
| Partition Coefficient(n-octanol/water): No data available. | |

### 10. STABILITY AND REACTIVITY

Chemical Stability:

BUTYLATED HYDROXYTOLUENE NF (BHT)
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Stable under recommended storage conditions.

Possibility of Hazardous Reactions:
No data available.

Conditions to Avoid:
No data available.

Materials to Avoid:
Strong oxidizing agents.

Hazardous Decomposition Products:
Hazardous decomposition products formed under fire conditions; carbon oxides.

## 11. TOXICOLOGICAL INFORMATION

**Acute toxicity;**
Oral LD50: LD50 Oral - Rat - 890 mg/kg
LD50 Oral - Mouse - 1040 mg/kg
LD50 Oral - Guinea pig - 10700 mg/kg
Inhalation LC50: No data available
Dermal LD50: LD50 Dermal - Rat - >2,000 mg/kg

Other information on acute toxicity:
No data available

Skin corrosion/irritation:
No data available

Serious eye damage/eye irritation:
No data available

Respiratory or skin sensitisation:
No data available

Germ cell mutagenicity:
No data available

Carcinogenicity:
IARC: Group 3 - Not classifiable as to carcinogenic to humans.
ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

Reproductive toxicity:
No data available

Teratogenicity:
No data available

Specific target organ toxicity - single exposure (Globally Harmonized System):
No data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System):
No data available

Aspiration hazard:
No data available

Signs and Symptoms of Exposure:
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects:
No data available

## 12. ECOLOGICAL INFORMATION

Toxicity:
Toxicity to fish
LC50 - Oryzias latipes - 5.3 mg/l - 48 h.

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Toxicity to daphnia and other aquatic invertebrates
Static test EC50 - Daphnia magna (Water flea) - 0.48 mg/l - 48 h
(OECD Test Guideline 202)

Toxicity to bacteria
Growth inhibition EC50 - Protozoa - 1.7 mg/l - 24 h

Persistence and degradability:
No data available

Bioaccumulative potential:
No data available

Mobility in soil:
No data available

PBT and vPvB assessment:
No data available

Other adverse effects:
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

## 13. DISPOSAL CONSIDERATIONS

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. Provincial and local disposal regulations may differ from federal disposal regulations.

Dispose of container and unused contents in accordance with federal, provincial and local requirements.

## 14. TRANSPORT INFORMATION

The following information has been verified for: D.O.T., I.M.D.G.(US), I.M.O.(Can), I.A.T.A.(US) & I.C.A.O.(Can);

UN Number: UN3077
Packing Group: III
Limited Quantity: 5 kg
Hazard Class: 9
UN Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Butylated hydroxytoluene)

## 15. REGULATORY INFORMATION

This SDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all of the information required by the CPR.

## 16. OTHER INFORMATION

**Authorized Distributors:**

Comapny Name: A&C American Chemicals Inc.

BUTYLATED HYDROXYTOLUENE NF (BHT)
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Address: 1053 E. Whitaker Mill Rd. #115, Raleigh, NC 27604
Telephone: 919 390-2425 ext. 1002

Comapny Name: A&C Chemicals Europe Ltd.
Address: Questum, Ballingarrane, Cahir Road, Clonmel, Co. Tipperary, Ireland
Telephone: +353 87 2500956

Last Revision10/29/2019

Disclaimer:

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BUTYLATED HYDROXYTOLUENE NF (BHT)
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Lubrizol

Version: 3.1
Revision Date: 09/13/2018

# SAFETY DATA SHEET

## 1. Identification

**Identification**
**Product name:** CARBOPOL® AQUA SF-1 POLYMER

**Additional identification**
**Chemical name:** Acrylate copolymer
**CAS-No.:** Mixture

**Recommended use and restriction on use**
**Recommended use:** Aqua-Personal Care
**Restrictions on use:** None identified.

**Details of the supplier of the safety data sheet**
**Supplier**
Company Name: THE LUBRIZOL CORPORATION
Address: 9921 BRECKSVILLE RD
BRECKSVILLE, OH 44141
US
Telephone: 216-447-5000

**Emergency telephone number:**
FOR TRANSPORT EMERGENCY CALL CHEMTREC (+1)703 527 3887 , OR WITHIN USA 800 424 9300

## 2. Hazard(s) identification

**Hazard Classification**
Not classified

**Label Elements:**

**Hazard Symbol:** No symbol

**Signal Word:** No signal word.

**Hazard Statement:** Not applicable

**Precautionary Statements:** Not applicable

**Other hazards which do not result in GHS classification:** None identified.

## 3. Composition/information on ingredients

**General information:** The components are not hazardous or are below required disclosure limits.

## 4. First-aid measures

SDS_US - CARBOPOL® AQUA SF-1 POLYMER 1/10

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**Ingestion:** Treat symptomatically. Get medical attention.

**Inhalation:** Remove exposed person to fresh air if adverse effects are observed.

**Skin Contact:** Wash with soap and water. If skin irritation occurs, get medical attention.

**Eye contact:** Any material that contacts the eye should be washed out immediately with water. If easy to do, remove contact lenses.

**Most important symptoms/effects, acute and delayed**

**Symptoms:** See section 11.

**Indication of immediate medical attention and special treatment needed**

**Treatment:** Treat symptomatically.

**5. Fire-fighting measures**

**General Fire Hazards:** No unusual fire or explosion hazards noted.

**Suitable (and unsuitable) extinguishing media**

**Suitable extinguishing media:** CO2, dry chemical, foam, water spray, water fog.

**Unsuitable extinguishing media:** Not determined.

**Specific hazards arising from the chemical:** See section 10 for additional information. Material will not burn until water has been evaporated. Container may rupture on heating.

**Special protective equipment and precautions for firefighters**

**Special fire fighting procedures:** No data available.

**Special protective equipment for fire-fighters:** Recommend wearing self-contained breathing apparatus.

**6. Accidental release measures**

**Personal precautions, protective equipment and emergency procedures:** Personal Protective Equipment must be worn, see Personal Protection Section for PPE recommendations. Ventilate area if spilled in confined space or other poorly ventilated areas.

**Methods and material for containment and cleaning up:** Dike far ahead of larger spill for later recovery and disposal. Pick up free liquid for recycle and/or disposal. Residual liquid can be absorbed on inert material. Spilled liquid and dried film are slippery. Use care to avoid falls. Wash area with soap and water.

**Environmental Precautions:** Avoid release to the environment. Do not contaminate water sources or sewer. Environmental manager must be informed of all major spillages. Prevent further leakage or spillage if safe to do so.

SDS_US - CARBOPOL® AQUA SF-1 POLYMER 2/10

Lubrizol

Version: 3.1
Revision Date: 09/13/2018

**7. Handling and storage**

**Precautions for safe handling:** Observe good industrial hygiene practices. Provide adequate ventilation. Wear appropriate personal protective equipment.
Keep containers closed when not in use. Do not eat, drink or smoke when using the product. Avoid inhalation of aerosol, mist, spray, fume or vapor. Avoid contact with eyes and prolonged or repeated contact with skin. Minimize contact with air to reduce contamination with mold, fungus, or other organisms which could cause decomposition or spoilage. Stir well before use.

**Maximum Handling Temperature:** Not determined.

**Conditions for safe storage, including any incompatibilities:** Store away from incompatible materials. See section 10 for incompatible materials. Store in a dry location. Do not store in open, unlabeled or mislabeled containers. Do not freeze.

**Maximum Storage Temperature:** Not determined.

**8. Exposure controls/personal protection**

**Control Parameters:**

**Occupational Exposure Limits**
None of the components have assigned exposure limits.

**Appropriate engineering controls:** Use material in well ventilated area only. Adequate ventilation should be provided so that exposure limits are not exceeded. Mechanical ventilation or local exhaust ventilation may be required.

**Individual protection measures, such as personal protective equipment**

**General information:** Use personal protective equipment as required.

**Eye/face protection:** If contact is likely, safety glasses with side shields are recommended.

**Skin Protection**

**Hand Protection:** Suitable gloves can be recommended by the glove supplier.

**Other:** Long sleeve shirt is recommended.

**Respiratory Protection:** Consult with an industrial hygienist to determine the appropriate respiratory protection for your specific use of this material. A respiratory protection program compliant with all applicable regulations must be followed whenever workplace conditions require the use of a respirator. Use respirator with a combination organic vapor and high efficiency filter cartridge if recommended exposure limit is exceeded. Use self-contained breathing apparatus for entry into confined space, for other poorly ventilated areas and for large spill clean-up sites.

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**Hygiene measures:** Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.

**9. Physical and chemical properties**

| | |
|---|---|
| **Appearance** | |
| **Physical state:** | liquid |
| **Form:** | liquid |
| **Color:** | White |
| **Odor:** | Slight acrylate |
| **Odor threshold:** | No data available. |
| **pH:** | 2.2 - 3.8 |
| **Freezing point:** | Approximate 0 °C |
| **Boiling Point:** | 212 °F (100 °C) |
| **Flash Point:** | Not applicable. |
| **Evaporation rate:** | < 1 n-butyl acetate=1 |
| **Flammability (solid, gas):** | No data available. |
| **Upper/lower limit on flammability or explosive limits** | |
| **Flammability limit - upper (%):** | No data available. |
| **Flammability limit - lower (%):** | No data available. |
| **Explosive limit - upper (%):** | No data available. |
| **Explosive limit - lower (%):** | No data available. |
| **Vapor pressure:** | Approximate 18 torr (20 °C 68 °F) |
| **Vapor density:** | < 1 |
| **Relative density:** | 1 - 1.1 68 °F (20 °C) |
| **Solubility(ies)** | |
| **Solubility in water:** | Miscible with water. |
| **Solubility (other):** | No data available. |
| **Partition coefficient (n-octanol/water):** | No data available. |
| **Auto-ignition temperature:** | No data available. |
| **Decomposition temperature:** | No data available. |
| **Viscosity:** | < 25 mPa.s ( 77 °F (25 °C) ) |
| **Other information** | |
| **Bulk density:** | Approximate 8.75 lb/gal 77 °F (25 °C) |
| **VOC:** | < 0.05 g/l |
| **Percent Solid:** | Approximate 30 % (Percent by Weight) |
| **Percent volatile:** | Approximate 70 %(Percent by Weight) |

**10. Stability and reactivity**

**Reactivity:** No data available.

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**Chemical Stability:** Material is stable under normal conditions.

**Possibility of hazardous reactions:** Will not occur.

**Conditions to avoid:** Do not freeze.

**Incompatible Materials:** Alkalies. Bases.

**Hazardous Decomposition Products:** Thermal decomposition or combustion may liberate carbon oxides and other toxic gases or vapors. Irritating and toxic substances may be emitted upon combustion, burning, or decomposition of dry solids. Acrylate monomers

**11. Toxicological information**

**Information on likely routes of exposure**

**Inhalation:** No data available.

**Ingestion:** No data available.

**Skin Contact:** No data available.

**Eye contact:** No data available.

**Information on toxicological effects**

**Acute toxicity**

**Oral**
Product: May cause irritation of the gastrointestinal tract.
ATEmix > 10,000 mg/kg.

**Dermal**
Product: Not classified for acute toxicity based on available data.

**Inhalation**
Product: Overexposure to vapors or mist may cause dizziness, headache, nausea, and/or flu-like symptoms. Avoid inhalation of mists or vapors.
Not classified for acute toxicity based on available data.

**Skin Corrosion/Irritation:**
Product: Prolonged or repeated contact may cause irritation.
Classification: Not irritating (Measured); Rabbit.
Remarks: Not classified as a primary skin irritant.

**Serious Eye Damage/Eye Irritation:**
Product: Remarks: Vapors formed from heating may cause eye irritation.
Classification: Not irritating (Measured); Rabbit.
Remarks: Not classified as a primary eye irritant.

**Respiratory sensitization:** No data available

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**Skin sensitization:**
Product: Classification: Not a skin sensitizer. (Read across) Not a skin sensitizer.

**Specific Target Organ Toxicity - Single Exposure:**
No data available

**Aspiration Hazard:**
No data available

**Chronic Effects**
**Carcinogenicity:**
No data available

**IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:**
No carcinogenic components identified

**US. National Toxicology Program (NTP) Report on Carcinogens:**
No carcinogenic components identified

**US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):**
No carcinogenic components identified

**Germ Cell Mutagenicity:**
No data available

**Reproductive toxicity:**
No data available

**Specific Target Organ Toxicity - Repeated Exposure:**
No data available

## 12. Ecological information

**Ecotoxicity**
**Fish**
No data available

**Aquatic Invertebrates**
Product: EC 50 (Water flea (Daphnia magna), 2 d): > 100 mg/l

**Toxicity to Aquatic Plants**
No data available

**Toxicity to soil dwelling organisms**
No data available

**Sediment Toxicity**
No data available





**Toxicity to Terrestrial Plants**
No data available

**Toxicity to Above-Ground Organisms**
No data available

**Toxicity to microorganisms**
No data available

**Persistence and Degradability**
**Biodegradation**
Product: OECD TG 301 B, 92 %, 28 d, Not readily degradable.

**Bioaccumulative Potential**
**Bioconcentration Factor (BCF)**
No data available

**Partition Coefficient n-octanol / water (log Kow)**
No data available

**Mobility:**
No data available

**Other Adverse Effects:** No data available.

## 13. Disposal considerations

**Disposal instructions:** Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations. Since emptied containers retain product residue, follow label warnings even after container is emptied.

**Contaminated Packaging:** Container packaging may exhibit hazards.

## 14. Transport information

**DOT**
Not regulated.

**IMDG**
Not regulated.

**IATA**
Not regulated.

**Transport in bulk according to Annex II of MARPOL and the IBC Code**
None known.

The DOT shipping information in this section is based on a bulk container. Please reviewthe accompanying shipping papers for the correct shipping descriptions based the size of the package. Shipping descriptions may vary based on mode of transport, quantities, temperature of the material, package size, and/or origin and destination. It is the responsibility ofthe transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material. During transportation, steps must be taken to prevent load shifting or materials falling, and all relating legal statutes should be obeyed. Reviewclassification requirements before shipping materials at elevated temperatures.





## 15. Regulatory information

**US Federal Regulations**
**TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)**
None present or none present in regulated quantities.

**CERCLA Hazardous Substance List (40 CFR 302.4)**
None present or none present in regulated quantities.

**Superfund Amendments and Reauthorization Act of 1986 (SARA)**

**SARA 311 Classifications**
Not classified

**SARA 302 Extremely Hazardous Substance**
None present or none present in regulated quantities.

**SARA 304 Emergency Release Notification**
None present or none present in regulated quantities.

**SARA 313 (TRI Reporting)**
None present or none present in regulated quantities.

**US State Regulations**
**US. California Proposition 65**
This product may contain chemical(s) known to the state of California to cause cancer and/or birth defects. Additional information can be received upon request.

**Inventory Status**
Australia (AICS)
All components are in compliance with chemical notification requirements in Australia.

Canada (DSL/NDSL)
All substances contained in this product are in compliance with the Canadian Environmental Protection Act and are present on the Domestic Substances List (DSL) or are exempt.

China (IECSC)
All components of this product are listed on the Inventory of Existing Chemical Substances in China.

European Union (REACh)
To obtain information on the REACH compliance status of this product, please e-mail REACH@SDSInquiries.com.

Japan (ENCS)
All components are in compliance with the Chemical Substances Control Law of Japan.

Korea (ECL)
All components are in compliance in Korea.

New Zealand (NZIoC)
All components are in compliance with chemical notification requirements in New Zealand.





Philippines (PICCS)
All components are in compliance with the Philippines Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990 (R.A. 6969).

Switzerland (SWISS)
All components are in compliance with the Environmentally Hazardous Substances Ordinance in Switzerland.

Taiwan (TCSCA)
All components of this product are listed on the Taiwan inventory.

United States (TSCA)
All substances contained in this product are listed on the TSCA inventory or are exempt.

*The information that was used to confirm the compliance status of this product may deviate from the chemical information shown in Section 3.*

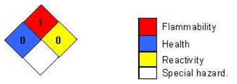
## 16.Other information, including date of preparation or last revision

**HMIS Hazard ID**

| | | |
|---|---|---|
| Health | | 0 |
| Flammability | | 1 |
| Physical Hazards | | 0 |

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible; *Chronic health effect

**NFPA Hazard ID**




Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible

**Issue Date:** 09/13/2018
**Version #:** 3.1
**Source of information:** Internal company data and other publically available resources.
**Further Information:** Contact supplier (see Section 1)
**Disclaimer:** As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of this product. Information contained herein is believed to be true and accurate but all statements or suggestions are made without warranty, expressed or implied, regarding accuracy of the information, the hazards connected with the use of the material or the results to be obtained from the use thereof. Compliance with all applicable federal, state, and local regulations remains the responsibility of the user.

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UNIVAR®

## SAFETY DATA SHEET

**SDS00217**
**Caustic Soda Micropearls Tech**

Preparation Date: 13/Jan/2020 Version: 9

### 1. IDENTIFICATION

**Product identifier**

| | |
|---|---|
| **Product Name** | Caustic Soda Micropearls Tech |

**Other means of identification**

| | |
|---|---|
| **SDS Number** | SDS00217 |
| **Synonyms** | Sodium Hydroxide or Lye |

**Recommended use of the chemical and restrictions on use**

| | |
|---|---|
| **Recommended Use** | Industrial cleaners. Petroleum industries. Metal finishing Chemical processing Drum cleaners. |
| **Restricted Uses** | No information available |

**Initial Supplier Identifier**
Univar Canada Ltd.
9800 Van Horne Way
Richmond, BC V6X 1W5
Telephone: 1-866-686-4827

**Emergency telephone number**

**24 Hour Emergency Phone Number (CANUTEC): 1-888-226-8832 (1-888-CAN-UTEC)**

### 2. HAZARD IDENTIFICATION

**Hazardous Classification of the substance or mixture**

| | |
|---|---|
| Corrosive to metals | Category 1 |
| Acute toxicity - Oral | Category 4 |
| Acute toxicity - Dermal | Category 4 |
| Skin corrosion/irritation | Category 1 |
| Sub-category A | |
| Serious eye damage/eye irritation | Category 1 |

**Label elements**

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**Hazard pictograms**

**Signal Word: Danger**

**Hazard statements**
May be corrosive to metals
Causes severe skin burns and eye damage
Harmful if swallowed
Harmful to aquatic life

**Precautionary Statements**

**Prevention**
Wash thoroughly after handling
Do not eat, drink or smoke when using this product
Do not breathe dust/fume/gas/mist/vapors/spray
Wear protective gloves/protective clothing/eye protection/face protection
Keep only in original packaging
Avoid release to the environment

Immediately call a POISON CENTER or doctor
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower
Wash contaminated clothing before reuse
IF INHALED: Remove person to fresh air and keep comfortable for breathing
IF SWALLOWED: Rinse mouth. DO NOT induce vomiting
IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell

Absorb spillage to prevent material damage

**Storage**
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Store in corrosive resistant container with a resistant inner liner

**Disposal**
Dispose of contents/container to an approved waste disposal plant

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

**Substance**

Not applicable.

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**Mixture**

| Chemical Name | CAS No | Weight-% (W/W) | Synonyms |
|---|---|---|---|
| Sodium Hydroxide | 1310-73-2 | 80-100 | Sodium Hydroxide |
| Sodium Chloride | 7647-14-5 | 1-5 | Sodium Chloride |
| Sodium Carbonate | 497-19-8 | 0.1-1 | Sodium Carbonate |

### 4. FIRST AID MEASURES

**Description of first aid measures**

**General advice**
Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

**Inhalation**
Remove to fresh air. If breathing has stopped, give artificial respiration. Get medical attention immediately. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. If breathing is difficult, (trained personnel should) give oxygen. Delayed pulmonary edema may occur.

**Eye contact**
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Keep eye wide open while rinsing. Do not rub affected area. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention.

**Skin contact**
Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Get immediate medical advice/attention.

**Ingestion**
Do NOT induce vomiting. Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. Get immediate medical advice/attention.

**Self-protection of the first aider**
Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. Wear personal protective clothing (see section 8). Avoid contact with skin, eyes or clothing. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation.

**Most important symptoms and effects, both acute and delayed:**
Causes severe eye burns. Small quantities can result in permanent damage and/or loss of vision. Inhalation of dusts or mists can cause damage to the upper respiratory tract and to the lung tissue depending on severity of exposure. Effects can range from mild irritation of mucous membranes, severe pneumonitis and destruction of lung tissue. May cause dermatitis. Corrosive action causes burns and frequently deep ulcerations with subsequent scarring. Prolonged contact destroys tissue. Corrosive to the respiratory passage. Causes severe burns Ingestion of product may result in death. Severe burns and complete tissue perforation of mucous membranes of mouth, throat and stomach.

**Indication of any immediate medical attention and special treatment needed:**

**Note to physicians**
Treatment based on sound judgment of physician and individual reactions of patient.

### 5. FIRE-FIGHTING MEASURES

**Suitable Extinguishing Media**
Use extinguishing media appropriate for surrounding fire.

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**Specific hazards arising from the substance or mixture**
Contact with some metals (particularly magnesium, aluminum and galvanized zinc) can rapidly generate hydrogen. Use water spray to cool containers. Reacts with metals to generate flammable hydrogen gas. Do not get water inside container. Avoid direct contact of this product with water as this can cause a violent exothermic reaction.

**Hazardous combustion products**
No decomposition expected under normal storage conditions.

**Special protective equipment and precautions for fire-fighters**
Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment.

## 6. ACCIDENTAL RELEASE MEASURES

**Personal precautions, protective equipment and emergency procedures**

Avoid contact with skin, eyes or clothing. Ensure adequate ventilation. Use personal protective equipment as required. Attention! Corrosive material. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.

**Environmental precautions**

Prevent further leakage or spillage if safe to do so. Should not be released into the environment. Do not allow to enter into soil/subsoil. Prevent product from entering drains.

**Methods and materials for containment and cleaning up**

Prevent further leakage or spillage if safe to do so.

## 7. HANDLING AND STORAGE

**Precautions for safe handling**

For industrial use only. Handle and open containers with care. Avoid contact with eyes, skin and clothing. Do not ingest. Avoid inhalation of chemical. Empty containers may contain hazardous product residues. Keep the containers closed when not in use. Protect against physical damage. Use appropriate personnel protective equipment. CAUTION - Do not add water to caustic soda beads. The proper way is to add the beads slowly to the surface of cold water and agitate while they dissolve to avoid violent eruption or explosive reaction. If the water is not agitated, adding caustic soda beads rapidly is dangerous. The danger is greater if the water is warm instead of cold. The high heat of solution of dry caustic soda may cause a sudden violent eruption of caustic solution. Also, a layer of concentrated solution may form and suddenly mix with a layer of less concentrated solution. In this case, the high heat of solution may create steam and cause the solution to erupt. Caustic soda reacts with magnesium, aluminum, zinc (galvanized), tin, chromium, brass and bronze, generating hydrogen which is explosive. Caustic soda may react with various sugars to generate carbon monoxide. Hazardous carbon monoxide gas can form upon contact with food and beverage products in enclosed vessels and can cause death. Do not enter a storage tank or container (truck or rail) that has contained this product, even if it appears empty.

**Conditions for safe storage, including any incompatibilities**

Store in accordance with good industrial practices. Keep containers tightly closed. Protect against moisture, water and physical damage. Do not store in aluminum container or use aluminum fittings or transfer lines, as flammable hydrogen can be generated. Store in a dry, well ventilated area, separate from acids, peroxides, metals, easily ignitable materials and other incompatibles. Store in corrosive resistant stainless steel container with a resistant inner liner.

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## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Control parameters**

**Exposure Limits**

| Chemical Name | Alberta OEL | British Columbia OEL | Ontario | Quebec OEL | Exposure Limit - ACGIH | Immediately Dangerous to Life or Health - IDLH |
|---|---|---|---|---|---|---|
| Sodium Hydroxide 1310-73-2 | Ceiling: 2 mg/m³ | Ceiling: 2 mg/m³ | CEV: 2 mg/m³ | Ceiling: 2 mg/m³ | 2 mg/m³ Ceiling | 10 mg/m³ |
| Sodium Chloride 7647-14-5 | Not available | Not available | Not available | Not available | Not available | Not available |
| Sodium Carbonate 497-19-8 | Not available | Not available | Not available | Not available | Not available | Not available |

Consult local authorities for recommended exposure limits

**Appropriate engineering controls**

**Engineering controls**
Localized ventilation should be used to control dust levels. Provide local exhaust to meet TLV requirements if making solutions or grinding up and mist or dust is generated. Ventilation facilities should be corrosion resistant.

**Individual protection measures, such as personal protective equipment**

**Eye/face protection**
Close fitting chemical safety goggles with faceshield.

**Hand protection**
Appropriate chemical resistant gloves should be worn. Nitrile gloves. Neoprene gloves. Rubber gloves.

**Skin and body protection**
Skin contact should be prevented through the use of suitable protective clothing, gloves and footwear, selected for conditions of use and exposure potential. Consideration must be given both to durability as well as permeation resistance. Rubber apron. Rubber boots. PVC clothing.

**Respiratory protection**
If exposure exceeds occupational exposure limits, use an appropriate NIOSH-approved respirator.

**General hygiene considerations**
Avoid contact with skin, eyes or clothing. Wear suitable gloves and eye/face protection. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Contaminated work clothing should not be allowed out of the workplace. Regular cleaning of equipment, work area and clothing is recommended. Wash hands before breaks and immediately after handling the product.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**Information on basic physical and chemical properties**
**Appearance**

| | |
|---|---|
| **Physical state** | Solid |
| **Color** | White |
| **Odor** | Odorless |
| **Odor threshold** | No information available |

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| **PROPERTIES** | **Values** | **Remarks • Method** |
|---|---|---|
| **pH** | 14 | |
| **Melting point / freezing point** | 318 °C / 604 °F | |
| **Initial boiling point/boiling range** | No data available | None known |
| **Flash point** | No data available | None known |
| **Evaporation rate** | No data available | None known |
| **Flammability (solid, gas)** | No data available | None known |
| **Flammability Limit in Air** | | |
| **Upper flammability limit:** | No data available | |
| **Lower flammability limit:** | No data available | |
| **Vapor pressure** | No data available | None known |
| **Relative vapor density** | No data available | None known |
| **Specific Gravity** | 2.13 @ 20°C | |
| **Water solubility** | Completely soluble | |
| **Solubility in other solvents** | No data available | |
| **Partition coefficient** | No data available | |
| **Autoignition temperature** | No data available | None known |
| **Decomposition temperature** | No data available | None known |
| **Kinematic viscosity** | No data available | None known |
| **Dynamic viscosity** | No data available | None known |
| **Explosive properties** | No information available. | |
| **Oxidizing properties** | No information available. | |
| **Molecular weight** | 40 | |
| **VOC Percentage Volatility** | No information available | |
| **Liquid Density** | No information available | |
| **Bulk density** | No information available | |

## 10. STABILITY AND REACTIVITY

**Reactivity/Chemical Stability**
Stable under normal conditions

**Possibility of hazardous reactions**
Contact with water may generate sufficient heat to ignite combustible materials. May be corrosive to metals.

**Conditions to avoid**
Addition of water results in large temperature increase. Avoid contact with incompatible materials.

**Incompatible materials**
Aldehydes. Contact with water. Contact with acids. Contact with air. Product is corrosive to tin, aluminum, zinc and alloys containing these metals and will react with these metals in powder from, avoid contact with leather, wool, acids, organic halogen compounds. Hazardous carbon monoxide gas can form upon contact with reducing sugars, food and beverage products in enclosed spaces and can cause death.

**Hazardous decomposition products**
No decomposition expected under normal storage conditions.

## 11. TOXICOLOGICAL INFORMATION

**Information on likely routes of exposure**

**Inhalation**
Inhalation of dusts or mists can cause damage to the upper respiratory tract and to the lung tissue depending on severity of exposure. Effects can range from mild irritation of mucous membranes, severe pneumonitis and

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destruction of lung tissue. Corrosive to the respiratory passage.

**Eye contact**
Causes severe eye burns. Small quantities can result in permanent damage and/or loss of vision.

**Skin contact**
May cause dermatitis. Corrosive action causes burns and frequently deep ulcerations with subsequent scarring. Prolonged contact destroys tissue. Causes severe burns.

**Ingestion**
Severe burns and complete tissue perforation of mucous membranes of mouth, throat and stomach. Harmful if swallowed.

**Information on toxicological effects**

**Symptoms**
No additional information available.

**Numerical measures of toxicity**

**Acute toxicity**

**The following values are calculated based on chapter 3.1 of the GHS document**

| | |
|---|---|
| **ATEmix (oral)** | 330.00 mg/kg |
| **ATEmix (dermal)** | 1369.00 mg/kg |

**Unknown acute toxicity** No information available

| Chemical Name | Oral LD50 | Dermal LD50 | Inhalation LC50 |
|---|---|---|---|
| Sodium Hydroxide 1310-73-2 | = 325 mg/kg ( Rat ) | = 1350 mg/kg ( Rabbit ) | Not available |
| Sodium Chloride 7647-14-5 | = 3 g/kg ( Rat ) | > 10 g/kg ( Rabbit ) | > 42 g/m³ ( Rat ) 1 h |
| Sodium Carbonate 497-19-8 | = 4090 mg/kg ( Rat ) | Not available | Not available |

**Delayed and immediate effects as well as chronic effects from short and long-term exposure**

**Skin corrosion/irritation**
May cause dermatitis. Corrosive action causes burns and frequently deep ulcerations with subsequent scarring. Prolonged contact destroys tissue. Causes severe burns.

**Serious eye damage/eye irritation**
Causes severe eye burns. Small quantities can result in permanent damage and/or loss of vision.

**Respiratory or skin sensitization**
No information available.

**Germ cell mutagenicity**
No information available.

**Carcinogenicity**
No information available.

| Chemical Name | ACGIH | IARC | NTP | OSHA |
|---|---|---|---|---|
| Sodium Hydroxide 1310-73-2 | Not available | Not available | Not available | Not available |
| Sodium Chloride 7647-14-5 | Not available | Not available | Not available | Not available |
| Sodium Carbonate | Not available | Not available | Not available | Not available |

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| 497-19-8 | | | | |
|---|---|---|---|---|

**Reproductive toxicity**
No information available.

**Specific target organ systemic toxicity - single exposure**
No information available.

**Specific target organ systemic toxicity - repeated exposure**
No information available.

**Aspiration hazard**
No information available.

## 12. ECOLOGICAL INFORMATION

**Ecotoxicity**

| Chemical Name | Ecotoxicity - Freshwater Algae Data | Ecotoxicity - Fish Species Data | Toxicity to microorganisms | Crustacea |
|---|---|---|---|---|
| Sodium Hydroxide 1310-73-2 | Not available | 45.4 mg/L LC50 (Oncorhynchus mykiss) 96 h static | Not available | Not available |
| Sodium Chloride 7647-14-5 | Not available | 4747 - 7824 mg/L LC50 (Oncorhynchus mykiss) 96 h flow-through 5560 - 6080 mg/L LC50 (Lepomis macrochirus) 96 h flow-through 6020 - 7070 mg/L LC50 (Pimephales promelas) 96 h static 6420 - 6700 mg/L LC50 (Pimephales promelas) 96 h static 12946 mg/L LC50 (Lepomis macrochirus) 96 h static 7050 mg/L LC50 (Pimephales promelas) 96 h semi-static | Not available | EC50: 340.7 - 469.2mg/L (48h, Daphnia magna) EC50: =1000mg/L (48h, Daphnia magna) |
| Sodium Carbonate 497-19-8 | 242 mg/L EC50 Nitzschia 120 h | 310 - 1220 mg/L LC50 (Pimephales promelas) 96 h static 300 mg/L LC50 (Lepomis macrochirus) 96 h static | Not available | EC50: =265mg/L (48h, Daphnia magna) |

**Persistence and degradability** No information available.

**Bioaccumulation** No information available.

| Chemical Name | Partition coefficient |
|---|---|
| Sodium Hydroxide 1310-73-2 | Not available |
| Sodium Chloride 7647-14-5 | Not available |
| Sodium Carbonate 497-19-8 | Not available |

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**Other adverse effects** No information available.

## 13. DISPOSAL CONSIDERATIONS

**Waste treatment methods**

Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.

Do not reuse empty containers.

## 14. TRANSPORT INFORMATION

**TDG (Canada):**

| | |
|---|---|
| **UN Number** | UN1823 |
| **Shipping name** | SODIUM HYDROXIDE, SOLID |
| **Class** | 8 |
| **Packing Group** | II |
| **Marine pollutant** | No. |

**DOT (U.S.)**

| | |
|---|---|
| **UN Number** | UN1823 |
| **Shipping name** | SODIUM HYDROXIDE, SOLID |
| **Class** | 8 |
| **Packing Group** | II |
| **Marine pollutant** | No |

## 15. REGULATORY INFORMATION

**Safety, health and environmental regulations/legislation specific for the substance or mixture**

**U.S. Regulatory Rules**

| Chemical Name | CERCLA/SARA - Section 302: | SARA (311, 312) Hazard Class: | CERCLA/SARA - Section 313: |
|---|---|---|---|
| Sodium Hydroxide - 1310-73-2 | Not Listed | Listed | Not Listed |
| Sodium Chloride - 7647-14-5 | Not Listed | Not Listed | Not Listed |
| Sodium Carbonate - 497-19-8 | Not Listed | Not Listed | Not Listed |

**International Inventories**

**TSCA** All components of this product are either on the Toxic Substances Control Act (TSCA) Inventory List or exempt.

**DSL/NDSL** All components of this product are either on the Domestic Substances List (DSL), the Non-Domestic Substances List (NDSL) or exempt.

**Legend:**
**TSCA** - United States Toxic Substances Control Act Section 8(b) Inventory
**DSL/NDSL** - Canadian Domestic Substances List/Non-Domestic Substances List

## 16. OTHER INFORMATION

| | | | | |
|---|---|---|---|---|
| **NFPA:** | **Health hazards** 3 | **Flammability** 0 | **Instability** 0 | **Physical and chemical properties** - |
| **HMIS:** | **Health hazards** 3 | **Flammability** 0 | **Physical hazards** 0 | **Personal protection** X |

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**SDS00217 - Caustic Soda Micropearls Tech** **Preparation Date: 13/Jan/2020**

**Legend** Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

| | | | |
|---|---|---|---|
| TWA | TWA (time-weighted average) | STEL | STEL (Short Term Exposure Limit) |
| Ceiling | Maximum limit value | * | Skin designation |

**Prepared By:** The Environment, Health and Safety Department of Univar Canada Ltd.

**Preparation Date:** 13/Jan/2020
**Revision Date:** 13/Jan/2020

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**End of Safety Data Sheet**

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TTCA

**Citric Acid Anhydrous**
**EXTENDED SAFETY DATA SHEET**
ACCORDING TO EC-REGULATIONS 1907/2006 (REACH); 1272/2008 & 453/2010 (CLP)

**Version: 1**
**Date: 28/02/2011**

**SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING**

**1.1 Product identifier**

| | |
|---|---|
| Chemical Name | Citric acid |
| Trade name | Citric acid Anhydrous |
| CAS No. | 77-92-9 |
| EINECS No. | 201-069-1 |
| REACH Registration No. | 01-2119457026-42-0009 |

**1.2** Relevant identified uses of the substance or mixture and uses advised against

| | |
|---|---|
| Identified use(s) | Used as a sour agent, buffering agent and antioxidant in the food industry, a correctant in pharmaceutical industry, used in detergents, buffering and chelating, sizing and as a sequestrant. |
| Uses advised against | No uses advised against |

**1.3 Details of the supplier of the Safety Data Sheet**

| | |
|---|---|
| Company Identification | TTCA Co., Ltd<br>West Wenhe Bridge North, Anqiu, Shandong China |
| Telephone | 0086-536-4222799 |
| Fax No | 0086-536-4221500 |
| Contact name | Cao Jiande |
| Email | eu@ttca.com.cn |
| EU Only Representative | CCCMC Europe Oy Ltd<br>Viikinkaari 6, 00790 HELSINKI |
| Telephone: | +358 9 319 36660 |
| Fax: | +358 9 319 36661 |
| Email: | Chairyr@cccmc.org.cn |
| contact person: | Chai Yanru |

**1.4** Emergency telephone number 00331.45.42.59.59
Opening hours

**SECTION 2: HAZARDS IDENTIFICATION**

**2.1 Classification of the substance or mixture**

**2.1.1 Regulation (EC) No. 1272/2008 (CLP)** Warning. H319: Causes serious eye irritation
**2.1.2 Directive 67/548/EEC & Directive 1999/45/EC** Xi; Irritant. R36
**2.2 Label elements**
**2.2.1 According to Regulation (EC) No. 1272/2008 & 453/2010 (CLP)**

| | |
|---|---|
| Hazard Pictogram | |
| Signal word(s) | Warning |
| Hazard statement(s) | H319: Causes serious eye irritation |
| Precautionary statement(s) | P264. Wash hands thoroughly after handling.<br>P280 Wear eye protection.<br>P305 + P351 + P338. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.<br>P337+P313: If eye irritation persists: Get medical advice/attention. |

**2.2.2 According to Directive 67/548/EEC & Directive 1999/45/EC**

| | |
|---|---|
| Hazard Symbol | Irritant |
| Risk Phrases | R36. Irritating to eye |

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| | | |
|---|---|---|
| | Safety Phrases | S26. Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice |
| 2.3 | **Other hazards** | Not known |
| 2.4 | **Additional Information** | Not known |

**SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS**

**3.1 Substance**

| Composition | %W/W | EC No. | CAS No |
|---|---|---|---|
| Citric acid | 99.5 to 100.5 | 201-069-1 | 77-92-9 |

**SECTION 4: FIRST AID MEASURES**

| | | |
|---|---|---|
| 4.1 | **Description of first aid measures** | |
| | **Inhalation** | Move to fresh air. |
| | **Skin Contact** | Wash off immediately with plenty of water for at least 15 minutes. If irritation persists, call a physician. |
| | **Eye Contact** | Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. |
| | **Ingestion** | Do NOT induce vomiting. Drink 1 or 2 glasses of water. Never give anything by mouth to an unconscious person. Consult a physician. |
| 4.2 | **Most important symptoms and effects, both acute and delayed** | Serious eye damage/eye irritation: Eye Irrit. 2 |
| 4.3 | **Indication of immediate medical attention and special treatment needed** | Consult a physician. |

**SECTION 5: FIRE-FIGHTING MEASURES**

| | | |
|---|---|---|
| 5.1 | **Extinguishing Media** | |
| | **5.1.1 Suitable Extinguishing Media** | Use alcohol-resistant foam, carbon dioxide, dry powder or water fog. |
| | **5.1.2. Unsuitable Extinguishing Media** | Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. |
| 5.2 | **Special hazards arising from the substance or mixture** | Oxides of carbon |
| 5.3 | **Advice for fire-fighters** | In the event of fire, wear self-contained breathing apparatus and wear suitable protective clothing. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations |
| 5.4 | **Additional information** | Explosion hazard from the generation of dust. |

**SECTION 6: ACCIDENTAL RELEASE MEASURES**

| | | |
|---|---|---|
| 6.1 | **Personal precautions, protective equipment and emergency procedures** | Use personal protective equipment. |
| 6.2 | **Environmental precautions** | Do not flush substance into surface water or sewage system. |
| 6.3 | **Methods and material for containment and cleaning up** | Sweep up or vacuum up spillage and collect in suitable container for disposal. |
| 6.4 | **Reference to other sections** | Section 8 |
| 6.5 | **Additional Information** | Not known |

**SECTION 7: HANDLING AND STORAGE**

| | | |
|---|---|---|
| 7.1 | **Precautions for safe handling** | Avoid contact with skin and eyes. Use only in well-ventilated areas. Do not breathe vapours/dust |

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| | | |
|---|---|---|
| 7.2 | **Conditions for safe storage, including any incompatibilities** | Keep locked up or in an area accessible only to qualified staff |
| | **Storage** | Store in tightly closed original container in a dry, cool and well ventilated place. Keep in original container. |
| | **Incompatible materials** | Strong oxidising substances, strong alkalis. |

**SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION**

| | | |
|---|---|---|
| 8.1 | **Control parameters** | |
| 8.1.1 | **Occupational Exposure Limits** | No values assigned |
| 8.1.2 | **Biological limit values** | No values assigned |
| 8.2 | **PNECs and DNELs** | |
| | **DNELs - Health** | No true DNEL for systemic toxicity can be derived. Local effects, eye irritation should be considered. |

**PNEC/PEC – Environment**

| Compartment | PNEC |
|---|---|
| Aquatic PNECaqua – freshwater (mg/l) | 0.44 |
| PNECaqua - marine water (mg/l) | 0.044 |
| PNECfreshwater-sediment (mg/kg d.w.) | 3.46. (Equivalent to 0.752 mg/kg wwt) |
| The PNECmarine-sediment mg/kg d.w. | 34.6. (Equivalent to 7.52 mg/kg wwt) |
| Terrestrial (PNECsoil mg/kg d.w.) | 33.1 |
| Sewage treatment plant PNEC STP (mg/l) | >1000 |
| Atmospheric Compartment | Not applicable |

| | | |
|---|---|---|
| 8.3 | **Exposure controls** | |
| 8.3.1 | **Appropriate engineering controls** | Minimise the risk of dust inhalation. Provide adequate ventilation. |
| 8.3.2 | **Personal protection equipment** | |
| | **Eye/face protection** | Safety glasses with side-shields |
| | **Skin protection (Hand protection/ Other)** | Avoid contact with skin, eyes and clothing. Wash hands before breaks and at the end of workday. Protective gloves must satisfy the specifications of EU Directive 89/686/EEC and EN 374 |
| | **Respiratory protection** | Provide adequate ventilation. Wear respirator where dust level exceeds 10 mg/m3. |
| | **Thermal hazards** | Not applicable |
| 8.3.3 | **Environmental Exposure Controls** | Do not allow to enter drains, sewers or watercourses |
| 8.3.4 | **Hygiene measures** | Do not smoke in the work area. Wash at the end of each work shift and before eating, smoking and using the toilet. Wash promptly if skin becomes contaminated. Promptly remove any clothing that becomes contaminated. When using do not eat, drink or smoke. |

**SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**

| | | |
|---|---|---|
| 9.1 | **Information on basic physical and chemical properties** | |
| | Appearance | Solid, crystalline |
| | Colour | White |
| | Odour | Odourless |
| | pH (Value) | 1.7 (100g/l) |
| | Melting Point | Approx.153 ℃ at 1,013 hPa |
| | Boiling point/boiling range (℃): | Decomposes before boiling |

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| | | |
|---|---|---|
| | Flash Point (℃) | Not known |
| | Flammability | Non flammable |
| | Density | 1.665 g/cm³ at 20℃ |
| | Solubility (Water) | 590 g/L at 20℃ |
| | Solubility (Other) | Soluble in alcohol |
| | Partition Coefficient (Log Kow: -n-Octanol/water) | -0.2 to -1.8 |
| | Decomposition Temperature (℃) | Not known |
| | Explosive properties | Not explosive |
| | Oxidising properties | Not oxidising |
| 9.2 | **Other information** | The fraction below 100 µm = 84.1%; the D50 of the fraction below 100 µm = at 31.99 µm. |
| | Granulometry | |
| | Dissociation constant | pKa: 3.13, 4.76 and 6.4 at 25℃ |

**SECTION 10: STABILITY AND REACTIVITY**

| | | |
|---|---|---|
| 10.1 | **Reactivity** | Reacts with alkaline materials |
| 10.2 | **Chemical stability** | Stable under normal conditions |
| 10.3 | **Conditions to avoid** | Exposure to heat and moisture. |
| 10.4 | **Incompatible materials** | Sodium nitrite, potassium nitrite |
| 10.5 | **Hazardous Decomposition Product(s)** | Oxides of carbon. |

**SECTION 11: TOXICOLOGICAL INFORMATION**

| | | |
|---|---|---|
| 11.1 | **Information on toxicological effects** | |
| 11.1.1 | **Substances** | |
| | **Acute toxicity** | |
| | **Ingestion LD50 (mouse)** | 5400 mg/kg bw |
| | **Inhalation** | No data |
| | **Skin Contact. LD50 (dermal):** | >2000 mg/kg bw |
| | **Skin corrosion/irritation** | Mild skin irritant |
| | **Eye Contact** | Irritating |
| | **Respiratory or skin sensitization –skin** | Not a sensitizer |
| | **Mutagenicity** | Not a mutagen |
| | **Carcinogenicity** | Not a carcinogen |
| | **Reproductive toxicity** | Not a reproductive toxin |
| | **STOT - single exposure** | Not known |
| | **STOT - repeated exposure** | Not known |
| | **Aspiration hazard** | Not known |
| 11.2 | **Other information** | Not known |

**SECTION 12: ECOLOGICAL INFORMATION**

| | | |
|---|---|---|
| 12.1 | **Toxicity** | |
| | Fish LC50 (48hr) | 440 mg/l |
| | D. Magna LC 50 (24hr) | 1535 mg/l |
| | Algae (8 d mat. (nominal) based on cell density | 425 mg/l |
| 12.2 | **Persistence and degradability** | Biodegradable |
| 12.3 | **Bioaccumulative potential** | No expected to |
| 12.4 | **Mobility in soil** | Not applicable |
| 12.5 | **Results of PBT and vPvB assessment** | Not a PBT or a vPvB |
| 12.6 | **Other adverse effects** | Not known |

**SECTION 13: DISPOSAL CONSIDERATIONS**

| | | |
|---|---|---|
| 13.1 | **Waste treatment methods** | Disposal to licensed waste disposal site in accordance with local Waste Disposal Authority. |
| 13.2 | **Additional Information** | Not known |

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**SECTION 14: TRANSPORT INFORMATION**

| | | |
|---|---|---|
| 14.1 | **Land transport (ADR/RID)** | Not subject to transport regulations. |
| 14.2 | **Sea transport (IMDG)** | Not subject to transport regulations. |
| 14.3 | **Air transport (ICAO/IATA)** | Not subject to transport regulations. |
| 14.4 | **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code** | Not known |

**SECTION 15: REGULATORY INFORMATION**

| | | |
|---|---|---|
| 15.1 | **Safety, health and environmental regulations/legislation specific for the substance or mixture substance** | |
| 15.1.1 | **EU regulations** | User to follow EU directives and regulations |
| | **Authorisations and/or restrictions on use** | Not applicable |
| 15.1.2 | **National regulations** | User to follow national regulations |

**SECTION 16: OTHER INFORMATION**

**The following sections contain revisions or new statements**: Version 1.

**LEGEND**

| | |
|---|---|
| LTEL | Long Term Exposure Limit |
| STEL | Short Term Exposure Limit |
| STOT | Specific Target Organ Toxicity |
| DNEL | Derived No Effect Level |
| PNEC | Predicted No Effect Concentration |

**References:**
Chemical Safety Report for citric acid and citrates
Regulation (EC) No. 1272/2008 & 453/2010 (CLP)
Directive 67/548/EEC & Directive 1999/45/EC

**Risk Phrases and Safety Phrases**
R36: Irritating to eyes
S26: Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice

**Hazard statement(s) and Precautionary statement(s)**
H319: Causes serious eye irritation
P264: Wash hands thoroughly after handling.
P280: Wear eye protection.
P305 + P351 + P338. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313: If eye irritation persists: Get medical advice/attention.

**Training advice:** Ensure staff and workers receive adequate training with regular updates in the handling of chemicals
**Additional Information.** Not known

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Annexes
I. Exposure scenarios
II. Use descriptors

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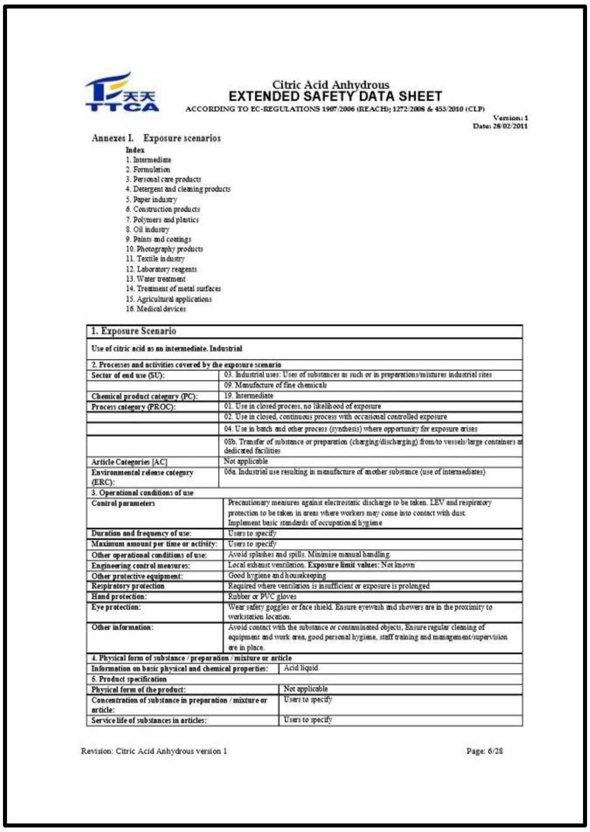

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Annexes I. Exposure scenarios

**Index**
1. Intermediate
2. Formulation
3. Personal care products
4. Detergent and cleaning products
5. Paper industry
6. Construction products
7. Polymers and plastics
8. Oil industry
9. Paints and coatings
10. Photography products
11. Textile industry
12. Laboratory reagents
13. Water treatment
14. Treatment of metal surfaces
15. Agricultural applications
16. Medical devices

| | |
|---|---|
| 1. Exposure Scenario | |
| **Use of citric acid as an intermediate. Industrial** | |
| **2. Processes and activities covered by the exposure scenario** | |
| **Sector of end use (SU):** | 03. Industrial uses: Uses of substances as such or in preparations/mixtures industrial sites |
| | 09. Manufacture of fine chemicals |
| **Chemical product category (PC):** | 19. Intermediate |
| **Process category (PROC):** | 01. Use in closed process, no likelihood of exposure |
| | 02. Use in closed, continuous process with occasional controlled exposure |
| | 04. Use in batch and other process (synthesis) where opportunity for exposure arises |
| | 08b. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| **Article Categories [AC]** | Not applicable |
| **Environmental release category (ERC):** | 06a. Industrial use resulting in manufacture of another substance (use of intermediates) |
| **3. Operational conditions of use** | |
| **Control parameters** | Precautionary measures against electrostatic discharge to be taken. LEV and respiratory protection to be taken in areas where workers may come into contact with dust. Implement basic standards of occupational hygiene |
| **Duration and frequency of use:** | Users to specify |
| **Maximum amount per time or activity:** | Users to specify |
| **Other operational conditions of use:** | Avoid splashes and spills. Minimise manual handling. |
| **Engineering control measures:** | Local exhaust ventilation. **Exposure limit values:** Not known |
| **Other protective equipment:** | Good hygiene and housekeeping |
| **Respiratory protection** | Required where ventilation is insufficient or exposure is prolonged |
| **Hand protection:** | Rubber or PVC gloves |
| **Eye protection:** | Wear safety goggles or face shield. Ensure eyewash and showers are in the proximity to workstation location. |
| **Other information:** | Avoid contact with the substance or contaminated objects, Ensure regular cleaning of equipment and work area, good personal hygiene, staff training and management/supervision are in place. |
| **4. Physical form of substance / preparation / mixture or article** | |
| **Information on basic physical and chemical properties:** | Acid liquid |
| **5. Product specification** | |
| **Physical form of the product:** | Not applicable |
| **Concentration of substance in preparation / mixture or article:** | Users to specify |
| **Service life of substances in articles:** | Users to specify |

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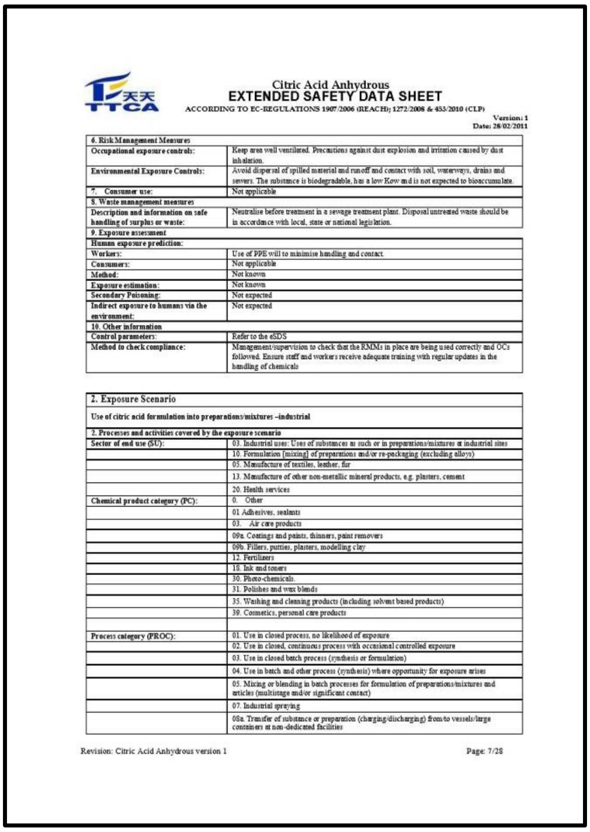

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| | |
|---|---|
| **6. Risk Management Measures** | |
| **Occupational exposure controls:** | Keep area well ventilated. Precautions against dust explosion and irritation caused by dust inhalation. |
| **Environmental Exposure Controls:** | Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate. |
| **7. Consumer use:** | Not applicable |
| **8. Waste management measures** | |
| **Description and information on safe handling of surplus or waste:** | Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation. |
| **9. Exposure assessment** | |
| **Human exposure prediction:** | |
| **Workers:** | Use of PPE will to minimise handling and contact. |
| **Consumers:** | Not applicable |
| **Method:** | Not known |
| **Exposure estimation:** | Not known |
| **Secondary Poisoning:** | Not expected |
| **Indirect exposure to humans via the environment:** | Not expected |
| **10. Other information** | |
| **Control parameters:** | Refer to the eSDS |
| **Method to check compliance:** | Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals |

| | |
|---|---|
| 2. Exposure Scenario | |
| **Use of citric acid formulation into preparations/mixtures –industrial** | |
| **2. Processes and activities covered by the exposure scenario** | |
| **Sector of end use (SU):** | 03. Industrial uses: Uses of substances as such or in preparations/mixtures at industrial sites |
| | 10. Formulation [mixing] of preparations and/or re-packaging (excluding alloys) |
| | 05. Manufacture of textiles, leather, fur |
| | 13. Manufacture of other non-metallic mineral products, e.g. plasters, cement |
| | 20. Health services |
| **Chemical product category (PC):** | 0. Other |
| | 01 Adhesives, sealants |
| | 03. Air care products |
| | 09a. Coatings and paints, thinners, paint removers |
| | 09b. Fillers, putties, plasters, modelling clay |
| | 12. Fertilizers |
| | 18. Ink and toners |
| | 30. Photo-chemicals. |
| | 31. Polishes and wax blends |
| | 35. Washing and cleaning products (including solvent based products) |
| | 39. Cosmetics, personal care products |
| | |
| **Process category (PROC):** | 01. Use in closed process, no likelihood of exposure |
| | 02. Use in closed, continuous process with occasional controlled exposure |
| | 03. Use in closed batch process (synthesis or formulation) |
| | 04. Use in batch and other process (synthesis) where opportunity for exposure arises |
| | 05. Mixing or blending in batch processes for formulation of preparations/mixtures and articles (multistage and/or significant contact) |
| | 07. Industrial spraying |
| | 08a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities |

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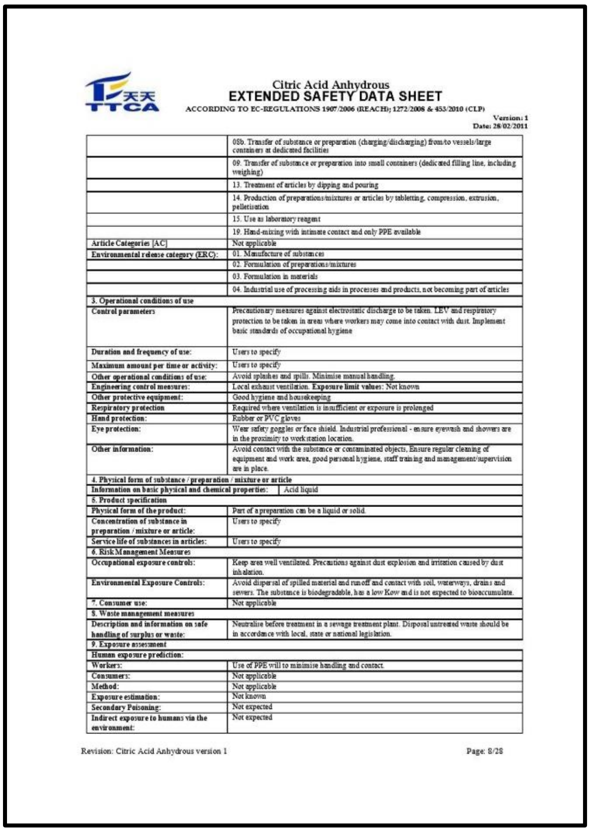

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| | |
|---|---|
| | 08b. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| | 09. Transfer of substance or preparation into small containers (dedicated filling line, including weighing) |
| | 13. Treatment of articles by dipping and pouring |
| | 14. Production of preparations/mixtures or articles by tabletting, compression, extrusion, pelletisation |
| | 15. Use as laboratory reagent |
| | 19. Hand-mixing with intimate contact and only PPE available |
| **Article Categories [AC]** | Not applicable |
| **Environmental release category (ERC):** | 01. Manufacture of substances |
| | 02. Formulation of preparations/mixtures |
| | 03. Formulation in materials |
| | 04. Industrial use of processing aids in processes and products, not becoming part of articles |
| **3. Operational conditions of use** | |
| **Control parameters** | Precautionary measures against electrostatic discharge to be taken. LEV and respiratory protection to be taken in areas where workers may come into contact with dust. Implement basic standards of occupational hygiene |
| **Duration and frequency of use:** | Users to specify |
| **Maximum amount per time or activity:** | Users to specify |
| **Other operational conditions of use:** | Avoid splashes and spills. Minimise manual handling. |
| **Engineering control measures:** | Local exhaust ventilation. **Exposure limit values:** Not known |
| **Other protective equipment:** | Good hygiene and housekeeping |
| **Respiratory protection** | Required where ventilation is insufficient or exposure is prolonged |
| **Hand protection:** | Rubber or PVC gloves |
| **Eye protection:** | Wear safety goggles or face shield. Industrial professional - ensure eyewash and showers are in the proximity to workstation location. |
| **Other information:** | Avoid contact with the substance or contaminated objects, Ensure regular cleaning of equipment and work area, good personal hygiene, staff training and management/supervision are in place. |
| **4. Physical form of substance / preparation / mixture or article** | |
| **Information on basic physical and chemical properties:** | Acid liquid |
| **5. Product specification** | |
| **Physical form of the product:** | Part of a preparation can be a liquid or solid. |
| **Concentration of substance in preparation / mixture or article:** | Users to specify |
| **Service life of substances in articles:** | Users to specify |
| **6. Risk Management Measures** | |
| **Occupational exposure controls:** | Keep area well ventilated. Precautions against dust explosion and irritation caused by dust inhalation. |
| **Environmental Exposure Controls:** | Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate. |
| **7. Consumer use:** | Not applicable |
| **8. Waste management measures** | |
| **Description and information on safe handling of surplus or waste:** | Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation. |
| **9. Exposure assessment** | |
| **Human exposure prediction:** | |
| **Workers:** | Use of PPE will to minimise handling and contact. |
| **Consumers:** | Not applicable |
| **Method:** | Not applicable |
| **Exposure estimation:** | Not known |
| **Secondary Poisoning:** | Not expected |
| **Indirect exposure to humans via the environment:** | Not expected |

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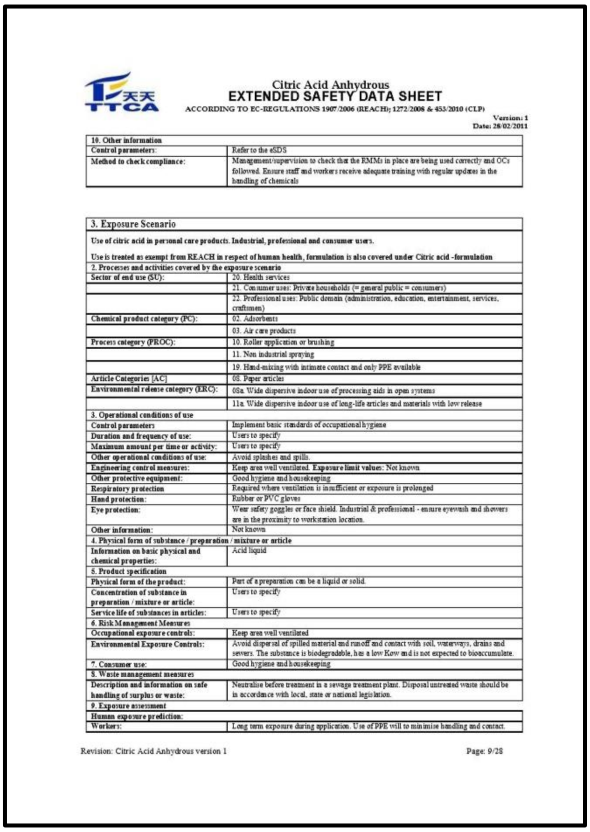

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| | |
|---|---|
| **10. Other information** | |
| **Control parameters:** | Refer to the eSDS |
| **Method to check compliance:** | Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals |

| | |
|---|---|
| 3. Exposure Scenario | |
| **Use of citric acid in personal care products. Industrial, professional and consumer users.**<br>**Use is treated as exempt from REACH in respect of human health, formulation is also covered under Citric acid -formulation** | |
| **2. Processes and activities covered by the exposure scenario** | |
| **Sector of end use (SU):** | 20. Health services |
| | 21. Consumer uses: Private households (= general public = consumers) |
| | 22. Professional uses: Public domain (administration, education, entertainment, services, craftsmen) |
| **Chemical product category (PC):** | 02. Adsorbents |
| | 03. Air care products |
| **Process category (PROC):** | 10. Roller application or brushing |
| | 11. Non industrial spraying |
| | 19. Hand-mixing with intimate contact and only PPE available |
| **Article Categories [AC]** | 08. Paper articles |
| **Environmental release category (ERC):** | 08a. Wide dispersive indoor use of processing aids in open systems |
| | 11a. Wide dispersive indoor use of long-life articles and materials with low release |
| **3. Operational conditions of use** | |
| **Control parameters** | Implement basic standards of occupational hygiene |
| **Duration and frequency of use:** | Users to specify |
| **Maximum amount per time or activity:** | Users to specify |
| **Other operational conditions of use:** | Avoid splashes and spills. |
| **Engineering control measures:** | Keep area well ventilated. **Exposure limit values:** Not known |
| **Other protective equipment:** | Good hygiene and housekeeping |
| **Respiratory protection** | Required where ventilation is insufficient or exposure is prolonged |
| **Hand protection:** | Rubber or PVC gloves |
| **Eye protection:** | Wear safety goggles or face shield. Industrial & professional - ensure eyewash and showers are in the proximity to workstation location. |
| **Other information:** | Not known |
| **4. Physical form of substance / preparation / mixture or article** | |
| **Information on basic physical and chemical properties:** | Acid liquid |
| **5. Product specification** | |
| **Physical form of the product:** | Part of a preparation can be a liquid or solid. |
| **Concentration of substance in preparation / mixture or article:** | Users to specify |
| **Service life of substances in articles:** | Users to specify |
| **6. Risk Management Measures** | |
| **Occupational exposure controls:** | Keep area well ventilated |
| **Environmental Exposure Controls:** | Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate. |
| **7. Consumer use:** | Good hygiene and housekeeping |
| **8. Waste management measures** | |
| **Description and information on safe handling of surplus or waste:** | Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation. |
| **9. Exposure assessment** | |
| **Human exposure prediction:** | |
| **Workers:** | Long term exposure during application. Use of PPE will to minimise handling and contact. |

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|---|---|
| **Consumers:** | Long term exposure to low concentrations during application/use. |
| **Method:** | Not applicable |
| **Exposure estimation:** | Not known |
| **Secondary Poisoning:** | Not expected |
| **Indirect exposure to humans via the environment:** | Not expected |
| **10. Other information** | |
| **Control parameters:** | Refer to the eSDS |
| **Method to check compliance:** | Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals |

| | |
|---|---|
| 4. Exposure Scenario | |
| **Use of citric acid in detergents and cleaning products. Industrial, professional and consumer users** | |
| **2. Processes and activities covered by the exposure scenario** | |
| **Sector of end use (SU):** | 03. Industrial uses: Uses of substances as such or in preparations/mixtures at industrial sites |
| | 21 Consumer uses: Private households (= general public = consumers) |
| | 22 Professional uses: Public domain (administration, education, entertainment, services, craftsmen) |
| **Chemical product category (PC):** | 03. Air care products |
| | 28. Perfumes, fragrances |
| | 31. Polishes and wax blends |
| | 35. Washing and cleaning products (including solvent based products) |
| | 36. Water softeners |
| | 37. Water treatment chemicals |
| **Process category (PROC):** | 01. Use in closed process, no likelihood of exposure |
| | 02. Use in closed, continuous process with occasional controlled exposure |
| | 04 Use in batch and other process (synthesis) where opportunity for exposure arises |
| | 05. Mixing or blending in batch processes for formulation of preparations/mixtures/mixtures and articles (multistage and/or significant contact) |
| | 07. Industrial spraying |
| | 08a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities |
| | 08b. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| | 09. Transfer of substance or preparation into small containers (dedicated filling line, including weighing) |
| | 10. Roller application or brushing |
| | 11. Non industrial spraying |
| | 13. Treatment of articles by dipping and pouring |
| | 19. Hand-mixing with intimate contact and only PPE available |
| **Article Categories [AC]** | 08. Paper articles |
| **Environmental release category (ERC):** | 02. Formulation of preparations/mixtures |
| | 04. Industrial use of processing aids in processes and products, not becoming part of articles |
| | 08a. Wide dispersive indoor use of processing aids in open systems |
| | 8d. Wide dispersive outdoor use of processing aids in open systems |
| | 09a. Wide dispersive indoor use of substances in closed systems |
| | 09b. Wide dispersive outdoor use of substances in closed systems |
| **3. Operational conditions of use** | |
| **Control parameters** | Implement basic standards of occupational hygiene |
| **Duration and frequency of use:** | Users to specify |

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| **Maximum amount per time or activity:** | Users to specify |
| **Other operational conditions of use:** | Avoid splashes and spills. |
| **Engineering control measures:** | Keep area well ventilated. **Exposure limit values:** Not known |
| **Other protective equipment:** | Good hygiene and housekeeping |
| **Respiratory protection** | Required where ventilation is insufficient or exposure is prolonged |
| **Hand protection:** | Rubber or PVC gloves |
| **Eye protection:** | Wear safety goggles or face shield. Industrial professional - ensure eyewash and showers are in the proximity to workstation location. |
| **Other information:** | Avoid contact with the substance or contaminated objects, Ensure regular cleaning of equipment and work area, good personal hygiene, staff training and management/supervision are in place. |
| **4. Physical form of substance / preparation / mixture or article** | |
| **Information on basic physical and chemical properties:** | Acid liquid |
| **5. Product specification** | |
| **Physical form of the product:** | Part of a preparation can be a liquid or solid. |
| **Concentration of substance in preparation / mixture or article:** | Formulators information |
| **Service life of substances in articles:** | In use 2 to 12 months |
| **6. Risk Management Measures** | |
| **Occupational exposure controls:** | Keep area well ventilated |
| **Environmental Exposure Controls:** | Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.<br>The substance is biodegradable, has a low Kow and is not expected to bioaccumulate. |
| **7. Consumer use:** | Good hygiene and housekeeping |
| **8. Waste management measures** | |
| **Description and information on safe handling of surplus or waste:** | Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation. |
| **9. Exposure assessment** | |
| **Human exposure prediction:** | |
| **Workers:** | Short term during formulation. Long term exposure during application. Use of PPE will to minimise handling and contact. |
| **Consumers:** | Long term exposure to low concentrations during application/use |
| **Method:** | Not applicable |
| **Exposure estimation:** | Not known |
| **Secondary Poisoning:** | Not expected |
| **Indirect exposure to humans via the environment:** | Not expected |
| **10. Other information** | |
| **Control parameters:** | Refer to the eSDS |
| **Method to check compliance:** | Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals |

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|---|---|
| 5. Exposure Scenario | |
| **Use of citric acid in paper industry. Industrial** | |
| **2. Processes and activities covered by the exposure scenario** | |
| **Sector of end use (SU):** | 03. Industrial uses: Uses of substances as such or in preparations/mixtures industrial sites |
| | 06a. Manufacture of pulp, paper and paper products |
| **Chemical product category (PC):** | 26. Paper and board dye, finishing and impregnation products: including bleaches and other processing aids |
| **Process category (PROC):** | 05. Mixing or blending in batch processes for formulation of preparations/mixtures/mixtures and articles (multistage and/or significant contact) |
| | 8a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities. |
| **Article Categories [AC]** | Not applicable |

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|---|---|
| **Environmental release category (ERC):** | 04. Industrial use of processing aids in processes and products, not becoming part of articles |
| **3. Operational conditions of use** | |
| **Control parameters** | Implement basic standards of occupational hygiene |
| **Duration and frequency of use:** | Users to specify |
| **Maximum amount per time or activity:** | Users to specify |
| **Other operational conditions of use:** | Avoid splashes and spills. |
| **Engineering control measures:** | Keep area well ventilated. **Exposure limit values:** Not known |
| **Other protective equipment:** | Good hygiene and housekeeping |
| **Respiratory protection** | Required where ventilation is insufficient or exposure is prolonged |
| **Hand protection:** | Rubber or PVC gloves |
| **Eye protection:** | Wear safety goggles or face shield. Ensure eyewash and showers are in the proximity to workstation location. |
| **Other information:** | Not known |
| **4. Physical form of substance / preparation / mixture or article** | |
| **Information on basic physical and chemical properties:** | Acid liquid |
| **5. Product specification** | |
| **Physical form of the product:** | Part of a preparation can be a liquid or solid. |
| **Concentration of substance in preparation / mixture or article:** | Users to specify |
| **Service life of substances in articles:** | Users to specify |
| **6. Risk Management Measures** | |
| **Occupational exposure controls:** | Keep area well ventilated |
| **Environmental Exposure Controls:** | Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate. |
| **7. Consumer use:** | Not applicable |
| **8. Waste management measures** | |
| **Description and information on safe handling of surplus or waste:** | Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation. |
| **9. Exposure assessment** | |
| **Human exposure prediction:** | |
| **Workers:** | Long term exposure during application. Use of PPE will to minimise handling and contact. |
| **Consumers:** | Not applicable |
| **Method:** | Not applicable |
| **Exposure estimation:** | Not known |
| **Secondary Poisoning:** | Not expected |
| **Indirect exposure to humans via the environment:** | Not expected |
| **10. Other information** | |
| **Control parameters:** | Refer to the eSDS |
| **Method to check compliance:** | Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals |

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|---|---|
| 6. Exposure Scenario | |
| **Use of citric acid in construction products. Industrial, professional and consumer** | |
| **2. Processes and activities covered by the exposure scenario** | |
| **Sector of end use (SU):** | 02. Mining, (without offshore industries) |
| | 03. Industrial uses: Uses of substances as such or in preparations/mixtures industrial sites |
| | 10. Formulation [mixing] of preparations and/or re-packaging (excluding alloys) |
| | 19. Building and construction work |
| | 21. Consumer uses: Private households (= general public = consumers) |
| | 22 Professional uses: Public domain (administration, education, entertainment, services, craftsmen) |
| **Chemical product category (PC):** | 0. Other |
| **Process category (PROC):** | 02. Use in closed, continuous process with occasional controlled exposure |

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|---|---|
| | 04. Use in batch and other process (synthesis) where opportunity for exposure arises |
| | 05. Mixing or blending in batch processes for formulation of preparations/mixtures and articles (multistage and/or significant contact) |
| | 07. Industrial spraying |
| | 08a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities |
| | 08b. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| | 10. Roller application or brushing |
| | 11. Non industrial spraying |
| | 13. Treatment of articles by dipping and pouring |
| | 14. Production of preparations/mixtures or articles by tabletting, compression, extrusion, pelletisation |
| | 19. Hand-mixing with intimate contact and only PPE available |
| | 21. Low energy manipulation of substances bound in materials and/or articles |
| | 24. High (mechanical) energy work-up of substances bound in materials and/or articles |
| **Article Categories [AC]** | 04. Stone, plaster, cement, glass and ceramic articles |
| **Environmental release category (ERC):** | 05. Industrial use resulting in inclusion into or onto a matrix |
| | 08c. Wide dispersive indoor use resulting in inclusion into or onto a matrix |
| | 08f. Wide dispersive outdoor use resulting in inclusion into or onto a matrix |
| | 10a. Wide dispersive outdoor use of long-life articles and materials with low release |
| | 10b. Wide dispersive outdoor use of long-life articles and materials with high or in-tended release (including abrasive processing) |
| | 11a. Wide dispersive indoor use of long-life articles and materials with low release |
| | 11b. Wide dispersive indoor use of long-life articles and materials with high or intended release (including abrasive processing) |
| | 12a. Industrial processing of articles with abrasive techniques (low release) |
| **3. Operational conditions of use** | |
| **Control parameters** | Implement basic standards of occupational hygiene |
| **Duration and frequency of use:** | Users to specify |
| **Maximum amount per time or activity:** | Users to specify |
| **Other operational conditions of use:** | Avoid splashes and spills. |
| **Engineering control measures:** | Keep area well ventilated. **Exposure limit values:** Not known |
| **Other protective equipment:** | Good hygiene and housekeeping |
| **Respiratory protection** | Required where ventilation is insufficient or exposure is prolonged |
| **Hand protection:** | Rubber or PVC gloves |
| **Eye protection:** | Wear safety goggles or face shield. Industrial/professional, ensure eyewash and showers are in the proximity to workstation location. |
| **Other information:** | Precautionary measures against electrostatic discharge to be taken. LEV and respiratory protection to be taken in areas where workers may come into contact with dust. Implement basic standards of occupational hygiene |
| **4. Physical form of substance / preparation / mixture or article** | |
| **Information on basic physical and chemical properties:** | Acid liquid |
| **5. Product specification** | |
| **Physical form of the product:** | Part of a preparation can be a liquid or solid. |
| **Concentration of substance in preparation / mixture or article:** | Users to specify |
| **Service life of substances in articles:** | Users to specify |
| **6. Risk Management Measures** | |
| **Occupational exposure controls:** | Keep area well ventilated |
| **Environmental Exposure Controls:** | Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate. |

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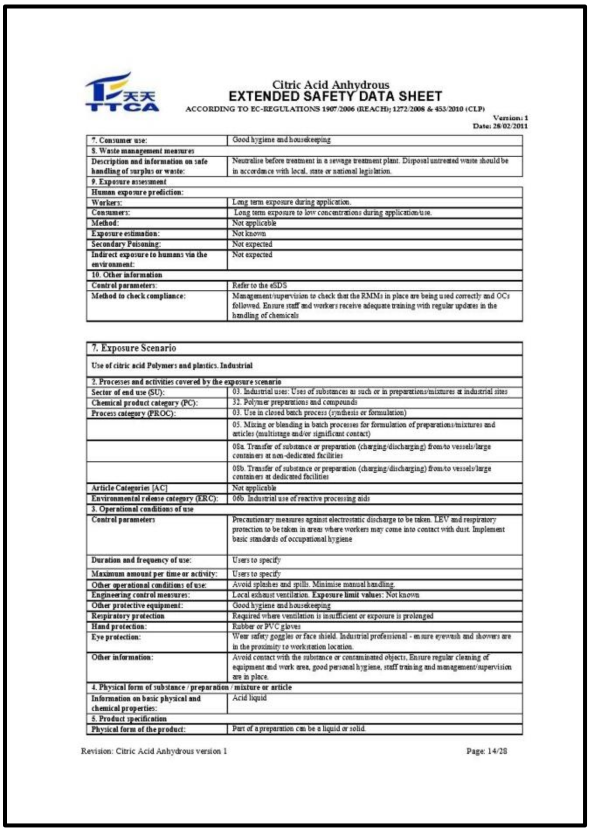

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|---|---|
| **7. Consumer use:** | Good hygiene and housekeeping |
| **8. Waste management measures** | |
| **Description and information on safe handling of surplus or waste:** | Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation. |
| **9. Exposure assessment** | |
| **Human exposure prediction:** | |
| **Workers:** | Long term exposure during application. |
| **Consumers:** | Long term exposure to low concentrations during application/use. |
| **Method:** | Not applicable |
| **Exposure estimation:** | Not known |
| **Secondary Poisoning:** | Not expected |
| **Indirect exposure to humans via the environment:** | Not expected |
| **10. Other information** | |
| **Control parameters:** | Refer to the eSDS |
| **Method to check compliance:** | Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals |

| | |
|---|---|
| 7. Exposure Scenario | |
| **Use of citric acid Polymers and plastics. Industrial** | |
| **2. Processes and activities covered by the exposure scenario** | |
| **Sector of end use (SU):** | 03. Industrial uses: Uses of substances as such or in preparations/mixtures at industrial sites |
| **Chemical product category (PC):** | 32. Polymer preparations and compounds |
| **Process category (PROC):** | 03. Use in closed batch process (synthesis or formulation) |
| | 05. Mixing or blending in batch processes for formulation of preparations/mixtures and articles (multistage and/or significant contact) |
| | 08a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities |
| | 08b. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| **Article Categories [AC]** | Not applicable |
| **Environmental release category (ERC):** | 06b. Industrial use of reactive processing aids |
| **3. Operational conditions of use** | |
| **Control parameters** | Precautionary measures against electrostatic discharge to be taken. LEV and respiratory protection to be taken in areas where workers may come into contact with dust. Implement basic standards of occupational hygiene |
| **Duration and frequency of use:** | Users to specify |
| **Maximum amount per time or activity:** | Users to specify |
| **Other operational conditions of use:** | Avoid splashes and spills. Minimise manual handling. |
| **Engineering control measures:** | Local exhaust ventilation. **Exposure limit values:** Not known |
| **Other protective equipment:** | Good hygiene and housekeeping |
| **Respiratory protection** | Required where ventilation is insufficient or exposure is prolonged |
| **Hand protection:** | Rubber or PVC gloves |
| **Eye protection:** | Wear safety goggles or face shield. Industrial professional - ensure eyewash and showers are in the proximity to workstation location. |
| **Other information:** | Avoid contact with the substance or contaminated objects, Ensure regular cleaning of equipment and work area, good personal hygiene, staff training and management/supervision are in place. |
| **4. Physical form of substance / preparation / mixture or article** | |
| **Information on basic physical and chemical properties:** | Acid liquid |
| **5. Product specification** | |
| **Physical form of the product:** | Part of a preparation can be a liquid or solid. |

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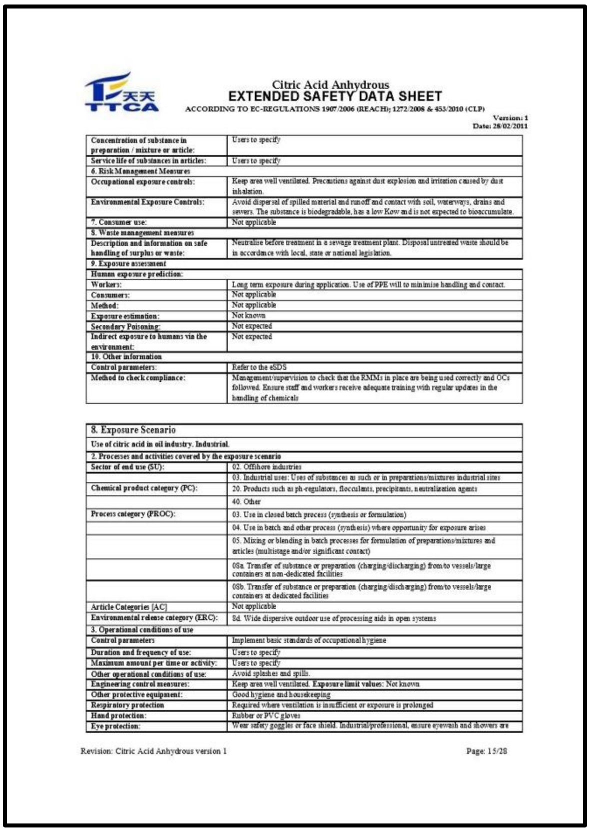

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| **Concentration of substance in preparation / mixture or article:** | Users to specify |
| **Service life of substances in articles:** | Users to specify |
| **6. Risk Management Measures** | |
| **Occupational exposure controls:** | Keep area well ventilated. Precautions against dust explosion and irritation caused by dust inhalation. |
| **Environmental Exposure Controls:** | Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate. |
| **7. Consumer use:** | Not applicable |
| **8. Waste management measures** | |
| **Description and information on safe handling of surplus or waste:** | Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation. |
| **9. Exposure assessment** | |
| **Human exposure prediction:** | |
| **Workers:** | Long term exposure during application. Use of PPE will to minimise handling and contact. |
| **Consumers:** | Not applicable |
| **Method:** | Not applicable |
| **Exposure estimation:** | Not known |
| **Secondary Poisoning:** | Not expected |
| **Indirect exposure to humans via the environment:** | Not expected |
| **10. Other information** | |
| **Control parameters:** | Refer to the eSDS |
| **Method to check compliance:** | Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals |

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| 8. Exposure Scenario | |
| **Use of citric acid in oil industry. Industrial.** | |
| **2. Processes and activities covered by the exposure scenario** | |
| **Sector of end use (SU):** | 02. Offshore industries |
| | 03. Industrial uses: Uses of substances as such or in preparations/mixtures industrial sites |
| **Chemical product category (PC):** | 20. Products such as ph-regulators, flocculants, precipitants, neutralization agents |
| | 40. Other |
| **Process category (PROC):** | 03. Use in closed batch process (synthesis or formulation) |
| | 04. Use in batch and other process (synthesis) where opportunity for exposure arises |
| | 05. Mixing or blending in batch processes for formulation of preparations/mixtures and articles (multistage and/or significant contact) |
| | 08a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities |
| | 08b. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| **Article Categories [AC]** | Not applicable |
| **Environmental release category (ERC):** | 8d. Wide dispersive outdoor use of processing aids in open systems |
| **3. Operational conditions of use** | |
| **Control parameters** | Implement basic standards of occupational hygiene |
| **Duration and frequency of use:** | Users to specify |
| **Maximum amount per time or activity:** | Users to specify |
| **Other operational conditions of use:** | Avoid splashes and spills. |
| **Engineering control measures:** | Keep area well ventilated. **Exposure limit values:** Not known |
| **Other protective equipment:** | Good hygiene and housekeeping |
| **Respiratory protection** | Required where ventilation is insufficient or exposure is prolonged |
| **Hand protection:** | Rubber or PVC gloves |
| **Eye protection:** | Wear safety goggles or face shield. Industrial/professional, ensure eyewash and showers are |

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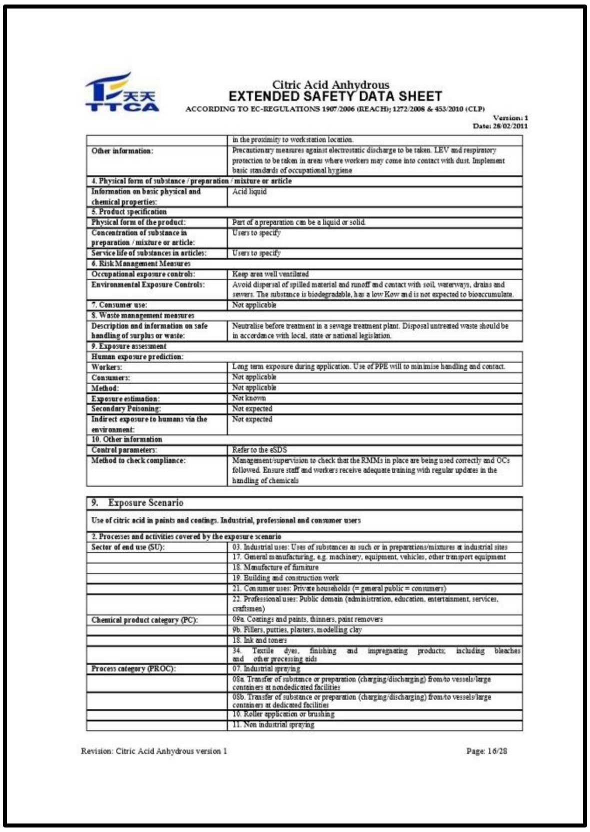

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| | in the proximity to workstation location. |
| **Other information:** | Precautionary measures against electrostatic discharge to be taken. LEV and respiratory protection to be taken in areas where workers may come into contact with dust. Implement basic standards of occupational hygiene |
| **4. Physical form of substance / preparation / mixture or article** | |
| **Information on basic physical and chemical properties:** | Acid liquid |
| **5. Product specification** | |
| **Physical form of the product:** | Part of a preparation can be a liquid or solid. |
| **Concentration of substance in preparation / mixture or article:** | Users to specify |
| **Service life of substances in articles:** | Users to specify |
| **6. Risk Management Measures** | |
| **Occupational exposure controls:** | Keep area well ventilated |
| **Environmental Exposure Controls:** | Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate. |
| **7. Consumer use:** | Not applicable |
| **8. Waste management measures** | |
| **Description and information on safe handling of surplus or waste:** | Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation. |
| **9. Exposure assessment** | |
| **Human exposure prediction:** | |
| **Workers:** | Long term exposure during application. Use of PPE will to minimise handling and contact. |
| **Consumers:** | Not applicable |
| **Method:** | Not applicable |
| **Exposure estimation:** | Not known |
| **Secondary Poisoning:** | Not expected |
| **Indirect exposure to humans via the environment:** | Not expected |
| **10. Other information** | |
| **Control parameters:** | Refer to the eSDS |
| **Method to check compliance:** | Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals |

| | |
|---|---|
| 9. Exposure Scenario | |
| **Use of citric acid in paints and coatings. Industrial, professional and consumer users** | |
| **2. Processes and activities covered by the exposure scenario** | |
| **Sector of end use (SU):** | 03. Industrial uses: Uses of substances as such or in preparations/mixtures at industrial sites |
| | 17. General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment |
| | 18. Manufacture of furniture |
| | 19. Building and construction work |
| | 21. Consumer uses: Private households (= general public = consumers) |
| | 22. Professional uses: Public domain (administration, education, entertainment, services, craftsmen) |
| **Chemical product category (PC):** | 09a. Coatings and paints, thinners, paint removers |
| | 9b. Fillers, putties, plasters, modelling clay |
| | 18. Ink and toners |
| | 34. Textile dyes, finishing and impregnating products; including bleaches and other processing aids |
| **Process category (PROC):** | 07. Industrial spraying |
| | 08a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at nondedicated facilities |
| | 08b. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| | 10. Roller application or brushing |
| | 11. Non industrial spraying |

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| | |
|---|---|
| | 19. Hand-mixing with intimate contact and only PPE available |
| | 24. High (mechanical) energy work-up of substances bound in materials and/or articles |
| **Article Categories [AC]** | 04. Stone, plaster, cement, glass and ceramic articles |
| | 11. Wood articles |
| **Environmental release category (ERC):** | 05. Industrial use resulting in inclusion into or onto a matrix |
| | 08c. Wide dispersive indoor use resulting in inclusion into or onto a matrix |
| | 08f. Wide dispersive outdoor use resulting in inclusion into or onto a matrix |
| | 10a. Wide dispersive outdoor use of long-life articles and materials with low release |
| | 10b. Wide dispersive outdoor use of long-life articles and materials with high or in-tended release (including abrasive processing) |
| | 11a. Wide dispersive indoor use of long-life articles and materials with low release |
| | 11b. Wide dispersive indoor use of long-life articles and materials with high or intended release (including abrasive processing) |
| **3. Operational conditions of use** | |
| **Control parameters** | Implement basic standards of occupational hygiene |
| **Duration and frequency of use:** | Users to specify |
| **Maximum amount per time or activity:** | Users to specify |
| **Other operational conditions of use:** | Avoid splashes and spills. |
| **Engineering control measures:** | Keep area well ventilated. **Exposure limit values:** Not known |
| **Other protective equipment:** | Good hygiene and housekeeping |
| **Respiratory protection** | Required where ventilation is insufficient or exposure is prolonged |
| **Hand protection:** | Rubber or PVC gloves |
| **Eye protection:** | Wear safety goggles or face shield. Industrial professional - ensure eyewash and showers are in the proximity to workstation location. |
| **Other information:** | Not known |
| **4. Physical form of substance / preparation / mixture or article** | |
| **Information on basic physical and chemical properties:** | Acid liquid |
| **5. Product specification** | |
| **Physical form of the product:** | Part of a preparation can be a liquid or solid. |
| **Concentration of substance in preparation / mixture or article:** | Formulators information |
| **Service life of substances in articles:** | |
| **6. Risk Management Measures** | |
| **Occupational exposure controls:** | Keep area well ventilated |
| **Environmental Exposure Controls:** | Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.<br>The substance is biodegradable, has a low Kow and is not expected to bioaccumulate. |
| **7. Consumer use:** | Good hygiene and housekeeping |
| **8. Waste management measures** | |
| **Description and information on safe handling of surplus or waste:** | Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation. |
| **9. Exposure assessment** | |
| **Human exposure prediction:** | |
| **Workers:** | Short term during formulation. Long term exposure during application. Use of PPE will to minimise handling and contact. |
| **Consumers:** | Exposure to low concentrations during application/use |
| **Method:** | Not applicable |
| **Exposure estimation:** | Not known |
| **Secondary Poisoning:** | Not expected |
| **Indirect exposure to humans via the environment:** | Not expected |
| **10. Other information** | |
| **Control parameters:** | Refer to the eSDS |
| **Method to check compliance:** | Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals |

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| | |
|---|---|
| 10. Exposure Scenario | |
| **Use of citric acid in photography products. Professional and consumer users** | |
| **2. Processes and activities covered by the exposure scenario** | |
| **Sector of end use (SU):** | 03. Industrial uses: Uses of substances as such or in preparations/mixtures at industrial sites |
| | 20. Health services |
| | 21. Consumer uses: Private households (= general public = consumers) |
| | 22. Professional uses: Public domain (administration, education, entertainment, services, craftsmen) |
| **Chemical product category (PC):** | 30. Photo-chemicals |
| **Process category (PROC):** | 05. Mixing or blending in batch processes for formulation of preparations/mixtures and articles (multistage and/or significant contact) |
| | 13. Treatment of articles by dipping and pouring |
| **Article Categories [AC]** | Not applicable |
| **Environmental release category (ERC):** | 08a Wide dispersive indoor use of processing aids in open systems |
| **3. Operational conditions of use** | |
| **Control parameters** | Implement basic standards of occupational hygiene |
| **Duration and frequency of use:** | Users to specify |
| **Maximum amount per time or activity:** | Users to specify |
| **Other operational conditions of use:** | Avoid splashes and spills. |
| **Engineering control measures:** | Keep area well ventilated. **Exposure limit values:** Not known |
| **Other protective equipment:** | Good hygiene and housekeeping |
| **Respiratory protection** | Required where ventilation is insufficient or exposure is prolonged |
| **Hand protection:** | Rubber or PVC gloves |
| **Eye protection:** | Wear safety goggles or face shield. Professional - ensure eyewash and showers are in the proximity to workstation location. |
| **Other information:** | Not known |
| **4. Physical form of substance / preparation / mixture or article** | |
| **Information on basic physical and chemical properties:** | Acid liquid |
| **5. Product specification** | |
| **Physical form of the product:** | Part of a preparation can be a liquid or solid. |
| **Concentration of substance in preparation / mixture or article:** | Formulators information |
| **Service life of substances in articles:** | |
| **6. Risk Management Measures** | |
| **Occupational exposure controls:** | Keep area well ventilated |
| **Environmental Exposure Controls:** | Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate. |
| **7. Consumer use:** | Good hygiene and housekeeping |
| **8. Waste management measures** | |
| **Description and information on safe handling of surplus or waste:** | Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation. |
| **9. Exposure assessment** | |
| **Human exposure prediction:** | |
| **Workers:** | Short term during formulation. Long term exposure during application |
| **Consumers:** | Exposure to low concentrations during application/use |
| **Method:** | Not applicable |
| **Exposure estimation:** | Not known |
| **Secondary Poisoning:** | Not expected |
| **Indirect exposure to humans via the environment:** | Not expected |
| **10. Other information** | |

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| | |
|---|---|
| **Control parameters:** | Refer to the eSDS |
| **Method to check compliance:** | Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals |

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|---|---|
| 11. Exposure Scenario | |
| **Use of citric acid in textiles. Industrial** | |
| **2. Processes and activities covered by the exposure scenario** | |
| **Sector of end use (SU):** | 03. Industrial uses: Uses of substances as such or in preparations/mixtures industrial sites |
| | 05. Manufacture of textiles, leather, fur |
| **Chemical product category (PC):** | 20. Products such as ph-regulators, flocculants, precipitants, neutralization agents |
| | 23. Leather tanning, dye, finishing, impregnation and care products |
| | 24. Lubricants, greases, release products |
| **Process category (PROC):** | 08a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities |
| | 08b. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| | 10. Roller application or brushing |
| | 13. Treatment of articles by dipping and pouring |
| | 22. Potentially closed processing operations with minerals/metals at elevated temperature |
| **Article Categories [AC]** | 05. Fabrics, textiles and apparel |
| | 06. Leather articles |
| **Environmental release category (ERC):** | 04. Industrial use of processing aids in processes and products, not becoming part of articles |
| **3. Operational conditions of use** | |
| **Control parameters** | Implement basic standards of occupational hygiene |
| **Duration and frequency of use:** | Users to specify |
| **Maximum amount per time or activity:** | Users to specify |
| **Other operational conditions of use:** | Avoid splashes and spills. |
| **Engineering control measures:** | Keep area well ventilated. **Exposure limit values:** Not known |
| **Other protective equipment:** | Good hygiene and housekeeping |
| **Respiratory protection** | Required where ventilation is insufficient or exposure is prolonged |
| **Hand protection:** | Rubber or PVC gloves |
| **Eye protection:** | Wear safety goggles or face shield. Ensure eyewash and showers are in the proximity to workstation location. |
| **Other information:** | Precautionary measures against electrostatic discharge to be taken. LEV and respiratory protection to be taken in areas where workers may come into contact with dust. Implement basic standards of occupational hygiene |
| **4. Physical form of substance / preparation / mixture or article** | |
| **Information on basic physical and chemical properties:** | Acid liquid |
| **5. Product specification** | |
| **Physical form of the product:** | Part of a preparation can be a liquid or solid. |
| **Concentration of substance in preparation / mixture or article:** | Users to specify |
| **Service life of substances in articles:** | Users to specify |
| **6. Risk Management Measures** | |
| **Occupational exposure controls:** | Keep area well ventilated |
| **Environmental Exposure Controls:** | Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate. |
| **7. Consumer use:** | Not applicable |
| **8. Waste management measures** | |

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|---|---|
| **Description and information on safe handling of surplus or waste:** | Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation. |
| **9. Exposure assessment** | |
| **Human exposure prediction:** | |
| **Workers:** | Long term exposure during application.<br>Use of PPE will to minimise handling and contact. |
| **Consumers:** | Not applicable<br>. |
| **Method:** | Not applicable |
| **Exposure estimation:** | Not known |
| **Secondary Poisoning:** | Not expected |
| **Indirect exposure to humans via the environment:** | Not expected |
| **10. Other information** | |
| **Control parameters:** | Refer to the eSDS |
| **Method to check compliance:** | Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals |

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|---|---|
| 12. Exposure Scenario | |
| **Use of citric acid in laboratory agents. Industrial users** | |
| **2. Processes and activities covered by the exposure scenario** | |
| **Sector of end use (SU):** | 03. Industrial uses: Uses of substances as such or in preparations/mixtures at industrial sites |
| **Chemical product category (PC):** | 04. Anti-Freeze and de-icing products |
| | 16. Heat transfer fluids |
| | 20. Products such as ph-regulators, flocculants, precipitants, neutralization agents |
| | 37. Water treatment chemicals |
| **Process category (PROC):** | 01. Use in closed process, no likelihood of exposure |
| | 02. Use in closed, continuous process with occasional controlled exposure |
| | 03. Use in closed batch process (synthesis or formulation) |
| | 04. Use in batch and other process (synthesis) where opportunity for exposure arises |
| | 08a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities |
| **Article Categories [AC]** | Not applicable |
| **Environmental release category (ERC):** | 04. Industrial use of processing aids in processes and products, not becoming part of articles |
| | 07. Industrial use of sub-stances in closed systems |
| **3. Operational conditions of use** | |
| **Control parameters** | Implement basic standards of occupational hygiene |
| **Duration and frequency of use:** | Users to specify |
| **Maximum amount per time or activity:** | Users to specify |
| **Other operational conditions of use:** | Avoid splashes and spills. |
| **Engineering control measures:** | Keep area well ventilated. **Exposure limit values:** Not known |
| **Other protective equipment:** | Good hygiene and housekeeping |
| **Respiratory protection** | Required where ventilation is insufficient or exposure is prolonged |
| **Hand protection:** | Rubber or PVC gloves |
| **Eye protection:** | Wear safety goggles or face shield. Ensure eyewash and showers are in the proximity to workstation location. |
| **Other information:** | Avoid contact with the substance or contaminated objects, Ensure regular cleaning of equipment and work area; good personal hygiene, staff training and management/supervision are in place. |
| **4. Physical form of substance / preparation / mixture or article** | |
| **Information on basic physical and chemical properties:** | Acid liquid |
| **5. Product specification** | |

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|---|---|
| **Physical form of the product:** | Part of a preparation can be a liquid or solid. |
| **Concentration of substance in preparation / mixture or article:** | Formulators information |
| **Service life of substances in articles:** | |
| **6. Risk Management Measures** | |
| **Occupational exposure controls:** | Keep area well ventilated |
| **Environmental Exposure Controls:** | Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate. |
| **7. Consumer use:** | Not applicable |
| **8. Waste management measures** | |
| **Description and information on safe handling of surplus or waste:** | Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation. |
| **9. Exposure assessment** | |
| **Human exposure prediction:** | |
| **Workers:** | Short term during formulation. Long term exposure during application. Use of PPE will to minimise handling and contact. |
| **Consumers:** | Not applicable |
| **Method:** | Not applicable |
| **Exposure estimation:** | Not known |
| **Secondary Poisoning:** | Not expected |
| **Indirect exposure to humans via the environment:** | Not expected |
| **10. Other information** | |
| **Control parameters:** | Refer to the eSDS |
| **Method to check compliance:** | Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals |

| | |
|---|---|
| 13. Exposure Scenario | |
| **Use of citric acid in water treatment. Industrial** | |
| **2. Processes and activities covered by the exposure scenario** | |
| **Sector of end use (SU):** | 03. Industrial uses: Uses of substances as such or in preparations/mixtures at industrial sites |
| | 14. Manufacture of basic metals, including alloys |
| | 15. Manufacture of fabricated metal products, except machinery and equipment |
| | 16. Manufacture of computer, electronic and optical products, electrical equipment |
| | 17. General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment |
| **Chemical product category (PC):** | 04. Anti-Freeze and de-icing products |
| | 07. Base metals and alloys |
| | 14. Metal surface treatment products, including galvanic and electroplating products |
| | 16. Heat transfer fluids |
| | 17. Hydraulic fluids |
| | 20. Products such as ph-regulators, flocculants, precipitants, neutralization agents |
| | 25. Metal working fluids |
| | 26. Paper and board dye, finishing and impregnation products: including bleaches and other processing aids |
| | 35. Washing and cleaning products (including solvent based products) |
| | 37. Water treatment chemicals |

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|---|---|
| **Process category (PROC):** | 01. Use in closed process, no likelihood of exposure |
| | 02. Use in closed, continuous process with occasional controlled exposure |
| | 03. Use in closed batch process (synthesis or formulation) |
| | 04. Use in batch and other process (synthesis) where opportunity for exposure arises |
| | 07. Industrial spraying |
| | 08a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities |
| | 08b. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| | 09. Transfer of substance or preparation into small containers (dedicated filling line, including weighing) |
| | 10. Roller application or brushing |
| | 13. Treatment of articles by dipping and pouring |
| | 18. Greasing at high energy conditions |
| | 20. Heat and pressure transfer fluids in dispersive, professional use but closed systems |
| | 25. Other hot work operations with metals |
| **Article Categories [AC]** | Not applicable |
| **Environmental release category (ERC):** | 04. Industrial use of processing aids in processes and products, not becoming part of articles |
| | 07. Industrial use of sub-stances in closed systems |
| **3. Operational conditions of use** | |
| **Control parameters** | Precautionary measures against electrostatic discharge to be taken. LEV and respiratory protection to be taken in areas where workers may come into contact with dust. Implement basic standards of occupational hygiene |
| **Duration and frequency of use:** | Users to specify |
| **Maximum amount per time or activity:** | Users to specify |
| **Other operational conditions of use:** | Avoid splashes and spills. Minimise manual handling. |
| **Engineering control measures:** | Local exhaust ventilation. **Exposure limit values**: Not known |
| **Other protective equipment:** | Good hygiene and housekeeping |
| **Respiratory protection** | Required where ventilation is insufficient or exposure is prolonged |
| **Hand protection:** | Rubber or PVC gloves |
| **Eye protection:** | Wear safety goggles or face shield. Ensure eyewash and showers are in the proximity to workstation location. |
| **Other information:** | Avoid contact with the substance or contaminated objects, Ensure regular cleaning of equipment and work area; good personal hygiene, staff training and management/supervision are in place. |
| **4. Physical form of substance / preparation / mixture or article** | |
| **Information on basic physical and chemical properties:** | Acid liquid |
| **5. Product specification** | |
| **Physical form of the product:** | Part of a preparation can be a liquid or solid. |
| **Concentration of substance in preparation / mixture or article:** | Users to specify |
| **Service life of substances in articles:** | Users to specify |
| **6. Risk Management Measures** | |
| **Occupational exposure controls:** | Keep area well ventilated. Precautions against dust explosion and irritation caused by dust inhalation. |
| **Environmental Exposure Controls:** | Avoid dispersal of spilled material and run off and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate. |
| **7. Consumer use:** | Not applicable |
| **8. Waste management measures** | |
| **Description and information on safe handling of surplus or waste:** | Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation. |

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|---|---|
| **9. Exposure assessment** | |
| **Human exposure prediction:** | |
| **Workers:** | Use of PPE will to minimise handling and contact. |
| **Consumers:** | Not applicable |
| **Method:** | Not applicable |
| **Exposure estimation:** | Not known |
| **Secondary Poisoning:** | Not expected |
| **Indirect exposure to humans via the environment:** | Not expected |
| **10. Other information** | |
| **Control parameters:** | Refer to the eSDS |
| **Method to check compliance:** | Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals |

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|---|---|
| 14. Exposure Scenario | |
| **Use of citric acid in treatment of metals & surfaces. Industrial** | |
| **2. Processes and activities covered by the exposure scenario** | |
| **Sector of end use (SU):** | 03. Industrial uses: Uses of substances as such or in preparations/mixtures at industrial sites |
| | 14. Manufacture of basic metals, including alloys |
| | 15. Manufacture of fabricated metal products, except machinery and equipment |
| | 16. Manufacture of computer, electronic and optical products, electrical equipment |
| | 17. General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment |
| **Chemical product category (PC):** | 07. Base metals and alloys |
| | 14. Metal surface treatment products, including galvanic and electroplating products |
| | 25. Metal working fluids |
| | 31. Polishes and wax blends |
| | 35. Washing and cleaning products (including solvent based products) |
| **Process category (PROC):** | 02. Use in closed, continuous process with occasional controlled exposure |
| | 03. Use in closed batch process (synthesis or formulation) |
| | 04. Use in batch and other process (synthesis) where opportunity for exposure arises |
| | 07. Industrial spraying |
| | 08a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities |
| | 08b. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| | 09. Transfer of substance or preparation into small containers (dedicated filling line, including weighing) |
| | 10. Roller application or brushing |
| | 13. Treatment of articles by dipping and pouring |
| | 17. Lubrication at high energy conditions and in partly open process |
| | 18. Greasing at high energy conditions |
| | 23. Open processing and transfer operations with minerals/metals at elevated temperature |
| **Article Categories [AC]** | Not applicable |
| **Environmental release category (ERC):** | 04. Industrial use of processing aids in processes and products, not becoming part of articles |
| | 06b. Industrial use of reactive processing aids |

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|---|---|
| **3. Operational conditions of use** | |
| **Control parameters** | Precautionary measures against electrostatic discharge to be taken. LEV and respiratory protection to be taken in areas where workers may come into contact with dust. Implement basic standards of occupational hygiene. |
| **Duration and frequency of use:** | Users to specify |
| **Maximum amount per time or activity:** | Users to specify |
| **Other operational conditions of use:** | Avoid splashes and spills. Minimise manual handling. |
| **Engineering control measures:** | Local exhaust ventilation. **Exposure limit values**: Not known |
| **Other protective equipment:** | Good hygiene and housekeeping |
| **Respiratory protection** | Required where ventilation is insufficient or exposure is prolonged |
| **Hand protection:** | Rubber or PVC gloves |
| **Eye protection:** | Wear safety goggles or face shield. Ensure eyewash and showers are in the proximity to workstation location. |
| **Other information:** | Avoid contact with the substance or contaminated objects, Ensure regular cleaning of equipment and work area; good personal hygiene, staff training and management/supervision are in place. |
| **4. Physical form of substance / preparation / mixture or article** | |
| **Information on basic physical and chemical properties:** | Acid liquid |
| **5. Product specification** | |
| **Physical form of the product:** | Part of a preparation can be a liquid or solid. |
| **Concentration of substance in preparation / mixture or article:** | Users to specify |
| **Service life of substances in articles:** | Users to specify |
| **6. Risk Management Measures** | |
| **Occupational exposure controls:** | Keep area well ventilated. Precautions against dust explosion and irritation caused by dust inhalation. |
| **Environmental Exposure Controls:** | Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate. |
| **7. Consumer use:** | Not applicable |
| **8. Waste management measures** | |
| **Description and information on safe handling of surplus or waste:** | Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation. |
| **9. Exposure assessment** | |
| **Human exposure prediction:** | |
| **Workers:** | Short term exposure during application. Use of PPE will to minimise handling and contact. |
| **Consumers:** | Not applicable |
| **Method:** | Not applicable |
| **Exposure estimation:** | Not known |
| **Secondary Poisoning:** | Not expected |
| **Indirect exposure to humans via the environment:** | Not expected |
| **10. Other information** | |
| **Control parameters:** | Refer to the eSDS |
| **Method to check compliance:** | Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals |

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|---|---|
| 15. Exposure Scenario | |
| **Use of citric acid agricultural applications. Industrial, professional & consumer** | |
| **2. Processes and activities covered by the exposure scenario** | |
| **Sector of end use (SU):** | 01. Agriculture, forestry, fishery |

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| | |
|---|---|
| | 03. Industrial uses: Uses of substances as such or in preparations/mixtures at industrial sites |
| | 21. Consumer uses: Private households (= general public = consumers) |
| | 22. Professional uses: Public domain (administration, education, entertainment, services, craftsmen) |
| **Chemical product category (PC):** | 09. Biocidal products (e.g. Disinfectants, pest control) |
| | 12. Fertilizers |
| | 21. Laboratory chemicals |
| **Process category (PROC):** | 03. Use in closed batch process (synthesis or formulation) |
| | 05. Mixing or blending in batch processes for formulation of preparations/mixtures and articles (multistage and/or significant contact) |
| | 08a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities |
| | 08b. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| | 10. Roller application or brushing |
| | 11. Non industrial spraying |
| | 14. Production of preparations/mixtures or articles by tabletting, compression, extrusion, pelletisation |
| | 15. Use as laboratory reagent |
| | 19. Hand-mixing with intimate contact and only PPE available |
| **Article Categories [AC]** | 02. Formulation of preparations/mixtures |
| **Environmental release category (ERC):** | 04. Industrial use of processing aids in processes and products, not becoming part of articles |
| | 8b. Wide dispersive indoor use of reactive substances in open systems |
| | 8d. Wide dispersive outdoor use of processing aids in open systems |
| **3. Operational conditions of use** | |
| **Control parameters** | Precautionary measures against electrostatic discharge to be taken. LEV and respiratory protection to be taken in areas where workers may come into contact with dust. Implement basic standards of occupational hygiene |
| **Duration and frequency of use:** | Users to specify |
| **Maximum amount per time or activity:** | Users to specify |
| **Other operational conditions of use:** | Avoid splashes and spills. Minimise manual handling. |
| **Engineering control measures:** | Local exhaust ventilation. **Exposure limit values**: Not known |
| **Other protective equipment:** | Good hygiene and housekeeping |
| **Respiratory protection** | Required where ventilation is insufficient or exposure is prolonged |
| **Hand protection:** | Rubber or PVC gloves |
| **Eye protection:** | Wear safety goggles or face shield. Industrial professional - ensure eyewash and showers are in the proximity to workstation location. |
| **Other information:** | Avoid contact with the substance or contaminated objects, Ensure regular cleaning of equipment and work area; good personal hygiene, staff training and management/supervision are in place. |
| **4. Physical form of substance / preparation / mixture or article** | |
| **Information on basic physical and chemical properties:** | Acid liquid |
| **5. Product specification** | |
| **Physical form of the product:** | Part of a preparation can be a liquid or solid. |
| **Concentration of substance in preparation / mixture or article:** | Users to specify |
| **Service life of substances in articles:** | Users to specify |
| **6. Risk Management Measures** | |
| **Occupational exposure controls:** | Keep area well ventilated. Precautions against dust explosion and irritation caused by dust inhalation. |
| **Environmental Exposure Controls:** | Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate. |

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Citric Acid Anhydrous
**EXTENDED SAFETY DATA SHEET**
ACCORDING TO EC-REGULATIONS 1907/2006 (REACH); 1272/2008 & 453/2010 (CLP)
**Version: 1**
**Date: 28/02/2011**

| **16. Exposure Scenario** | |
|---|---|
| **Use of citric acid in medical devices. Industrial & consumer** | |
| **2. Processes and activities covered by the exposure scenario** | |
| **Sector of end use (SU):** | 03. Industrial uses: Uses of substances as such or in preparations/mixtures at industrial sites |
| | 20. Health services |
| | 22. Professional uses: Public domain (administration, education, entertainment, services, craftsmen) |
| **Chemical product category (PC):** | 20 Products such as ph-regulators, flocculants, precipitants, neutralization agents |
| **Process category (PROC):** | 01. Use in closed process, no likelihood of exposure |
| **Article Categories [AC]** | 07. Industrial use of sub-stances in closed systems |
| **Environmental release category (ERC):** | 8d. Wide dispersive outdoor use of processing aids in open systems |
| **3. Operational conditions of use** | |
| **Control parameters** | Precautionary measures against electrostatic discharge to be taken. LEV and respiratory protection to be taken in areas where workers may come into contact with dust. Implement basic standards of occupational hygiene. |
| **Duration and frequency of use:** | Users to specify |
| **Maximum amount per time or activity:** | Users to specify |
| **Other operational conditions of use:** | Avoid splashes and spills. Minimise manual handling. |
| **Engineering control measures:** | Local exhaust ventilation. **Exposure limit values:** Not known |
| **Other protective equipment:** | Good hygiene and housekeeping |
| **Respiratory protection** | Required where ventilation is insufficient or exposure is prolonged |
| **Hand protection:** | Rubber or PVC gloves |
| **Eye protection:** | Wear safety goggles or face shield. Industrial professional - ensure eyewash and showers are in the proximity to workstation location. |
| **Other information:** | Avoid contact with the substance or contaminated objects, Ensure regular cleaning of equipment and work area; good personal hygiene, staff training and management/supervision are in place. |
| **4. Physical form of substance / preparation / mixture or article** | |
| **Information on basic physical and chemical properties:** | Acid liquid |
| **5. Product specification** | |
| **Physical form of the product:** | Part of a preparation can be a liquid or solid. |
| **Concentration of substance in preparation / mixture or article:** | Users to specify |
| **Service life of substances in articles:** | Users to specify |
| **6. Risk Management Measures** | |
| **Occupational exposure controls:** | Keep area well ventilated. Precautions against dust explosion and irritation caused by dust inhalation. |
| **Environmental Exposure Controls:** | Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. The substance is biodegradable, has a low Kow and is not expected to bioaccumulate. |
| **7. Consumer use:** | Good hygiene and housekeeping |
| **8. Waste management measures** | |
| **Description and information on safe handling of surplus or waste:** | Neutralise before treatment in a sewage treatment plant. Disposal untreated waste should be in accordance with local, state or national legislation. |
| **9. Exposure assessment** | |
| **Human exposure prediction:** | |
| **Workers:** | Use of PPE will to minimise handling and contact. |
| **Consumers:** | Good hygiene and housekeeping |
| **Method:** | Not applicable |
| **Exposure estimation:** | Not known |
| **Secondary Poisoning:** | Not expected |
| **Indirect exposure to humans via the** | Not expected |

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| | |
|---|---|
| **environment:** | |
| **10. Other information** | |
| **Control parameters:** | Refer to the eSDS |
| **Method to check compliance:** | Management/supervision to check that the RMMs in place are being used correctly and OCs followed. Ensure staff and workers receive adequate training with regular updates in the handling of chemicals |

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Annex II Use descriptors

| **Identified use** | **Sector of Use - main user groups (SU)** | **Sector of Use – sectors of end-use** | **Preparation Category (PC)** | **Process category (PROC)** | **Article category (AC)** | **Environmental Release Category (ERC)** |
|---|---|---|---|---|---|---|
| Manufacture | SU3 | SU3 | PC19 | PROC1, 2, 3, 8b | | ERC1 |
| Intermediate | SU3 | SU3, 9 | PC19 | PROC1, 2, 3, 4, 8b | | ERC6a |
| Formulation | SU3, 10 | SU5, 13, 20 | PC0, 1, 3, 9, 12, 18, 30, 31, 35, 39 | PROC 2, 3, 4, 5, 7, 8a, 8b, 9, 13, 14, 15, 19 | | ERC1, 2, 3, 4 |
| Personal care products | SU21, 22 | SU20 | PC2, 39 | PROC 10, 11, 19 | AC8 | ERC 8a, 11a |
| Detergent and cleaning products | SU3, 21, 22 | | PC3, 28, 31, 35, 36, 37 | PROC1, 2, 4, 5, 7, 8a, 8b, 9, 10, 11, 13, 19 | AC8 AC35 | ERC2, 4, 8A, 8D, 9A, 9B |
| Paper industry | SU3 | SU6 | PC26 | PROC 5, 8a | | ERC4 |
| Construction products | SU3, 21, 22 | SU2, 10, 19 | PC10 | PROC 2, 4, 5, 7, 8a, 8b, 10, 11, 13, 14, 19, 21, 24 | AC4, 12-1, 12-2 | ERC5, 8c, 8f, 10a, 10b, 11a, 11b, 12a |
| Polymers and plastics | SU3 | SU11, 12 | PC32 | PROC 3, 5, 8a, 8b | | RC6b |
| Oil industry | SU3 | SU2 | PC20, 40 | PROC 3, 4, 8, 8a, 8b, | | ERC8d |
| Paints and coatings | SU3, 21, 22 | SU17, 18, 19 | PC9, 18, 34 | PROC 7, 8a, 8b, 10, 11, 19, 21, 24 | AC4, 11 | ERC5, 8c, 8f, 10a, 10b, 11a, 11b |
| Photography products | SU3, 21, 22 | SU20 | PC30 | PROC 5, 13 | | ERC8a |
| Textile industry | SU3 | SU5 | PC20, 23, 24 | PROC 8a, 8b, 10, 13, 22 | AC5, 6 | ERC4 |
| Laboratory reagents | SU3 | | PC4, 16, 20, 37 | PROC 1, 2, 3, 4, 8a, | | ERC4, 7 |
| Water treatment | SU3 | SU14, 15, 16, 17 | PC4, 7, 14, 16, 17, 20, 25, 31, 35, 37 | PROC 1, 2, 3, 4, 7, 8a, 8b, 9, 10, 13, 18, 20, 25, xyzl | | ERC4, 7 |
| Treatment of metal surfaces SU3 | SU3 | SU14, 15, 16, 17 | PC7, 14, 25, 31, 35 | PROC 2, 3, 4, 7, 8a, 8b, 9, 10, 13, 17, 18, 23 | | ERC4, 6b |
| Agricultural applications | SU3, 21, 22 | SU1 | PC8, 12, 21 | PROC 3, 5, 8a, 8b, 10, 11, 14, 15, 19 | | ERC2, 4, 8b, 8d |
| Medical devices | SU3 | SU22 SU20 | PC20 | PROC1 | | ERC7 |

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MAKINGCOSMETICS® SDS (Safety Data Sheet)

## Vitamin C (Magnesium ascorbyl phosphate)

Safety Data Sheet according to Federal Register / Vol. 77, No. 58 / March 26, 2012 / Rules and Regulation

Revision Date: 05-25-2015
Supersedes: 11-11-2013

**1 PRODUCT & COMPANY IDENTIFICATION**

**Product Name:** Vitamin C (Magnesium ascorbyl phosphate)
**Synonyms:**
**INCI Name:** Magnesium ascorbyl phosphate
**CAS Number:** 113170-55-1
**Formula:** $C_6H_6O_9PMg3_{/2}$
**Product Form:** Powder
**Product Use:** Cosmetic use

**Distributor:** MakingCosmetics.com Inc.
**Address:** 35318 SE Center Street, Snoqualmie, WA 98065 (USA)
**Phone / Fax:** 425-292-9502 / 425-292-9601
**Web:** www.makingcosmetics.com

**Emergency Telephone Number: 1-800-424-9300 (Chemtrec)**

**2 HAZARDS IDENTIFICATION**

**GHS Classification:** Not classified
**GHS Labeling:** Not classified
**GHS Hazard Pictograms:** None
**GHS Hazard Statements:** None
**GHS Precautionary Statements:** None
**Potential Health Hazards:** Eyes: No known hazard.
Inhalation: May cause irritation of the respiratory tract.
Skin: No known hazard.
Ingestion: May cause gastrointestinal irritation.

**NFPA Ratings (704):**

| | | |
|---|---|---|
| Health | 1 | Slight |
| Flammability | 0 | Minimal |
| Reactivity | 0 | Minimal |
| Specific Hazard | n/a | |

**3 COMPOSITION/INFORMATION ON INGREDIENTS**

| Component | CAS No. | Weight % | Molecular Weight |
|---|---|---|---|
| Magnesium ascorbyl phosphate | 113170-55-1 | 100% | 278.39 g/mol |

**4 FIRST AID MEASURES**

**Eyes:** In case of eye contact, rinse with plenty of water and seek medical attention if necessary
**Inhalation:** Move casualty to fresh air and keep at rest. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention if necessary.
**Skin:** Flush with plenty of water and wash using soap.
**Ingestion:** Do Not induce Vomiting! Never give anything by mouth to an unconscious person. Get medical attention if necessary.

**5 FIRE-FIGHTING MEASURES**

**Suitable (and unsuitable) extinguishing media:** May be combustible at high temperature. Auto-ignition temperature (660°C (1220°F). Use appropriate media (foam, carbon dioxide, dry chemical) for adjacent fire. Do not use water.
**Special protective equipment & precautions for firefighters:** Wear self-contained, approved breathing apparatus and full protective clothing, including eye protection and boots.
**Specific hazards arising from the chemical:** These products are carbon oxides (CO, CO2). As with most powdered organic solids, fire is possible at elevated temperatures or by contact with an ignition source.

**6 ACCIDENTAL RELEASE MEASURES**

**Personal precautions, protective equipment & emergency procedures:** See section 8 for recommendations on the use of personal protective equipment.

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MAKINGCOSMETICS® SDS (Safety Data Sheet)

**Environmental precautions:** Not available
**Methods and material for containment and cleaning up:** Sweep up and place in suitable, closed containers for disposal. Clean surfaces thoroughly with water to remove residual contamination. Dispose of all waste and cleanup materials in accordance with regulations.

**7 HANDLING & STORAGE**

**Precautions for safe handling:** See section 8 for recommendations on the use of personal protective equipment. Keep container closed when not in use.
**Conditions for safe storage, incl. any incompatibilities:** Store in cool, dry well ventilated area. Keep away from incompatible materials (see section 10 for incompatibilities).

**8 EXPOSURE CONTROLS / PERSONAL PROTECTION**

| Component | Exposure Limits | Basis | Entity |
|---|---|---|---|
| Magnesium ascorbyl phosphate | Not available | | |

TWA: Time Weighted Average over 8 hours of work.
TLV: Threshold Limit Value over 8 hours of work.
REL: Recommended Exposure Limit
PEL: Permissible Exposure Limit
STEL: Short Term Exposure Limit during x minutes.
IDLH: Immediately Dangerous to Life or Health
WEEL: Workplace Environmental Exposure Levels
CEIL: Ceiling

**Personal Protection:**
**Eyes:** Not required, but wear chemical safety glasses or goggles.
**Inhalation:** Not needed under normal conditions of use.
**Body:** Slip proof shoes may be worn where spills may occur
**Other:** Provide eyewash stations, quick-drench showers and washing facilities accessible to areas of use and handling

**9 PHYSICAL AND CHEMICAL PROPERTIES**

**Appearance, Physical State:** Solid powder
**Odor:** Odorless
**Taste:** Not available
**Color:** Off white to yellow
**Molecular Weight:** Not available
**pH** 7 - 8.5
**Boiling Point:** Not available
**Melting Point:** Not available
**Flash Point:** Not available
**Specific Gravity:** 1.76/cm$^3$
**Vapor Pressure:** Not available
**Saponification Value:** Not available
**Iodine Value:** Not available
**Flammability:** Not available
**Peroxide Value:** Not available
**Solubility:** Soluble in water: 154 g/l @ 20°C

**10 STABILITY AND REACTIVITY**

**Reactivity:** Product is stable
**Chemical Stability:** Product is stable
**Hazardous Polymerization:** Will not occur
**Conditions to Avoid:** Avoid strong oxidizers
**Incompatible Materials:** No known
**Hazardous Decomposition Products:** No known
**Special Remarks:** None

**11 TOXICOLOGICAL INFORMATION**

**Acute Toxicity:** LD50 (oral, rat) > 2000 mg/kg; LD50(dermal, rat) > 2000 mg/kg
**Skin:** Slightly irritant in case of skin contact
**Eyes:** Slightly irritant in case of eye contact
**Respiratory:** Slightly irritant in case of inhalation
**Ingestion:** Slightly irritant in case of ingestion
**Carcinogenicity:** Not available
**Teratogenicity:** Not available

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MAKINGCOSMETICS® SDS (Safety Data Sheet)

**Germ Cell Mutagenicity:** Not available
**Embryotoxicity:** Not available
**Specific Target Organ Toxicity:** Not available
**Reproductive Toxicity:** Not available
**Special Remarks:** Not available

**12 ECOLOGICAL INFORMATION**

**Ecotoxicity**
**Aquatic Vertebrate:** Not available
**Aquatic Invertebrate:** Not available
**Terrestrial:** Not available
**Persistence and Degradability:** Not available
**Bioaccumulative Potential:** Not available
**Mobility in Soil:** Not available
**PBT and vPvB Assessment:** Not available
**Other Adverse Effects:** Not available

**13 DISPOSAL CONSIDERATIONS**

**Waste Residues:** Users should review their operations in terms of the applicable federal/national or local regulations and consult with appropriate regulatory agencies if necessary before disposing of waste product container.
**Product Containers:** Users should review their operations in terms of the applicable federal/national or local regulations and consult with appropriate regulatory agencies if necessary before disposing of waste product container.
The information in section 13 is for the product as shipped. Use and/or alterations to the product may change the characteristics of the material and alter the waste classification and proper disposal methods

**14 TRANSPORT INFORMATION**

**DOT (Dept. of Transportation, USA):** Not regulated
**TDG (Transportation of Dangerous Goods, Canada):** Not regulated
**IMDG (International Maritime Dangerous Goods):** Not regulated
**IATA (International Air Transport Association):** Not regulated
**ICAO (International Civil Aviation Organization):** Not regulated

**15 REGULATORY INFORMATION**

**TSCA Inventory Status:** TSCA 8(b) inventory: listed
**DSCL (EEC):** This product is not classified according to the EU regulations.
**WHMIS (Canada):** Not controlled under WHMIS (Canada)

**16 OTHER INFORMATION**

**Revision Date:** 05-25-2015
**Compliance:** This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200
**Disclaimer:** This information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any other process. Such information is to be the best of the company's knowledge and believed accurate and reliable as of the date indicated. However, no representation, warranty or guarantee of any kind, express or implied, is made as to its accuracy, reliability or completeness and we assume no responsibility for any loss, damage or expense, direct or consequential, arising out of use. It is the user's responsibility to satisfy himself as to the suitableness & completeness of such information for his own particular use.

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BASF
We create chemistry

## Safety data sheet

Page: 1/13
BASF Safety data sheet according to Regulation (EC) No. 1907/2006 as amended from time to time.
Date / Revised: 08.01.2016 Version: 2.0
Product: **Cutina® AGS-JP**
(ID no. 30608338/SDS_GEN_EU/EN)
Date of print 28.10.2016

**SECTION 1: Identification of the substance/mixture and of the company/undertaking**

**1.1. Product identifier**

**Cutina® AGS-JP**

Chemical name: Fatty acids, C16-18, esters with ethylene glycol

REACH registration number: 01-2119489414-31-0012, 01-2119489414-31-0000

**1.2. Relevant identified uses of the substance or mixture and uses advised against**

Relevant identified uses: cosmetic ingredient

**1.3. Details of the supplier of the safety data sheet**

Company:
BASF SE
67056 Ludwigshafen
GERMANY
Operating Division Care Chemicals

Telephone: +49 211 7940-2222
E-mail address: emc-ehs-masterdata@basf.com

**1.4. Emergency telephone number**

International emergency number:
Telephone: +49 180 2273-112

**SECTION 2: Hazards Identification**

**2.1. Classification of the substance or mixture**

According to Regulation (EC) No 1272/2008 [CLP]

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No need for classification according to GHS criteria for this product.

**2.2. Label elements**

According to Regulation (EC) No 1272/2008 [CLP]

The product does not require a hazard warning label in accordance with GHS criteria.

**2.3. Other hazards**

According to Regulation (EC) No 1272/2008 [CLP]

Fine dust produced by abrasion can form explosive mixtures with air.

**SECTION 3: Composition/Information on Ingredients**

**3.1. Substances**

Chemical nature

Fatty acids, C16-18, esters with ethylene glycol
CAS Number: 91031-31-1
EC-Number: 292-932-1

**3.2. Mixtures**

Not applicable

**SECTION 4: First-Aid Measures**

**4.1. Description of first aid measures**
If adverse health effects develop seek medical attention.

If inhaled:
not relevant.

On skin contact:
After contact with skin, wash immediately with plenty of water.

On contact with eyes:
In case of contact with the eyes, rinse immediately for at least 15 minutes with plenty of water. Seek medical attention if necessary.

On ingestion:

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Rinse mouth and then drink 200-300 ml of water.

**4.2. Most important symptoms and effects, both acute and delayed**
Symptoms: No significant symptoms are expected due to the non-classification of the product.

Hazards: No hazard is expected under intended use and appropriate handling.

**4.3. Indication of any immediate medical attention and special treatment needed**
Treatment: Treat symptomatically.

**SECTION 5: Fire-Fighting Measures**

**5.1. Extinguishing media**
Suitable extinguishing media:
water spray, dry powder, foam

Unsuitable extinguishing media for safety reasons:
carbon dioxide

**5.2. Special hazards arising from the substance or mixture**
harmful vapours
Evolution of fumes/fog. The substances/groups of substances mentioned can be released in case of fire.

**5.3. Advice for fire-fighters**
Special protective equipment:
Wear a self-contained breathing apparatus.

Further information:
Dispose of fire debris and contaminated extinguishing water in accordance with official regulations.

**SECTION 6: Accidental Release Measures**

**6.1. Personal precautions, protective equipment and emergency procedures**
Use personal protective clothing. Avoid dust formation.

**6.2. Environmental precautions**
Do not discharge into drains/surface waters/groundwater.

**6.3. Methods and material for containment and cleaning up**
For small amounts: Pick up with suitable appliance and dispose of.
For large amounts: Contain with dust binding material and dispose of.
Dispose of absorbed material in accordance with regulations.

**6.4. Reference to other sections**

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Information regarding exposure controls/personal protection and disposal considerations can be found in section 8 and 13.

**SECTION 7: Handling and Storage**

**7.1. Precautions for safe handling**
Handle in accordance with good industrial hygiene and safety practice.

Protection against fire and explosion:
Avoid dust formation. Take precautionary measures against static discharges. Avoid all sources of ignition: heat, sparks, open flame.

**7.2. Conditions for safe storage, including any incompatibilities**

Suitable materials for containers: Paper/Fibreboard, Stove-lacquer EHD0022, Polypropylene (PP), High density polyethylene (HDPE)
Further information on storage conditions: Keep container tightly closed and dry; store in a cool place.
Please refer to the product specific data sheet for further information.

Storage stability:
Storage temperature: <= 30 °C
Protect against moisture.

Protect from temperatures above: 30 °C
The product melts above the declared temperature limit.

**7.3. Specific end use(s)**
For the relevant identified use(s) listed in Section 1 the advice mentioned in this section 7 is to be observed.

**SECTION 8: Exposure Controls/Personal Protection**

**8.1. Control parameters**

Components with occupational exposure limits

107-21-1: ethanediol; ethylene glycol
TWA value 52 mg/m3 ; 20 ppm (OEL (EU))
indicative
STEL value 104 mg/m3 ; 40 ppm (OEL (EU))
indicative
Skin Designation (OEL (EU))
The substance can be absorbed through the skin.

PNEC
Data refer to the product

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Components with PNEC

91031-31-1: Fatty acids, C16-18, esters with ethylene glycol
freshwater:
A PNEC could not be derived as the substance showed no toxic effects in studies performed in the range of its solubility. At the present state of knowledge, no negative ecological effects are expected.
marine water:
A PNEC could not be derived as the substance showed no toxic effects in studies performed in the range of its solubility. At the present state of knowledge, no negative ecological effects are expected.
intermittent release:
A PNEC could not be derived as the substance showed no toxic effects in studies performed in the range of its solubility. At the present state of knowledge, no negative ecological effects are expected.
STP:
No PNEC value available.
sediment (freshwater):
No PNEC value available.
sediment (marine water):
No PNEC value available.
soil: 1 mg/kg
oral (secondary poisoning): 93.33 mg/kg

DNEL
Data refer to the product

Components with DNEL

91031-31-1: Fatty acids, C16-18, esters with ethylene glycol
worker: Long-term exposure- systemic effects, dermal: 193.6 mg/kg
worker: Long-term exposure- systemic effects, Inhalation: 163.54 mg/m3
consumer: Long-term exposure- systemic effects, dermal: 96.8 mg/kg
consumer: Long-term exposure- systemic effects, Inhalation: 33.66 mg/m3
consumer: Long-term exposure- systemic effects, oral: 9.68 mg/kg

**8.2. Exposure controls**

Personal protective equipment

Respiratory protection:
Respiratory protection not required.

Hand protection:
Hand protection not required.

Eye protection:
Safety glasses with side-shields (frame goggles) (e.g. EN 166)

Body protection:

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Body protection must be chosen depending on activity and possible exposure, e.g. apron, protecting boots, chemical-protection suit (according to EN 14605 in case of splashes or EN ISO 13982 in case of dust).

General safety and hygiene measures
Handle in accordance with good industrial hygiene and safety practice. No eating, drinking, smoking or tobacco use at the place of work. Handle in accordance with good industrial hygiene and safety practice.

**SECTION 9: Physical and Chemical Properties**

**9.1. Information on basic physical and chemical properties**

| | | |
|---|---|---|
| Form: | beads | |
| Colour: | white to light yellow | |
| Odour: | almost odourless | |
| Odour threshold: | not applicable | |
| pH value: | not applicable | |
| Melting point: | 65.5 °C | (Directive 84/449/EEC, A.1) |
| Boiling point: | not determined | |
| Flash point: | 260 °C | (ASTM D92) |
| Evaporation rate: | The product is a non-volatile solid. | |
| Flammability: | not flammable | |
| Flammability of Aerosol Products: | not applicable, the product does not form flammable aerosoles | |
| Lower explosion limit: | For solids not relevant for classification and labelling. | |
| Upper explosion limit: | For solids not relevant for classification and labelling. | |
| Ignition temperature: | 360 °C | (VDI 2263, sheet 1, 2.6) |
| Vapour pressure: | < 0.0000001 mbar (20 °C) | (calculated) |
| Relative vapour density (air): | not applicable | |
| Solubility in water: | insoluble < 0.0001 g/l (20 °C) | (Directive 84/449/EEC, A.6) |
| Solubility (qualitative) solvent(s): distilled water | insoluble | |
| Partitioning coefficient n-octanol/water (log Kow): | > 6.27 | (calculated) |
| Self ignition: | not applicable | |

Thermal decomposition: No decomposition if stored and handled as prescribed/indicated.
Viscosity, dynamic:
not applicable, the product is a solid
Viscosity, kinematic:
not applicable, the product is a solid
Explosion hazard: not explosive
Fire promoting properties: not fire-propagating

**9.2. Other information**

Bulk density: 0.89 - 0.91 g/cm3 (Directive 92/69/EEC, A.3)
Other Information:
If necessary, information on other physical and chemical parameters is indicated in this section.
No further information available.

**SECTION 10: Stability and Reactivity**

**10.1. Reactivity**
No hazardous reactions if stored and handled as prescribed/indicated.

**10.2. Chemical stability**
The product is stable if stored and handled as prescribed/indicated.

**10.3. Possibility of hazardous reactions**
None if used for intended purpose.

**10.4. Conditions to avoid**
See MSDS section 7 - Handling and storage.

**10.5. Incompatible materials**

Substances to avoid:
No substances known that should be avoided.

**10.6. Hazardous decomposition products**

Hazardous decomposition products:
No hazardous decomposition products if stored and handled as prescribed/indicated.

**SECTION 11: Toxicological Information**

**11.1. Information on toxicological effects**

Acute toxicity

Assessment of acute toxicity:
Virtually nontoxic after a single skin contact.



Virtually nontoxic after a single ingestion.

Experimental/calculated data:
LD50 rat (oral): > 2,000 mg/kg
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

LD50 rat (dermal): > 2,000 mg/kg
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Irritation

Assessment of irritating effects:
Not irritating to the eyes.

Not irritating to the skin.

Experimental/calculated data:
Skin corrosion/irritation rabbit: non-irritant (OECD Guideline 404)

Serious eye damage/irritation rabbit: non-irritant
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Respiratory/Skin sensitization

Assessment of sensitization:
No sensitizing effect.

Experimental/calculated data:
guinea pig: Non-sensitizing.
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Germ cell mutagenicity

Assessment of mutagenicity:
Results from a number of mutagenicity studies with microorganisms and mammalian cell culture are available. Taking into account all of the information, there is no indication that the substance is mutagenic.

Experimental/calculated data:
Ames-test
Bacteria: negative (OECD Guideline 471)

Micronucleus assay
mouse: negative



The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Carcinogenicity

Assessment of carcinogenicity:
The whole of the information assessable provides no indication of a carcinogenic effect.

Reproductive toxicity

Assessment of reproduction toxicity:
The results of animal studies gave no indication of a fertility impairing effect.

Developmental toxicity

Assessment of teratogenicity:
In animal studies the substance did not cause malformations.

Specific target organ toxicity (single exposure)

Assessment of STOT single:
Based on the available information there is no specific target organ toxicity to be expected after a single exposure.

Repeated dose toxicity and Specific target organ toxicity (repeated exposure)

Assessment of repeated dose toxicity:
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition. The information available on the product provides no indication of toxicity on target organs after repeated exposure.

Aspiration hazard

No aspiration hazard expected.

Other relevant toxicity information

The product has not been tested. The statement has been derived from the properties of the individual components.

**SECTION 12: Ecological Information**

**12.1. Toxicity**

Toxicity to fish:
LC50 > 100 mg/l, Brachydanio rerio (DIN EN ISO 7346-2)

Aquatic invertebrates:



EC50 > 100 mg/l, Daphnia magna
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Aquatic plants:
EC50 > 100 mg/l, Scenedesmus subspicatus (OECD Guideline 201)

Microorganisms/Effect on activated sludge:
EC50 > 10,000 mg/l, Pseudomonas putida
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

**12.2. Persistence and degradability**

Assessment biodegradation and elimination (H2O):
Readily biodegradable (according to OECD criteria).

**12.3. Bioaccumulative potential**

Assessment bioaccumulation potential:
Accumulation in organisms is not to be expected.

**12.4. Mobility in soil**

Assessment transport between environmental compartments:
Volatility: The substance will rapidly evaporate into the atmosphere from the water surface.
Adsorption in soil: Adsorption to solid soil phase is expected.

**12.5. Results of PBT and vPvB assessment**

According to Annex XIV of Regulation (EC) No.1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain a substance fulfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/very bioaccumulative) criteria. Self classification

**12.6. Other adverse effects**

The substance is not listed in Regulation (EC) 1005/2009 on substances that deplete the ozone layer.

**SECTION 13: Disposal Considerations**

**13.1. Waste treatment methods**

Must be disposed of or incinerated in accordance with local regulations.

Contaminated packaging:
Uncontaminated packaging can be re-used.

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Packs that cannot be cleaned should be disposed of in the same manner as the contents.

**SECTION 14: Transport Information**

**Land transport**

ADR

| | |
|---|---|
| | Not classified as a dangerous good under transport regulations |
| UN number: | Not applicable |
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |
| Environmental hazards: | Not applicable |
| Special precautions for user | None known |

RID

| | |
|---|---|
| | Not classified as a dangerous good under transport regulations |
| UN number: | Not applicable |
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |
| Environmental hazards: | Not applicable |
| Special precautions for user | None known |

**Inland waterway transport**
ADN

| | |
|---|---|
| | Not classified as a dangerous good under transport regulations |
| UN number: | Not applicable |
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |
| Environmental hazards: | Not applicable |
| Special precautions for user: | None known |

Transport in inland waterway vessel
Not evaluated

**Sea transport**

IMDG

Page: 12/13
BASF Safety data sheet according to Regulation (EC) No. 1907/2006 as amended from time to time.
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Date of print 28.10.2016

| | |
|---|---|
| | Not classified as a dangerous good under transport regulations |
| UN number: | Not applicable |
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |
| Environmental hazards: | Not applicable |
| Special precautions for user | None known |

**Air transport**

IATA/ICAO

| | |
|---|---|
| | Not classified as a dangerous good under transport regulations |
| UN number: | Not applicable |
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |
| Environmental hazards: | Not applicable |
| Special precautions for user | None known |

**14.1. UN number**
See corresponding entries for "UN number" for the respective regulations in the tables above.

**14.2. UN proper shipping name**
See corresponding entries for "UN proper shipping name" for the respective regulations in the tables above.

**14.3. Transport hazard class(es)**
See corresponding entries for "Transport hazard class(es)" for the respective regulations in the tables above.

**14.4. Packing group**
See corresponding entries for "Packing group" for the respective regulations in the tables above.

**14.5. Environmental hazards**
See corresponding entries for "Environmental hazards" for the respective regulations in the tables above.

**14.6. Special precautions for user**
See corresponding entries for "Special precautions for user" for the respective regulations in the tables above.

**14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code**

| | |
|---|---|
| Regulation: | Not evaluated |
| Shipment approved: | Not evaluated |

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| | |
|---|---|
| Pollution name: | Not evaluated |
| Pollution category: | Not evaluated |
| Ship Type: | Not evaluated |

**SECTION 15: Regulatory Information**

**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**

If other regulatory information applies that is not already provided elsewhere in this safety data sheet, then it is described in this subsection.

**15.2. Chemical Safety Assessment**

Chemical Safety Assessment performed

**SECTION 16: Other Information**

Information on intended use: This product is of industrial quality and unless otherwise specified or agreed intended exclusively for industrial use. This includes the mentioned and recommended usage. Any other intended applications should be discussed with the manufacturer. In particular this concerns the application for products that are the object of special standards and regulations.

The data contained in this safety data sheet are based on our current knowledge and experience and describe the product only with regard to safety requirements. The data do not describe the product's properties (product specification). Neither should any agreed property nor the suitability of the product for any specific purpose be deduced from the data contained in the safety data sheet. It is the responsibility of the recipient of the product to ensure any proprietary rights and existing laws and legislation are observed.

Vertical lines in the left hand margin indicate an amendment from the previous version.

BASF
The Chemical Company

## Safety data sheet

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BASF Safety data sheet according to Regulation (EC) No. 1907/2006
Date / Revised: 12.05.2014 Version: 2.0
Product: **Dehyton® KE T IS**
(ID no. 30531792/SDS_GEN_EU/EN)
Date of print 13.05.2014

**SECTION 1: Identification of the substance/mixture and of the company/undertaking**

**1.1. Product identifier**

**Dehyton® KE T IS**

**1.2. Relevant identified uses of the substance or mixture and uses advised against**

Relevant identified uses: surfactants

**1.3. Details of the supplier of the safety data sheet**

Company:
BASF SE
67056 Ludwigshafen
GERMANY
Operating Division Care Chemicals

Telephone: +49 211 7940-2222
E-mail address: emc-ehs-masterdata@basf.com

**1.4. Emergency telephone number**

International emergency number:
Telephone: +49 180 2273-112

**SECTION 2: Hazards Identification**

**2.1. Classification of the substance or mixture**

According to Regulation (EC) No 1272/2008 [CLP]

Eye Dam./Irrit. 1
Aquatic Chronic 3

According to Directive 67/548/EEC or 1999/45/EC

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Possible Hazards:
Risk of serious damage to eyes.

For the classifications not written out in full in this section the full text can be found in section 16.

**2.2. Label elements**

According to Regulation (EC) No 1272/2008 [CLP]

Pictogram:

Signal Word:
Danger

Hazard Statement:

| | |
|---|---|
| H318 | Causes serious eye damage. |
| H412 | Harmful to aquatic life with long lasting effects. |

Precautionary Statements (Prevention):

| | |
|---|---|
| P280 | Wear eye/face protection. |
| P273 | Avoid release to the environment. |

Precautionary Statements (Response):

| | |
|---|---|
| P305 + P351 + P338 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. |
| P310 | Immediately call a POISON CENTER or doctor/physician. |

Precautionary Statements (Disposal):

| | |
|---|---|
| P501 | Dispose of contents/container to hazardous or special waste collection point. |

According to Regulation (EC) No 1272/2008 [CLP]

Hazard determining component(s) for labelling: 1-Propanaminium, 3-amino-N-(carboxymethyl)-N,N-dimethyl-, N-(C8-18 and C18-unsatd. acyl) derivs., inner salts

According to Directive 67/548/EEC or 1999/45/EC

EEC Directives

Hazard symbol(s)
Xi Irritant.

R-phrase(s)

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| | |
|---|---|
| R41 | Risk of serious damage to eyes. |

S-phrase(s)

| | |
|---|---|
| S25 | Avoid contact with eyes. |
| S26 | In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. |
| S39 | Wear eye/face protection. |

Hazard determining component(s) for labelling: 1-Propanaminium, 3-amino-N-(carboxymethyl)-N,N-dimethyl-, N-(C8-18 and C18-unsatd. acyl) derivs., inner salts

**2.3. Other hazards**

According to Regulation (EC) No 1272/2008 [CLP]

No specific dangers known, if the regulations/notes for storage and handling are considered.

**SECTION 3: Composition/Information on Ingredients**

**3.1. Substances**

Not applicable

**3.2. Mixtures**

Chemical nature

BET C8-18/18:1 amidopropyl diMe

Aqueous solution based on:

Hazardous ingredients (GHS)
according to Regulation (EC) No. 1272/2008

1-Propanaminium, 3-amino-N-(carboxymethyl)-N,N-dimethyl-, N-(C8-18 and C18-unsatd. acyl) derivs., inner salts

| | |
|---|---|
| Content (W/W): >= 20 % - <= 30 % | Eye Dam./Irrit. 1 |
| CAS Number: 147170-44-3 | Aquatic Chronic 3 |
| REACH registration number: 01-2119489410-39 | H318, H412 |

Hazardous ingredients
according to Directive 1999/45/EC

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1-Propanaminium, 3-amino-N-(carboxymethyl)-N,N-dimethyl-, N-(C8-18 and C18-unsatd. acyl) derivs., inner salts
Content (W/W): >= 20 % - <= 30 %
CAS Number: 147170-44-3
REACH registration number: 01-2119489410-39
Hazard symbol(s): Xi
R-phrase(s): 41

For the classifications not written out in full in this section, including the indication of danger, the hazard symbols, the R phrases, and the hazard statements, the full text is listed in section 16.

**SECTION 4: First-Aid Measures**

**4.1. Description of first aid measures**
If adverse health effects develop seek medical attention.

If inhaled:
not relevant.

On skin contact:
After contact with skin, wash immediately with plenty of water.

On contact with eyes:
Rinse immediately with plenty of running water (for 10 minutes), seek medical attention from a specialist.

On ingestion:
Rinse mouth and then drink 200-300 ml of water.

**4.2. Most important symptoms and effects, both acute and delayed**
Symptoms: The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11., Further important symptoms and effects are so far not known.

Hazards: No hazard is expected under intended use and appropriate handling.

**4.3. Indication of any immediate medical attention and special treatment needed**
Treatment: Treat symptomatically.

**SECTION 5: Fire-Fighting Measures**

**5.1. Extinguishing media**
Suitable extinguishing media:
water spray, carbon dioxide, dry powder, foam

**5.2. Special hazards arising from the substance or mixture**
harmful vapours

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Evolution of fumes/fog. The substances/groups of substances mentioned can be released in case of fire.

**5.3. Advice for fire-fighters**
Further information:
Dispose of fire debris and contaminated extinguishing water in accordance with official regulations.

**SECTION 6: Accidental Release Measures**

**6.1. Personal precautions, protective equipment and emergency procedures**
Use personal protective clothing.

**6.2. Environmental precautions**
Do not discharge into drains/surface waters/groundwater.

**6.3. Methods and material for containment and cleaning up**
For small amounts: Pick up with suitable absorbent material.
For large amounts: Dike spillage. Pump off product.
Dispose of absorbed material in accordance with regulations.

**6.4. Reference to other sections**
Information regarding exposure controls/personal protection and disposal considerations can be found in section 8 and 13.

**SECTION 7: Handling and Storage**

**7.1. Precautions for safe handling**
Handle in accordance with good industrial hygiene and safety practice.

Protection against fire and explosion:
Take precautionary measures against static discharges. Avoid all sources of ignition: heat, sparks, open flame.

**7.2. Conditions for safe storage, including any incompatibilities**

Suitable materials for containers: polyethylene (PE), High density polyethylene (HDPE)
Further information on storage conditions: Keep container tightly closed and dry; store in a cool place.
At the usual storage and transportation conditions no impairments of the product are to be expected. Outside temperature limits, the properties of the product will change. The property change is reversible. Please refer to the technical leaflet for further information.

Protect from temperatures below: 0 °C
Characteristics of the product are reversibly changed when falling below the limit temperature.
Protect from temperatures above: 40 °C

**7.3. Specific end use(s)**

For the relevant identified use(s) listed in Section 1 the advice mentioned in this section 7 is to be observed.

**SECTION 8: Exposure Controls/Personal Protection**

**8.1. Control parameters**

Components with occupational exposure limits

7647-14-5: Sodium chloride

PNEC
Data refer to the lead substance

Components with PNEC

147170-44-3: 1-Propanaminium, 3-amino-N-(carboxymethyl)-N,N-dimethyl-, N-(C8-18 and C18-unsatd. acyl) derivs., inner salts
freshwater: 0.0135 mg/l
marine water: 0.00135 mg/l
sediment (freshwater): 1 mg/kg
sediment (marine water): 0.1 mg/kg
soil: 0.8 mg/kg
STP: 3000 mg/l

DNEL
Data refer to the lead substance

Components with DNEL

147170-44-3: 1-Propanaminium, 3-amino-N-(carboxymethyl)-N,N-dimethyl-, N-(C8-18 and C18-unsatd. acyl) derivs., inner salts
worker: Long-term exposure- systemic effects, dermal: 12.5 mg/kg
worker: Long-term exposure- systemic effects, Inhalation: 44 mg/m3
consumer: Long-term exposure- systemic effects, dermal: 7.5 mg/kg
consumer: Long-term exposure- systemic effects, oral: 7.5 mg/kg

**8.2. Exposure controls**

Personal protective equipment

Respiratory protection:
Not needed.

Hand protection:
Suitable are protective gloves with the following specification. The recommendation is valid for laboratory conditions, specific workplace conditions must be taken into consideration separately. Suitable materials also with prolonged, direct contact (Recommended: Protective index 6, corresponding > 480 minutes of permeation time according to EN 374):
nitrile rubber (NBR) - 0.2 mm coating thickness



Eye protection:
Tightly fitting safety goggles (splash goggles) (e.g. EN 166)

Body protection:
Body protection must be chosen depending on activity and possible exposure, e.g. apron, protecting boots, chemical-protection suit (according to EN 14605 in case of splashes or EN ISO 13982 in case of dust).

General safety and hygiene measures
Handle in accordance with good industrial hygiene and safety practice. No eating, drinking, smoking or tobacco use at the place of work. Handle in accordance with good industrial hygiene and safety practice.

**SECTION 9: Physical and Chemical Properties**

**9.1. Information on basic physical and chemical properties**

| | | |
|---|---|---|
| Form: | liquid | |
| Colour: | light yellow | |
| Odour: | slight odour | |
| pH value: | 4 - 6<br>(water, 5 %(m), 20 °C) | (ISO 4316) |
| Flash point: | > 100 °C<br>Aqueous preparation | |
| Evaporation rate: | not applicable | |
| Flammability: | not flammable | |
| Flammability of Aerosol Products: | not applicable, the product does not form flammable aerosoles | |
| Lower explosion limit: | For liquids not relevant for classification and labelling. | |
| Density: | 1.06 g/cm3<br>(20 °C) | (DIN 51757) |
| Relative vapour density (air): | not applicable | |
| Solubility in water: | soluble | |
| Solubility (qualitative) solvent(s): | distilled water<br>miscible in all proportions | |
| Partitioning coefficient n-octanol/water (log Kow): | not determined | |
| Self ignition: | Temperature: > 160 °C | |
| Thermal decomposition: | No decomposition if stored and handled as prescribed/indicated. | |
| Viscosity, dynamic: | not determined | |
| Viscosity, kinematic: | not determined | |



| | | |
|---|---|---|
| Explosion hazard: | not explosive | |
| Fire promoting properties: | not fire-propagating | (See user defined text.) |

**9.2. Other information**

Other Information:
If necessary, information on other physical and chemical parameters is indicated in this section.
No further information available.

**SECTION 10: Stability and Reactivity**

**10.1. Reactivity**
No hazardous reactions if stored and handled as prescribed/indicated.

**10.2. Chemical stability**
The product is stable if stored and handled as prescribed/indicated.

**10.3. Possibility of hazardous reactions**
None if used for intended purpose.

**10.4. Conditions to avoid**
See MSDS section 7 - Handling and storage.

**10.5. Incompatible materials**

Substances to avoid:
No substances known that should be avoided.

**10.6. Hazardous decomposition products**

No hazardous decomposition products known.

**SECTION 11: Toxicological Information**

**11.1. Information on toxicological effects**

Acute toxicity

Assessment of acute toxicity:
Virtually nontoxic after a single skin contact.

Virtually nontoxic by inhalation.

Virtually nontoxic after a single ingestion.

Experimental/calculated data:
LD50 (oral): > 5,000 mg/kg



LD50 (dermal): > 5,000 mg/kg (OECD Guideline 402)

Irritation

Assessment of irritating effects:
May cause severe damage to the eyes.

Not irritating to the skin.

Respiratory/Skin sensitization

Assessment of sensitization:
There is no evidence of a skin-sensitizing potential.

Germ cell mutagenicity

Assessment of mutagenicity:
The chemical structure does not suggest a specific alert for such an effect.

Carcinogenicity

Assessment of carcinogenicity:
The chemical structure does not suggest a specific alert for such an effect.

Reproductive toxicity

Assessment of reproduction toxicity:
The chemical structure does not suggest a specific alert for such an effect.

Developmental toxicity

Assessment of teratogenicity:
No data was available concerning toxicity to development.

Specific target organ toxicity (single exposure)

Assessment of STOT single:
Based on available Data, the classification criteria are not met.

Repeated dose toxicity and Specific target organ toxicity (repeated exposure)

Assessment of repeated dose toxicity:
None known.

Aspiration hazard

No aspiration hazard expected.

Other relevant toxicity information

The product has not been tested. The statements on toxicology have been derived from the properties of the individual components.

**SECTION 12: Ecological Information**

**12.1. Toxicity**

Assessment of aquatic toxicity:
The product has not been tested. The statement has been derived from the properties of the individual components.

Toxicity to fish:
LC50 > 1 - 10 mg/l

Aquatic invertebrates:
EC50 > 1 - 10 mg/l

Aquatic plants:
EC50 > 1 - 10 mg/l

Microorganisms/Effect on activated sludge:
EC0 > 100 mg/l

Chronic toxicity to fish:
No observed effect concentration > 0.1 - 1 mg/l

Chronic toxicity to aquatic invertebrates:
No observed effect concentration > 0.1 - 1 mg/l

**12.2. Persistence and degradability**

Assessment biodegradation and elimination (H2O):
The organic component of the product is biodegradable.

**12.3. Bioaccumulative potential**

Assessment bioaccumulation potential:
No data available.

**12.4. Mobility in soil**

Assessment transport between environmental compartments:
not applicable

**12.5. Results of PBT and vPvB assessment**

According to Annex XIV of Regulation (EC) No.1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain a substance fulfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/very bioaccumulative) criteria. Self classification



**12.6. Other adverse effects**

The product does not contain substances that are listed in Regulation (EC) 1005/2009 on substances that deplete the ozone layer.

**SECTION 13: Disposal Considerations**

**13.1. Waste treatment methods**

Must be disposed of or incinerated in accordance with local regulations.

**SECTION 14: Transport Information**

**Land transport**

ADR

| | |
|---|---|
| | Not classified as a dangerous good under transport regulations |
| UN number: | Not applicable |
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |
| Environmental hazards: | Not applicable |
| Special precautions for user | None known |

RID

| | |
|---|---|
| | Not classified as a dangerous good under transport regulations |
| UN number: | Not applicable |
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |
| Environmental hazards: | Not applicable |
| Special precautions for user | None known |

**Inland waterway transport**
ADN

| | |
|---|---|
| | Not classified as a dangerous good under transport regulations |
| UN number: | Not applicable |
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |
| Environmental hazards: | Not applicable |
| Special precautions for | None known |



| | |
|---|---|
| user | |
| Transport in inland waterway vessel: | Not evaluated |

**Sea transport**

IMDG

| | |
|---|---|
| | Not classified as a dangerous good under transport regulations |
| UN number: | Not applicable |
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |
| Environmental hazards: | Not applicable |
| Special precautions for user | None known |

**Air transport**

IATA/ICAO

| | |
|---|---|
| | Not classified as a dangerous good under transport regulations |
| UN number: | Not applicable |
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |
| Environmental hazards: | Not applicable |
| Special precautions for user | None known |

**14.1. UN number**
See corresponding entries for "UN number" for the respective regulations in the tables above.

**14.2. UN proper shipping name**
See corresponding entries for "UN proper shipping name" for the respective regulations in the tables above.

**14.3. Transport hazard class(es)**
See corresponding entries for "Transport hazard class(es)" for the respective regulations in the tables above.

**14.4. Packing group**
See corresponding entries for "Packing group" for the respective regulations in the tables above.

**14.5. Environmental hazards**
See corresponding entries for "Environmental hazards" for the respective regulations in the tables above.



**14.6. Special precautions for user**
See corresponding entries for "Special precautions for user" for the respective regulations in the tables above.

**14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**

| | |
|---|---|
| Regulation: | Not evaluated |
| Shipment approved: | Not evaluated |
| Pollution name: | Not evaluated |
| Pollution category: | Not evaluated |
| Ship Type: | Not evaluated |

**SECTION 15: Regulatory Information**

**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**

**15.2. Chemical Safety Assessment**

Advice on product handling can be found in sections 7 and 8 of this safety data sheet.

**SECTION 16: Other Information**

Information on intended use: This product is of industrial quality and unless otherwise specified or agreed intended exclusively for industrial use. This includes the mentioned and recommended usage. Any other intended applications should be discussed with the manufacturer. In particular this concerns the application for products that are the object of special standards and regulations.

Full text of the classifications, including the indication of danger, the hazard symbols, the R phrases, and the hazard statements, if mentioned in section 2 or 3:

| | |
|---|---|
| Xi | Irritant. |
| 41 | Risk of serious damage to eyes. |
| Eye Dam./Irrit. | Serious eye damage/eye irritation |
| Aquatic Chronic | Hazardous to the aquatic environment - chronic |
| H318 | Causes serious eye damage. |
| H412 | Harmful to aquatic life with long lasting effects. |

The data contained in this safety data sheet are based on our current knowledge and experience and describe the product only with regard to safety requirements. The data do not describe the product's properties (product specification). Neither should any agreed property nor the suitability of the product for any specific purpose be deduced from the data contained in the safety data sheet. It is the responsibility of the recipient of the product to ensure any proprietary rights and existing laws and legislation are observed.

Vertical lines in the left hand margin indicate an amendment from the previous version.

BASF
We create chemistry

## Safety data sheet

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BASF Safety data sheet according to Regulation (EC) No. 1907/2006 as amended from time to time.
Date / Revised: 18.10.2018 Version: 3.0
Product: **Dehyton® KE-AS**
(ID no. 30635007/SDS_GEN_EU/EN)
Date of print 19.10.2018

**SECTION 1: Identification of the substance/mixture and of the company/undertaking**

**1.1. Product identifier**

**Dehyton® KE-AS**

**1.2. Relevant identified uses of the substance or mixture and uses advised against**

Relevant identified uses: Chemical

**1.3. Details of the supplier of the safety data sheet**

Company:
BASF SE
67056 Ludwigshafen
GERMANY
Operating Division Care Chemicals

Telephone: +49 211 7940-2222
E-mail address: emc-ehs-masterdata@basf.com

**1.4. Emergency telephone number**

International emergency number:
Telephone: +49 180 2273-112

**SECTION 2: Hazards Identification**

**2.1. Classification of the substance or mixture**

According to Regulation (EC) No 1272/2008 [CLP]

Eye Dam./Irrit. 1
Aquatic Chronic 3

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H318, H412

For the classifications not written out in full in this section the full text can be found in section 16.

**2.2. Label elements**

According to Regulation (EC) No 1272/2008 [CLP]

Pictogram:

Signal Word:
Danger

Hazard Statement:

| | |
|---|---|
| H318 | Causes serious eye damage. |
| H412 | Harmful to aquatic life with long lasting effects. |

Precautionary Statements (Prevention):

| | |
|---|---|
| P280 | Wear eye/face protection. |
| P273 | Avoid release to the environment. |

Precautionary Statements (Response):

| | |
|---|---|
| P305 + P351 + P338 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. |
| P310 | Immediately call a POISON CENTER or doctor/physician. |

Precautionary Statements (Disposal):

| | |
|---|---|
| P501 | Dispose of contents/container to hazardous or special waste collection point. |

According to Regulation (EC) No 1272/2008 [CLP]

Hazard determining component(s) for labelling: 1-Propanaminium, 3-amino-N-(carboxymethyl)-N,N-dimethyl-, N-(C8-18 and C18-unsatd. acyl) derivs., inner salts

**2.3. Other hazards**

According to Regulation (EC) No 1272/2008 [CLP]

No specific dangers known, if the regulations/notes for storage and handling are considered.

**SECTION 3: Composition/Information on Ingredients**

**3.1. Substances**

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Not applicable

**3.2. Mixtures**

Chemical nature

Aqueous solution based on: 1-Propanaminium, 3-amino-N-(carboxymethyl)-N,N-dimethyl-, N-(C8-18 and C18-unsatd. acyl) derivs., inner salts

Hazardous ingredients (GHS)
according to Regulation (EC) No. 1272/2008

1-Propanaminium, 3-amino-N-(carboxymethyl)-N,N-dimethyl-, N-(C8-18 and C18-unsatd. acyl) derivs., inner salts

| | |
|---|---|
| Content (W/W): >= 30 % - < 40 %<br>CAS Number: 147170-44-3<br>REACH registration number: 01-2119489410-39 | Eye Dam./Irrit. 1<br>Aquatic Chronic 3<br>H318, H412<br><br>Specific concentration limit:<br>Eye Dam./Irrit. 1: > 10 %<br>Eye Dam./Irrit. 2: > 4 - 10 % |

For the classifications not written out in full in this section, including the hazard classes and the hazard statements, the full text is listed in section 16.

**SECTION 4: First-Aid Measures**

**4.1. Description of first aid measures**
If adverse health effects develop seek medical attention.

If inhaled:
not relevant.

On skin contact:
After contact with skin, wash immediately with plenty of water.

On contact with eyes:
Rinse immediately with plenty of running water (for 10 minutes), seek medical attention from a specialist.

On ingestion:
Rinse mouth and then drink 200-300 ml of water.

**4.2. Most important symptoms and effects, both acute and delayed**
Symptoms: The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11., (Further) symptoms and / or effects are not known so far

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Hazards: No hazard is expected under intended use and appropriate handling.

**4.3. Indication of any immediate medical attention and special treatment needed**
Treatment: Treat symptomatically.

**SECTION 5: Fire-Fighting Measures**

**5.1. Extinguishing media**
Suitable extinguishing media:
water spray, carbon dioxide, dry powder, foam

**5.2. Special hazards arising from the substance or mixture**
harmful vapours
Evolution of fumes/fog. The substances/groups of substances mentioned can be released in case of fire.

**5.3. Advice for fire-fighters**
Special protective equipment:
Wear a self-contained breathing apparatus.

Further information:
Dispose of fire debris and contaminated extinguishing water in accordance with official regulations.

**SECTION 6: Accidental Release Measures**

**6.1. Personal precautions, protective equipment and emergency procedures**
Use personal protective clothing.

**6.2. Environmental precautions**
Do not discharge into drains/surface waters/groundwater.

**6.3. Methods and material for containment and cleaning up**
For small amounts: Pick up with suitable absorbent material.
For large amounts: Dike spillage. Pump off product.
Dispose of absorbed material in accordance with regulations.

**6.4. Reference to other sections**
Information regarding exposure controls/personal protection and disposal considerations can be found in section 8 and 13.

**SECTION 7: Handling and Storage**

**7.1. Precautions for safe handling**
Handle in accordance with good industrial hygiene and safety practice.

Protection against fire and explosion:
Take precautionary measures against static discharges. Avoid all sources of ignition: heat, sparks, open flame.

Control of exposure and risk management measures

| | |
|---|---|
| Emission factor air: | 0.02 % |
| Emission factor water: | 0.01 % |
| Emission factor soil: | 0 % |

Exposure estimate and reference to its source

| | |
|---|---|
| Assessment method: | EASY TRA v2.0, ECETOC TRA v2.0 Environment |
| Maximum amount of safe use: | 1,610.7 kg/d |
| Remarks: | Risk from environmental exposure is driven by freshwater sediment., Data refer to the lead substance |

**7.2. Conditions for safe storage, including any incompatibilities**

Suitable materials for containers: High density polyethylene (HDPE)
Further information on storage conditions: Keep container tightly closed and dry; store in a cool place.
Store protected against freezing.

**7.3. Specific end use(s)**
For the relevant identified use(s) listed in Section 1 the advice mentioned in this section 7 is to be observed.

**SECTION 8: Exposure Controls/Personal Protection**

**8.1. Control parameters**

Components with occupational exposure limits

7647-14-5: Sodium chloride

PNEC
Data refer to the dissolved main component

Components with PNEC

147170-44-3: 1-Propanaminium, 3-amino-N-(carboxymethyl)-N,N-dimethyl-, N-(C8-18 and C18-unsatd. acyl) derivs., inner salts
freshwater: 0.0135 mg/l
marine water: 0.00135 mg/l
sediment (freshwater): 1 mg/kg
sediment (marine water): 0.1 mg/kg
soil: 0.8 mg/kg
STP: 3000 mg/l



DNEL
Data refer to the dissolved main component

Components with DNEL

147170-44-3: 1-Propanaminium, 3-amino-N-(carboxymethyl)-N,N-dimethyl-, N-(C8-18 and C18-unsatd. acyl) derivs., inner salts
worker: Long-term exposure- systemic effects, dermal: 12.5 mg/kg
worker: Long-term exposure- systemic effects, Inhalation: 44 mg/m3
consumer: Long-term exposure- systemic effects, dermal: 7.5 mg/kg
consumer: Long-term exposure- systemic effects, oral: 7.5 mg/kg

**8.2. Exposure controls**

Personal protective equipment

Respiratory protection:
Respiratory protection not required.

Hand protection:
Suitable are protective gloves with the following specification. The recommendation is valid for laboratory conditions, specific workplace conditions must be taken into consideration separately. Suitable materials also with prolonged, direct contact (Recommended: Protective index 6, corresponding > 480 minutes of permeation time according to EN 374):
nitrile rubber (NBR) - 0.2 mm coating thickness

Eye protection:
Tightly fitting safety goggles (splash goggles) (e.g. EN 166)

Body protection:
Body protection must be chosen depending on activity and possible exposure, e.g. apron, protecting boots, chemical-protection suit (according to EN 14605 in case of splashes or EN ISO 13982 in case of dust).

General safety and hygiene measures
Handle in accordance with good industrial hygiene and safety practice. No eating, drinking, smoking or tobacco use at the place of work. Handle in accordance with good industrial hygiene and safety practice.

Environmental exposure controls
Do not discharge product into the environment without control.

**SECTION 9: Physical and Chemical Properties**

**9.1. Information on basic physical and chemical properties**

| | |
|---|---|
| Form: | liquid |
| Colour: | light yellow |
| Odour: | odourless |



| | |
|---|---|
| Odour threshold: | not applicable |
| pH value: | 4 - 6 (20 °C) |
| Flash point: | > 101 °C Aqueous preparation |
| Evaporation rate: | Value can be approximated from Henry's Law Constant or vapor pressure. |
| Flammability: | not flammable |
| Flammability of Aerosol Products: | not applicable, the product does not form flammable aerosoles |
| Lower explosion limit: | For liquids not relevant for classification and labelling. |
| Upper explosion limit: | For liquids not relevant for classification and labelling. |
| Ignition temperature: | not determined |
| Vapour pressure: | not determined |
| Density: | 1.05 - 1.07 g/cm3 (20 °C) |
| Relative vapour density (air): | not applicable |
| Solubility in water: | soluble |
| Solubility (qualitative) solvent(s): distilled water | readily soluble |
| Partitioning coefficient n-octanol/water (log Kow): | not applicable for mixtures |
| Self ignition: | not applicable |
| Thermal decomposition: | No decomposition if stored and handled as prescribed/indicated. |
| Viscosity, dynamic: | not determined |
| Viscosity, kinematic: | not determined |
| Explosion hazard: | not explosive |
| Fire promoting properties: | not fire-propagating |

**9.2. Other information**

Other Information:
If necessary, information on other physical and chemical parameters is indicated in this section.
No further information available.



**SECTION 10: Stability and Reactivity**

**10.1. Reactivity**
No hazardous reactions if stored and handled as prescribed/indicated.

**10.2. Chemical stability**
The product is stable if stored and handled as prescribed/indicated.

**10.3. Possibility of hazardous reactions**
None if used for intended purpose.

**10.4. Conditions to avoid**
See MSDS section 7 - Handling and storage.

**10.5. Incompatible materials**

Substances to avoid:
No substances known that should be avoided.

**10.6. Hazardous decomposition products**

Hazardous decomposition products:
No hazardous decomposition products if stored and handled as prescribed/indicated.

**SECTION 11: Toxicological Information**

**11.1. Information on toxicological effects**

Acute toxicity

Assessment of acute toxicity:
Virtually nontoxic after a single ingestion.

Experimental/calculated data:
LD50 (oral): > 5,000 mg/kg

Irritation

Assessment of irritating effects:
May cause severe damage to the eyes.

Not irritating to the skin.

Respiratory/Skin sensitization

Assessment of sensitization:
There is no evidence of a skin-sensitizing potential.

Germ cell mutagenicity

Assessment of mutagenicity:
The chemical structure does not suggest a specific alert for such an effect.

Carcinogenicity

Assessment of carcinogenicity:
The chemical structure does not suggest a specific alert for such an effect.

Reproductive toxicity

Assessment of reproduction toxicity:
The chemical structure does not suggest a specific alert for such an effect.

Developmental toxicity

Assessment of teratogenicity:
No data was available concerning toxicity to development.

Specific target organ toxicity (single exposure)

Assessment of STOT single:
Based on available Data, the classification criteria are not met.

Repeated dose toxicity and Specific target organ toxicity (repeated exposure)

Assessment of repeated dose toxicity:
The information available on the product provides no indication of toxicity on target organs after repeated exposure.

Aspiration hazard

No aspiration hazard expected.

Other relevant toxicity information

The product has not been tested. The statements on toxicology have been derived from the properties of the individual components.

## SECTION 12: Ecological Information

### 12.1. Toxicity

Assessment of aquatic toxicity:
The product has not been tested. The statement has been derived from the properties of the individual components.



Toxicity to fish:
LC50 > 1 - 10 mg/l

Microorganisms/Effect on activated sludge:
EC0 > 100 mg/l

Chronic toxicity to fish:
No observed effect concentration > 0.1 - 1 mg/l

### 12.2. Persistence and degradability

Assessment biodegradation and elimination (H2O):
The organic component of the product is biodegradable.

### 12.3. Bioaccumulative potential

Assessment bioaccumulation potential:
No data available.

### 12.4. Mobility in soil

Assessment transport between environmental compartments:
Volatility: not applicable

### 12.5. Results of PBT and vPvB assessment

According to Annex XIV of Regulation (EC) No.1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain a substance fulfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/very bioaccumulative) criteria. Self classification

### 12.6. Other adverse effects

The product does not contain substances that are listed in Regulation (EC) 1005/2009 on substances that deplete the ozone layer.

## SECTION 13: Disposal Considerations

### 13.1. Waste treatment methods

Must be disposed of or incinerated in accordance with local regulations.

## SECTION 14: Transport Information

**Land transport**



ADR

| | |
|---|---|
| | Not classified as a dangerous good under transport regulations |
| UN number: | Not applicable |
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |
| Environmental hazards: | Not applicable |
| Special precautions for user | None known |

RID

| | |
|---|---|
| | Not classified as a dangerous good under transport regulations |
| UN number: | Not applicable |
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |
| Environmental hazards: | Not applicable |
| Special precautions for user | None known |

**Inland waterway transport**
ADN

| | |
|---|---|
| | Not classified as a dangerous good under transport regulations |
| UN number: | Not applicable |
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |
| Environmental hazards: | Not applicable |
| Special precautions for user: | None known |

Transport in inland waterway vessel
Not evaluated

**Sea transport**

IMDG

| | |
|---|---|
| | Not classified as a dangerous good under transport regulations |
| UN number: | Not applicable |
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |
| Environmental hazards: | Not applicable |
| Special precautions for | None known |



user

**Air transport**

IATA/ICAO

| | |
|---|---|
| | Not classified as a dangerous good under transport regulations |
| UN number: | Not applicable |
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |
| Environmental hazards: | Not applicable |
| Special precautions for user | None known |

### 14.1. UN number
See corresponding entries for "UN number" for the respective regulations in the tables above.

### 14.2. UN proper shipping name
See corresponding entries for "UN proper shipping name" for the respective regulations in the tables above.

### 14.3. Transport hazard class(es)
See corresponding entries for "Transport hazard class(es)" for the respective regulations in the tables above.

### 14.4. Packing group
See corresponding entries for "Packing group" for the respective regulations in the tables above.

### 14.5. Environmental hazards
See corresponding entries for "Environmental hazards" for the respective regulations in the tables above.

### 14.6. Special precautions for user
See corresponding entries for "Special precautions for user" for the respective regulations in the tables above.

### 14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code

| | |
|---|---|
| Regulation: | Not evaluated |
| Shipment approved: | Not evaluated |
| Pollution name: | Not evaluated |
| Pollution category: | Not evaluated |
| Ship Type: | Not evaluated |

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**SECTION 15: Regulatory Information**

**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**

Prohibitions, Restrictions and Authorizations

Annex XVII of Regulation (EC) No 1907/2006: Number on List: 3

**15.2. Chemical Safety Assessment**

Advice on product handling can be found in sections 7 and 8 of this safety data sheet.

**SECTION 16: Other Information**

Information on intended use: This product is of industrial quality and unless otherwise specified or agreed intended exclusively for industrial use. This includes the mentioned and recommended usage. Any other intended applications should be discussed with the manufacturer. In particular this concerns the application for products that are the object of special standards and regulations.

Full text of the classifications, including the hazard classes and the hazard statements, if mentioned in section 2 or 3:

| | |
|---|---|
| Eye Dam./Irrit. | Serious eye damage/eye irritation |
| Aquatic Chronic | Hazardous to the aquatic environment - chronic |
| H318 | Causes serious eye damage. |
| H412 | Harmful to aquatic life with long lasting effects. |

The data contained in this safety data sheet are based on our current knowledge and experience and describe the product only with regard to safety requirements. This safety data sheet is neither a Certificate of Analysis (CoA) nor technical data sheet and shall not be mistaken for a specification agreement. Identified uses in this safety data sheet do neither represent an agreement on the corresponding contractual quality of the substance/mixture nor a contractually designated use. It is the responsibility of the recipient of the product to ensure any proprietary rights and existing laws and legislation are observed.

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SAFETY DATA SHEET

**DERMALCARE MAP L-213/K**

Revision Date 08/08/2018

**SECTION 1: Identification of the substance/mixture and of the company/undertaking**

**1.1 Product identifier**

- Trade name DERMALCARE MAP L-213/K

**1.2 Relevant identified uses of the substance or mixture and uses advised against**

Uses of the Substance / Mixture

- FDA regulated use only.
- Surfactants used in cosmetics

**1.3 Details of the supplier of the safety data sheet**

Company

Solvay USA Inc.,
NOVECARE
504 Carnegie Center
Princeton, NJ, 08540, US
Telephone Number: 800-973-7873

**1.4 Emergency telephone**

FOR EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT, CONTACT CHEMTREC (24-Hour Number): 800-424-9300 within the United States and Canada, or 703-527-3887 for international collect calls.

**SECTION 2: Hazards identification**

Although OSHA has not adopted the environmental portion of the GHS regulations, this document may include information on environmental effects.

**2.1 Classification of the substance or mixture**

HCS 2012 (29 CFR 1910.1200)

| | |
|---|---|
| Skin irritation, Category 2 | H315: Causes skin irritation. |
| Serious eye damage, Category 1 | H318: Causes serious eye damage. |

**2.2 Label elements**

HCS 2012 (29 CFR 1910.1200)

**Pictogram**

**Signal Word**
- Danger

**Hazard Statements**
- H315 Causes skin irritation.
- H318 Causes serious eye damage.

**Precautionary Statements**

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Version : 1.06 / US ( Z8 )
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SAFETY DATA SHEET

**DERMALCARE MAP L-213/K**

Revision Date 08/08/2018

Prevention
- P264 Wash skin thoroughly after handling.
- P280 Wear protective gloves/ eye protection/ face protection.

Response
- P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
- P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
- P332 + P313 If skin irritation occurs: Get medical advice/ attention.
- P362 Take off contaminated clothing and wash before reuse.

**2.3 Other hazards which do not result in classification**

- H402: Harmful to aquatic life.

**SECTION 3: Composition/information on ingredients**

**3.1 Substance**

- Not applicable, this product is a mixture.

**3.2 Mixture**

- Chemical nature Alkyl ether phosphate, potassium salt

Hazardous Ingredients and Impurities

| Chemical name | Identification number CAS-No. | Concentration [%] |
|---|---|---|
| Alkyl Ether Phosphate Ester, Potassium Salt | ***** | >= 30 - < 40 |
| Phosphoric acid, potassium salt (1:3) | 7778-53-2 | >= 1 - < 3 |

The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

Non Hazardous Ingredients and Impurities

| Chemical name | Identification number CAS-No. | Concentration [%] |
|---|---|---|
| Water/Inerts | ***** | 60- 70 |

**SECTION 4: First aid measures**

**4.1 Description of first-aid measures**

General advice

- Show this material safety data sheet to the doctor in attendance.
- First responder needs to protect himself.
- Place affected apparel in a sealed bag for subsequent decontamination.

In case of inhalation

- Move to fresh air in case of accidental inhalation of vapors.
- Keep at rest.
- Consult a physician if necessary.

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SAFETY DATA SHEET

**DERMALCARE MAP L-213/K**

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In case of skin contact

- Take off contaminated clothing and shoes immediately.
- Wash off with plenty of water.
- Wash off immediately with plenty of water for at least 15 minutes.
- Call a physician if irritation develops or persists.

In case of eye contact

- Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
- Get immediate medical advice/ attention.

In case of ingestion

- Rinse mouth with water.
- Do not induce vomiting without medical advice.
- Keep at rest.
- Consult a physician if necessary.

**4.2 Most important symptoms and effects, both acute and delayed**

**Effects**
- Skin contact may aggravate existing skin disease
- Inhalation of product may aggravate existing chronic respiratory problems such as asthma, emphysema or bronchitis

**4.3 Indication of any immediate medical attention and special treatment needed**

Notes to physician

- All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.
- Treat symptomatically.
- There is no specific antidote available.

**SECTION 5: Firefighting measures**

| | |
|---|---|
| Flash point | > 200 °F (> 93 °C)<br>closed cup<br><br>Flammability class: Will burn |
| Autoignition temperature | No data available |
| Flammability / Explosive limit | No data available |

**5.1 Extinguishing media**

Suitable extinguishing media

- Water spray
- Foam
- Carbon dioxide (CO2)
- Multipurpose powders

Unsuitable extinguishing media

- Do not use a solid water stream as it may scatter and spread fire.

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**5.2 Special hazards arising from the substance or mixture**

**Specific hazards during fire fighting**

- Aqueous liquid. Does not present any particular risk in the event of a fire.
- Nevertheless, following the evaporation of water, the residue may burn:
- with the release of toxic gas.
- Hazardous decomposition products formed under fire conditions.

**Hazardous combustion products:**

- Carbon monoxide, carbon dioxide and unburned hydrocarbons (smoke).
- Oxides of phosphorus
- Oxides of potassium

**5.3 Advice for firefighters**

**Special protective equipment for fire-fighters**

- Firefighters should wear NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing.

- Wear full protective clothing and self-contained breathing apparatus.
- Personal protective equipment comprising: suitable protective gloves, safety goggles and protective clothing

**Specific fire fighting methods**

- Do not use a solid water stream as it may scatter and spread fire.
- Use appropriate means for fighting adjacent fires.

**Further information**

- Collect contaminated fire extinguishing water separately. This must not be discharged into drains.
- Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

**SECTION 6: Accidental release measures**

**6.1 Personal precautions, protective equipment and emergency procedures**

- Avoid inhalation, ingestion and contact with skin and eyes.
- Wear chemical resistant personal protective equipment
- Wear suitable gloves.
- Wear suitable protective clothing.

- Tightly fitting safety goggles

- In the case of dust or aerosol formation use respirator with an approved filter.

- Stop leak if safe to do so.

- For further information refer to section 8 "Exposure controls / personal protection."

-

**6.2 Environmental precautions**

- Contain the spilled material by diking.
- The product should not be allowed to enter drains, water courses or the soil.
- Spills may be reportable to the National Response Center (800-424-8802) and to state and/or local agencies

**6.3 Methods and materials for containment and cleaning up**

***Methods for containment***





- Stop leak if safe to do so.
- Dam up with sand or inert earth (do not use combustible materials).

***Recovery***
- Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust).
- Carefully recover the remainder by sweeping or vacuuming it up.
- Keep in properly labeled containers.
- Never return spills in original containers for re-use.

***Decontamination / cleaning***
- Wash nonrecoverable remainder with large amounts of water.
- Recover the cleaning water for subsequent disposal.
- Decontaminate tools, equipment and personal protective equipment in a segregated area.

***Disposal***
- Dispose of in accordance with local regulations.

**Additional advice**

- No conditions to be specially mentioned.

**6.4 Reference to other sections**

- 7. HANDLING AND STORAGE
- 8. EXPOSURE CONTROLS/PERSONAL PROTECTION
- 13. DISPOSAL CONSIDERATIONS

**SECTION 7: Handling and storage**

**7.1 Precautions for safe handling**

- Handle in accordance with good industrial hygiene and safety practice.

- Avoid inhalation, ingestion and contact with skin and eyes.

- Wear personal protective equipment.
- Wear suitable protective clothing.

**Hygiene measures**

- Personal hygiene is an important work practice exposure control measure and the following general measures should be taken when working with or handling this materials:
- 1) Do not store, use, and/or consume foods, beverages, tobacco products, or cosmetics in areas where this material is stored.
- 2) Wash hands and face carefully before eating, drinking, using tobacco, applying cosmetics, or using the toilet.
- 3) Wash exposed skin promptly to remove accidental splashes or contact with material.

- Handle in accordance with good industrial hygiene and safety practice.
- Use clean, well maintained personal protection equipment.
- Regular cleaning of equipment, work area and clothing.
- When using do not eat or drink.
- Smoking, eating and drinking should be prohibited in the application area.
- Wash hands and face before breaks and immediately after handling the product.
- Contaminated work clothing should not be allowed out of the workplace.
- The user is responsible for monitoring the working environment in accordance with local laws and regulations.

**7.2 Conditions for safe storage, including any incompatibilities**





**Technical measures/Storage conditions**

- Take all necessary measures to avoid accidental discharge of products into drains and waterways due to the rupture of containers or transfer systems.

- Keep containers tightly closed in a dry, cool and well-ventilated place.
- Keep away from open flames, hot surfaces and sources of ignition.
- Keep away from incompatible materials to be indicated by the manufacturer
- Do not freeze.

- Keep away from: Strong oxidizing agents

**Packaging material**

**Suitable material**
- Plastic materials.
- Stainless steel
- Coated metals.

**Unsuitable material**
- Unlined steel

**Requirements for storage rooms and vessels**

**Recommended storage temperature:** 59 - 104 °F (15 - 40 °C)

**7.3 Specific end use(s)**

- no data available

**SECTION 8: Exposure controls/personal protection**

Introductory Remarks: These recommendations provide general guidance for handling this product. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. Assistance with selection, use and maintenance of worker protection equipment is generally available from equipment manufacturers.

**8.1 Control parameters**

- Contains no substances with occupational exposure limit values above their regulatory reporting threshold.





**8.2 Exposure controls**

**Control measures**

**Engineering measures**
- Where engineering controls are indicated by use conditions or a potential for excessive exposure exists, the following traditional exposure control techniques may be used to effectively minimize employee exposures :

- Effective exhaust ventilation system
- Ensure adequate ventilation.

- Extract at emission point.
- Ensure that extracted air cannot be returned to the workplace through the ventilation system.

- Avoid splashes.
- Avoid formation of aerosol.

**Individual protection measures**

**Respiratory protection**
- When respirators are required, select NIOSH/MSHA approved equipment based on actual or potential airborne concentrations and in accordance with the appropriate regulatory standards and/or industrial recommendations.
- This should be achieved by a good general extraction and -if practically feasible- by the use of a local exhaust ventilation.
- Use a respirator with an approved filter if a risk assessment indicates this is necessary.

**Hand protection**
- Where there is a risk of contact with hands, use appropriate gloves
- Gloves must be inspected prior to use.
- Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time.
- Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

***Suitable material***
- Impervious gloves

**Eye protection**
- Eye and face protection requirements will vary dependent upon work environment conditions and material handling practices. Appropriate ANSI Z87 approved equipment should be selected for the particular use intended for this material.
- Eye contact should be prevented through the use of:

- Tightly fitting safety goggles
- If splashes are likely to occur, wear:
- Face-shield

**Skin and body protection**
- Protective suit

- Choose body protection according to the amount and concentration of the dangerous substance at the work place.

**Hygiene measures**
- Personal hygiene is an important work practice exposure control measure and the following general measures should be taken when working with or handling this materials:
- 1) Do not store, use, and/or consume foods, beverages, tobacco products, or cosmetics in areas where this material is stored.
- 2) Wash hands and face carefully before eating, drinking, using tobacco, applying cosmetics, or using the toilet.
- 3) Wash exposed skin promptly to remove accidental splashes or contact with material.

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- Handle in accordance with good industrial hygiene and safety practice.
- Use clean, well maintained personal protection equipment.
- Regular cleaning of equipment, work area and clothing.
- When using do not eat or drink.
- Smoking, eating and drinking should be prohibited in the application area.
- Wash hands and face before breaks and immediately after handling the product.
- Contaminated work clothing should not be allowed out of the workplace.
- The user is responsible for monitoring the working environment in accordance with local laws and regulations.

**Protective measures**

- Emergency equipment immediately accessible, with instructions for use.
- Ensure that eyewash stations and safety showers are close to the workstation location.
- Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the potential hazards, and/or risks that may occur during use.
- The protective equipment must be selected in accordance with current local standards and in cooperation with the supplier of the protective equipment.

**SECTION 9: Physical and chemical properties**

Physical and Chemical properties here represent typical properties of this product. Contact the business area using the Product information phone number in Section 1 for its exact specifications.

**9.1 Information on basic physical and chemical properties**

| | |
|---|---|
| Appearance | Physical state: liquid (77 °F (25 °C))<br>Color: clear |
| Odor | slight |
| Odor Threshold | No data available |
| pH | 7.0 - 8.0 ( 77 °F (25 °C))<br>pure product |
| Melting point/freezing point | Freezing point: < 32 °F (0 °C) |
| Initial boiling point and boiling range | > Boiling point/boiling range: 212 °F (100 °C) ( 759.81 mmHg (1,013 hPa)) |
| Flash point | > 200 °F (> 93 °C) closed cup<br>Flammability class: Will burn |
| Evaporation rate (Butylacetate = 1) | No data available |
| Flammability (solid, gas) | No data available |
| Flammability (liquids) | No data available |
| Flammability / Explosive limit | No data available |
| Autoignition temperature | No data available |
| Vapor pressure | < 23.25 mmHg (31 hPa) ( 77 °F (25 °C)) |

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| | |
|---|---|
| Vapor density | No data available |
| Density | 1.088 g/cm3 ( 77 °F (25 °C)) |
| Relative density | No data available |
| Solubility | Water solubility:<br>soluble |
| Partition coefficient: n-octanol/water | No data available |
| Decomposition temperature | No data available |
| Viscosity | No data available |
| Explosive properties | No data available |
| Oxidizing properties | Not considered as oxidizing., Structure-activity relationship (SAR) |

**9.2 Other information**

No data available

**SECTION 10: Stability and reactivity**

**10.1 Reactivity**

- Stable at normal ambient temperature and pressure.

**10.2 Chemical stability**

- Stable under recommended storage conditions.

**10.3 Possibility of hazardous reactions**

**polymerization**
- Hazardous polymerization does not occur.
- No dangerous reaction known under conditions of normal use.

**10.4 Conditions to avoid**

- Keep away from open flames, hot surfaces and sources of ignition.
- Avoid excessive heat for prolonged periods of time.

**10.5 Incompatible materials**

- Strong oxidizing agents

**10.6 Hazardous decomposition products**

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**Hazardous decomposition products**

- On combustion or on thermal decomposition (following the evaporation of water) releases:
- Carbon monoxide, carbon dioxide and unburned hydrocarbons (smoke).
- Oxides of phosphorus
- Oxides of potassium

**SECTION 11: Toxicological information**

**11.1 Information on toxicological effects**

| | |
|---|---|
| Acute toxicity | |
| Acute oral toxicity | No data available |
| Acute inhalation toxicity | No data available |
| Acute dermal toxicity | No data available |
| Acute toxicity (other routes of administration) | No data available |
| Skin corrosion/irritation | |
| Alkyl Ether Phosphate Ester, Potassium Salt | By analogy<br>Irritating to skin.<br>CESIO<br>Unpublished reports |
| Serious eye damage/eye irritation | |
| Alkyl Ether Phosphate Ester, Potassium Salt | By analogy<br>Risk of serious damage to eyes.<br>CESIO<br>Unpublished reports |
| Respiratory or skin sensitization | No data available |
| Mutagenicity | |
| Genotoxicity in vitro | No data available |
| Genotoxicity in vivo | No data available |
| Carcinogenicity | No data available |

This product does not contain any ingredient designated as probable or suspected human carcinogens by:
NTP
IARC
OSHA

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| | |
|---|---|
| Toxicity for reproduction and development | |
| Toxicity to reproduction / fertility | No data available |
| Developmental Toxicity/Teratogenicity | No data available |
| STOT | |
| STOT-single exposure | No data available |
| STOT-repeated exposure | No data available |
| Experience with human exposure | No data available |
| Aspiration toxicity | No data available |

**SECTION 12: Ecological information**

**12.1 Toxicity**

| | |
|---|---|
| Aquatic Compartment | |
| Acute toxicity to fish | The product itself has not been tested. |
| Acute toxicity to daphnia and other aquatic invertebrates | The product itself has not been tested. |
| Toxicity to aquatic plants | The product itself has not been tested. |
| Toxicity to microorganisms | The product itself has not been tested. |
| Chronic toxicity to fish | The product itself has not been tested. |
| Chronic toxicity to daphnia and other aquatic invertebrates | The product itself has not been tested. |

**12.2 Persistence and degradability**

| | |
|---|---|
| Abiotic degradation | No data available |
| Physical- and photo-chemical elimination | No data available |
| Biodegradation | No data available |

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| | |
|---|---|
| **Degradability assessment** | Conclusion is not possible due to incomplete or heterogeneous data on the components |

**12.3 Bioaccumulative potential**

| | |
|---|---|
| **Partition coefficient: n-octanol/water** | No data available |
| **Bioconcentration factor (BCF)** | No data available |

**12.4 Mobility in soil**

| | |
|---|---|
| **Adsorption potential (Koc)** | No data available |
| **Known distribution to environmental compartments** | No data available |
| **12.5 Results of PBT and vPvB assessment** | No data available |

**12.6 Other adverse effects**

**Ecotoxicity assessment**

| | |
|---|---|
| **Short-term (acute) aquatic hazard** | According to the available data on the components<br>Harmful to aquatic life.<br>According to the classification criteria for mixtures. |
| **Long-term (chronic) aquatic hazard** | According to the available data on the components<br>This product has no known ecotoxicological effects.<br>According to the classification criteria for mixtures. |

**SECTION 13: Disposal considerations**

**13.1 Waste treatment methods**

**Product Disposal**

***Prohibition***

- Do not discharge directly into the environment.
- Chemical additions, processing or otherwise altering this material may make the waste management information presented in this SDS incomplete, inaccurate or otherwise inappropriate. Please be advised that state and local requirements for waste disposal may be more restrictive or otherwise different from federal laws and regulations. Consult state and local regulations regarding the proper disposal of this material.
- Dispose of in accordance with local regulations.

**Waste Code**

- Environmental Protection Agency
- Hazardous Waste – NO

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**Advice on cleaning and disposal of packaging**

- Empty the packaging completely prior to disposal.
- Dispose of contents/ container to an approved waste disposal plant.
- Dispose of in accordance with local regulations.
- Where possible recycling is preferred to disposal or incineration.
- Rinse with an appropriate solvent.
- The recycled material must be completely dry and free of pollutants.

**SECTION 14: Transport information**

**DOT**
not regulated

**TDG**
not regulated

**NOM**
not regulated

**IMDG**
not regulated

**IATA**
not regulated

Note: The above regulatory prescriptions are those valid on the date of publication of this sheet. Given the possible evolution of transportation regulations for hazardous materials, it would be advisable to check their validity with your sales office.

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**SECTION 15: Regulatory information**

**15.1 Notification status**

| Inventory Information | Status |
|---|---|
| United States TSCA Inventory | - Listed on Inventory |
| Canadian Domestic Substances List (DSL) | - One or more components not listed on inventory |
| Australia Inventory of Chemical Substances (AICS) | - Listed on Inventory |
| Japan. CSCL - Inventory of Existing and New Chemical Substances | - Listed on Inventory |
| Korea. Korean Existing Chemicals Inventory (KECI) | - Listed on Inventory |
| China. Inventory of Existing Chemical Substances in China (IECSC) | - Listed on Inventory |
| Philippines Inventory of Chemicals and Chemical Substances (PICCS) | - Listed on Inventory |
| Taiwan Chemical Substance Inventory (TCSI) | - Listed on Inventory |
| EU. European Registration, Evaluation, Authorisation and Restriction of Chemical (REACH) | - When purchased from a European Solvay legal entity, this product is compliant with the registration provisions of the REACH Regulation (EC) No. 1907/2006 as all its components are either excluded, exempt, and/or registered. When purchased from a legal entity outside of Europe, please contact your local representative for additional information. |
| New Zealand. Inventory of Chemical Substances | - One or more components not listed on inventory<br>- Product approval status / restrictions not determined. |

**Additional Information**

- This product is regulated under the United States Food and Drug Act (FDA).

**15.2 Federal Regulations**

**US. EPA EPCRA SARA Title III**

**SARA Hazard Designation Sections 311/312 (40 CFR 370)**

| | |
|---|---|
| Skin corrosion or irritation | Yes |
| Serious eye damage or eye irritation | Yes |

**The categories not mentioned are not relevant for the product.**

**Section 313 Toxic Chemicals (40 CFR 372.65)**
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

**Section 302 Emergency Planning Extremely Hazardous Substance Threshold Planning Quantity (40 CFR 355)**
This material does not contain any components with a section 302 EHS TPQ.
**Section 302 Emergency Planning Extremely Hazardous Substance Reportable Quantity (40 CFR 355)**

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| Components | CAS-No. | Reportable quantity |
|---|---|---|
| Ethylene Oxide | 75-21-8 | 10 lb |

**Section 304 Emergency Release Notification Reportable Quantity (40 CFR 355)**

| Components | CAS-No. | Reportable quantity |
|---|---|---|
| Ethylene Oxide | 75-21-8 | 10 lb |

**US. EPA CERCLA Hazardous Substances and Reportable Quantities (40 CFR 302.4)**

| Components | CAS-No. | Reportable quantity |
|---|---|---|
| 1,4-Dioxane | 123-91-1 | 100 lb |
| Ethylene Oxide | 75-21-8 | 10 lb |

**15.3 State Regulations**

**US. California Safe Drinking Water & Toxic Enforcement Act (Proposition 65)**

WARNING! This product contains a chemical known in the State of California to cause cancer.

| Components | CAS-No. |
|---|---|
| 1,4-Dioxane | 123-91-1 |
| Ethylene Oxide | 75-21-8 |

WARNING! This product contains a chemical known in the State of California to cause cancer.

| Components | CAS-No. | Concentration |
|---|---|---|
| 1,4-Dioxane | 123-91-1 | < 0.002 % |
| Ethylene Oxide | 75-21-8 | < 0.0001 % |

WARNING: This product contains a chemical known in the State of California to cause birth defects or other reproductive harm.

| Components | CAS-No. |
|---|---|
| Ethylene Oxide | 75-21-8 |

WARNING: This product contains a chemical known in the State of California to cause birth defects or other reproductive harm.

| Components | CAS-No. | Concentration |
|---|---|---|
| Ethylene Oxide | 75-21-8 | < 0.002 % |

**SECTION 16: Other information**

**NFPA (National Fire Protection Association) - Classification**

| | |
|---|---|
| Health | 2 moderate |
| Flammability | 1 slight |
| Instability or Reactivity | 0 minimal |

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**HMIS (Hazardous Materials Identification System (Paint & Coating)) - Classification**

| | |
|---|---|
| Health | 2 moderate |
| Flammability | 1 slight |
| Reactivity | 0 minimal |
| PPE | Determined by User; dependent on local conditions |

**Further information**

- Product evaluated under the US GHS format.

**Date Prepared:** 08/08/2018

- ACGIH American Conference of Governmental Industrial Hygienists
- OSHA Occupational Safety and Health Administration
- NTP National Toxicology Program
- IARC International Agency for Research on Cancer
- NIOSH National Institute for Occupational Safety and Health

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information, and belief at the date of its publication. Such information is only given as a guidance to help the user handle, use, process, store, transport, dispose, and release the product in satisfactory safety conditions and is not to be considered as a warranty or quality specification. It should be used in conjunction with technical sheets but do not replace them. Thus, the information only relates to the designated specific product and may not be applicable if such product is used in combination with other materials or in any other manufacturing process, unless otherwise specifically indicated. It does not release the user from ensuring he is in conformity with all regulations linked to its activity.

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DIPOTASSIUM GLYCYRRHIZINATE MARUZEN PHARMACEUTICALS Co., Ltd. Revised: 2017/07/24

SAFETY DATA SHEET

1.Product and Company Identification

| | | | | |
|---|---|---|---|---|
| ProductName | DIPOTASSIUM GLYCYRRHIZINATE | | | |
| First issue | 2016/07/29 | | | |
| Revised | 2017/07/24 | | | |
| Company | Name: | MARUZEN PHARMACEUTICALS Co., Ltd. | | |
| | Address: | 14703-10 Mukaihigashi Cho Onomichi City Hiroshima 722-0062 Japan | | |
| | Name of Section: | QUALITY ASSURANCE DIVISION | | |
| | TEL: | 81-848-44-2217 | FAX: | 81-848-20-6114 |

2.Hazards Identification

[GHS CLASSIFICATION]

PHYSICO-CHEMICAL HAZARDS

| | |
|---|---|
| Explosives | : Not applicable |
| Flammable aerosols | : Not applicable |
| Self-reactive substances and mixtures | : Not applicable |
| Self-heating substances and mixtures | : Not applicable |
| Substances and mixtures which, in contact with water, emit flammable gases | : Not applicable |
| Organic peroxides | : Not applicable |
| Corrosive to metals | : Not applicable |

HEALTH HAZARDS

| | |
|---|---|
| Acute toxicity(oral) | : Not classified |
| Acute toxicity(dermal) | : No data available |
| Acute toxicity(gases) | : Not applicable |
| Acute toxicity(vapours) | : No data available |
| Acute toxicity(dusts and mists) | : No data available |
| Skin corrosion/irritation | : No data available |
| Serious eye damage/eye irritation | : No data available |
| Respiratory sensitization | : No data available |
| Skin sensitization | : No data available |
| Germ cell mutagenicity | : No data available |
| Carcinogenicity | : No data available |
| Reproductive toxicity | : No data available |
| Specific target organ systemic toxicity(single exposure) | : No data available |
| Specific target organ systemic toxicity(repeated exposure) | : No data available |
| Aspiration hazard | : No data available |

ENVIRONMENTAL HAZARDS

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| | |
|---|---|
| Hazard to the aquatic environment (acute) | : No data available |
| Hazard to the aquatic environment (chronic) | : No data available |

[GHS LABEL ELEMENTS]

| | |
|---|---|
| Pictogram | : No data available |
| Signal word | : No data available |
| Hazard statement | : No data available |
| Precautionary statement | : No data available |

3.Composition/Information on Ingredients

Substance or preparation : Substance

| CAS No. | INCI Name |
|---|---|
| 1007893-70-0、68797-35-3 | DIPOTASSIUM GLYCYRRHIZATE |

| EINECS No. | INCI Name(EU) |
|---|---|
| 272-296-1 | DIPOTASSIUM GLYCYRRHIZATE |

| Concentration(%) | Component name |
|---|---|
| 100.00 | Dipotassium glycyrrhizinate |

4.First Aid Measures

| | |
|---|---|
| Eye | : Flush eyes well with a large amount of running water immediately, consult a physician. |
| Skin | : Rinse skin with running water. |
| Ingestion | : Consult a physician. |
| | : Rinse mouth well, give plenty of drinking water (adult:4 to 5 cups) to dilute the substance. Never give anything by mouth to an unconscious person. |
| Inhalation | : Immediately move victim to fresh air. |
| | : If breathing is difficult, qualified personnel should give oxygen or mouth to mouth resuscitation. |
| | : If irritation persists, consult a physician. |

5.Fire Fighting measures

| | |
|---|---|
| Extinguishing Media | : Water, dry chemical powder, carbon dioxide, dry sand |
| Extinguishing media that do not use it | : No comment in particular. |
| Specific extinguishing method | : Eliminate all ignition sources, use appropriate media for extinction if safe to do so. |
| Specific protective equipment for firefighters | : In the case of fire-extinguishing work, if required, an air inhalator and the protection clothes for chemistry will be worn. |

6.Accidental Release Measure

| | |
|---|---|
| Personal precautions | : Indoor spillage area should be well aired after treatment. |
| | : The spillage area should be roped off and sign posted to prevent entry. |
| Enviromental precautions | : Prevent spills from entering rivers and/or watercourses to protect the environment. |

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DIPOTASSIUM GLYCYRRHIZINATE MARUZEN PHARMACEUTICALS Co., Ltd. Revised: 2017/07/24

| | |
|---|---|
| Methods for clean up | : Removes as much powder as possible, and wash the area with water. |

7.Handling and Storage

| | |
|---|---|
| Handling | : Beware of escaping dust and water absorbance. |
| Technological measures | : Workers should refer to 'section 8 -exposure prevention and protection measures' And take appropriate measures such as wearing protective clothing. |
| Precaution for safe handling | : Avoid contact with eyes, skin and clothing. |
| | : Wearing protective clothing is suggested. |
| | : Do not subject to rough handling such as falling/dropping/damage to avoid spilling of content at transportation. |
| Conditions for safe storage | : Due to the material's hygroscopicity, avoiding leaving it outside. |
| | : Store in an airtight container in the dark at room temperature . |

8.Exposure Control/Personal Protection

| | |
|---|---|
| Engineering control | : Use exhaust ventilation to keep airborne concentrations below exposure limits. |
| Personal protection | |
| Respiratory protection | : Protective mask from dust |
| Hand protection | : Protective gloves |
| Eye protection | : Safety glasses(goggles) |
| Skin protection | : Protective clothing and boots |
| Appropriate sanitary requirement | : If on skin ; Wash with plenty of soap and water. |

9.Physical and Chemical Properties

| | |
|---|---|
| Physical State | : Powder |
| Color | : White to light yellow |
| Odor | : Odorless |
| pH | : 5.0～6.0 |

10.Stability and Reactivity

| | |
|---|---|
| Stability | : No data |
| Conditions to avoid | : Sunlight, heat, high temperatures and moisuture |
| Hazardous reactions/decomposition products | : No data |

11.Toxicological Information

【Information on Product】

| | |
|---|---|
| Skin sensitization test | : Negative Concentration of test solution ; 1st induction:1.25%,2nd induction:10%,challenge:10%,1%(guinea pig) 2002/6/25 |
| Reverse mutation test | : Negative Concentration of test solution ; 5000 μg/0.1mL/plate(TA98,TA100,TA1535,TA1537) 2002/1/23 |

12.Ecological Information

| | |
|---|---|
| Ecotoxicity and toxicity to fish | : No information available |

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Ecotoxicity and invertebrate toxicity : No information available
Ecotoxicity and algal toxicity : No information available
Persistence and biodegradability : No information available
Bioaccumulative potential : No information available
Mobility in soil : No information available

13.Disposal Considerations

Any disposal practice must be in compliance with country, local, state, and federal laws and regulations.

(contact country, local or state environmental agency for specific rules)

14.Transport Information

Please refer to national measures that may be relevant.

15.Regulatory Information

Please refer to national measures that may be relevant.

16.Other Information

The above information is based on the best of our knowledge and available information at this point but does not purport to be all inclusive and shall be used only as a guide.

This product is intended to be used by expert persons having chemical knowledge and skill, at their own discretion and risk and Maruzen shall not be held liable for any damageresulting from handling or from contact with the above material.

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Clewat N, Nagase ChemteX Corporation, P112126465-4, 2016/09/14, 1/6

Safety Data Sheet (SDS)

Preparation Date 2014/04/01
Revision Date 2016/09/14

Section 1 – CHEMICALS AND COMPANY IDENTIFICATION

Chemical Identifier: Clewat N
Product Code: P11212-AA6973
Reference Number: P112126465-4
Company Name: Nagase ChemteX Corporation
Address: 236, Tatsunocho-nakai, Tatsuno, Hyogo, Japan
Company Contact: Nagase ChemteX Corporation
Phone Number: +81-3-3660-5901
Fax Number: +81-3-3665-3451
Emergency Phone Number: +81-791-62-0862

Section 2 – HAZARDS IDENTIFICATION

GHS Classification

Health Hazards: Skin corrosion/irritation Category 2
Serious eye damage/eye irritation Category 2A
Sensitization – skin Category 1
Specific target organ toxicity (single exposure) Category 3(respiratory tract irritation)

Environmental Hazards: Hazardous to the aquatic environment (acute) Category 3
Other hazards than mentioned above are Not applicable or No data available.

GHS Label Elements

Symbols

Signal Word: Warning

Hazard Statements: H315 Causes skin irritation
H317 May cause an allergic skin reaction
H319 Causes serious eye irritation
H335 May cause respiratory irritation
H402 Harmful to aquatic life

Precautionary Statements

Prevention Precautionary Statements: Avoid breathing mist, vapours, spray, dust and fume.(P261)
Wash hand thoroughly after handling.(P264)
Use only outdoors or in a well-ventilated area.(P271)
Contaminated work clothing should not be allowed out of the workplace.(P272)
Avoid release to the environment.(P273)
Wear protective gloves, protective clothing and eye protection.(P280)

Response Precautionary Statements: IF ON SKIN: Rinse skin with water or shower.(P302+P353)

Clewat N, Nagase ChemteX Corporation, P112126465-4, 2016/09/14, 2/6

IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.(P304+P340)
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.(P305+P351+P338)
IF exposed or if you feel unwell: Call a doctor.(P309+P311)
If skin irritation or rash occurs: Get medical advice and attention.(P333+P313)
If eye irritation persists: Get medical advice and attention.(P337+P313)
Take off contaminated clothing and wash it before reuse.(P362+P364)

Storage Precautionary Statements: Store in a well-ventilated place keeping container tightly closed.(P403+P233)
Store locked up.(P405)

Disposal Precautionary Statements: Dispose of contents and container in accordance with local, regional and national regulations (to be specified).(P501)

Section 3 – COMPOSITION / INFORMATION ON INGREDIENTS

Distinction of Substance or Mixture: Substance

| Chemical Name or Generic Name | Concentration or Its Ranges | Formula | ENCS No./ISHL No. | | CAS RN |
|---|---|---|---|---|---|
| | | | ENCS No. | ISHL No. | |
| Ethylenediaminetetraacetic acid, disodium salt dihydrate | 100% | – | (2)-1265 | 2-(4)-116 | 139-33-3 |

Impurities and/or Stabilizing Additives which Contribute to the Classification: No information available

Section 4 – FIRST AID MEASURES

Inhalation: If breathing is difficult, move affected person to the open air. Keep him or her at rest to allow easier breathing.
Call a doctor if you feel unwell.

Skin Contact: Wash the skin with flowing water or shower.
Wash contaminated clothing before reuse.
Call a doctor if you feel unwell.
Take off or dispose of all polluted clothes.
If skin irritation or rash occurs: Get medical advice and attention.

Eye Contact: Rinse cautiously with water for several minutes.
Remove contact lenses, if present and easy to do.
Continue rinsing.
When the ocular stimulation lasts, Seek medical treatment and advice.

Ingestion: Rinse a mouth. Don't make vomit by force.
Get medical treatment and advice.

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Section 5 – FIRE FIGHTING MEASURES

Respond based on treatment for general chemical fire.

Extinguishing Media: Foam. Carbon dioxide. BCF (where regulations permit). Dry chemical powder. Dry sand.

Specific Fire Fighting: Move containers from fire area if you can do it without risk.
Cool containers with flooding quantities of water until well after fire is out.
Use extinguishing agent suitable for type of surrounding fire.

Protection of Fire Figther: In fire fighting, wear respiratory protection and chemical protective clothing.

Section 6 – ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures: Do not touch or walk through spilled material.
Isolate the site as a leak area by providing a zone that has an appropriate width to all directions.
Keep unauthorized personnel away.
Stay upwind.
Ventilate closed spaces before entering.
Wear appropriate personal protective equipment (Refer to "Section 8 – EXPOSURE CONTROLS / PERSONAL PROTECTION") and avoid inhalation or contact with eyes and skin.
Keep out of low areas.
Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Environmental Precautions: Do not release into the environment.
Pay attention not to cause the influence on the environment by discharging into rivers.

Methods and Equipment for Containment and Cleaning up: All equipment used when handling the product must be grounded.
After removal, flush contaminated area thoroughly with water.
Collect spillages in empty container using a vacuum,waste cloth, dry sand, etc. Flush a floor fully.
After rinsing away, neutralizing is desirable.

Prevention Measures for Secondary Accidents: Removes all ignition sources promptly. (Prohibition of smoking, sparks, and flames in the surrounding area).
Prevent flowing into drain, sewage, basement, and closed area.

Section 7 – HANDLING AND STORAGE

Since this product is a chelating agent, it reacts with metallic parts and there is a possibility to cause corrosion or damage of them. The use of container or other equipment made from SUS316 or suitable resin etc. is recommended.

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| | | |
|---|---|---|
| Handling | Technical Measures | Provide ventilation system and use necessary personal protective equipment as described in "Section 8 – EXPOSURE CONTROLS / PERSONAL PROTECTION". |
| | Precautions for Safe Handling | Prohibit use of heat, sparks, and fire in the surrounding area.<br>Wash hand thoroughly after handling.<br>Contaminated work clothing should not be allowed out of the workplace.<br>Avoid release to the environment.<br>Do not get in eyes, on skin or on clothing.<br>Do not breath mist, vapors, spray, dust or fume.<br>Do not swallow. |
| | Prevents Handling of Incompatible Substances or Mixtures | Refer to "Section 10 – STABILITY AND REACTIVITY". |
| | Specific Hygine Measures | Wash hand thoroughly after handling.<br>Contaminated work clothing should not be allowed out of the workplace. |
| Storage Precautionary Statements | Technical Measures | Refer to "Section 10 – STABILITY AND REACTIVITY".<br>Keep away from direct sunlight.<br>Keep in a well-ventilated place. Keep container tightly closed.<br>Keep in a cool place or at the designated storage temperature. Keep in a dark place. |
| | Material Used in Packaging/Container | Follow all regulations in your country.<br>Keep only in the original container. |

**Section 8 – EXPOSURE CONTROLS / PERSONAL PROTECTION**

| | | |
|---|---|---|
| Engineering Controls | | Facilities storing or utilizing this product should be equipped with an eyewash facility and safety shower.<br>Handle at the workplace in which the suitable ventilator was installed. |
| Personal Protective Equipment | Respiratory Protection | Wear an adequate protective apparatus for respiratory organs. |
| | Hand Protection | Wear protective gloves.<br>Use impervious glove. |
| | Eye Protection | Wear eye protection.<br>Goggles (ordinary glass type with side shields, and goggle type) |
| | Skin and Body Protection | Wear a protective equipment for the face.<br>Wear suitable protective clothing.<br>Use impervious protective clothing(e.g. apron, rubber boots etc.) if needed. |

**Section 9 – PHYSICAL AND CHEMICAL PROPERTIES**

| | | |
|---|---|---|
| Appearance | Form | solid (crystalline powder) |
| | Colour | white |
| Odour | | no data available |
| Odour threshold | | no data available |
| pH | | 4 |
| Melting Point/Freezing Point | | no data available |

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| | | |
|---|---|---|
| Initial Boiling Point and Boiling Ranges | | no data available |
| Flash Point | | Not ignited |
| Evaporation Rate | | no data available |
| Flammability (solid, gas) | | no data available |
| Flammability or Explosive Limits | Lower Limit | no data available |
| | Upper Limit | no data available |
| Vapour Pressure | | no data available |
| Vapour Density | | no data available |
| Specific Gravity (Density) | | 0.95 g/mL |
| Solubility | | Water solubility: 11g/100g (20°C) |
| Partition Coefficient : n-Octanol/Water | | no data available |
| Auto-Ignition Temperature | | no data available |
| Decomposition Temperature | | no data available |
| Viscosity | | no data available |

**Section 10 – STABILITY AND REACTIVITY**

| | |
|---|---|
| Chemical stability and Reactivity | This product is considered stable under usual condition. |
| Possibility of Hazardous Reaction | Hazardous polymerization will not occur. |
| Conditions to Avoid | Contact with oxidizers.<br>High-temperature material. Spark. Naked flame. |
| Incompatible Substances or Mixtures | Oxidizers. |
| Hazardous Decomposition Products | Nitrogen oxides. |

**Section 11 – TOXICOLOGICAL INFORMATION**

| | |
|---|---|
| Acute Toxicity | Oral LD50 rat 2000 mg/kg<br>Oral LD50 mouse 2050 mg/kg<br>Intraperitoneal LD50 mouse 280 mg/kg<br>Intravenous LD50 mouse 56mg/kg<br>Intravenous LD50 rabbit 47mg/kg |
| Skin Corrosion/Irritation | Skin irritation. |
| Serious eye damage/eye irritation | Strong eye irritation. |

**Section 12 – ECOLOGICAL INFORMATION**

| | |
|---|---|
| Ecotoxicity | Golden ides LC50(96 hour) >500mg/L |
| Persistence | Low-degradability |
| Hazardous to the ozone layer | No information available |
| Environmental and Other Adverse Effects | COD(Mn) : 636000 mg/L, BOD(5) : 25000 mg/L |

**Section 13 – DISPOSAL CONSIDERATIONS**

| | |
|---|---|
| Residual Waste | Incinerate in small portions with an incinerator or entrust to an industrial waste disposal company approved by the local authority.<br>Discharge, treatment, or disposal may be subjected to national, state, or local laws. |
| Contaminated Container and Packaging | If possible, clean up and recycle. Or perform suitable processing in accordance with regulation. |

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Remove residual contents completely before an empty container is discarded.

**Section 14 – TRANSPORT INFORMATION**

| | | |
|---|---|---|
| International Regulations | Regulatory Information by Sea | Not applicable |
| | Transport in bulk according to MARPOL 73/78,Annex Ⅱ,and the IBC code | Not applicable |
| | Regulatory Information by Air | Not applicable |
| Specific Safety Measures | | Check the container for any leaks and breakages. Load up carefully to prevent a fall, a overturning and a breakage. Carry out prevention to unpiling of cargo.<br>Do not wet container. Do not handle roughly. |

**Section 15 – REGULATORY INFORMATION**

Follow all regulations in your country.

**Section 16 – OTHER INFORMATION**

| | |
|---|---|
| Information Contact | See "Section 1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION". |
| Literature References | ・GHS LOGIST (MSDS Authoring Systems) / Japan Chemical Database Ltd.<br>・Chemical Risk Information Platform (CHRIP) / National Institute of Technology and Evaluation (NITE)<br>・Online MSDS Information / Ministry of Health, Labour and Welfare (JAPAN)<br>・ezADVANCE / Japan Chemical Database Ltd.<br>・ChemWatch online ChemGold<br>・MSDS information of raw materials |
| Other Property | The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication.<br>The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release. And is not to be considered a warranty or quality specification. |

Material Safety Data Sheet

DSM

**DL-alpha-Tocopheryl Acetate** **0420085**

Version 1.1 Revision Date 08.12.2017 Date of last issue: 03.10.2014

**1. PRODUCT AND COMPANY IDENTIFICATION**

| | |
|---|---|
| Product name | : DL-alpha-Tocopheryl Acetate |
| Substance name | : 3,4-Dihydro-2,5,7,8-tetramethyl-2-(4,8,12-trimethyltridecyl)-2H-1-benzopyran-6-ol acetate |
| CAS-No. | : 7695-91-2 |

**Manufacturer or supplier's details**

| | |
|---|---|
| Company | : DSM Nutritional Products Asia Pacific |
| Address | : Pasir Panjang Road, #13-31, Mapletree Business City 30 Singapore 117440 |
| Telephone | : +6566326500 |
| Telefax | : +6566326600 |
| E-mail address | : sds.nutritionalproducts@dsm.com |

**Recommended use of the chemical and restrictions on use**

| | |
|---|---|
| Recommended use | : For the fortification of foods<br>Ingredient for capsules and/or tablets<br>Ingredient for pharmaceutical products<br>Ingredient for personal care products |

**2. HAZARDS IDENTIFICATION**

**GHS Classification**

Not a hazardous substance or mixture.

**GHS-Labelling**

Not a hazardous substance or mixture.

**Other hazards which do not result in classification**

None known.

**3. COMPOSITION/INFORMATION ON INGREDIENTS**

| | |
|---|---|
| Brief description of the product | : Substance |

**Hazardous components**

No hazardous ingredients

**Further ingredients**

| Component | CAS-No. | Weight percent |
|---|---|---|
| 3,4-dihydro-2,5,7,8-tetramethyl-2-(4,8,12-trimethyltridecyl)-2H-benzopyran-6-yl acetate (dl-α-tocopheryl acetate) | 7695-91-2 | >= 96 - <= 100 % |

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Material Safety Data Sheet — DSM

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**4. FIRST AID MEASURES**

| | |
|---|---|
| General advice | : No hazards which require special first aid measures. |
| If inhaled | : Move to fresh air. If symptoms persist, call a physician. |
| In case of skin contact | : Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. |
| In case of eye contact | : Flush eyes with water as a precaution. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. |
| If swallowed | : Clean mouth with water and drink afterwards plenty of water. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. |
| Most important symptoms and effects, both acute and delayed | : No specific symptoms known. |
| Notes to physician | : Treat symptomatically. |

**5. FIREFIGHTING MEASURES**

| | |
|---|---|
| Suitable extinguishing media | : Alcohol-resistant foam<br>Dry chemical<br>Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. |
| Unsuitable extinguishing media | : High volume water jet |
| Specific hazards during firefighting | : None known. |
| Specific extinguishing methods | : Standard procedure for chemical fires. |
| Special protective equipment for firefighters | : In the event of fire, wear self-contained breathing apparatus. |

**6. ACCIDENTAL RELEASE MEASURES**

| | |
|---|---|
| Personal precautions, protective equipment and emergency procedures | : Use personal protective equipment. |
| Environmental precautions | : Try to prevent the material from entering drains or water courses. |
| Methods and materials for containment and cleaning up | : Wipe up with absorbent material (e.g. cloth, fleece). Keep in suitable, closed containers for disposal. |

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**7. HANDLING AND STORAGE**

| | |
|---|---|
| Advice on safe handling | : For personal protection see section 8. |
| Advice on protection against fire and explosion | : Take necessary action to avoid static electricity discharge. Product will burn under fire conditions. |
| Conditions for safe storage | : To maintain product quality, do not store in heat or direct sunlight.<br>Keep container tightly closed and dry. |
| Materials to avoid | : Bases, Strong acids, Oxidizing agents<br>Iron salts, Silver salts, Powdered metal salts |

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

**Components with workplace control parameters**

Contains no substances with occupational exposure limit values.

**Personal protective equipment**

| | |
|---|---|
| Respiratory protection | : Breathing apparatus needed only when aerosol or mist is formed.<br>No personal respiratory protective equipment normally required. |
| Hand protection | : Glove material: for example nitrile rubber |
| Eye protection | : Safety glasses |
| Skin and body protection | : Lightweight protective clothing |
| Hygiene measures | : General industrial hygiene practice. |

**9. PHYSICAL AND CHEMICAL PROPERTIES**

**Information on basic physical and chemical properties**

| | |
|---|---|
| Appearance | : viscous liquid |
| Colour | : colourless - yellow |
| Odour | : odourless |
| Odour Threshold | : No information available. |
| pH | : No data available |
| Melting point/range | : -27.5 °C |
| Boiling point/boiling range | : 267 °C (3.2 hPa) |

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| | |
|---|---|
| | 184 °C (0.01 hPa)<br>> 300 °C (1,013 hPa) with decomposition |
| Flash point | : 243 - 266 °C (DIN 51758) |
| Evaporation rate | : not determined |
| Lower explosion limit | : not determined |
| Upper explosion limit | : not determined |
| Vapour pressure | : < 0.001 hPa (20 °C)<br>ca. 1.4 hPa (240 °C) |
| Relative vapour density | : not determined |
| Density | : ca. 0.98 g/cm3 (20 °C) |
| Water solubility | : < 0.8 mg/l (20 °C; OECD Test Guideline 105) practically insoluble |
| Solubility in other solvents | : Acetone: easily soluble<br>Chloroform: easily soluble<br>Diethylether: easily soluble<br>Alcohol: soluble |
| Partition coefficient: n-octanol/water | : log Pow 12.2 (calculated (citation from literature)) |
| Auto-ignition temperature | : not pyrophoric |
| Ignition temperature | : 320 °C ( 985 - 1,004 hPa, DIN 51794) |
| Thermal decomposition | : Not relevant |
| Viscosity, dynamic | : ca. 6,589 mPa.s (20 °C) |
| Viscosity, kinematic | : 5076 mm2/s ( 20 °C) |
| Explosive properties | : Not explosive |
| Oxidizing properties | : No data available |

**Other information**

| | |
|---|---|
| Molecular weight | : 472.73 g/mol |

**10. STABILITY AND REACTIVITY**

| | |
|---|---|
| Reactivity | : No hazards to be specially mentioned. |
| Chemical stability | : Stable under recommended storage conditions. |
| Possibility of hazardous reactions | : Possible incompatibility with materials listed under section 10.5. |
| Conditions to avoid | : Heat |
| Incompatible materials | : Bases<br>Strong acids |

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| | |
|---|---|
| | Oxidizing agents<br>Iron salts<br>Silver salts<br>Powdered metal salts |
| Hazardous decomposition products | : No decomposition if used as directed. |

**11. TOXICOLOGICAL INFORMATION**

| | |
|---|---|
| Acute oral toxicity | : LD50 (Rat): > 10,000 mg/kg (OECD Test Guideline 401)<br>: LD50 (Mouse): > 4,000 mg/kg (OECD Test Guideline 401) |
| Acute dermal toxicity | : LD50 (Rat): > 3,000 mg/kg |
| Skin irritation | : No skin irritation (Rabbit, OECD Test Guideline 404)<br>: no phototoxic skin reaction (Guinea pig) |
| Eye irritation | : No eye irritation (Rabbit, OECD Test Guideline 405) |
| Sensitisation | : Does not cause skin sensitisation. (human)<br>: no photoallergenic skin reaction (Guinea pig) |
| Genotoxicity in vitro | : negative (Ames test, OECD Test Guideline 471)<br>: not genotoxic (In vitro cytogenicity study in mammalian cells, OECD Test Guideline 473) |
| Genotoxicity in vivo | : not genotoxic (In vivo micronucleus test, Mouse, OECD Test Guideline 474) |
| Carcinogenicity | : (Rat , OECD Test Guideline 453) Animal testing did not show any carcinogenic effects. |
| Reproductive toxicity | : No toxicity to reproduction (Rat, OECD Test Guideline 415) |
| Teratogenicity | : not teratogenic NOAEL: > 1,600 mg/kg bw/d (Rat, OECD Test Guideline 414)<br>: not teratogenic NOAEL: > 1,600 mg/kg bw/d (Rabbit, OECD Test Guideline 414) |

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| | |
|---|---|
| STOT - single exposure (Acute exposure) | : The substance or mixture is not classified as specific target organ toxicant, single exposure. |
| STOT - repeated exposure | : NOAEL (Oral, Rat) : 2000 mg/kg bw/d<br>Subacute toxicity study (28 days)<br>(OECD Test Guideline 407)<br>: NOAEL (Oral, Rat) : 500 mg/kg bw/d<br>Sub-chronic toxicity study (90-day)<br>(OECD Test Guideline 408) |
| Further information | : The product passes into and partly through the skin of pigs. |
| Aspiration toxicity | : No aspiration toxicity classification |

**12. ECOLOGICAL INFORMATION**

**Toxicity**

| | |
|---|---|
| Toxicity to fish | : Oncorhynchus mykiss (rainbow trout)<br>LC50 (96 h) > 100 mg/l<br>(nominal concentration)<br>(OECD Test Guideline 203) |
| Toxicity to daphnia and other aquatic invertebrates | : Daphnia magna (Water flea)<br>EC50 (48 h) > 100 mg/l<br>(nominal concentration)<br>(OECD Test Guideline 202) |
| Toxicity to algae | : Pseudokirchneriella subcapitata (microalgae)<br>EC50 (72 h) > 100 mg/l<br>(nominal concentration)<br>(OECD Test Guideline 201) |
| Toxicity to bacteria | : Pseudomonas putida<br>EC10 (0.5 h) > 10,000 mg/l<br>(nominal concentration)<br>: activated sludge<br>EC20 (0.5 h) > 927 mg/l |
| Toxicity to fish (Chronic toxicity) | : Oncorhynchus mykiss (rainbow trout)<br>NOEC (28 d) 100 mg/l<br>(nominal concentration)<br>(OECD Test Guideline 215) |

**Persistence and degradability**

| | |
|---|---|
| Biodegradability | : Not readily biodegradable.<br>17 % (28 d)<br>(OECD Test Guideline 301F) |

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**Bioaccumulative potential**

| | |
|---|---|
| Partition coefficient: n-octanol/water | : log Pow 12.2 (calculated (citation from literature)) |

**Mobility in soil**

| | |
|---|---|
| Distribution among environmental compartments | : Adsorption, Soil<br>log Koc 7.14 (calculated value) |

**Results of PBT and vPvB assessment**

| | |
|---|---|
| Assessment | : The substance does not fullfill the PBT criteria.<br>: The substance does not fullfill the vPvB criteria. |

**Other adverse effects**

| | |
|---|---|
| Additional ecological information | : There is no data available for this product. |

**13. DISPOSAL CONSIDERATIONS**

**Disposal methods**

| | |
|---|---|
| Waste from residues | : Offer surplus and non-recyclable solutions to a licensed disposal company. |
| Contaminated packaging | : Empty containers should be taken to an approved waste handling site for recycling or disposal. |

**14. TRANSPORT INFORMATION**

**International Regulations**

**UNRTDG**
Not regulated as a dangerous good

**IATA-DGR**
Not regulated as a dangerous good

**IMDG-Code**
Not regulated as a dangerous good

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**
Not applicable for product as supplied.

**Special precautions for user**

| | |
|---|---|
| Remarks | : Not classified as dangerous in the meaning of transport regulations. |

**15. REGULATORY INFORMATION**

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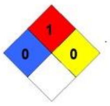
**Safety, health and environmental regulations/legislation specific for the substance or mixture**

| | |
|---|---|
| **NFPA Classification** | : Health hazard: 0<br>Fire Hazard: 1<br>Reactivity Hazard: 0 |




**16. OTHER INFORMATION**

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**Abbreviations**: 67/548/EEC= Dangerous Substances Directive. 1999/45/EC= Dangerous Preparations Directive. Regulation (EC) No. 1272/2008= Regulation on classification, labelling and packaging of substances and mixtures. DNEL= Derived No-Effect Level. PNEC= Predicted No-Effect Concentration. NFPA= National Fire Protection Association (USA). IATA= International Air Transport Association. IMDG= International Maritime Dangerous Goods. RID= International Rule for Transport of Dangerous Substances by Railway; ADR= European Agreement concerning the International Carriage of Dangerous Goods by Road. TWA= Time Weighted Average. STEL= Short term exposure limit. WEL = Workplace Exposure Limit.

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Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Commission Regulation (EU) 2015/830 - Europe

**Emery Oleochemicals (M) Sdn Bhd** — Emery Oleochemicals

**SAFETY DATA SHEET**

**EDENOR® C16-98 MY**

| | | |
|---|---|---|
| Date of printing | : | 02.04.2019 |
| Date of revision | : | 02.04.2019 |
| SDS No. | : | 3150800 |

**SECTION 1: Identification of the substance/mixture and of the company/ undertaking**

**1.1 Product identifier**

| | |
|---|---|
| **Product name** | : EDENOR® C16-98 MY |
| **Product code** | : 3150800 |
| **Product description** | : Palmitic acid |
| **Product type** | : Powder. |
| **Usage** | : Oleochemical raw material |

**1.2 Relevant identified uses of the substance or mixture and uses advised against**
Not available.

**1.3 Details of the supplier of the safety data sheet**
Emery Oleochemicals (M) Sdn Bhd
Lot 4, Jalan Perak, Kawasan Perusahaan,
42500 Telok Panglima Garang,
Selangor, Malaysia
Phone: ++6(03)-33268686

**1.4 Emergency telephone number**
**Supplier**

| | |
|---|---|
| **Telephone number** | : +6(03)-33268686 |

**SECTION 2: Hazards identification**

**2.1 Classification of the substance or mixture**

| | |
|---|---|
| **Product definition** | : Mono-constituent substance |

**Classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]**
Not classified.

The product is not classified as hazardous according to Regulation (EC) 1272/2008 as amended.
See Section 16 for the full text of the H statements declared above.
See Section 11 for more detailed information on health effects and symptoms.

**2.2 Label elements**

| | |
|---|---|
| **Signal word** | : No signal word. |
| **Hazard statements** | : No known significant effects or critical hazards. |
| **Precautionary statements** | |
| **Prevention** | : Not applicable. |
| **Response** | : Not applicable. |
| **Storage** | : Not applicable. |
| **Disposal** | : Not applicable. |
| **Supplemental label elements** | : Not applicable. |

**2.3 Other hazards**

*Date of issue/Date of revision* : 4/2/2019 *Date of previous issue* : 12/12/2018 *Version* : 1.06 1/10

Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Commission Regulation (EU) 2015/830 - Europe

*EDENOR® C16-98 MY*

## SECTION 2: Hazards identification

**Substance meets the criteria for PBT according to Regulation (EC) No. 1907/2006, Annex XIII** : Not available.

**Substance meets the criteria for vPvB according to Regulation (EC) No. 1907/2006, Annex XIII** : Not available.

**Other hazards which do not result in classification** : Fine dust clouds may form explosive mixtures with air.

## SECTION 3: Composition/information on ingredients

**3.1 Substances** : Mono-constituent substance

There are no ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment, are PBTs, vPvBs or Substances of equivalent concern, or have been assigned a workplace exposure limit and hence require reporting in this section.

## SECTION 4: First aid measures

**4.1 Description of first aid measures**

**Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.

**Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.

**Skin contact** : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.

**Ingestion** : Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

**Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training.

**4.2 Most important symptoms and effects, both acute and delayed**

Potential acute health effects

**Eye contact** : Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes.

**Inhalation** : Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs.

**Skin contact** : No known significant effects or critical hazards.

**Ingestion** : No known significant effects or critical hazards.

Over-exposure signs/symptoms

**Eye contact** : Adverse symptoms may include the following:
irritation
redness

**Inhalation** : Adverse symptoms may include the following:
respiratory tract irritation
coughing

**Skin contact** : No specific data.

**Ingestion** : No specific data.

**4.3 Indication of any immediate medical attention and special treatment needed**

**Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

**Specific treatments** : No specific treatment.

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Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Commission Regulation (EU) 2015/830 - Europe

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## SECTION 5: Firefighting measures

**5.1 Extinguishing media**

**Suitable extinguishing media** : Use dry chemical powder.

**Unsuitable extinguishing media** : Avoid high pressure media which could cause the formation of a potentially explosible dust-air mixture.

**5.2 Special hazards arising from the substance or mixture**

**Hazards from the substance or mixture** : May form explosible dust-air mixture if dispersed.

**Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

**5.3 Advice for firefighters**

**Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

**Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

## SECTION 6: Accidental release measures

**6.1 Personal precautions, protective equipment and emergency procedures**

**For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing dust. Put on appropriate personal protective equipment.

**For emergency responders** : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

**6.2 Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

**6.3 Methods and materials for containment and cleaning up**

**Small spill** : Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

**Large spill** : Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Avoid creating dusty conditions and prevent wind dispersal. Dispose of via a licensed waste disposal contractor.

**6.4 Reference to other sections** : See Section 1 for emergency contact information.
See Section 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

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## SECTION 7: Handling and storage

**7.1 Precautions for safe handling**

**Protective measures** : Put on appropriate personal protective equipment (see Section 8). Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Prevent dust accumulation. Electrical equipment and lighting should be protected to appropriate standards to prevent dust coming into contact with hot surfaces, sparks or other ignition sources. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material.

**Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

**7.2 Conditions for safe storage, including any incompatibilities**

Store in a segregated and approved area. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Use appropriate containment to avoid environmental contamination. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Do not store above the following temperature: 60°C (140°F)

**7.3 Specific end use(s)**

**Recommendations** : Not available.

## SECTION 8: Exposure controls/personal protection

**8.1 Control parameters**

Occupational exposure limits

No exposure limit value known.

DNELs/DMELs

No DNELs/DMELs available.

PNECs

No PNECs available.

**8.2 Exposure controls**

**Appropriate engineering controls** : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Individual protection measures

**Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Ensure that eyewash stations and safety showers are close to the workstation location.

**Eye/face protection** : Use eye protection according to EN 166, designed to protect against powders and dusts.

Skin protection

**Hand protection** : Wear suitable gloves tested to EN374.

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## SECTION 8: Exposure controls/personal protection

**Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Respiratory protection** : If dust is generated and ventilation is inadequate, use respirator that will protect against dust/mist. Half-face mask (DIN EN 140)

**Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

## SECTION 9: Physical and chemical properties

**9.1 Information on basic physical and chemical properties**

Appearance

**Physical state** : Solid. [depends on delivery temperature]

**Color** : White to yellowish.

**Odor** : Faint odor.

**Odor threshold** : Not available.

**pH** : Not available.

**Melting point/freezing point** : Not available.

**Initial boiling point and boiling range** : Not available.

**Flash point** : Open cup: >190°C [ISO 2592]

**Evaporation rate** : Not available.

**Flammability (solid, gas)** : Not available.

**Upper/lower flammability or explosive limits** : Not available.

**Vapor pressure** : Not available.

**Vapor density** : Not available.

**Density** : 0.88 g/cm³ [40°C (104°F)]

**Solubility(ies)** : Not available.

**Partition coefficient: n-octanol/ water** : Not available.

**Auto-ignition temperature** : Not available.

**Decomposition temperature** : Not available.

**Viscosity** : Not available.

**Explosive properties** : Not available.

**Oxidizing properties** : Not available.

**9.2 Other information**

No additional information.

## SECTION 10: Stability and reactivity

**10.1 Reactivity** : No specific test data related to reactivity available for this product or its ingredients.

**10.2 Chemical stability** : The product is stable.

**10.3 Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.

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## SECTION 10: Stability and reactivity

**10.4 Conditions to avoid** : Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Prevent dust accumulation.

**10.5 Incompatible materials** : Reactive or incompatible with the following materials: oxidizing materials

**10.6 Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## SECTION 11: Toxicological information

**11.1 Information on toxicological effects**

**Acute toxicity**

| Product/ingredient name | Result | Species | Dose | Exposure |
|---|---|---|---|---|
| - | LD50 Oral | Rat - Male, Female | >5000 mg/kg | - |

**Conclusion/Summary** : Not available.

**Irritation/Corrosion**

| Product/ingredient name | Result | Species | Score | Exposure | Observation |
|---|---|---|---|---|---|
| -<br>- | Skin - Edema<br>Skin - Erythema/Eschar | Rabbit<br>Rabbit | 0<br>0 | -<br>- | -<br>- |

**Conclusion/Summary** : Not available.

**Sensitization**

**Conclusion/Summary** : Not available.

**Mutagenicity**

**Conclusion/Summary** : Not available.

**Carcinogenicity**

**Conclusion/Summary** : Not available.

**Reproductive toxicity**

**Conclusion/Summary** : Not available.

**Teratogenicity**

**Conclusion/Summary** : Not available.

**Specific target organ toxicity (single exposure)**

Not available.

**Specific target organ toxicity (repeated exposure)**

Not available.

**Aspiration hazard**

Not available.

**Information on the likely routes of exposure** : Not available.





## SECTION 12: Ecological information

**12.1 Toxicity**

| Product/ingredient name | Result | Species | Exposure |
|---|---|---|---|
| - | Acute LC50 >100 mg/l | Fish | 96 hours |

**Conclusion/Summary** : Not available.

**12.2 Persistence and degradability**

| Product/ingredient name | Test | Result | Dose | Inoculum |
|---|---|---|---|---|
| - | ISO ISO 10708 (BODIS Test) | >60 % - Readily - 28 days | - | - |

**Conclusion/Summary** : Not available.

| Product/ingredient name | Aquatic half-life | Photolysis | Biodegradability |
|---|---|---|---|
| - | - | - | Readily |

**12.3 Bioaccumulative potential**

| Product/ingredient name | $LogP_{ow}$ | BCF | Potential |
|---|---|---|---|
| - | 7.17 | - | high |

**12.4 Mobility in soil**

**Soil/water partition coefficient ($K_{OC}$)** : Not available.

**Mobility** : Not available.

**12.5 Results of PBT and vPvB assessment**

**PBT** : Not available.
P: Not available. B: Not available. T: Not available.

**vPvB** : Not available.
vP: Not available. vB: Not available.

**12.6 Other adverse effects** : No known significant effects or critical hazards.

## SECTION 13: Disposal considerations

**13.1 Waste treatment methods**

**Product**

**Methods of disposal** : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction.

**Hazardous waste** : Within the present knowledge of the supplier, this product is not regarded as hazardous waste, as defined by EU Directive 2008/98/EC.

**Packaging**

**Methods of disposal** : The generation of waste should be avoided or minimized wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

**Special precautions** : This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.





## SECTION 14: Transport information

| | ADR/RID | ADN | IMDG | IATA |
|---|---|---|---|---|
| **14.1 UN number** | Not regulated. | Not regulated. | Not regulated. | Not regulated. |
| **14.2 UN proper shipping name** | - | - | - | - |
| **14.3 Transport hazard class(es)** | - | - | - | - |
| **14.4 Packing group** | - | - | - | - |
| **14.5 Environmental hazards** | No. | No. | No. | No. |
| **Additional information** | - | - | - | - |

**14.6 Special precautions for user** : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

**14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code** : Not available.

## SECTION 15: Regulatory information

**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

**EU Regulation (EC) No. 1907/2006 (REACH)**

**Annex XIV - List of substances subject to authorization**

**Annex XIV**

None of the components are listed.

**Substances of very high concern**

None of the components are listed.

**Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles** : Not applicable.

**Other EU regulations**

**Europe inventory** : All components are listed or exempted.

**Ozone depleting substances (1005/2009/EU)**

Not listed.

**Prior Informed Consent (PIC) (649/2012/EU)**

Not listed.

**Seveso Directive**

This product is not controlled under the Seveso Directive.

**International regulations**

**Chemical Weapon Convention List Schedules I, II & III Chemicals**

Not listed.





## SECTION 15: Regulatory information

**Montreal Protocol (Annexes A, B, C, E)**

Not listed.

**Stockholm Convention on Persistent Organic Pollutants**

Not listed.

**Rotterdam Convention on Prior Informed Consent (PIC)**

Not listed.

**UNECE Aarhus Protocol on POPs and Heavy Metals**

Not listed.

**International lists**

**National inventory**

**Australia** : All components are listed or exempted.
**Canada** : All components are listed or exempted.
**China** : All components are listed or exempted.
**Japan** : **Japan inventory (ENCS)**: All components are listed or exempted.
**Japan inventory (ISHL)**: Not determined.
**Malaysia** : Not determined.
**New Zealand** : All components are listed or exempted.
**Philippines** : All components are listed or exempted.
**Republic of Korea** : All components are listed or exempted.
**Taiwan** : All components are listed or exempted.
**Turkey** : All components are listed or exempted.
**United States** : All components are listed or exempted.

**15.2 Chemical Safety Assessment** : This product contains substances for which Chemical Safety Assessments are still required.

## SECTION 16: Other information

Indicates information that has changed from previously issued version.

**Abbreviations and acronyms** : ATE = Acute Toxicity Estimate
CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]
DMEL = Derived Minimal Effect Level
DNEL = Derived No Effect Level
EUH statement = CLP-specific Hazard statement
PBT = Persistent, Bioaccumulative and Toxic
PNEC = Predicted No Effect Concentration
RRN = REACH Registration Number
vPvB = Very Persistent and Very Bioaccumulative

**Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]**

| Classification | Justification |
|---|---|
| Not classified. | |

**Full text of abbreviated H statements**

Not applicable.

**Full text of classifications [CLP/GHS]**

Not applicable.

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## SECTION 16: Other information

**Version** : 1.06

**Notice to reader**

**To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.**
**Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.**

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Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Commission Regulation (EU) 2015/830 - Europe

# Emery Oleochemicals (M) Sdn Bhd

Emery Oleochemicals

# SAFETY DATA SHEET

## EDENOR® C12-99 MY

Date of printing : 19.04.2019
Date of revision : 19.04.2019
SDS No. : 6150572516

## SECTION 1: Identification of the substance/mixture and of the company/ undertaking

**1.1 Product identifier**

**Product name** : EDENOR® C12-99 MY
**CAS number** : 143-07-7
**REACH Registration number** : 01-2119538184-40-0001 - Emery Oleochemicals GmbH
**Product code** : 6150572516
**Product description** : Lauric acid
**Product type** : Solid.

**1.2 Relevant identified uses of the substance or mixture and uses advised against**

See Annex to the Safety data sheet for additional information in the Exposure Scenario(s).

**1.3 Details of the supplier of the safety data sheet**

Emery Oleochemicals (M) Sdn Bhd
Lot 4, Jalan Perak, Kawasan Perusahaan,
42500 Telok Panglima Garang,
Selangor, Malaysia
Phone: ++6(03)-33268686

**1.4 Emergency telephone number**

**Supplier**
**Telephone number** : +6(03)-33268686

## SECTION 2: Hazards identification

**2.1 Classification of the substance or mixture**

**Product definition** : Mono-constituent substance

**Classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]**
Eye Dam. 1, H318

The product is classified as hazardous according to Regulation (EC) 1272/2008 as amended.
See Section 16 for the full text of the H statements declared above.
See Section 11 for more detailed information on health effects and symptoms.

**2.2 Label elements**

**Hazard pictograms** :

**Signal word** : Danger
**Hazard statements** : H318 - Causes serious eye damage.
**Precautionary statements**
**Prevention** : P280 - Wear eye or face protection.
**Response** : P305 + P351 + P338 + P310 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.

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## SECTION 2: Hazards identification

**Storage** : Not applicable.
**Disposal** : Not applicable.
**Hazardous ingredients** : lauric acid
**Supplemental label elements** : Not applicable.

**2.3 Other hazards**

**Substance meets the criteria for PBT according to Regulation (EC) No. 1907/2006, Annex XIII** : No.
P: Not available. B: Not available. T: No.
**Substance meets the criteria for vPvB according to Regulation (EC) No. 1907/2006, Annex XIII** : Not available.
**Other hazards which do not result in classification** : None known.

## SECTION 3: Composition/information on ingredients

**3.1 Substances** : Mono-constituent substance

| Product/ingredient name | Identifiers | % | Regulation (EC) No. 1272/2008 [CLP] | Type |
|---|---|---|---|---|
| Lauric acid (C12) | EC: 205-582-1<br>CAS: 143-07-7 | 99 - 100 | Eye Dam. 1, H318<br><br>**See Section 16 for the full text of the H statements declared above.** | [A] |

There are no additional ingredients present which, within the current knowledge of the supplier, are classified and contribute to the classification of the substance and hence require reporting in this section.

Type
[A] Constituent
[B] Impurity
[C] Stabilizing additive

Occupational exposure limits, if available, are listed in Section 8.

## SECTION 4: First aid measures

**4.1 Description of first aid measures**

**Eye contact** : Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.
**Inhalation** : Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If unconscious, place in recovery position and get medical attention immediately.
**Skin contact** : Get medical attention immediately. Call a poison center or physician. Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.

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## SECTION 4: First aid measures

**Ingestion** : Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. Do not induce vomiting unless directed to do so by medical personnel. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately.
**Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

**4.2 Most important symptoms and effects, both acute and delayed**

**Potential acute health effects**
**Eye contact** : Causes serious eye damage.
**Inhalation** : No known significant effects or critical hazards.
**Skin contact** : No known significant effects or critical hazards.
**Ingestion** : No known significant effects or critical hazards.

**Over-exposure signs/symptoms**
**Eye contact** : Adverse symptoms may include the following:
pain
watering
redness
**Inhalation** : No specific data.
**Skin contact** : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur
**Ingestion** : Adverse symptoms may include the following:
stomach pains

**4.3 Indication of any immediate medical attention and special treatment needed**

**Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
**Specific treatments** : No specific treatment.

## SECTION 5: Firefighting measures

**5.1 Extinguishing media**

**Suitable extinguishing media** : Use dry chemical, $CO_2$, water spray (fog) or foam.
**Unsuitable extinguishing media** : Do not use water jet.

**5.2 Special hazards arising from the substance or mixture**

**Hazards from the substance or mixture** : No specific fire or explosion hazard.
**Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

**5.3 Advice for firefighters**

**Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

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## SECTION 5: Firefighting measures

**Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

## SECTION 6: Accidental release measures

**6.1 Personal precautions, protective equipment and emergency procedures**

**For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

**For emergency responders** : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

**6.2 Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

**6.3 Methods and materials for containment and cleaning up**

**Small spill** : Move containers from spill area. Avoid dust generation. Using a vacuum with HEPA filter will reduce dust dispersal. Place spilled material in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

**Large spill** : Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Dispose of via a licensed waste disposal contractor.

**6.4 Reference to other sections** : See Section 1 for emergency contact information.
See Section 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

## SECTION 7: Handling and storage

**7.1 Precautions for safe handling**

**Protective measures** : Put on appropriate personal protective equipment (see Section 8). Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

**Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

**7.2 Conditions for safe storage, including any incompatibilities**

Keep container tightly closed and sealed until ready for use. Use appropriate containment to avoid environmental contamination. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Do not store above the following temperature: 35°C (95°F)

**7.3 Specific end use(s)**

**Recommendations** : See Annex of this SDS for a description of recommendations relating to safe handling and use.

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## SECTION 8: Exposure controls/personal protection

**8.1 Control parameters**

**Occupational exposure limits**

No exposure limit value known.

**Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to monitoring standards, such as the following: European Standard EN 689 (Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy) European Standard EN 14042 (Workplace atmospheres - Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents) European Standard EN 482 (Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents) Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

**DNELs/DMELs**

| Product/ingredient name | Type | Exposure | Value | Population | Effects |
|---|---|---|---|---|---|
| lauric acid | DNEL | Long term Dermal | 10 mg/kg bw/day | Workers | Systemic |
| | DNEL | Long term Inhalation | 17.632 mg/m³ | Workers | Systemic |
| | DNEL | Long term Dermal | 5 mg/kg bw/day | Consumers | Systemic |
| | DNEL | Long term Inhalation | 4.348 mg/m³ | Consumers | Systemic |
| | DNEL | Long term Oral | 2.5 mg/kg bw/day | Consumers | Systemic |

**PNECs**

| Product/ingredient name | Compartment Detail | Value | Method Detail |
|---|---|---|---|
| lauric acid | Fresh water | 0.047 mg/l | Assessment Factors |
| | Marine water | 0.0047 mg/l | Assessment Factors |
| | Intermittent release | 0.036 mg/l | Assessment Factors |
| | Fresh water sediment | 4.09 mg/kg dwt | Equilibrium Partitioning |
| | Marine water sediment | 0.409 mg/kg dwt | Equilibrium Partitioning |
| | Soil | 0.7906 mg/kg dwt | Equilibrium Partitioning |
| | Sewage Treatment Plant | 912 mg/l | Assessment Factors |

**8.2 Exposure controls**

**Appropriate engineering controls** : If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

**Individual protection measures**

**Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Ensure that eyewash stations and safety showers are close to the workstation location.

**Eye/face protection** : If inhalation hazards exist, a full-face respirator may be required instead.

**Skin protection**

**Hand protection** : Wear suitable gloves tested to EN374. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

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## SECTION 8: Exposure controls/personal protection

**Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Respiratory protection** : Work in well-ventilated zones or use proper respiratory protection. Half-face mask (DIN EN 140)

**Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

## SECTION 9: Physical and chemical properties

**9.1 Information on basic physical and chemical properties**

**Appearance**

**Physical state** : Solid.
**Color** : White.
**Odor** : Characteristic.
**Odor threshold** : Not available.
**pH** : Not available.
**Melting point/freezing point** : 43 to 44°C
**Initial boiling point and boiling range** : Not available.
**Flash point** : Open cup: >160°C [DIN ISO 2592]
**Evaporation rate** : Not available.
**Flammability (solid, gas)** : Not available.
**Upper/lower flammability or explosive limits** : Not available.
**Vapor pressure** : Not available.
**Vapor density** : Not available.
**Density** : 0.88 g/cm³ [40°C (104°F)]
**Solubility(ies)** : Not available.
**Partition coefficient: n-octanol/water** : Not available.
**Auto-ignition temperature** : Not available.
**Decomposition temperature** : Not available.
**Viscosity** : Not available.
**Explosive properties** : Not available.
**Oxidizing properties** : Not available.

**9.2 Other information**

No additional information.

## SECTION 10: Stability and reactivity

**10.1 Reactivity** : No specific test data related to reactivity available for this product or its ingredients.

**10.2 Chemical stability** : The product is stable.

**10.3 Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.

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## SECTION 10: Stability and reactivity

**10.4 Conditions to avoid** : Avoid all possible sources of ignition (spark or flame).

**10.5 Incompatible materials** : No specific data.

**10.6 Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## SECTION 11: Toxicological information

**11.1 Information on toxicological effects**

**Acute toxicity**

| Product/ingredient name | Result | Species | Dose | Exposure |
|---|---|---|---|---|
| lauric acid | LD50 Dermal | Rat - Male, Female | >2000 mg/kg | - |
| | LD50 Oral | Rat - Male, Female | >5000 mg/kg | - |

**Conclusion/Summary** : Not available.

**Irritation/Corrosion**

| Product/ingredient name | Result | Species | Score | Exposure | Observation |
|---|---|---|---|---|---|
| lauric acid | Skin - Erythema/Eschar | Rabbit | 0.4 | 4 hours | 8 days |
| | Eyes - Cornea opacity | Rabbit | 2.9 | - | - |

**Conclusion/Summary** : Not available.

**Sensitization**

| Product/ingredient name | Route of exposure | Species | Result |
|---|---|---|---|
| lauric acid | skin | Guinea pig | Not sensitizing |

**Conclusion/Summary** : Not available.

**Mutagenicity**

| Product/ingredient name | Test | Experiment | Result |
|---|---|---|---|
| lauric acid | OECD 471 Bacterial Reverse Mutation Test Analogy | Experiment: In vitro<br>Subject: Bacteria | Negative |
| | OECD 473 *In vitro* Mammalian Chromosomal Aberration Test Analogy | Experiment: In vitro<br>Subject: Mammalian-Animal | Negative |
| | OECD 476 *In vitro* Mammalian Cell Gene Mutation Test Analogy | Experiment: In vitro<br>Subject: Mammalian-Animal | Negative |

**Conclusion/Summary** : Not available.

**Carcinogenicity**

**Conclusion/Summary** : Not available.

**Reproductive toxicity**

**Conclusion/Summary** : Not available.

**Teratogenicity**

**Conclusion/Summary** : Not available.

**Specific target organ toxicity (single exposure)**

Not available.

**Specific target organ toxicity (repeated exposure)**

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## SECTION 11: Toxicological information

Not available.

**Aspiration hazard**
Not available.

**Information on the likely routes of exposure** : Not available.

## SECTION 12: Ecological information

**12.1 Toxicity**

| Product/ingredient name | Result | Species | Exposure |
|---|---|---|---|
| lauric acid | Acute EC50 >7.6 mg/l Fresh water | Algae - Pseudokirchnerella subcapitata | 72 hours |
| | Acute EC50 3.6 mg/l Fresh water | Crustaceans - Daphnia magna | 48 hours |

**Conclusion/Summary** : Not available.

**12.2 Persistence and degradability**

| Product/ingredient name | Test | Result | Dose | Inoculum |
|---|---|---|---|---|
| lauric acid | OECD 301D Ready Biodegradability - Closed Bottle Test | >80 % - Readily - 30 days | 2 mg/l | - |

**Conclusion/Summary** : Not available.

| Product/ingredient name | Aquatic half-life | Photolysis | Biodegradability |
|---|---|---|---|
| lauric acid | - | - | Readily |

**12.3 Bioaccumulative potential**

| Product/ingredient name | $LogP_{ow}$ | BCF | Potential |
|---|---|---|---|
| lauric acid | 4.6 | - | high |

**12.4 Mobility in soil**

**Soil/water partition coefficient ($K_{OC}$)** : Not available.

**Mobility** : Not available.

**12.5 Results of PBT and vPvB assessment**

**PBT** : No.
P: Not available. B: Not available. T: No.

**vPvB** : Not available.
vP: Not available. vB: Not available.

**12.6 Other adverse effects** : No known significant effects or critical hazards.





## SECTION 13: Disposal considerations

**13.1 Waste treatment methods**

**Product**

**Methods of disposal** : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction.

**Hazardous waste** : The classification of the product may meet the criteria for a hazardous waste.

**Packaging**

**Methods of disposal** : The generation of waste should be avoided or minimized wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

**Special precautions** : This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

## SECTION 14: Transport information

| | ADR/RID | ADN | IMDG | IATA |
|---|---|---|---|---|
| 14.1 UN number | Not regulated. | Not regulated. | Not regulated. | Not regulated. |
| 14.2 UN proper shipping name | - | - | - | - |
| 14.3 Transport hazard class(es) | - | - | - | - |
| 14.4 Packing group | - | - | - | - |
| 14.5 Environmental hazards | No. | No. | No. | No. |
| Additional information | - | - | - | - |

**14.6 Special precautions for user** : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

**14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code** : Not available.

## SECTION 15: Regulatory information

**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

**EU Regulation (EC) No. 1907/2006 (REACH)**

**Annex XIV - List of substances subject to authorization**

**Annex XIV**
None of the components are listed.

**Substances of very high concern**
None of the components are listed.





## SECTION 15: Regulatory information

**Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles** : Not applicable.

**Other EU regulations**

**Europe inventory** : All components are listed or exempted.

**Ozone depleting substances (1005/2009/EU)**
Not listed.

**Prior Informed Consent (PIC) (649/2012/EU)**
Not listed.

**Seveso Directive**
This product is not controlled under the Seveso Directive.

**International regulations**

**Chemical Weapon Convention List Schedules I, II & III Chemicals**
Not listed.

**Montreal Protocol (Annexes A, B, C, E)**
Not listed.

**Stockholm Convention on Persistent Organic Pollutants**
Not listed.

**Rotterdam Convention on Prior Informed Consent (PIC)**
Not listed.

**UNECE Aarhus Protocol on POPs and Heavy Metals**
Not listed.

**International lists**

**National inventory**

**Australia** : All components are listed or exempted.
**Canada** : All components are listed or exempted.
**China** : All components are listed or exempted.
**Japan** : **Japan inventory (ENCS)**: All components are listed or exempted.
**Japan inventory (ISHL)**: Not determined.
**Malaysia** : Not determined.
**New Zealand** : All components are listed or exempted.
**Philippines** : All components are listed or exempted.
**Republic of Korea** : All components are listed or exempted.
**Taiwan** : All components are listed or exempted.
**Turkey** : All components are listed or exempted.
**United States** : All components are listed or exempted.

**15.2 Chemical Safety Assessment** : Chemical Safety Assessments for all substances in this product are either Complete or Not applicable.





## SECTION 16: Other information

Indicates information that has changed from previously issued version.

**Abbreviations and acronyms** : ATE = Acute Toxicity Estimate
CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]
DMEL = Derived Minimal Effect Level
DNEL = Derived No Effect Level
EUH statement = CLP-specific Hazard statement
PBT = Persistent, Bioaccumulative and Toxic
PNEC = Predicted No Effect Concentration
RRN = REACH Registration Number
vPvB = Very Persistent and Very Bioaccumulative

**Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]**

| Classification | Justification |
|---|---|
| Eye Dam. 1, H318 | Calculation method |

**Full text of abbreviated H statements**

| | |
|---|---|
| H318 | Causes serious eye damage. |

**Full text of classifications [CLP/GHS]**

| | |
|---|---|
| Eye Dam. 1, H318 | SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1 |

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**Notice to reader**

**To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.**
**Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.**

Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Commission Regulation (EU) 2015/830 - Europe

## Emery Oleochemicals (M) Sdn Bhd

# SAFETY DATA SHEET

## EDENOR® C14-99 MY

Date of printing : 19.04.2019
Date of revision : 19.04.2019
SDS No. : 3150600107

### SECTION 1: Identification of the substance/mixture and of the company/undertaking

**1.1 Product identifier**

Product name : EDENOR® C14-99 MY
Product code : 3150600107
Product description : Myristic Acid
Product type : Solid.

**1.2 Relevant identified uses of the substance or mixture and uses advised against**

Not available.

**1.3 Details of the supplier of the safety data sheet**

Emery Oleochemicals (M) Sdn Bhd
Lot 4, Jalan Perak, Kawasan Perusahaan,
42500 Telok Panglima Garang,
Selangor, Malaysia
Phone: ++6(03)-33268686

**1.4 Emergency telephone number**

Supplier
Telephone number : +6(03)-33268686

### SECTION 2: Hazards identification

**2.1 Classification of the substance or mixture**

Product definition : Mono-constituent substance

Classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]
Not classified.

The product is not classified as hazardous according to Regulation (EC) 1272/2008 as amended.
See Section 16 for the full text of the H statements declared above.
See Section 11 for more detailed information on health effects and symptoms.

**2.2 Label elements**

Signal word : No signal word.
Hazard statements : No known significant effects or critical hazards.
Precautionary statements
Prevention : Not applicable.
Response : Not applicable.
Storage : Not applicable.
Disposal : Not applicable.
Supplemental label elements : Not applicable.

**2.3 Other hazards**

Other hazards which do not result in classification : None known.

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### SECTION 3: Composition/information on ingredients

3.2 Mixtures : Mono-constituent substance

There are no ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment, are PBTs, vPvBs or Substances of equivalent concern, or have been assigned a workplace exposure limit and hence require reporting in this section.

### SECTION 4: First aid measures

**4.1 Description of first aid measures**

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.
Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.
Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
Ingestion : Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.
Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training.

**4.2 Most important symptoms and effects, both acute and delayed**

Potential acute health effects
Eye contact : No known significant effects or critical hazards.
Inhalation : No known significant effects or critical hazards.
Skin contact : No known significant effects or critical hazards.
Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms
Eye contact : No specific data.
Inhalation : No specific data.
Skin contact : No specific data.
Ingestion : No specific data.

**4.3 Indication of any immediate medical attention and special treatment needed**

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
Specific treatments : No specific treatment.

### SECTION 5: Firefighting measures

**5.1 Extinguishing media**

Suitable extinguishing media : Use dry chemical, $CO_2$, water spray (fog) or foam.
Unsuitable extinguishing media : Do not use water jet.

**5.2 Special hazards arising from the substance or mixture**

Hazards from the substance or mixture : No specific fire or explosion hazard.
Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

**5.3 Advice for firefighters**

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### SECTION 5: Firefighting measures

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

### SECTION 6: Accidental release measures

**6.1 Personal precautions, protective equipment and emergency procedures**

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment.
For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

6.2 Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

**6.3 Methods and materials for containment and cleaning up**

Small spill : Move containers from spill area. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.
Large spill : Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

6.4 Reference to other sections : See Section 1 for emergency contact information.
See Section 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

### SECTION 7: Handling and storage

**7.1 Precautions for safe handling**

Protective measures : Put on appropriate personal protective equipment (see Section 8).
Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

**7.2 Conditions for safe storage, including any incompatibilities**

Keep container tightly closed and sealed until ready for use. Use appropriate containment to avoid environmental contamination. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers.

**7.3 Specific end use(s)**

Recommendations : Not available.

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### SECTION 8: Exposure controls/personal protection

**8.1 Control parameters**

Occupational exposure limits
No exposure limit value known.

DNELs/DMELs
No DNELs/DMELs available.

PNECs
No PNECs available.

**8.2 Exposure controls**

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Individual protection measures
Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Ensure that eyewash stations and safety showers are close to the workstation location.
Eye/face protection : Wear safety glasses with side protection in accordance with EN 166.
Skin protection
Hand protection : Wear suitable gloves tested to EN374.
Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Respiratory protection : Work in well-ventilated zones or use proper respiratory protection. Half-face mask (DIN EN 140)
Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

### SECTION 9: Physical and chemical properties

**9.1 Information on basic physical and chemical properties**

Appearance
Physical state : Solid.
Color : White.
Odor : Fatty
Odor threshold : Not available.
pH : Not available.
Melting point/freezing point : 53 to 54°C
Initial boiling point and boiling range : 192°C
Flash point : Open cup: >165°C [DIN ISO 2592]
Evaporation rate : Not available.
Flammability (solid, gas) : Not available.
Upper/lower flammability or explosive limits : Not available.
Vapor pressure : Not available.
Vapor density : Not available.

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## SECTION 9: Physical and chemical properties

**Density** : 0.88 g/cm³ [40°C (104°F)]
**Solubility(ies)** : Not available.
**Partition coefficient: n-octanol/ water** : Not available.
**Auto-ignition temperature** : Not available.
**Decomposition temperature** : Not available.
**Viscosity** : Not available.
**Explosive properties** : Not available.
**Oxidizing properties** : Not available.

**9.2 Other information**
No additional information.

## SECTION 10: Stability and reactivity

**10.1 Reactivity** : No specific test data related to reactivity available for this product or its ingredients.

**10.2 Chemical stability** : The product is stable.

**10.3 Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.

**10.4 Conditions to avoid** : Avoid all possible sources of ignition (spark or flame).

**10.5 Incompatible materials** : No specific data.

**10.6 Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## SECTION 11: Toxicological information

**11.1 Information on toxicological effects**

**Acute toxicity**

| Product/ingredient name | Result | Species | Dose | Exposure |
|---|---|---|---|---|
| - | LD50 Oral | Rat | >5000 mg/kg | - |

**Conclusion/Summary** : Not available.

**Acute toxicity estimates**
Not available.

**Irritation/Corrosion**

| Product/ingredient name | Result | Species | Score | Exposure | Observation |
|---|---|---|---|---|---|
| - | Eyes - Mild irritant | Rabbit | - | 100 milligrams | - |
| - | Skin - Edema | Rabbit | 0 | - | - |
| - | Eyes - Cornea opacity | Rabbit | 0 | - | - |

**Conclusion/Summary** : Not available.
**Sensitization**
**Conclusion/Summary** : Not available.
**Mutagenicity**
**Conclusion/Summary** : Not available.
**Carcinogenicity**
**Conclusion/Summary** : Not available.
**Reproductive toxicity**

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## SECTION 11: Toxicological information

**Conclusion/Summary** : Not available.
**Teratogenicity**
**Conclusion/Summary** : Not available.
**Specific target organ toxicity (single exposure)**
Not available.

**Specific target organ toxicity (repeated exposure)**
Not available.

**Aspiration hazard**
Not available.

**Information on the likely routes of exposure** : Not available.

## SECTION 12: Ecological information

**12.1 Toxicity**

| Product/ingredient name | Result | Species | Exposure |
|---|---|---|---|
| - | Acute LC50 >100 mg/l | Fish | 96 hours |

**Conclusion/Summary** : Not available.

**12.2 Persistence and degradability**

| Product/ingredient name | Test | Result | Dose | Inoculum |
|---|---|---|---|---|
| - | OECD 301D Ready Biodegradability - Closed Bottle Test Analogy | >80 % - Readily - 10 days | - | - |

**Conclusion/Summary** : This product is readily biodegradable.

| Product/ingredient name | Aquatic half-life | Photolysis | Biodegradability |
|---|---|---|---|
| - | - | - | Readily |

**12.3 Bioaccumulative potential**

| Product/ingredient name | $LogP_{ow}$ | BCF | Potential |
|---|---|---|---|
| - | 6.11 | - | high |

**12.4 Mobility in soil**
**Soil/water partition coefficient ($K_{OC}$)** : Not available.
**Mobility** : Not available.

**12.5 Results of PBT and vPvB assessment**
**PBT** : Not available.
**vPvB** : Not available.

**12.6 Other adverse effects** : No known significant effects or critical hazards.

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## SECTION 13: Disposal considerations

**13.1 Waste treatment methods**

**Product**

**Methods of disposal** : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction.

**Hazardous waste** : Within the present knowledge of the supplier, this product is not regarded as hazardous waste, as defined by EU Directive 2008/98/EC.

**Packaging**

**Methods of disposal** : The generation of waste should be avoided or minimized wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

**Special precautions** : This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

## SECTION 14: Transport information

| | ADR/RID | ADN | IMDG | IATA |
|---|---|---|---|---|
| 14.1 UN number | Not regulated. | Not regulated. | Not regulated. | Not regulated. |
| 14.2 UN proper shipping name | - | - | - | - |
| 14.3 Transport hazard class(es) | - | - | - | - |
| 14.4 Packing group | - | - | - | - |
| 14.5 Environmental hazards | No. | No. | No. | No. |
| Additional information | - | - | - | - |

**14.6 Special precautions for user** : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

**14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code** : Not available.

## SECTION 15: Regulatory information

**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

**EU Regulation (EC) No. 1907/2006 (REACH)**

**Annex XIV - List of substances subject to authorization**

**Annex XIV**
None of the components are listed.

**Substances of very high concern**
None of the components are listed.

*Date of issue/Date of revision : 4/19/2019 Date of previous issue : 10/6/2017 Version : 2.02 7/9*

Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Commission Regulation (EU) 2015/830 - Europe

*EDENOR® C14-99 MY*

## SECTION 15: Regulatory information

**Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles** : Not applicable.

**Other EU regulations**
**Europe inventory** : All components are listed or exempted.

**Ozone depleting substances (1005/2009/EU)**
Not listed.

**Prior Informed Consent (PIC) (649/2012/EU)**
Not listed.

**Seveso Directive**
This product is not controlled under the Seveso Directive.

**International regulations**

**Chemical Weapon Convention List Schedules I, II & III Chemicals**
Not listed.

**Montreal Protocol (Annexes A, B, C, E)**
Not listed.

**Stockholm Convention on Persistent Organic Pollutants**
Not listed.

**Rotterdam Convention on Prior Informed Consent (PIC)**
Not listed.

**UNECE Aarhus Protocol on POPs and Heavy Metals**
Not listed.

**International lists**
**National inventory**
**Australia** : All components are listed or exempted.
**Canada** : All components are listed or exempted.
**China** : All components are listed or exempted.
**Japan** : **Japan inventory (ENCS)**: All components are listed or exempted.
**Japan inventory (ISHL)**: Not determined.
**Malaysia** : Not determined.
**New Zealand** : All components are listed or exempted.
**Philippines** : All components are listed or exempted.
**Republic of Korea** : All components are listed or exempted.
**Taiwan** : All components are listed or exempted.
**Turkey** : All components are listed or exempted.
**United States** : All components are listed or exempted.

**15.2 Chemical Safety Assessment** : This product contains substances for which Chemical Safety Assessments are still required.

*Date of issue/Date of revision : 4/19/2019 Date of previous issue : 10/6/2017 Version : 2.02 8/9*

Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Commission Regulation (EU) 2015/830 - Europe

*EDENOR® C14-99 MY*

## SECTION 16: Other information

Indicates information that has changed from previously issued version.

**Abbreviations and acronyms** : ATE = Acute Toxicity Estimate
CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]
DMEL = Derived Minimal Effect Level
DNEL = Derived No Effect Level
EUH statement = CLP-specific Hazard statement
PBT = Persistent, Bioaccumulative and Toxic
PNEC = Predicted No Effect Concentration
RRN = REACH Registration Number
vPvB = Very Persistent and Very Bioaccumulative

**Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]**

| Classification | Justification |
|---|---|
| Not classified. | |

**Full text of abbreviated H statements**

Not applicable.

**Full text of classifications [CLP/GHS]**

Not applicable.

**Date of printing** : 4/19/2019
**Date of issue/ Date of revision** : 4/19/2019
**Date of previous issue** : 10/6/2017
**Version** : 2.02

**Notice to reader**

**To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.**
**Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.**

*Date of issue/Date of revision : 4/19/2019 Date of previous issue : 10/6/2017 Version : 2.02 9/9*

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Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Commission Regulation (EU) 2015/830 - Europe

# Emery Oleochemicals (M) Sdn Bhd

# SAFETY DATA SHEET

## EDENOR® C18-98 MY

Date of printing : 21.05.2018
Date of revision : 21.05.2018
SDS No. : 3130390516

## SECTION 1: Identification of the substance/mixture and of the company/ undertaking

**1.1 Product identifier**

**Product name** : EDENOR® C18-98 MY
**Product code** : 3130390516
**Product description** : Stearic acid
**Product type** : Solid.
**Usage** : Oleochemical raw material

**1.2 Relevant identified uses of the substance or mixture and uses advised against**

Not available.

**1.3 Details of the supplier of the safety data sheet**

Emery Oleochemicals (M) Sdn Bhd
Lot 4, Jalan Perak, Kawasan Perusahaan,
42500 Telok Panglima Garang,
Selangor, Malaysia
Phone: ++6(03)-33268686

**1.4 Emergency telephone number**

**Supplier**
**Telephone number** : +6(03)-33268686

## SECTION 2: Hazards identification

**2.1 Classification of the substance or mixture**

**Product definition** : Mono-constituent substance

**Classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]**

Not classified.

The product is not classified as hazardous according to Regulation (EC) 1272/2008 as amended.
See Section 16 for the full text of the H statements declared above.
See Section 11 for more detailed information on health effects and symptoms.

**2.2 Label elements**

**Signal word** : No signal word.
**Hazard statements** : No known significant effects or critical hazards.
**Precautionary statements**
**Prevention** : Not applicable.
**Response** : Not applicable.
**Storage** : Not applicable.
**Disposal** : Not applicable.
**Supplemental label elements** : Not applicable.

**2.3 Other hazards**

*Date of issue/Date of revision : 05/21/2018 Date of previous issue : 03/14/2018 Version : 1.05 1/9*

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Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Commission Regulation (EU) 2015/830 - Europe

*EDENOR® C18-98 MY*

## SECTION 2: Hazards identification

**Substance meets the criteria for PBT according to Regulation (EC) No. 1907/2006, Annex XIII** : Not available.
**Substance meets the criteria for vPvB according to Regulation (EC) No. 1907/2006, Annex XIII** : Not available.
**Other hazards which do not result in classification** : None known.

## SECTION 3: Composition/information on ingredients

**3.1 Substances** : Mono-constituent substance

There are no ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment, are PBTs, vPvBs or Substances of equivalent concern, or have been assigned a workplace exposure limit and hence require reporting in this section.

## SECTION 4: First aid measures

**4.1 Description of first aid measures**

**Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.
**Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.
**Skin contact** : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
**Ingestion** : Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.
**Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training.

**4.2 Most important symptoms and effects, both acute and delayed**

**Potential acute health effects**
**Eye contact** : No known significant effects or critical hazards.
**Inhalation** : No known significant effects or critical hazards.
**Skin contact** : No known significant effects or critical hazards.
**Ingestion** : No known significant effects or critical hazards.

**Over-exposure signs/symptoms**
**Eye contact** : No specific data.
**Inhalation** : No specific data.
**Skin contact** : No specific data.
**Ingestion** : No specific data.

**4.3 Indication of any immediate medical attention and special treatment needed**

**Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
**Specific treatments** : No specific treatment.

*Date of issue/Date of revision : 05/21/2018 Date of previous issue : 03/14/2018 Version : 1.05 2/9*

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Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Commission Regulation (EU) 2015/830 - Europe

*EDENOR® C18-98 MY*

## SECTION 5: Firefighting measures

**5.1 Extinguishing media**

**Suitable extinguishing media** : Use dry chemical, $CO_2$, water spray (fog) or foam.
**Unsuitable extinguishing media** : Do not use water jet.

**5.2 Special hazards arising from the substance or mixture**

**Hazards from the substance or mixture** : No specific fire or explosion hazard.
**Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

**5.3 Advice for firefighters**

**Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
**Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

## SECTION 6: Accidental release measures

**6.1 Personal precautions, protective equipment and emergency procedures**

**For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment.
**For emergency responders** : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

**6.2 Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

**6.3 Methods and materials for containment and cleaning up**

**Small spill** : Move containers from spill area. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.
**Large spill** : Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

**6.4 Reference to other sections** : See Section 1 for emergency contact information.
See Section 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

*Date of issue/Date of revision : 05/21/2018 Date of previous issue : 03/14/2018 Version : 1.05 3/9*

Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Commission Regulation (EU) 2015/830 - Europe

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## SECTION 7: Handling and storage

**7.1 Precautions for safe handling**

**Protective measures** : Put on appropriate personal protective equipment (see Section 8).

**Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

**7.2 Conditions for safe storage, including any incompatibilities**

Keep container tightly closed and sealed until ready for use. Use appropriate containment to avoid environmental contamination. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Store between the following temperatures: 20 to 40°C (68 to 104°F)

**7.3 Specific end use(s)**

**Recommendations** : Not available.

## SECTION 8: Exposure controls/personal protection

**8.1 Control parameters**

**Occupational exposure limits**

No exposure limit value known.

**DNELs/DMELs**

No DNELs/DMELs available.

**PNECs**

No PNECs available.

**8.2 Exposure controls**

**Appropriate engineering controls** : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

**Individual protection measures**

**Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Ensure that eyewash stations and safety showers are close to the workstation location.

**Eye/face protection** : Wear safety glasses with side protection in accordance with EN 166.

**Skin protection**

**Hand protection** : Wear suitable gloves tested to EN374.

**Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Respiratory protection** : Work in well-ventilated zones or use proper respiratory protection. Half-face mask (DIN EN 140)

**Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

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Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Commission Regulation (EU) 2015/830 - Europe

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## SECTION 9: Physical and chemical properties

**9.1 Information on basic physical and chemical properties**

**Appearance**

**Physical state** : Solid. [depends on delivery temperature]

**Color** : White.

**Odor** : Characteristic.

**Odor threshold** : Not available.

**pH** : Not available.

**Melting point/freezing point** : Not available.

**Initial boiling point and boiling range** : Not available.

**Flash point** : Open cup: >205°C [ISO 2592]

**Evaporation rate** : Not available.

**Flammability (solid, gas)** : Not available.

**Upper/lower flammability or explosive limits** : Not available.

**Vapor pressure** : Not available.

**Vapor density** : Not available.

**Density** : 0.88 g/cm³ [40°C (104°F)]

**Solubility(ies)** : Not available.

**Partition coefficient: n-octanol/ water** : Not available.

**Auto-ignition temperature** : Not available.

**Decomposition temperature** : Not available.

**Viscosity** : Not available.

**Explosive properties** : Not available.

**Oxidizing properties** : Not available.

**9.2 Other information**

No additional information.

## SECTION 10: Stability and reactivity

**10.1 Reactivity** : No specific test data related to reactivity available for this product or its ingredients.

**10.2 Chemical stability** : The product is stable.

**10.3 Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.

**10.4 Conditions to avoid** : Avoid all possible sources of ignition (spark or flame).

**10.5 Incompatible materials** : No specific data.

**10.6 Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

*Date of issue/Date of revision : 05/21/2018 Date of previous issue : 03/14/2018 Version : 1.05 5/9*

Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Commission Regulation (EU) 2015/830 - Europe

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## SECTION 11: Toxicological information

**11.1 Information on toxicological effects**

**Acute toxicity**

| Product/ingredient name | Result | Species | Dose | Exposure |
|---|---|---|---|---|
| - | LD50 Oral | Rat - Male, Female | >5000 mg/kg | - |

**Conclusion/Summary** : Not available.

**Irritation/Corrosion**

| Product/ingredient name | Result | Species | Score | Exposure | Observation |
|---|---|---|---|---|---|
| - | Skin - Edema | Rabbit | 0 | 72 hours | - |
| - | Skin - Erythema/Eschar | Rabbit | 0 | 72 hours | - |
| - | Eyes - Cornea opacity | Rabbit | 0 | 72 hours | - |

**Conclusion/Summary**

**Skin** : Non-irritating to the skin.

**Eyes** : Non-irritating to the eyes.

**Sensitization**

**Conclusion/Summary** : Not available.

**Mutagenicity**

**Conclusion/Summary** : No mutagenic effect. Analogy

**Carcinogenicity**

**Conclusion/Summary** : Not available.

**Reproductive toxicity**

**Conclusion/Summary** : Not available.

**Teratogenicity**

**Conclusion/Summary** : Not available.

**Specific target organ toxicity (single exposure)**

Not available.

**Specific target organ toxicity (repeated exposure)**

Not available.

**Aspiration hazard**

Not available.

**Information on the likely routes of exposure** : Not available.

## SECTION 12: Ecological information

**12.1 Toxicity**

| Product/ingredient name | Result | Species | Exposure |
|---|---|---|---|
| - | Acute LC50 >100 mg/l | Fish | 96 hours |

**Conclusion/Summary** : Not available.

**12.2 Persistence and degradability**

| Product/ingredient name | Test | Result | Dose | Inoculum |
|---|---|---|---|---|
| - | OECD 301B Ready Biodegradability - $CO_2$ Evolution Test | >70 % - Readily - 28 days | - | - |

**Conclusion/Summary** : This product is readily biodegradable.

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Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Commission Regulation (EU) 2015/830 - Europe

*EDENOR® C18-98 MY*

## SECTION 12: Ecological information

| Product/ingredient name | Aquatic half-life | Photolysis | Biodegradability |
|---|---|---|---|
| - | - | - | Readily |
| - | - | - | Readily |

**12.3 Bioaccumulative potential**

| Product/ingredient name | $LogP_{ow}$ | BCF | Potential |
|---|---|---|---|
| - | 8.23 | - | high |

**12.4 Mobility in soil**

**Soil/water partition coefficient ($K_{OC}$)** : Not available.

**Mobility** : Not available.

**12.5 Results of PBT and vPvB assessment**

**PBT** : Not available.
P: Not available. B: Not available. T: Not available.

**vPvB** : Not available.
vP: Not available. vB: Not available.

**12.6 Other adverse effects** : No known significant effects or critical hazards.

## SECTION 13: Disposal considerations

**13.1 Waste treatment methods**

**Product**

**Methods of disposal** : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction.

**Hazardous waste** : Within the present knowledge of the supplier, this product is not regarded as hazardous waste, as defined by EU Directive 2008/98/EC.

**Packaging**

**Methods of disposal** : The generation of waste should be avoided or minimized wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

**Special precautions** : This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

## SECTION 14: Transport information

| | ADR/RID | ADN | IMDG | IATA |
|---|---|---|---|---|
| **14.1 UN number** | Not regulated. | Not regulated. | Not regulated. | Not regulated. |
| **14.2 UN proper shipping name** | - | - | - | - |
| **14.3 Transport hazard class(es)** | - | - | - | - |

*Date of issue/Date of revision : 05/21/2018 Date of previous issue : 03/14/2018 Version : 1.05 7/9*

Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Commission Regulation (EU) 2015/830 - Europe

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## SECTION 14: Transport information

| | | | | |
|---|---|---|---|---|
| **14.4 Packing group** | - | - | - | - |
| **14.5 Environmental hazards** | No. | No. | No. | No. |
| **Additional information** | - | - | - | - |

**14.6 Special precautions for user** : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

**14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code** : Not available.

## SECTION 15: Regulatory information

**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

EU Regulation (EC) No. 1907/2006 (REACH)

Annex XIV - List of substances subject to authorization

Annex XIV

None of the components are listed.

Substances of very high concern

None of the components are listed.

**Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles** : Not applicable.

Other EU regulations

**Europe inventory** : All components are listed or exempted.

Ozone depleting substances (1005/2009/EU)

Not listed.

Prior Informed Consent (PIC) (649/2012/EU)

Not listed.

Seveso Directive

This product is not controlled under the Seveso Directive.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

*Date of issue/Date of revision : 05/21/2018 Date of previous issue : 03/14/2018 Version : 1.05 8/9*

Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Commission Regulation (EU) 2015/830 - Europe

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## SECTION 15: Regulatory information

International lists

National inventory

**Australia** : All components are listed or exempted.
**Canada** : All components are listed or exempted.
**China** : All components are listed or exempted.
**Japan** : **Japan inventory (ENCS)**: All components are listed or exempted.
**Japan inventory (ISHL)**: Not determined.
**Malaysia** : Not determined.
**New Zealand** : All components are listed or exempted.
**Philippines** : All components are listed or exempted.
**Republic of Korea** : All components are listed or exempted.
**Taiwan** : All components are listed or exempted.
**Turkey** : All components are listed or exempted.
**United States** : All components are listed or exempted.

**15.2 Chemical Safety Assessment** : This product contains substances for which Chemical Safety Assessments are still required.

## SECTION 16: Other information

Indicates information that has changed from previously issued version.

**Abbreviations and acronyms** : ATE = Acute Toxicity Estimate
CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]
DMEL = Derived Minimal Effect Level
DNEL = Derived No Effect Level
EUH statement = CLP-specific Hazard statement
PBT = Persistent, Bioaccumulative and Toxic
PNEC = Predicted No Effect Concentration
RRN = REACH Registration Number
vPvB = Very Persistent and Very Bioaccumulative

Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

| Classification | Justification |
|---|---|
| Not classified. | |

Full text of abbreviated H statements

Not applicable.

Full text of classifications [CLP/GHS]

Not applicable.

**Date of printing** : 05/21/2018
**Date of issue/ Date of revision** : 05/21/2018
**Date of previous issue** : 03/14/2018
**Version** : 1.05

Notice to reader

**To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.**
**Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.**

*Date of issue/Date of revision : 05/21/2018 Date of previous issue : 03/14/2018 Version : 1.05 9/9*

Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Commission Regulation (EU) 2015/830 - Europe

# Emery Oleochemicals (M) Sdn Bhd

# SAFETY DATA SHEET

## EMERSENSE™ AM 8025

Date of printing : 16.10.2017
Date of revision : 16.10.2017
SDS No. : 3500201259

## SECTION 1: Identification of the substance/mixture and of the company/ undertaking

**1.1 Product identifier**

**Product name** : EMERSENSE™ AM 8025
**Product code** : 3500201259
**Product description** : Vegetable oil diethanolamide
**Product type** : Liquid.

**1.2 Relevant identified uses of the substance or mixture and uses advised against**

Not available.

**1.3 Details of the supplier of the safety data sheet**

Emery Oleochemicals (M) Sdn Bhd
Lot 4, Jalan Perak, Kawasan Perusahaan,
42500 Telok Panglima Garang,
Selangor, Malaysia
Phone: ++6(03)-33268686

**1.4 Emergency telephone number**

Supplier

**Telephone number** : +6(03)-33268686

## SECTION 2: Hazards identification

**2.1 Classification of the substance or mixture**

**Product definition** : Mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

Skin Irrit. 2, H315
Eye Dam. 1, H318
Aquatic Chronic 2, H411

The product is classified as hazardous according to Regulation (EC) 1272/2008 as amended.

See Section 16 for the full text of the H statements declared above.

See Section 11 for more detailed information on health effects and symptoms.

**2.2 Label elements**

**Hazard pictograms** :

**Signal word** : Danger
**Hazard statements** : H318 - Causes serious eye damage.
H315 - Causes skin irritation.
H411 - Toxic to aquatic life with long lasting effects.

Precautionary statements

**Prevention** : P280 - Wear protective gloves. Wear eye or face protection.
P273 - Avoid release to the environment.

*Date of issue/Date of revision : 10/16/2017 Date of previous issue : 10/16/2017 Version : 2.01 1/12*

Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Commission Regulation (EU) 2015/830 - Europe

*EMERSENSE™ AM 8025*

## SECTION 2: Hazards identification

**Response** : P302 + P352 - IF ON SKIN: Wash with plenty of soap and water.
P305 + P351 + P338 + P310 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.
**Storage** : Not applicable.
**Disposal** : P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
**Hazardous ingredients** : Amides, palm kernel-oil, N,N-bis(hydroxyethyl)
2,2'-iminodiethanol
**Supplemental label elements** : Not applicable.

**2.3 Other hazards**

**Other hazards which do not result in classification** : None known.

## SECTION 3: Composition/information on ingredients

**3.2 Mixtures** : Mixture

| Product/ingredient name | Identifiers | % | Regulation (EC) No. 1272/2008 [CLP] | Type |
|---|---|---|---|---|
| Amides, palm kernel-oil, N,N-bis (hydroxyethyl) | EC: 277-612-1<br>CAS: 73807-15-5 | ≥75 - ≤90 | Skin Irrit. 2, H315<br>Eye Dam. 1, H318<br>Aquatic Chronic 2, H411 | [1] |
| Diethaolamine | EC: 203-868-0<br>CAS: 111-42-2<br>Index: 603-071-00-1 | ≤3 | Acute Tox. 4, H302<br>Skin Irrit. 2, H315<br>Eye Dam. 1, H318<br>STOT RE 2, H373<br>Aquatic Chronic 2, H411<br>**See Section 16 for the full text of the H statements declared above.** | [1] |

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment, are PBTs, vPvBs or Substances of equivalent concern, or have been assigned a workplace exposure limit and hence require reporting in this section.

Type

[1] Substance classified with a health or environmental hazard
[2] Substance with a workplace exposure limit
[3] Substance meets the criteria for PBT according to Regulation (EC) No. 1907/2006, Annex XIII
[4] Substance meets the criteria for vPvB according to Regulation (EC) No. 1907/2006, Annex XIII
[5] Substance of equivalent concern

Occupational exposure limits, if available, are listed in Section 8.

## SECTION 4: First aid measures

**4.1 Description of first aid measures**

**Eye contact** : Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.

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## SECTION 4: First aid measures

**Inhalation** : Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If unconscious, place in recovery position and get medical attention immediately. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

**Skin contact** : Get medical attention immediately. Call a poison center or physician. Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.

**Ingestion** : Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. Do not induce vomiting unless directed to do so by medical personnel. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately.

**Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

### 4.2 Most important symptoms and effects, both acute and delayed

<u>Potential acute health effects</u>

**Eye contact** : Causes serious eye damage.
**Inhalation** : No known significant effects or critical hazards.
**Skin contact** : Causes skin irritation.
**Ingestion** : No known significant effects or critical hazards.

<u>Over-exposure signs/symptoms</u>

**Eye contact** : Adverse symptoms may include the following:
pain
watering
redness

**Inhalation** : No specific data.

**Skin contact** : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur

**Ingestion** : Adverse symptoms may include the following:
stomach pains

### 4.3 Indication of any immediate medical attention and special treatment needed

**Notes to physician** : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

**Specific treatments** : No specific treatment.

## SECTION 5: Firefighting measures

### 5.1 Extinguishing media

**Suitable extinguishing media** : Use dry chemical, $CO_2$, water spray (fog) or foam.

**Unsuitable extinguishing media** : Do not use water jet.

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## SECTION 5: Firefighting measures

### 5.2 Special hazards arising from the substance or mixture

**Hazards from the substance or mixture** : In a fire or if heated, a pressure increase will occur and the container may burst. This material is toxic to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

**Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides

### 5.3 Advice for firefighters

**Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

**Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

## SECTION 6: Accidental release measures

### 6.1 Personal precautions, protective equipment and emergency procedures

**For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

**For emergency responders** : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

**6.2 Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities. Collect spillage.

### 6.3 Methods and materials for containment and cleaning up

**Small spill** : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

**Large spill** : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product.

**6.4 Reference to other sections** : See Section 1 for emergency contact information.
See Section 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

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## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

**Protective measures** : Put on appropriate personal protective equipment (see Section 8). Avoid release to the environment. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

**Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

### 7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed and sealed until ready for use. Use appropriate containment to avoid environmental contamination. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers.

<u>Seveso Directive - Reporting thresholds (in tonnes)</u>

<u>Danger criteria</u>

| Category | Notification and MAPP threshold | Safety report threshold |
|---|---|---|
| E2: Hazardous to the aquatic environment - Chronic 2 | 200 | 500 |

### 7.3 Specific end use(s)

**Recommendations** : Not available.

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

<u>Occupational exposure limits</u>

No exposure limit value known.

**Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to monitoring standards, such as the following: European Standard EN 689 (Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy) European Standard EN 14042 (Workplace atmospheres - Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents) European Standard EN 482 (Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents) Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

<u>DNELs/DMELs</u>

No DNELs/DMELs available.

<u>PNECs</u>

No PNECs available.

### 8.2 Exposure controls

**Appropriate engineering controls** : If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

<u>Individual protection measures</u>

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## SECTION 8: Exposure controls/personal protection

**Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Ensure that eyewash stations and safety showers are close to the workstation location.

**Eye/face protection** : If inhalation hazards exist, a full-face respirator may be required instead.

<u>Skin protection</u>

**Hand protection** : Wear suitable gloves tested to EN374. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

**Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Respiratory protection** : Work in well-ventilated zones or use proper respiratory protection. Half-face mask (DIN EN 140)

**Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

<u>Appearance</u>

**Physical state** : Liquid.
**Color** : Yellowish.
**Odor** : Odorless.
**Odor threshold** : Not available.
**pH** : 9 to 11
**Melting point/freezing point** : <5°C
**Initial boiling point and boiling range** : Not available.
**Flash point** : Closed cup: 194°C [Pensky-Martens.]
**Evaporation rate** : Not available.
**Flammability (solid, gas)** : Not available.
**Upper/lower flammability or explosive limits** : Not available.
**Vapor pressure** : Not available.
**Vapor density** : Not available.
**Density** : 0.99 g/cm³ [20°C (68°F)]
**Solubility(ies)** : Not available.
**Partition coefficient: n-octanol/water** : Not available.
**Auto-ignition temperature** : Not available.
**Decomposition temperature** : Not available.
**Viscosity** : Not available.
**Explosive properties** : Not available.
**Oxidizing properties** : Not available.

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## SECTION 9: Physical and chemical properties

**9.2 Other information**

No additional information.

## SECTION 10: Stability and reactivity

**10.1 Reactivity** : No specific test data related to reactivity available for this product or its ingredients.

**10.2 Chemical stability** : The product is stable.

**10.3 Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.

**10.4 Conditions to avoid** : Avoid all possible sources of ignition (spark or flame).

**10.5 Incompatible materials** : No specific data.

**10.6 Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## SECTION 11: Toxicological information

**11.1 Information on toxicological effects**

Acute toxicity

| Product/ingredient name | Result | Species | Dose | Exposure |
|---|---|---|---|---|
| Amides, palm kernel-oil, N, N-bis(hydroxyethyl) | LD50 Oral | Rat | >5000 mg/kg | - |

**Conclusion/Summary** : Not available.

Acute toxicity estimates

| Route | ATE value |
|---|---|
| Oral | 20000 mg/kg |

Irritation/Corrosion

| Product/ingredient name | Result | Species | Score | Exposure | Observation |
|---|---|---|---|---|---|
| Amides, palm kernel-oil, N, N-bis(hydroxyethyl) | Skin - Irritant | Rabbit | - | - | - |
| | Eyes - Severe irritant | Rabbit | - | - | - |
| 2,2'-iminodiethanol | Eyes - Severe irritant | Rabbit | - | 24 hours 750 Micrograms | - |
| | Eyes - Severe irritant | Rabbit | - | 5500 milligrams | - |
| | Skin - Mild irritant | Rabbit | - | 24 hours 500 milligrams | - |
| | Skin - Mild irritant | Rabbit | - | 50 milligrams | - |

**Conclusion/Summary** : Not available.

Sensitization

**Conclusion/Summary** : Not available.

Mutagenicity

**Conclusion/Summary** : Not available.

Carcinogenicity

**Conclusion/Summary** : Not available.

Reproductive toxicity

**Conclusion/Summary** : Not available.

Teratogenicity

**Conclusion/Summary** : Not available.

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## SECTION 11: Toxicological information

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

| Product/ingredient name | Category | Route of exposure | Target organs |
|---|---|---|---|
| 2,2'-iminodiethanol | Category 2 | Not determined | Not determined |

Aspiration hazard

Not available.

**Information on the likely routes of exposure** : Not available.

## SECTION 12: Ecological information

**12.1 Toxicity**

| Product/ingredient name | Result | Species | Exposure |
|---|---|---|---|
| Amides, palm kernel-oil, N, N-bis(hydroxyethyl) | Acute LC50 3.6 mg/l Fresh water | Fish | 96 hours |
| 2,2'-iminodiethanol | Acute EC50 12 mg/l Fresh water | Algae - Pseudokirchneriella subcapitata | 96 hours |
| | Acute LC50 28800 µg/l Fresh water | Crustaceans - Ceriodaphnia dubia - Neonate | 48 hours |
| | Acute LC50 2150 µg/l Fresh water | Daphnia - Daphnia pulex | 48 hours |
| | Acute LC50 775 mg/l Fresh water | Fish - Lepomis macrochirus | 96 hours |

**Conclusion/Summary** : Not available.

**12.2 Persistence and degradability**

| Product/ingredient name | Test | Result | Dose | Inoculum |
|---|---|---|---|---|
| Amides, palm kernel-oil, N, N-bis(hydroxyethyl) | OECD 301B Ready Biodegradability - $CO_2$ Evolution Test | 92.5 % - Readily - 28 days | - | - |

**Conclusion/Summary** : Not available.

| Product/ingredient name | Aquatic half-life | Photolysis | Biodegradability |
|---|---|---|---|
| Amides, palm kernel-oil, N, N-bis(hydroxyethyl) | - | - | Readily |

**12.3 Bioaccumulative potential**

| Product/ingredient name | $LogP_{ow}$ | BCF | Potential |
|---|---|---|---|
| 2,2'-iminodiethanol | -1.43 | - | low |

**12.4 Mobility in soil**

**Soil/water partition coefficient ($K_{OC}$)** : Not available.

**Mobility** : Not available.

**12.5 Results of PBT and vPvB assessment**

**PBT** : Not applicable.

**vPvB** : Not applicable.

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## SECTION 12: Ecological information

**12.6 Other adverse effects** : No known significant effects or critical hazards.

## SECTION 13: Disposal considerations

**13.1 Waste treatment methods**

Product

**Methods of disposal** : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction.

**Hazardous waste** : The classification of the product may meet the criteria for a hazardous waste.

Packaging

**Methods of disposal** : The generation of waste should be avoided or minimized wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

**Special precautions** : This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

## SECTION 14: Transport information

| | ADR/RID | ADN | IMDG | IATA |
|---|---|---|---|---|
| **14.1 UN number** | 3082 | 3082 | 3082 | 3082 |
| **14.2 UN proper shipping name** | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Amides, palm kernel-oil, N,N-bis (hydroxyethyl), 2,2'-iminodiethanol) | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Amides, palm kernel-oil, N,N-bis (hydroxyethyl), 2,2'-iminodiethanol) | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (2,2'-iminodiethanol) | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (2,2'-iminodiethanol) |
| **14.3 Transport hazard class(es)** | 9 | 9 | 9 | 9 |
| **14.4 Packing group** | - | - | - | - |
| **14.5 Environmental hazards** | Yes. | Yes. | Yes. | Yes. |
| **Additional information** | This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8. Tunnel code (E) | This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8. | This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8. | This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 5.0.2.4.1, 5.0.2.6.1.1 and 5.0.2.8. |

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## SECTION 14: Transport information

**14.6 Special precautions for user** : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

**14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code** : Not available.

## SECTION 15: Regulatory information

**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

EU Regulation (EC) No. 1907/2006 (REACH)

Annex XIV - List of substances subject to authorization

Annex XIV

None of the components are listed.

Substances of very high concern

None of the components are listed.

**Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles** : Not applicable.

Other EU regulations

**Europe inventory** : All components are listed or exempted.

Ozone depleting substances (1005/2009/EU)

Not listed.

Prior Informed Consent (PIC) (649/2012/EU)

Not listed.

Seveso Directive

This product is controlled under the Seveso Directive.

Danger criteria

| Category |
|---|
| E2: Hazardous to the aquatic environment - Chronic 2 |

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

International lists

National inventory

**Australia** : Not determined.

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## SECTION 15: Regulatory information

| | |
|---|---|
| **Canada** | : All components are listed or exempted. |
| **China** | : All components are listed or exempted. |
| **Japan** | : **Japan inventory (ENCS)**: Not determined.<br>**Japan inventory (ISHL)**: Not determined. |
| **Malaysia** | : Not determined. |
| **New Zealand** | : Not determined. |
| **Philippines** | : All components are listed or exempted. |
| **Republic of Korea** | : Not determined. |
| **Taiwan** | : All components are listed or exempted. |
| **Turkey** | : Not determined. |
| **United States** | : All components are listed or exempted. |

**15.2 Chemical Safety Assessment** : This product contains substances for which Chemical Safety Assessments are still required.

## SECTION 16: Other information

Indicates information that has changed from previously issued version.

**Abbreviations and acronyms** :
ATE = Acute Toxicity Estimate
CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]
DMEL = Derived Minimal Effect Level
DNEL = Derived No Effect Level
EUH statement = CLP-specific Hazard statement
PBT = Persistent, Bioaccumulative and Toxic
PNEC = Predicted No Effect Concentration
RRN = REACH Registration Number
vPvB = Very Persistent and Very Bioaccumulative

**Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]**

| Classification | Justification |
|---|---|
| Skin Irrit. 2, H315 | Calculation method |
| Eye Dam. 1, H318 | Calculation method |
| Aquatic Chronic 2, H411 | Calculation method |

**Full text of abbreviated H statements**

| | |
|---|---|
| H302 | Harmful if swallowed. |
| H315 | Causes skin irritation. |
| H318 | Causes serious eye damage. |
| H373 | May cause damage to organs through prolonged or repeated exposure. |
| H411 | Toxic to aquatic life with long lasting effects. |

**Full text of classifications [CLP/GHS]**

| | |
|---|---|
| Acute Tox. 4, H302 | ACUTE TOXICITY (oral) - Category 4 |
| Aquatic Chronic 2, H411 | AQUATIC HAZARD (LONG-TERM) - Category 2 |
| Eye Dam. 1, H318 | SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1 |
| Skin Irrit. 2, H315 | SKIN CORROSION/IRRITATION - Category 2 |
| STOT RE 2, H373 | SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2 |

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**Notice to reader**

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## SECTION 16: Other information

**To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.**
**Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.**

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**SAFETY DATA SHEET**

Revision Date: 11/07/2016
Print Date: 12/9/2016
SDS Number: R0717854
Version: 1.3

Escalol™ 567 UV filters
™ Trademark, Ashland or its subsidiaries, registered in various countries
827731

29 CFR 1910.1200 (OSHA HazCom 2012)

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product identifier
Trade name : Escalol™ 567
UV filters
™ Trademark, Ashland or its subsidiaries, registered in various countries

Substance name ESCALOL® 567

Substance No.
EC-No. 205-031-5

Relevant identified uses of the substance or mixture and uses advised against
Use of the substance/mixture : Personal care, Cosmetics

| Details of the supplier of the safety data sheet | Emergency telephone number |
|---|---|
| Ashland<br>P.O. Box 2219<br>Columbus, OH 43216<br>United States of America<br><br>EHSProductSafety@ashland.com | 1-800-ASHLAND (1-800-274-5263)<br><br>Regulatory Information Number<br>1-800-325-3751<br><br>Product Information<br>614-790-3333 |

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification
Combustible Dust :

GHS label elements
Signal Word : Warning

Hazard Statements : May form combustible dust concentrations in air.

Precautionary Statements : Prevention:
Keep dust/air mixtures away from ignition sources.

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**SAFETY DATA SHEET**

Revision Date: 11/07/2016
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SDS Number: R0717854
Version: 1.3

Escalol™ 567 UV filters
™ Trademark, Ashland or its subsidiaries, registered in various countries
827731

Other hazards
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance

Chemical nature : organic

Hazardous components
No hazardous ingredients

SECTION 4. FIRST AID MEASURES

General advice : No hazards which require special first aid measures.

If inhaled : If breathed in, move person into fresh air.
If unconscious place in recovery position and seek medical advice.
If symptoms persist, call a physician.

In case of skin contact : First aid is not normally required. However, it is recommended that exposed areas be cleaned by washing with soap and water.

In case of eye contact : Remove contact lenses.
Protect unharmed eye.

If swallowed : Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.
If symptoms persist, call a physician.

Most important symptoms and effects, both acute and delayed : No symptoms known or expected.

Notes to physician : No hazards which require special first aid measures.

SECTION 5. FIREFIGHTING MEASURES

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Escalol™ 567 UV filters
™ Trademark, Ashland or its subsidiaries, registered in various countries
827731

| | | |
|---|---|---|
| Suitable extinguishing media | : | Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.<br>Water spray<br>Foam |
| Specific hazards during firefighting | : | Organic dusts at sufficient concentration can form explosive mixtures in air.<br>Do not allow run-off from fire fighting to enter drains or water courses. |
| Hazardous combustion products | : | Acetone<br>carbon dioxide and carbon monoxide |
| Specific extinguishing methods | : | |
| | | Product is compatible with standard fire-fighting agents. |
| Further information | : | Standard procedure for chemical fires. |
| Special protective equipment for firefighters | : | In the event of fire, wear self-contained breathing apparatus. |

SECTION 6. ACCIDENTAL RELEASE MEASURES

| | | |
|---|---|---|
| Personal precautions, protective equipment and emergency procedures | : | Avoid dust formation.<br>Avoid breathing dust.<br>Material can create slippery conditions.<br>Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed. |
| Environmental precautions | : | Prevent further leakage or spillage if safe to do so. |
| Methods and materials for containment and cleaning up | : | Pick up and arrange disposal without creating dust.<br>Keep in suitable, closed containers for disposal. |
| Other information | : | Comply with all applicable federal, state, and local regulations. |

SECTION 7. HANDLING AND STORAGE

| | | |
|---|---|---|
| Advice on safe handling | : | Avoid dust formation.<br>Ensure all equipment is electrically grounded and bonded before beginning transfer operations.<br>The material can accumulate static charge and can therefore |

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cause electrical ignition of flammable atmospheres.
Smoking, eating and drinking should be prohibited in the application area.
For personal protection see section 8.
Maintain good housekeeping. Do not permit dust layers to accumulate, for example, on floors, ledges, and equipment, in order to avoid any potential for dust explosion hazards.

For further guidance on prevention of dust explosions, refer to National Fire Protection Association (NFPA) 654: "Standard for the Prevention of Fire and Dust Explosions, from the Manufacturing, Processing and Handling of Combustible Particulate Solids".

| | | |
|---|---|---|
| Conditions for safe storage | : | No smoking. |
| Materials to avoid | : | No materials to be especially mentioned. |

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

| | | |
|---|---|---|
| Engineering measures | : | Provide appropriate exhaust ventilation at places where dust is formed.<br>General room ventilation should be adequate for normal conditions of use. However, if unusual operating conditions exist, provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below exposure guidelines (if applicable) or below levels that cause known, suspected or apparent adverse effects.<br><br>For exposures to dust, utilize the exposure limits for Particulates (insoluble) Not Otherwise Classified (PNOC). ACGIH TWA - 10 mg/m3 inhalable fraction, 3 mg/m3 respirable fraction. OSHA PEL - 15 mg/m3 total dust, 5 mg/m3 respirable fraction. |

Personal protective equipment

| | | |
|---|---|---|
| Respiratory protection | : | No personal respiratory protective equipment normally required. |
| Eye protection | : | Safety glasses |

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| | | |
|---|---|---|
| Skin and body protection | : | Wear as appropriate:<br>Safety shoes<br>Wear resistant gloves (consult your safety equipment supplier). |
| Hygiene measures | : | Avoid breathing dust. |

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

| | | |
|---|---|---|
| Appearance | : | powder |
| Physical state | : | solid |
| Colour | : | yellow |
| Odour | : | mild, characteristic |
| Odour Threshold | : | No data available |
| pH | : | No data available |
| Melting point/freezing point | : | 144 - 149 °F / 62 - 65 °C |
| Boiling point/boiling range | : | 302 - 320 °F / 150 - 160 °C (7 hPa) |
| Flash point | : | 215.6 °C |
| Evaporation rate | : | No data available |
| Flammability (solid, gas) | : | No data available |
| Upper explosion limit | : | No data available |
| Lower explosion limit | : | No data available |
| Vapour pressure | : | No data available |
| Relative vapour density | : | No data available |
| Relative density | : | No data available |
| Density | : | 1.34 g/cm3 (25 °C) |

Solubility(ies)

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| | | |
|---|---|---|
| Water solubility | : | insoluble |
| Solubility in other solvents | : | No data available |
| Partition coefficient: n-octanol/water | : | No data available |
| Thermal decomposition | : | No data available |
| Viscosity | | |
| Viscosity, dynamic | : | No data available |
| Viscosity, kinematic | : | No data available |
| Oxidizing properties | : | No data available |

SECTION 10. STABILITY AND REACTIVITY

| | | |
|---|---|---|
| Reactivity | : | No decomposition if stored and applied as directed. |
| Chemical stability | : | Stable under recommended storage conditions. |
| Possibility of hazardous reactions | : | Dust may form explosive mixture in air. |
| Conditions to avoid | : | Keep away from heat, flame, sparks and other ignition sources. |
| Incompatible materials | : | Strong oxidizing agents |
| Hazardous decomposition products | | No hazardous decomposition products are known. |

SECTION 11. TOXICOLOGICAL INFORMATION

| | | |
|---|---|---|
| Information on likely routes of exposure | : | Inhalation<br>Skin contact<br>Eye Contact<br>Ingestion |

Acute toxicity
Not classified based on available information.
Skin corrosion/irritation

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Not classified based on available information.
Serious eye damage/eye irritation
Not classified based on available information.
Product :
Remarks: Unlikely to cause eye irritation or injury., Product dust may be irritating to eyes, skin and respiratory system.

Respiratory or skin sensitisation
Skin sensitisation: Not classified based on available information.
Respiratory sensitisation: Not classified based on available information.
Germ cell mutagenicity
Not classified based on available information.
Carcinogenicity
Not classified based on available information.
Reproductive toxicity
Not classified based on available information.
STOT - single exposure
Not classified based on available information.
STOT - repeated exposure
Not classified based on available information.
Aspiration toxicity
Not classified based on available information.
Product :
No aspiration toxicity classification

Further information
Product :
Remarks: No data available

Carcinogenicity:

| | |
|---|---|
| IARC | No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC. |
| OSHA | No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA. |
| NTP | No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP. |

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SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity
No data available
Persistence and degradability
No data available
Bioaccumulative potential
No data available
Mobility in soil
No data available
Other adverse effects
No data available
Product :
Additional ecological information : No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods
General advice : Dispose of in accordance with all applicable local, state and federal regulations.

Contaminated packaging : Empty remaining contents.

SECTION 14. TRANSPORT INFORMATION

International transport regulations
REGULATION

| ID NUMBER | PROPER SHIPPING NAME | *HAZARD CLASS | SUBSIDIARY HAZARDS | PACKING GROUP | MARINE POLLUTANT / LTD. QTY. |
|---|---|---|---|---|---|

U.S. DOT - ROAD
Not dangerous goods

CFR_RAIL_C
Not dangerous goods

U.S. DOT - INLAND WATERWAYS
Not dangerous goods

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TDG_ROAD_C
Not dangerous goods

TDG_RAIL_C
Not dangerous goods

TDG_INWT_C
Not dangerous goods

INTERNATIONAL MARITIME DANGEROUS GOODS

| | | | | | |
|---|---|---|---|---|---|
| UN | 3077 | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (BENZOPHENONE-3) | 9 | III | MARINE POLLUTANT:( BENZOPHENONE-3) |

INTERNATIONAL AIR TRANSPORT ASSOCIATION - CARGO

| | | | | | |
|---|---|---|---|---|---|
| UN | 3077 | Environmentally hazardous substance, solid, n.o.s. (BENZOPHENONE-3) | 9 | III | |

INTERNATIONAL AIR TRANSPORT ASSOCIATION - PASSENGER

| | | | | | |
|---|---|---|---|---|---|
| UN | 3077 | Environmentally hazardous substance, solid, n.o.s. (BENZOPHENONE-3) | 9 | III | |

MX_DG

| | | | | | |
|---|---|---|---|---|---|
| UN | 3077 | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (BENZOPHENONE-3) | 9 | III | |

*ORM = ORM-D, CBL = COMBUSTIBLE LIQUID

| | | |
|---|---|---|
| Marine pollutant | | no |

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Dangerous goods descriptions (if indicated above) may not reflect quantity, end-use or region-specific exceptions that can be applied. Consult shipping documents for descriptions that are specific to the shipment.

SECTION 15. REGULATORY INFORMATION

SARA 311/312 Hazards : Fire Hazard

SARA 313 Component(s)SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

California Prop 65 This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

The components of this product are reported in the following inventories:

TSCA : On TSCA Inventory

DSL : All components of this product are on the Canadian DSL

AICS : On the inventory, or in compliance with the inventory

ENCS : On the inventory, or in compliance with the inventory

KECI : On the inventory, or in compliance with the inventory

PICCS : On the inventory, or in compliance with the inventory

IECSC : On the inventory, or in compliance with the inventory

Inventories
AICS (Australia), DSL (Canada), IECSC (China), REACH (European Union), ENCS (Japan), ISHL (Japan), KECI (Korea), NZIoC (New Zealand), PICCS (Philippines), TCSI (Taiwan), TSCA (USA)

SECTION 16. OTHER INFORMATION

Further information
Revision Date: 11/07/2016

| NFPA: | HMIS III: |
|---|---|

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| | |
|---|---|
| HEALTH | 0 |
| FLAMMABILITY | 0 |
| PHYSICAL HAZARD | 0 |

0 = not significant, 1 = Slight,
2 = Moderate, 3 = High
4 = Extreme, * = Chronic

NFPA Flammable and Combustible Liquids Classification
Not applicable

Full text of H-Statements

Sources of key data used to compile the Safety Data Sheet
Ashland internal data including own and sponsored test reports
The UNECE administers regional agreements implementing harmonised classification for labelling (GHS) and transport.

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. This SDS has been prepared by Ashland's Environmental Health and Safety Department (1-800-325-3751).

List of abbreviations and acronyms that could be, but not necessarily are, used in this safety data sheet:
ACGIH : American Conference of Industrial Hygienists
BEI : Biological Exposure Index
CAS : Chemical Abstracts Service (Division of the American Chemical Society).
CMR : Carcinogenic, Mutagenic or Toxic for Reproduction
FG : Food grade
GHS : Globally Harmonized System of Classification and Labeling of Chemicals.
H-statement : Hazard Statement
IATA : International Air Transport Association.

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IATA-DGR : Dangerous Goods Regulation by the "International Air Transport Association" (IATA).

ICAO : International Civil Aviation Organization
ICAO-TI (ICAO) : Technical Instructions by the "International Civil Aviation Organization"
IMDG : International Maritime Code for Dangerous Goods
ISO : International Organization for Standardization
logPow : octanol-water partition coefficient
LCxx : Lethal Concentration, for xx percent of test population
LDxx : Lethal Dose, for xx percent of test population.
ICxx : Inhibitory Concentration for xx of a substance
Exxx : Effective Concentration of xx
N.O.S.: Not Otherwise Specified
OECD : Organization for Economic Co-operation and Development
OEL : Occupational Exposure Limit
P-Statement : Precautionary Statement
PBT : Persistent , Bioaccumulative and Toxic
PPE : Personal Protective Equipment
STEL : Short-term exposure limit
STOT : Specific Target Organ Toxicity
TLV : Threshold Limit Value
TWA : Time-weighted average
vPvB : Very Persistent and Very Bioaccumulative
WEL : Workplace Exposure Level

CERCLA : Comprehensive Environmental Response, Compensation, and Liability Act
DOT : Department of Transportation
FIFRA : Federal Insecticide, Fungicide, and Rodenticide Act
HMIRC : Hazardous Materials Information Review Commission
HMIS : Hazardous Materials Identification System
NFPA : National Fire Protection Association
NIOSH : National Institute for Occupational Safety and Health
OSHA : Occupational Safety and Health Administration
PMRA : Health Canada Pest Management Regulatory Agency
RTK : Right to Know
WHMIS : Workplace Hazardous Materials Information System

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**MATERIAL SAFETY DATA SHEET**

Date Printed: 09-20-2010
Date Updated: 02-01-2006
Version 1.3

Section 1 - Product and Company Information

| | |
|---|---|
| Product Name | ETHANOL-D(1), ABSOLUTE, >99.5 (ATOM % D) |
| Product Number | 31260 |
| Brand | FLUKA |
| Company | Sigma-Aldrich |
| Address | 3050 Spruce Street<br>SAINT LOUIS, MO 63103<br>USA |
| Technical Phone: | +1 800-325-5832 |
| Fax: | +1 800-325-5052 |
| Emergency Phone: | (314) 776-6555 |

Section 2 - Composition/Information on Ingredient

| Substance Name | CAS # | SARA 313 |
|---|---|---|
| ETHANOL-D(1), ABSOLUTE, >99.5 (ATOM % D) | 925-93-9 | No |

Formula C2H5DO

Section 3 - Hazards Identification

EMERGENCY OVERVIEW
Flammable (USA) Highly Flammable (EU). Irritant.
Irritating to eyes, respiratory system and skin.
Target organ(s): Liver. Nerves.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE
In case of contact, immediately wash skin with soap and copious amounts of water.

EYE EXPOSURE
In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measures

EXPLOSION HAZARDS
Vapor may travel considerable distance to source of ignition and

FLUKA - 31260
Page 1

FLASH POINT
57.2 °F 14 °C Method: closed cup

AUTOIGNITION TEMP
N/A

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Vapor may travel considerable distance to source of ignition and flash back. Flammable liquid.
Specific Method(s) of Fire Fighting: Use water spray to cool fire-exposed containers.

EXPOSURE HAZARD(S)
Material: Irritant.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Shut off all sources of ignition. Use nonsparking tools.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Absorb on sand or vermiculite and place in closed containers for disposal. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe vapor. Avoid contact with eyes, skin, and clothing.

STORAGE
Suitable: Keep tightly closed. Keep away from heat, sparks, and open flame. Store in a cool dry place. Store under nitrogen.

SPECIAL REQUIREMENTS
Hygroscopic.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Mechanical exhaust required.

PERSONAL PROTECTIVE EQUIPMENT

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(EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.
Hand: Rubber gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

Appearance — Color: Colorless; Form: Clear liquid

| Property | Value | At Temperature or Pressure |
|---|---|---|
| Molecular Weight | 47.08 AMU | |
| pH | N/A | |
| BP/BP Range | 78.0 - 79.0 °C | 760 mmHg |
| MP/MP Range | N/A | |
| Freezing Point | N/A | |
| Vapor Pressure | N/A | |
| Vapor Density | N/A | |
| Saturated Vapor Conc. | N/A | |
| SG/Density | 0.81 g/cm3 | |
| Bulk Density | N/A | |
| Odor Threshold | N/A | |
| Volatile% | N/A | |
| VOC Content | N/A | |
| Water Content | N/A | |
| Solvent Content | N/A | |
| Evaporation Rate | N/A | |
| Viscosity | N/A | |
| Surface Tension | N/A | |
| Partition Coefficient | N/A | |
| Decomposition Temp. | N/A | |
| Flash Point | 57.2 °F 14 °C | Method: closed cup |
| Explosion Limits | N/A | |
| Flammability | N/A | |
| Autoignition Temp | N/A | |
| Refractive Index | 1.3595 | |
| Optical Rotation | N/A | |
| Miscellaneous Data | N/A | |
| Solubility | N/A | |

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Conditions to Avoid: Moisture.
Materials to Avoid: Oxidizing agents, Peroxides, Acids, Acid chlorides, Acid anhydrides, Alkali metals, Ammonia.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

Section 11 - Toxicological Information

ROUTE OF EXPOSURE

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membranes, and upper respiratory tract. May be harmful by inhalation, ingestion, or skin absorption.

TARGET ORGAN(S) OR SYSTEM(S)
Liver. Central nervous system.

SIGNS AND SYMPTOMS OF EXPOSURE
Narcotic effect. Nausea, headache, and vomiting. Exposure can cause: Can cause CNS depression.

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Ethanol [or] Ethyl alcohol [or] Ethanol solutions [or] Ethyl alcohol solutions
UN#: 1170
Class: 3
Packing Group: Packing Group II
Hazard Label: Flammable liquid
PIH: Not PIH

IATA
Proper Shipping Name: Ethanol
IATA UN Number: 1170
Hazard Class: 3
Packing Group: II

Section 15 - Regulatory Information

EU ADDITIONAL CLASSIFICATION
Symbol of Danger: F
Indication of Danger: Highly Flammable.
R: 11
Risk Statements: Highly flammable.
S: 7-16
Safety Statements: Keep container tightly closed. Keep away from sources of ignition - no smoking.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Flammable (USA) Highly Flammable (EU). Irritant.
Risk Statements: Irritating to eyes, respiratory system and skin.
Safety Statements: Keep away from sources of ignition - no smoking. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing.
US Statements: Target organ(s): Liver. Nerves.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: No

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WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: No
NDSL: No

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2006 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.

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SENSIENT™

**Safety Data Sheet**
**FD&C RED N°40 07700-C**
Safety Data Sheet dated 4/18/2019 version 7

**SECTION 1: Identification of the substance/mixture and of the company/undertaking**
**1.1 Product Identifier**
Substance indentification:
Trade name: FD&C RED N°40 07700-C
Trade code: 07700C
EC number: 247-368-0
Registration Number: See Paragraph 3
**1.2 Relevant identified uses of the substance or mixture and uses advised against**
Recommended use: Cosmetic Ingredient
Uses advised against: Not available
**1.3 Details of the supplier of the safety data sheet**
Company/ undertaking identification: Sensient Cosmetic Technologies
7-9, Rue de l'industrie
F-95310 SAINT OUEN L'AUMONE,
France

Tel: +33 (0) 1.34.48.57.00
Fax: +33 (0) 1.34.64.44.40
email: msds@sensient-cosmetics.com
**1.4 Emergency telephone number**
- For emergencies involving dangerous goods, contact ORFILA : 33 (0) 1 45.42.59.59
- For non-hazardous goods, contact SENSIENT Tel: 33 (0)1 34 48 57 00

**SECTION 2: Hazards identification**
**2.1 Classification of the substance or mixture**

0 The product is not classified as dangerous according to Regulation EC 1272/2008 (CLP).
Adverse physicochemical, human health and environmental effects:
No other hazards
**2.2 Label elements**

The product is not classified as dangerous according to Regulation EC 1272/2008 (CLP).
**Special provisions according to Annex XVII of REACH and subsequent amendments:**
None
**2.3 Other hazards**
No PBT Ingredients are present
Other Hazards: No other hazards
**Hazards not otherwise classified identified during the classification process**

**SECTION 3: Composition/information on ingredients**
**3.1 Substances**

Print date 4/18/2019 Production Name FD&C RED N°40 07700-C Page n. 1 of 6

| | |
|---|---|
| Chemical characterisation: | FD&C RED NO. 40 |
| CAS number: | 25956-17-6 |
| EC number: | 247-368-0 |
| Registration Number | 01-2119935928-21-XXXX |

**3.2 Mixtures**
Not Available

### SECTION 4: First aid measures

**4.1 Description of first aid measures**
In case of skin contact:
Wash with plenty of water and disinfectant/non-abrasive soap.
In case of eye contact:
Wash immediately with water.
In case of ingestion:
Do not induce vomiting, get medical attention showing the MSDS and label hazardous.
In case of inhalation:
Remove casualty to fresh air and keep warm and at rest.
**4.2 Most important symptoms and effects, both acute and delayed**
Not Available
**4.3 Indication of any immediate medical attention and special treatment needed**

### SECTION 5: Firefighting measures

**5.1 Extinguishing media**
Suitable extinguishing media:
Water, $CO_2$, foam, chemical powders, according to the materials involved in the fire.
In case of fire, use foam, dry chemical, $CO_2$.
Unsuitable extinguishing media:
None in particular.
**5.2 Special hazards arising from the substance or mixture**
Do not inhale explosion and combustion gases.
Burning produces heavy smoke.
**5.3 Advice for fire-fighters**
Use suitable breathing apparatus .
Collect contaminated fire extinguishing water separately. This must not be discharged into drains.
Move undamaged containers from immediate hazard area if it can be done safely.

### SECTION 6: Accidental release measures

**6.1 Personal precautions, protective equipment and emergency procedures**
Wear personal protection equipment.
Remove persons to safety.
See protective measures under point 7 and 8.
**6.2 Environmental precautions**
Do not allow to enter into soil/subsoil. Do not allow to enter into surface water or drains.
Retain contaminated washing water and dispose of it following local legislation.
In case of gas escape or of entry into waterways, soil or drains, inform the responsible authorities if required.
Suitable material for taking up: dry and inert absorbing material (e.g. vermiculite, sand, earth).
**6.3 Methods and material for containment and cleaning up**
Suitable material for taking up: dry and inert absorbing material (e.g. vermiculite, sand, earth).
Wash with plenty of water.
**6.4 Reference to other sections**
See also section 8 and 13.

### SECTION 7: Handling and storage

**7.1 Precautions for safe handling:**
Avoid contact with skin and eyes, inhalation of vapours and mists.
Do not eat or drink while working.
See also section 8 for recommended protective equipment.
**7.2 Conditions for safe storage, including any incompatibilities**
Store in a tightly closed container in a cool, dry, well-ventilated area.
Incompatible materials:

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None in particular.
Instructions as regards storage premises:
Adequately ventilated premises.
**7.3 Specific end use(s)**
Recommendation(s)
Storage temperature < 25°C
Industrial sector specific solutions:
None in particular.

### SECTION 8: Exposure controls/personal protection

**8.1 Control parameters**
No Data Available
**8.2 Exposure controls**
Eye/face protection:
Eye glasses with side protection.
Skin protection:
Chemical protection clothing.
Hand protection:
NBR (nitrile rubber).
Respiratory protection:
Filtering Half-face mask (DIN EN 149).
Hygienic and Technical measures
Not Available

### SECTION 9: Physical and chemical properties

**9.1 Information on basic physical and chemical properties**
Physical State Solid
Appearance: Powder, Dark red
Odour: Odorless
Odour threshold: Not Available
pH: Not Available
Melting point/ range: 244 °C (471 °F)
Boiling point/ range: 310 °C (590 °F)
Flash point: 255 °C (491 °F)
Evaporation rate: Not Available
Upper/lower flammability or explosive limits: Not Available
Vapour density: Not Available
Vapour pressure (20°C): Not Available
Density (20°C): 0.71 g/cm3
Water solubility: Soluble
Lipid solubility: Insoluble
Partition coefficient (n-octanol/water): -1.28
Auto-ignition temperature: Not Available
Decomposition temperature: 380.00 °C
Viscosity (20°C): Not Available
Explosive properties: ST1
Oxidising properties: mild oxidizing properties
Flammability (Solid, Gas): Not Available
Volatile Organic compounds - VOCs = Not Available
**9.2 Other information**
Substance group relevant properties: Not Available
Miscibility: Not Available
Conductivity: Not Available

### SECTION 10: Stability and reactivity

**10.1 Reactivity**
Data not Available.
**10.2 Chemical stability**
Data not Available.
**10.3 Possibility of hazardous reactions**

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Burning produces carbon monoxide and/or carbon dioxide.
**10.4 Conditions to avoid**
Data not Available.
**10.5 Incompatible materials**
Data not Available.
**10.6 Hazardous decomposition products**
Data not Available.

### SECTION 11: Toxicological information

**11.1 Information on toxicological effects**
Toxicological Information:
FDA-EEC-CHINA : positive lists

**Toxicological Information of the Substance**

| | | |
|---|---|---|
| FD&C RED NO. 40 | a) acute toxicity | LD50 Oral Rat > 2000.00000 mg/kg |
| | b) skin corrosion/irritation | Skin Irritant No Irritant effect |
| | c) serious eye damage/irritation | Eye Irritant No Irritant effect |

**If not differently specified, the information required in Regulation (EU)2015/830 listed below must be considered as N.A.**
a) acute toxicity
b) skin corrosion/irritation
c) serious eye damage/irritation
d) respiratory or skin sensitisation
e) germ cell mutagenicity
f) carcinogenicity
g) reproductive toxicity
h) STOT-single exposure
i) STOT-repeated exposure
j) aspiration hazard

### SECTION 12: Ecological information

**12.1 Toxicity**
Adopt good working practices, so that the product is not released into the environment.
Eco-toxicity:

**List of Eco-Toxicological properties of the product**

| Component | Ecotox Data |
|---|---|
| FD&C RED NO. 40 | a) Aquatic acute toxicity : LC50 Fish Danio rerio > 100.00000 mg/l 96h OECD 203 |
| | a) Aquatic acute toxicity : EC50 Daphnia Daphnia magna = 486.50000 mg/l 48h |
| | a) Aquatic acute toxicity : EC50 Algae Green algae = 44524.00000 mg/l 96h |

**12.2 Persistence and degradability**
**Persistence/Degradability:**
Not Biodegradable
**12.3 Bioaccumulative potential**
Not Available
**12.4 Mobility in soil**
Not Available
**12.5 Results of PBT and vPvB assessment**
No PBT Ingredients are present
**12.6 Other adverse effects**
Not Available

### SECTION 13: Disposal considerations

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**13.1 Waste treatment methods**
Recover if possible. In so doing, comply with the local and national regulations currently in force.

### SECTION 14: Transport information

**14.1 UN number**
N/A
**14.2 UN proper shipping name**
ADR-Shipping Name: N/A
IATA-Technical name: N/A
IMDG-Technical name: N/A
**14.3 Transport hazard class(es)**
ADR-Class: N/A
IATA-Class: N/A
IMDG-Class: N/A
**14.4 Packing Group**
ADR-Packing Group: N/A
IATA-Packing group: N/A
IMDG-Packing group: N/A
**14.5 Environmental hazards**
Toxic Ingredients Qty: 0.00
High Toxicity Ingredients Qty: 0.00
Marine pollutant: No
Environmental Pollutant: No
**14.6 Special Precautions for User**
Road and Rail (ADR-RID):
ADR-Label: N/A
ADR-Upper number: N/A
ADR-Special Provisions: N/A
ADR-Transport category (Tunnel restriction code): N/A
Air (IATA):
IATA-Passenger Aircraft: N/A
IATA-Cargo Aircraft: N/A
IATA-Label: N/A
IATA-Sub Risk: N/A
IATA-Erg: N/A
IATA-Special Provisioning: N/A
Sea (IMDG):
IMDG-Stowage Code: N/A
IMDG-Stowage Note: N/A
IMDG-Sub Risk: N/A
IMDG-Special Provisioning: N/A
IMDG-Page: N/A
IMDG-Label: N/A
IMDG-EMS: N/A
IMDG-MFAG: N/A
**14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**
Not Available

### SECTION 15: Regulatory information

**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
Dir. 98/24/EC (Risks related to chemical agents at work)
Dir. 2000/39/EC (Occupational exposure limit values)
Regulation (EC) n. 1907/2006 (REACH)
Regulation (EC) n. 1272/2008 (CLP)
Regulation (EC) n. 790/2009 (ATP 1 CLP) and (EU) n. 758/2013
Regulation (EU) n. 286/2011 (ATP 2 CLP)
Regulation (EU) n. 618/2012 (ATP 3 CLP)
Regulation (EU) n. 487/2013 (ATP 4 CLP)
Regulation (EU) n. 944/2013 (ATP 5 CLP)
Regulation (EU) n. 605/2014 (ATP 6 CLP)

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Regulation (EU) n. 2015/1221 (ATP 7 CLP)
Regulation (EU) n. 2016/918 (ATP 8 CLP)
Regulation (EU) n. 2016/1179 (ATP 9 CLP)
Regulation (EU) n. 2015/830 (Annex II)
Restrictions related to the product or the substances contained according to Annex XVII Regulation (EC) 1907/2006 (REACH) and subsequent modifications:
Restrictions related to the product: None
Restrictions related to the substances contained: None
Provisions related to directive EU 2012/18 (Seveso III):

Not Available

German Water Hazard Class.
Class 2: hazardous for water.
SVHC Substances:
None > 0.1%

**15.2 Chemical Safety Assessment**
No Chemical Safety Assessment has been carried out for the substance.

## SECTION 16: Other information

This document was prepared by a competent person who has received appropriate training.
Main bibliographic sources:
ECDIN - Environmental Chemicals Data and Information Network - Joint Research Centre, Commission of the European Communities
SAX's DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS - Eight Edition - Van Nostrand Reinold
It is the duty of the user to ensure that this information is appropriate and complete with respect to the specific use intended.
This MSDS cancels and replaces any preceding release.
Legend to abbreviations and acronyms used in the safety data sheet:
ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road.
RID: Regulation Concerning the International Transport of Dangerous Goods by Rail
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
IATA-DGR: Dangerous Goods Regulation by the "International Air Transport Association" (IATA)
ICAO: International Civil Aviation Organization
Technical Instructions by the "International Civil Aviation Organization" (ICAO)
GHS: Globally Harmonized System of Classification and Labeling of Chemicals
CLP: Classification, Labeling, Packaging
EINECS: European Inventory of Existing Commercial Chemical Substances
INCI: International Nomenclature of Cosmetic Ingredients
CAS: Chemical Abstracts Service (division of the American Chemical Society)
GefStoffVO: Ordnance on Hazardous Substances, Germany
LC50: Lethal concentration, for 50 percent of test population
LD50: Lethal dose, for 50 percent of test population
DNEL: Derived No Effect Level
PNEC: Predicted No Effect Concentration
TLV: Threshold Limiting Value
TWATLV: Threshold Limiting Value for the Time Weighted Average 8 hour day.(ACGIH Standard)
STEL: Short Term Exposure limit
STOT: Specific Target Organ Toxicity
WGK: German Water Hazard Class
KSt: Explosion coefficient

**Paragraphs modified from the previous revision:**
- 1. IDENTIFICATION OF THE SUBSTANCE/ MIXTURE AND OF THE COMPANY/ UNDERTAKING
- 11. TOXICOLOGICAL INFORMATION
- 15. REGULATORY INFORMATION

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SDS Name: FD and C Yellow No.5 Powder

Emerald Performance Materials

**Safety Data Sheet (SDS)**
**International (GHS)**
Revision date: 2016-03-22

### SECTION 1: Identification

**Product identifiers:**

| | |
|---|---|
| **Product trade name:** | FD and C Yellow No.5 Powder |
| **Company product number:** | 21DA4400 |
| **Other means of identification:** | Not Available |

**Recommended use of the chemical and restrictions on use:**

| | |
|---|---|
| **Uses:** | FD&C Color |
| **Restrictions on use:** | None identified |

**Details of the supplier:**

| | |
|---|---|
| **Manufacturer/Supplier:** | Emerald Performance Materials, LLC<br>2020 Front Street, Suite 100<br>Cuyahoga Falls, Ohio 44221<br>United States<br>Telephone: +001-330-916-6700<br>FAX: +001-330-916-6734 |
| **For further information about this SDS:** | Email: product.compliance@emeraldmaterials.com |

**Emergency telephone number:**

Chemtrec (24 hours): USA: 1-800-424-9300; International: +001-703-527-3887.

### SECTION 2: Hazard(s) identification

**Classification of the substance or mixture:**

Not classified as hazardous under any GHS hazard class (UN GHS).

**Label elements:**

| | |
|---|---|
| **Hazard pictogram(s):** | Not Applicable |
| **Signal word:** | Not Applicable |
| **Hazard statements:** | Not Applicable |
| **Precautionary statements:** | Not Applicable |

**Supplemental information:** No Additional Information

**Other hazards:** Dermal contact may discolor the skin due to dye characteristics. May form combustible dust concentrations in air.

See Section 11 for toxicological information.

### SECTION 3: Composition/information on ingredients

**Substance:**

No Hazardous Components found under applicable regulations.

Amounts specified are typical and do not represent a specification. Remaining components are proprietary, non-hazardous, and/or present at amounts below reportable limits.

### SECTION 4: First-aid measures

**Description of first aid measures:**

**General:** If irritation or other symptoms occur or persist from any route of exposure, remove the affected individual from the area: see a physician/get medical attention.

**Eye contact:** Any material that contacts the eye should be washed out immediately with water. Get medical attention if

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SDS Name: FD and C Yellow No.5 Powder

symptoms occur.

**Skin contact:** Wash the affected area thoroughly with plenty of soap and water. Get medical attention if symptoms occur.

**Inhalation:** If affected, remove to fresh air. Get medical attention if symptoms occur.

**Ingestion:** Get medical attention if symptoms occur.

**Protection of first aid responders:** Wear proper personal protective clothing and equipment.

**Most important symptoms and effects, both acute and delayed:** Irritation, Skin discoloration due to dye. Preexisting sensitization, skin and/or respiratory disorders or diseases may be aggravated. See section 11 for additional information.

**Indication of any immediate medical attention and special treatment needed, if necessary:** Treat symptomatically.

### SECTION 5: Fire-fighting measures

**Extinguishing media:**

**Suitable:** Carbon dioxide, foam, dry chemical, water.

**Unsuitable:** Avoid hose streams or any method which will create dust clouds.

**Special hazards arising From the chemical:**

**Unusual fire/explosion hazards:** Concentrated dust/air combinations may produce explosive conditions. As with all organic dusts, fine particles suspended in air in critical proportions and in the presence of an ignition source may ignite and/or explode. Dust may be sensitive to ignition by electrostatic discharge, electrical arcs, sparks, welding torches, cigarettes, open flame, or other significant heat sources. As a precaution, implement standard safety measures for handling finely divided organic powders. See Section 7 for suggested measures.

**Hazardous combustion products:** Irritating or toxic substances may be emitted upon burning, combustion or decomposition. See section 10 (Hazardous decomposition products) for additional information.

**Special protective equipment and precautions for fire-fighters:** Avoid hose streams or any method which will create dust clouds. Wear self-contained breathing apparatus (SCBA) equipped with a full facepiece and operated in a pressure-demand mode (or other positive pressure mode) and approved protective clothing. Personnel without suitable respiratory protection must leave the area to prevent significant exposure to hazardous gases from combustion, burning or decomposition. In an enclosed or poorly ventilated area, wear SCBA during cleanup immediately after a fire as well as during the attack phase of firefighting operations.

See section 9 for additional information.

### SECTION 6: Accidental release measures

**Personal precautions, protective equipment and emergency procedures:** See Section 8 for recommendations on the use of personal protective equipment. If spilled in an enclosed area, ventilate. Avoid raising powdered material due to explosion hazard. Use spark-proof and explosion-proof equipment. If inhalation of dust cannot be avoided, wear an approved particulate respirator.

**Environmental precautions:** Do not flush product into public sewer, water systems or surface waters.

**Methods and materials for containment and cleaning up:** Contain spill. Wear proper personal protective clothing and equipment. Using care to avoid dust generation, vacuum or sweep into a closed container for reuse or disposal. Use approved industrial vacuum cleaner for removal. Avoid causing dust. Place into labeled, closed container; store in safe location to await disposal. Change contaminated clothing and launder before reuse.

### SECTION 7: Handling and storage

**Precautions for safe handling:** As with any chemical product, use good laboratory/workplace procedures. Wash thoroughly after handling this product. Always wash up before eating, smoking or using the facilities. Use under well-ventilated conditions. Avoid eye contact. Avoid repeated or prolonged skin contact. Avoid drinking, tasting, swallowing or ingesting this product. Avoid routine inhalation of dust of any kind. Exercise care when emptying containers, sweeping, mixing or doing other tasks which can create dust. Wash contaminated clothing before reuse. Provide eyewash fountains and safety showers in the work area. As a precaution to control dust explosion potential, implement the following safety measures:Eliminate ignition sources (e.g., sparks, static buildup, excessive heat, etc.). In general, dust of organic materials is a static charge generator which may be ignited by electrostatic

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SDS Name: FD and C Yellow No.5 Powder

discharge, electrical arcs, sparks, welding torches, cigarettes, open flame, or other significant heat sources. Use spark-proof tools and equipment. Bond, ground and properly vent conveyors, dust control devices and other transfer equipment. Prohibit flow of polymer, powder or dust through non-conductive ducts, vacuum hoses or pipes, etc.; only use grounded, electrically conductive transfer lines when pneumatically conveying product. Good housekeeping and controlling of dusts are necessary for safe handling of product. Prevent accumulation of dust (e.g., well-ventilated conditions, promptly vacuuming spills, cleaning overhead horizontal surfaces, etc.).

**Conditions for safe storage, including any incompatibilities:** Store cool and dry, under well-ventilated conditions. Store this material away from incompatible substances (see section 10). Do not store in open, unlabeled or mislabeled containers. Keep container closed when not in use. Product will absorb water vapor (hygroscopic).

### SECTION 8: Exposure controls / personal protection

**Control parameters:**

**Occupational exposure limits (OEL):** No applicable exposure limits.

**Exposure controls:**

**Appropriate engineering controls:** Always provide effective general and, when necessary, local exhaust ventilation to draw dust away from workers to prevent routine inhalation. Ventilation must be adequate to maintain the ambient workplace atmosphere below the exposure limit(s) outlined in the SDS. Eliminate ignition sources (e.g., sparks, static buildup, excessive heat, etc.). Prohibit flow of powder or dust through non-conductive ducts, vacuum hoses, or pipes, etc. Bond, ground, and properly vent conveyors, dust control devices and other transfer equipment.

**Individual protection measures, such as personal protective equipment:**

**Eye/face protection:** Wear eye protection.
**Skin and body protection:** Wear protective gloves. Use good laboratory/workplace procedures including personal protective clothing: labcoat, safety glasses and protective gloves.
**Respiratory protection:** Respiratory protection is not needed with proper ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. If inhalation of dust cannot be avoided, wear an approved particulate respirator.
**Further information:** Eyewash fountains and safety showers are recommended in the work area.

### SECTION 9: Physical and chemical properties

| | | | |
|---|---|---|---|
| **Form:** | Powder | **pH:** | Not Available |
| **Appearance:** | Yellow orange | **Relative density:** | Not Available |
| **Odor:** | None | **Partition coefficient (n-octanol/water):** | Not Available |
| **Odor threshold:** | Not Available | **% Volatile by weight:** | <5 % |
| **Solubility in water:** | Soluble | **VOC:** | Not Applicable |
| **Evaporation rate:** | Not Available | **Boiling point °C:** | Not Available |
| **Vapor pressure:** | Not Available | **Boiling point °F:** | Not Available |
| **Vapor density:** | Not Available | **Flash point:** | Not Available |
| **Viscosity:** | Not Available | **Auto-ignition temperature:** | Not Available |
| **Melting point/Freezing point:** | Not Available | **Flammability (solid, gas):** | Not flammable (may form combustible dust-air mixtures) |
| **Oxidizing properties:** | Not oxidizing | **Flammability or explosive limits:** | **LFL/LEL** Not Available |
| **Explosive properties:** | Not explosive | | **UFL/UEL** Not Available |
| **Decomposition temperature:** | Not Available | | |

**Other information:** Amounts specified are typical and do not represent a specification.

**Dust combustibility data:** FD&C YELLOW NO. 5: Particle size variation is considered a critical factor in regards to dust explosion hazard information. Results applicable as follows: sample particle size <75 um, <5% moisture content. Sample tested may not be typical of product.:

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SDS Name: FD and C Yellow No.5 Powder

- Minimum explosive concentration: 100 g/m3
- Minimum Autoignition temperature (dust cloud): 570 °C
- Minimum Autoignition temperature (dust layer): 325 °C
- Maximum pressure of explosion: 7.9 bars-gauge
- Deflagration Index, Kst: 109 bar-m/sec
- Dust Hazard Class: 1 (weak)

## SECTION 10: Stability and reactivity

**Reactivity:** None known.

**Chemical stability:** This product is stable.

**Possibility of hazardous reactions:** Hazardous polymerization will not occur.

**Conditions to avoid:** Avoid dust formation.

**Incompatible materials:** Avoid strong bases and oxidizing agents.

**Hazardous decomposition products:** Oxides of carbon, oxides of nitrogen, oxides of sulfur.

## SECTION 11: Toxicological information

**Information on likely routes of exposure:**

**General:** Caution must be exercised through the prudent use of protective equipment and handling procedures to minimize exposure.

**Eyes:** Solid particles on the eye (powder/dust) may cause pain and be accompanied by irritation.

**Skin:** Repeated or prolonged skin contact may cause irritation. Repeated or prolonged skin contact may cause allergic reactions with susceptible persons.

**Inhalation:** Dust inhalation may cause respiratory irritation.

**Ingestion:** Ingestion may cause irritation.

**Acute toxicity information:** Not classified (based on available data, the classification criteria are not met). No toxicity studies have been conducted on this product. Oral LD50, Rat: >5000 mg/kg.

**Skin corrosion/irritation:** Not classified (based on available data, the classification criteria are not met).

**Serious eye damage/irritation:** Not classified (based on available data, the classification criteria are not met).

**Respiratory or skin sensitization:** Not classified (based on available data, the classification criteria are not met). FD&C YELLOW NO. 5 appears to be able to elicit intolerance reactions in a small fraction of the exposed population.

**Carcinogenicity:** Not classified.

**Germ cell mutagenicity:** Not classified.

**Reproductive toxicity:** Not classified.

**Specific target organ toxicity (STOT) - single exposure:** Not classified.

**Specific target organ toxicity (STOT) - repeated exposure:** Not classified.

**Aspiration hazard:** Not classified (technical impossibility to obtain the data).

**Other toxicity information:** No additional information available.

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SDS Name: FD and C Yellow No.5 Powder

## SECTION 12: Ecological information

**Ecotoxicity:** Freshwater Fish Toxicity: The acute LC50 is >100 mg/L based on actual data. Freshwater Invertebrates Toxicity: The acute EC50 is >1000 mg/L based on actual data.

**Persistence and degradability:** Not readily biodegradable.

**Bioaccumulative potential:** Not expected to bioaccumulate.

**Mobility in soil:** Expected to be mobile in soil, as it is soluble in water.

**Other adverse effects:** No additional information available.

## SECTION 13: Disposal considerations

Dispose of unused contents (incineration or landfill) in accordance with national and local regulations. Dispose of container in accordance with national and local regulations. Ensure the use of properly authorized waste management companies, where appropriate.

See Section 8 for recommendations on the use of personal protective equipment.

## SECTION 14: Transport information

The information below is provided to assist in documentation. It may supplement the information on the package. The package in your possession may carry a different version of the label depending on the date of manufacture. Depending on inner packaging quantities and packaging instructions, it may be subject to specific regulatory exceptions.

**UN number:** N/A

**UN proper shipping name:**

Not regulated - See Bill of Lading for Details

**Transport hazard class(es):**

**U.S. DOT hazard class:** N/A
**Canada TDG hazard class:** N/A
**Europe ADR/RID hazard class:** N/A
**IMDG Code (ocean) hazard class:** N/A
**ICAO/IATA (air) hazard class:** N/A

A "N/A" listing for the hazard class indicates the product is not regulated for transport by that regulation.

**Packing group:** N/A

**Environmental hazards:**

**Marine pollutant:** Not Applicable
**Hazardous substance (USA):** Not Applicable

**Special precautions for user:** Not Applicable

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code:**

Not Applicable

## SECTION 15: Regulatory information

**Safety, health and environmental regulations specific for the product in question:**

**Japan regulations:**

**Japan Industrial Safety and Health Law:**

| Chemical name | Category |
|---|---|
| No subject chemicals | |

**Japan Fire Service Law:**

| Chemical name | Category | TQ |
|---|---|---|
| No subject chemicals | | |

**Japan Poisonous and Deleterious Substances:**

| Chemical name | Category | Threshold |
|---|---|---|
| No subject chemicals | | |

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SDS Name: FD and C Yellow No.5 Powder

**Japan Prevention of Marine Pollution and Disaster:**

| Chemical name | Category |
|---|---|
| No subject chemicals | |

**Japan Chemical Substances Control Law:**

| Chemical name | Category | Notes |
|---|---|---|
| No subject chemicals | | |

**Korean regulations:**

**Korea Industrial Safety and Health Act:**

| Chemical name | Category | Threshold |
|---|---|---|
| No subject chemicals | | |

**Korea Act on Registration and Evaluation of Chemical Substances (K-REACH) - Substances subject to registration:**

No subject chemicals

**Korea Chemical Control Act (CCA):**

| Chemical name | Category | Code | Threshold |
|---|---|---|---|
| No subject chemicals | | | |

**Korea Safety Control of Dangerous Substances Act (MPSS):**

| Chemical name | Class | Threshold |
|---|---|---|
| No subject chemicals | | |

**Korea Waste Control Act: Waste disposal methods must comply with local and national laws.**

| Chemical name | Notes |
|---|---|
| No subject chemicals | |

**Other regulations:** No Additional Information

**Chemical inventories:**

| Regulation | Status |
|---|---|
| Australian Inventory of Chemical Substances (AICS): | Y |
| Canadian Domestic Substances List (DSL): | Y |
| Canadian Non-Domestic Substances List (NDSL): | N |
| China Inventory of Existing Chemical Substances (IECSC): | Y |
| European Inventory of Existing Chemical Substances (EINECS): | Y |
| European List of Notified Chemical Substances (ELINCS): | N |
| Japan Existing and New Chemical Substances (ENCS): | Y |
| Korean Existing and Evaluated Chemical Substances (KECL): | Y |
| New Zealand Inventory of Chemicals (NZIoC): | Y |
| Philippines Inventory of Chemicals and Chemical Substances (PICCS): | Y |
| Taiwan Inventory of Existing Chemicals: | Y |
| U.S. Toxic Substances Control Act (TSCA): | Y |

A "Y" listing indicates all intentionally added components are either listed or are otherwise compliant with the regulation. A "N" listing indicates that for one or more components: 1) there is no listing on the public inventory; 2) no information is available; or 3) the component has not been reviewed. A "Y" for New Zealand may mean that a qualified group standard may exist for the components in this product.

**Chemical inventory notes:** New Zealand: One or more components may be covered by a group standard.

## SECTION 16: Other information

**Legend:**
* : Trademark owned by Emerald Performance Materials, LLC.
ACGIH: American Conference of Governmental Industrial Hygienists
N/A: Not Applicable
N/E: None Established
STEL: Short Term Exposure Limit
TWA: Time Weighted Average (exposure for 8-hour workday)

**Users Responsibility/Disclaimer of Liability:**
The information set forth herein is based on our current knowledge, and is intended to describe the product solely with respect to health, safety and the environment. As such, it must not be interpreted as a guarantee of any specific property of the product. As a result, the customer shall be solely responsible for deciding whether said information is suitable and beneficial.

Safety Data Sheet Preparer:
Product Compliance Department
Emerald Performance Materials, LLC

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SDS Name: FD and C Yellow No.5 Powder

2020 Front Street, Suite 100
Cuyahoga Falls, Ohio 44221
United States

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SEQ Number : 19-1019 Issue date: 2020/8/5 1/4

## SAFETY DATA SHEET

**1. Identification**

Product Identity: **Citrus 046.623**

Manufacturer: NAGAOKA CO., LTD.
Address: 2-6, Kitakyuhojimachi 2-chome, Chuo-Ku, Osaka JAPAN
E-mail: overseas@npc-nagaoka.co.jp
Tel.: +81-(0)6-6228-3450
Fax: +81-(0)6-6268-3456

**2. Hazard identification**

**【GHS classification】**

Flammable liquids : Category 3
Acute toxicity (Oral) : Not classified
Acute toxicity (Dermal) : Not classified
Acute toxicity (Inhalation) : Classification not possible
Skin corrosion / irritation : Category 2
Serious eye damage / eye irritation : Category 2
Respiratory sensitization : Classification not possible
Skin sensitization : Category 1
Germ cell mutagenicity : Classification not possible
Carcinogenicity : Classification not possible
Reproductive toxicity : Category 2
Specific target organ toxicity, single exposure : Category 2
Specific target organ toxicity, repeated exposure : Category 2
Aspiration hazard : Classification not possible
Hazardous to the aquatic environment (acute) : Category 1
Hazardous to the aquatic environment (long-term) : Category 1

**【GHS label element】**
**Pictogram or symbol, signal word**

Warning

**Hazard statement**
Flammable liquid and vapor
Causes skin irritation
Causes serious eye irritation
May cause an allergic skin reaction
Suspected of damaging fertility or the unborn child
May cause damage to organs
May cause damage to organs through prolonged or repeated exposure
Very toxic to aquatic life
Very toxic to aquatic life with long lasting effects

**Precautionary statement**
Please read the SDS before using the product.
Open flames prohibited. Do not form sources of ignition with electric devices, static electricity, spark and so forth.
Wear protective gloves, protective glasses and so forth.
Use in a well-ventilated space, and avoid inhalation of vapor of the volatile components or dust as much as possible.
Wash hands well after handling.
Contact with skin or clothing: Wash with a large volume of water and soap.
Eye contact: Wash carefully with water for several minutes.
When a person inhales the product in a large quantity and feels sick: Move the person to a space with fresh air and let him/her rest in a posture in which it is easy to breathe.
Consult with a doctor depending on the symptoms.
Exposure or concern of exposure: Seek diagnosis and treatment of a doctor.

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If there is eye/skin irritation, eruption, or sickness after inhalation, seek diagnosis and treatment of a doctor.
Collect the leaked material and avoid release into the environment.
Store properly in a sealed container at a ventilated cool, dark space (or specified location).
Residual contents, containers and so forth shall be disposed properly as industrial waste.

**3. Composition /information on ingredients**

| Substances and Concentration | Chemical name | CAS No. | % | |
|---|---|---|---|---|
| | benzyl acetate | 140-11-4 | 1～5% | class 1 designated chemical substance |

**4. First-aid measures**

If inhaled : Immediately take the affected person to a place with fresh air, lower their head, lay them on their side and keep their body warm.
If not breathing, give artificial respiration.
In case of skin contact : Remove contaminated clothing immediately and wash skin with soap and water.
In case of eczema or other skin disorders:
Seek medical attention and take along these instructions.
In case of eye contact : Rinse with water. Get medical attention if irritation develops and persists.
Remove contact lenses if present.
If swallowed : Rinse the moouth and dring 1,2 cups of water or milk.
Do not force the person to throw up.
After giving first aid measures, ask the doctor for diagnosis if necessary.

**5. Fire-fighting measures**

Suitable extinguishing media : Use Water spray, sand, dry-chemical, carbon dioxide or foam.
Special protective equipment for firefighters : Fire-extinguishing work is done from the windward and the suitable fire-extinguish method according to the surrounding situation is used.
Eliminate all ignition sources if safe to do so.
Uninvolved persons should evacuate to a safe place.
Special protective equipment for firefighters : When extinguishing fire, be sure to wear personal protective equipment

**6. Accidental release measures**

Personal Protection : Use extra personal protective equipment.
Environmental precautions : Prevent product from entering drains. Following product recovery, flush area with water.
Methods and materials for containment and cleaning up : Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.
Prevention of Secondary Accident : Remove all sources of ignition. Fire-extinguishing devices should be prepared in case of a fire.

**7. Handling and storage**

Handling
Technical measures : Do not handle, store or open near an open flame, sources of heat or sources of ignition.
Precautions for safe handling : Handling is performed in a well ventilated place.
Wear suitable protective equipment.
Avoid vapor inhalation and contact with skin.
Wash hands and face thoroughly after handling.

Storage
Storage conditions : Store properly in a sealed container at a ventilated cool, dark space (or specified location).
Observe good industrial hygiene practices.

**8. Exposure controls/personal protection**

Control parameters

| Substance | Control Concentration | Acceptable Concentration | | |
|---|---|---|---|---|
| | | Japanese Society of Occupational Health[1] | ACGIH(TWA)[2] | ACGIH(STEL)[2] |
| benzyl acetate | — | — | 10ppm | — |

Engineering controls : It is preferable that properly sealed equipment or local exhaust ventilation system is in operation at the place of handling.

Personal protective equipment
Respiratory Protection : Protective mask
Hand protection : Protective gloves
Eye protection : Safety glasses
Skin and body protection : Protective clothing (long-sleeved work clothes etc.)

**9. Physical and chemical properties**

Physical state
Form : Liquid
Color : Light yellow-Yellow
p H : N/A

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Odor : Characteristic
Flash Point : 50℃
Relative density : 0.873 (d20/20)
Solubility : Insoluble in water

**10. Stability and reactivity**

Stability : Stable and non self-polymerizable under normal conditions.
Possibility of dangerous or harmful reaction : No appreciable reactivity.
Conditions to be avoided : None
Substances not to be mixed : None
Hazardous decomposition products : No hazardous gases are released during self decomposition.

**11. Toxicological information**
For main component information, see "Appended table."

**12. Ecological information**
For main component information, see "Appended table."

**13.Disposal considerations**
Dispose of waste and residues in accordance with local authority requirements.

**14. Transport information**

Japanese regulation
Land transport : Comply with laws.
Marine transport : Comply with laws.
Air transport : Comply with laws.
International regulation
UN Number : 1169
UN Classification : Class 3
Packing Group : Ⅲ
Marine Pollutant : Listed
Special Safety Conditions during Transport : Handle with care.
Keep away from sources of ignition.

**15. Japanese regulatory information**

Industrial Safety and Health Act : Dangerous and harmful substances subject to indicate their names
Dangerous and harmful substances subject to notify their names
Dangerous substances : Inflammable substances
Fire Service Act : Hazardous Materials Category ⅣNot classified (Insoluble in water) Not classified
Ship Safety Act : Flammable liquids
USA: : Indefinitely
EU: : Indefinitely

**16.Other information**

Cited document
1)Journal of the Institute(2013)
2)Threshold Limit Values and Biological Exposure Indices (ACGIH) (2013)
3)National Institute of Technology and Evaluation (NITE) GHS classification result
4)Guidance on perfume's GHS (Revised 2nd edition) Japan Flavor & Fragrance Materials Association
5)IFRA-IOFI Labeling Manual (2013)
6)Safety data sheet prepared by material manufacturer

About contents of description

This SDS was prepared sincerely on the basis of the information we could obtain, however, any warranty shall not be given the Prior to use, please investigate not only the hazards and toxicity information, but also the laws and regulations of the organization, area and country where the products are to be used, which shall be given the first priority.

The stated cautions are for normal handling only. In case of special handling, sufficient care should be taken, in addition to the safety.

The product must be used and / or the condition and duration of storage. Be handled only by those who are familiar with specialized knowledge and have experience or under the guidance of those specialists. Safe usage conditions shall be set up on each user's own responsibility.

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Attachment Annexed Table

Health and environmental hazards information of the product (mixture) and its major constituents[3,4,5]

| Hazard item | Product | GHS classification of the major components | | |
|---|---|---|---|---|
| | | benzyl acetate | | |
| 1. Acute toxicity (Oral) | Not classified | Not classified | | |
| 1. Acute toxicity (Dermal) | Not classified | Not classified | | |
| 1. Acute toxicity (Inhalation) | Classification not possible | Classification not possible | | |
| 2. Skin corrosion / irritation | Category 2 | Category 2 | | |
| 3. Serious eye damage / eye irritation | Category 2 | Category 2 | | |
| 4. Respiratory sensitization | Classification not possible | Classification not possible | | |
| 4. Skin sensitization | Category 1 | Not classified | | |
| 5. Germ cell mutagenicity | Classification not possible | Not classified | | |
| 6. Carcinogenicity | Classification not possible | Not classified | | |
| 7. Reproductive toxicity | Category 2 | Classification not possible | | |
| 8. Specific target organ toxicity, single exposure | Category 2 | Category 1(Respiratory system,CNS)<br>Category 3 (Narcotic effects)<br>—<br>— | | |
| 9. Specific target organ toxicity, repeated exposure | Category 2 | Category 1 (kidney) | | |
| 10. Aspiration hazard | Classification not possible | Classification not possible | | |
| 11. Hazardous to the aquatic environment (acute) | Category 1 | Category 2 | | |
| 11. Hazardous to the aquatic environment (long-term) | Category 1 | Not classified | | |

To add 33, 34, 35

Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Commission Regulation (EU) 2015/830 - Europe

## Emery Oleochemicals (M) Sdn Bhd

Emery Oleochemicals

## SAFETY DATA SHEET

## GLYCERINE 99.5 % USP

Date of printing : 07.01.2020
Date of revision : 07.01.2020
SDS No. : 3200400

### SECTION 1: Identification of the substance/mixture and of the company/ undertaking

**1.1 Product identifier**

**Product name** : GLYCERINE 99.5 % USP
**Product code** : 3200400
**Product description** : glycerol
**Product type** : Liquid.
**Usage** : Cosmetics. pharmaceuticals. tobacco. food. plastics. alkyd resins. nitrition. cellophane

**1.2 Relevant identified uses of the substance or mixture and uses advised against**

Not available.

**1.3 Details of the supplier of the safety data sheet**

Emery Oleochemicals (M) Sdn Bhd
Lot 4, Jalan Perak, Kawasan Perusahaan,
42500 Telok Panglima Garang,
Selangor, Malaysia
Phone: ++6(03)-33268686

**1.4 Emergency telephone number**

**Supplier**
**Telephone number** : +6(03)-33268686

### SECTION 2: Hazards identification

**2.1 Classification of the substance or mixture**

**Product definition** : Mono-constituent substance

**Classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]**
Not classified.

The product is not classified as hazardous according to Regulation (EC) 1272/2008 as amended.
See Section 16 for the full text of the H statements declared above.
See Section 11 for more detailed information on health effects and symptoms.

**2.2 Label elements**

**Signal word** : No signal word.
**Hazard statements** : No known significant effects or critical hazards.
**Precautionary statements**
**Prevention** : Not applicable.
**Response** : Not applicable.
**Storage** : Not applicable.
**Disposal** : Not applicable.
**Supplemental label elements** : Not applicable.

**2.3 Other hazards**

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### SECTION 2: Hazards identification

**Substance meets the criteria for PBT according to Regulation (EC) No. 1907/2006, Annex XIII** : No.
P: Not available. B: Not available. T: No.
**Substance meets the criteria for vPvB according to Regulation (EC) No. 1907/2006, Annex XIII** : Not available.
**Other hazards which do not result in classification** : None known.

### SECTION 3: Composition/information on ingredients

**3.1 Substances** : Mono-constituent substance

There are no ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment, are PBTs, vPvBs or Substances of equivalent concern, or have been assigned a workplace exposure limit and hence require reporting in this section.

### SECTION 4: First aid measures

**4.1 Description of first aid measures**

**Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.
**Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.
**Skin contact** : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
**Ingestion** : Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.
**Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training.

**4.2 Most important symptoms and effects, both acute and delayed**

**Potential acute health effects**
**Eye contact** : No known significant effects or critical hazards.
**Inhalation** : No known significant effects or critical hazards.
**Skin contact** : No known significant effects or critical hazards.
**Ingestion** : No known significant effects or critical hazards.

**Over-exposure signs/symptoms**
**Eye contact** : No specific data.
**Inhalation** : No specific data.
**Skin contact** : No specific data.
**Ingestion** : No specific data.

**4.3 Indication of any immediate medical attention and special treatment needed**

**Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
**Specific treatments** : No specific treatment.

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Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Commission Regulation (EU) 2015/830 - Europe
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### SECTION 5: Firefighting measures

**5.1 Extinguishing media**

**Suitable extinguishing media** : Use dry chemical, $CO_2$, water spray (fog) or foam.
**Unsuitable extinguishing media** : Do not use water jet.

**5.2 Special hazards arising from the substance or mixture**

**Hazards from the substance or mixture** : In a fire or if heated, a pressure increase will occur and the container may burst.
**Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

**5.3 Advice for firefighters**

**Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
**Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

### SECTION 6: Accidental release measures

**6.1 Personal precautions, protective equipment and emergency procedures**

**For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment.
**For emergency responders** : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

**6.2 Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

**6.3 Methods and materials for containment and cleaning up**

**Small spill** : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
**Large spill** : Stop leak if without risk. Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations. Dispose of via a licensed waste disposal contractor.

**6.4 Reference to other sections** : See Section 1 for emergency contact information.
See Section 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

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### SECTION 7: Handling and storage

**7.1 Precautions for safe handling**

**Protective measures** : Put on appropriate personal protective equipment (see Section 8).
**Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

**7.2 Conditions for safe storage, including any incompatibilities**

Keep container tightly closed and sealed until ready for use. Use appropriate containment to avoid environmental contamination. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers.

**7.3 Specific end use(s)**

**Recommendations** : Not available.

### SECTION 8: Exposure controls/personal protection

**8.1 Control parameters**

**Occupational exposure limits**
No exposure limit value known.

**DNELs/DMELs**
No DNELs/DMELs available.

**PNECs**
No PNECs available.

**8.2 Exposure controls**

**Appropriate engineering controls** : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

**Individual protection measures**
**Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Ensure that eyewash stations and safety showers are close to the workstation location.
**Eye/face protection** : Wear safety glasses with side protection in accordance with EN 166.
**Skin protection**
**Hand protection** : Wear suitable gloves tested to EN374.
**Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
**Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
**Respiratory protection** : No special protection is required.
**Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

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## SECTION 9: Physical and chemical properties

**9.1 Information on basic physical and chemical properties**

**Appearance**

| | |
|---|---|
| **Physical state** | : Liquid. [liquid] |
| **Color** | : colourless |
| **Odor** | : odorless |
| **Odor threshold** | : Not available. |
| **pH** | : Not available. |
| **Melting point/freezing point** | : 18°C |
| **Initial boiling point and boiling range** | : Not available. |
| **Flash point** | : Open cup: >180°C [ISO 2592;; Flash and fire point] |
| **Evaporation rate** | : Not available. |
| **Flammability (solid, gas)** | : Not available. |
| **Upper/lower flammability or explosive limits** | : Not available. |
| **Vapor pressure** | : Not available. |
| **Vapor density** | : Not available. |
| **Density** | : 1.263 g/cm³ [20°C (68°F)] |
| **Solubility(ies)** | : Not available. |
| **Partition coefficient: n-octanol/ water** | : Not available. |
| **Auto-ignition temperature** | : Not available. |
| **Decomposition temperature** | : Not available. |
| **Viscosity** | : Not available. |
| **Explosive properties** | : Not available. |
| **Oxidizing properties** | : Not available. |

**9.2 Other information**

No additional information.

## SECTION 10: Stability and reactivity

| | |
|---|---|
| **10.1 Reactivity** | : No specific test data related to reactivity available for this product or its ingredients. |
| **10.2 Chemical stability** | : The product is stable. |
| **10.3 Possibility of hazardous reactions** | : Under normal conditions of storage and use, hazardous reactions will not occur. |
| **10.4 Conditions to avoid** | : Avoid all possible sources of ignition (spark or flame). |
| **10.5 Incompatible materials** | : No specific data. |
| **10.6 Hazardous decomposition products** | : Under normal conditions of storage and use, hazardous decomposition products should not be produced. |





## SECTION 11: Toxicological information

**11.1 Information on toxicological effects**

**Acute toxicity**

| Product/ingredient name | Result | Species | Dose | Exposure |
|---|---|---|---|---|
| - | LD50 Dermal | Rat - Male, Female | >4000 mg/kg | - |
| - | LD50 Oral | Rat - Male, Female | >5000 mg/kg | - |

**Conclusion/Summary** : Not available.

**Irritation/Corrosion**

| Product/ingredient name | Result | Species | Score | Exposure | Observation |
|---|---|---|---|---|---|
| - | Skin - Primary dermal irritation index (PDII) | Rabbit | <2 | 24 hours | 72 hours |
| - | Eyes - Non irritating | Rabbit | <2 | Single instillation, without washing | 7 days |

**Conclusion/Summary** : Not available.

**Sensitization**

| Product/ingredient name | Route of exposure | Species | Result |
|---|---|---|---|
| - | skin | Guinea pig | Not sensitizing |

**Conclusion/Summary** : Not available.

**Mutagenicity**

| Product/ingredient name | Test | Experiment | Result |
|---|---|---|---|
| - | OECD 471 Bacterial Reverse Mutation Test | Experiment: In vitro<br>Subject: Bacteria<br>Metabolic activation: With and without | Negative |
| - | OECD 473 *In vitro* Mammalian Chromosomal Aberration Test | Experiment: In vitro<br>Subject: Mammalian-Animal<br>Metabolic activation: With and without | Negative |
| - | OECD 476 *In vitro* Mammalian Cell Gene Mutation Test | Experiment: In vitro<br>Subject: Mammalian-Animal<br>Metabolic activation: With and without | Negative |

**Conclusion/Summary** : Not available.

**Carcinogenicity**

**Conclusion/Summary** : Not available.

**Reproductive toxicity**

**Conclusion/Summary** : Not available.

**Teratogenicity**

**Conclusion/Summary** : Not available.

**Specific target organ toxicity (single exposure)**

Not available.

**Specific target organ toxicity (repeated exposure)**





## SECTION 11: Toxicological information

Not available.

**Aspiration hazard**

Not available.

**Information on the likely routes of exposure** : Not available.

## SECTION 12: Ecological information

**12.1 Toxicity**

| Product/ingredient name | Result | Species | Exposure |
|---|---|---|---|
| - | Acute EC50 >100 mg/l Fresh water | Crustaceans - Daphnia Magna | 24 hours |
| - | Acute LC50 >100 mg/l Fresh water | Fish - Oncorhynchus mykiss | 96 hours |
| - | Acute NOEC >3000 mg/l Fresh water | Algae - Entosiphon sulcatum | 72 hours |

**Conclusion/Summary** : Not available.

**12.2 Persistence and degradability**

| Product/ingredient name | Test | Result | Dose | Inoculum |
|---|---|---|---|---|
| - | OECD 301D Ready Biodegradability - Closed Bottle Test | >60 % - Readily - 28 days | - | - |

**Conclusion/Summary** : Not available.

| Product/ingredient name | Aquatic half-life | Photolysis | Biodegradability |
|---|---|---|---|
| - | - | - | Readily |

**12.3 Bioaccumulative potential**

| Product/ingredient name | $LogP_{ow}$ | BCF | Potential |
|---|---|---|---|
| - | -1.76 | - | low |

**12.4 Mobility in soil**

| | |
|---|---|
| **Soil/water partition coefficient ($K_{OC}$)** | : Not available. |
| **Mobility** | : Not available. |

**12.5 Results of PBT and vPvB assessment**

**PBT** : No.
P: Not available. B: Not available. T: No.

**vPvB** : Not available.
vP: Not available. vB: Not available.

**12.6 Other adverse effects** : No known significant effects or critical hazards.





## SECTION 13: Disposal considerations

**13.1 Waste treatment methods**

**Product**

**Methods of disposal** : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction.

**Hazardous waste** : Within the present knowledge of the supplier, this product is not regarded as hazardous waste, as defined by EU Directive 2008/98/EC.

**Packaging**

**Methods of disposal** : The generation of waste should be avoided or minimized wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

**Special precautions** : This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

## SECTION 14: Transport information

| | ADR/RID | ADN | IMDG | IATA |
|---|---|---|---|---|
| **14.1 UN number** | Not regulated. | Not regulated. | Not regulated. | Not regulated. |
| **14.2 UN proper shipping name** | - | - | - | - |
| **14.3 Transport hazard class(es)** | - | - | - | - |
| **14.4 Packing group** | - | - | - | - |
| **14.5 Environmental hazards** | No. | No. | No. | No. |
| **Additional information** | - | - | - | - |

**14.6 Special precautions for user** : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

**14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code** : Not available.

## SECTION 15: Regulatory information

**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

**EU Regulation (EC) No. 1907/2006 (REACH)**

**Annex XIV - List of substances subject to authorization**

**Annex XIV**

None of the components are listed.

**Substances of very high concern**

None of the components are listed.

Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Commission Regulation (EU) 2015/830 - Europe

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## SECTION 15: Regulatory information

**Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles** : Not applicable.

**Other EU regulations**

**Europe inventory** : All components are listed or exempted.

**Ozone depleting substances (1005/2009/EU)**
Not listed.

**Prior Informed Consent (PIC) (649/2012/EU)**
Not listed.

**Seveso Directive**
This product is not controlled under the Seveso Directive.

**International regulations**

**Chemical Weapon Convention List Schedules I, II & III Chemicals**
Not listed.

**Montreal Protocol (Annexes A, B, C, E)**
Not listed.

**Stockholm Convention on Persistent Organic Pollutants**
Not listed.

**Rotterdam Convention on Prior Informed Consent (PIC)**
Not listed.

**UNECE Aarhus Protocol on POPs and Heavy Metals**
Not listed.

**International lists**

**National inventory**

**Australia** : All components are listed or exempted.
**Canada** : All components are listed or exempted.
**China** : All components are listed or exempted.
**Japan** : **Japan inventory (ENCS)**: All components are listed or exempted.
**Japan inventory (ISHL)**: All components are listed or exempted.
**Malaysia** : All components are listed or exempted.
**New Zealand** : All components are listed or exempted.
**Philippines** : All components are listed or exempted.
**Republic of Korea** : All components are listed or exempted.
**Taiwan** : All components are listed or exempted.
**Turkey** : All components are listed or exempted.
**United States** : All components are listed or exempted.

**15.2 Chemical Safety Assessment** : Chemical Safety Assessments for all substances in this product are either Complete or Not applicable.

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## SECTION 16: Other information

Indicates information that has changed from previously issued version.

**Abbreviations and acronyms** : ATE = Acute Toxicity Estimate
CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]
DMEL = Derived Minimal Effect Level
DNEL = Derived No Effect Level
EUH statement = CLP-specific Hazard statement
PBT = Persistent, Bioaccumulative and Toxic
PNEC = Predicted No Effect Concentration
RRN = REACH Registration Number
vPvB = Very Persistent and Very Bioaccumulative

**Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]**

| Classification | Justification |
|---|---|
| Not classified. | |

**Full text of abbreviated H statements**
Not applicable.

**Full text of classifications [CLP/GHS]**
Not applicable.

**Date of printing** : 1/7/2020
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**Notice to reader**

**To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.**
**Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.**

*Date of issue/Date of revision* : 1/7/2020 *Date of previous issue* : 9/20/2019 *Version* : 1.03 10/10

Kingfisher® Colours Ltd.

10/12 Deacon Way
Tilehurst
Reading, RG30 6QQ
Berkshire, England
Tel: (0)118 943 2000
Fax: (0)118 943 3334

## SAFETY DATA SHEET

**Section 1 Identification of the substance/mixture and of the company undertaking**

**1.1 Product Identifier**
- Trade Name **A307 TUDOR SAGE**
- Identification Number CAS 1308-38-9, EINECS 215-160-9
- Registration Number
- Synonyms – Pigment Green 17; C.I. 77288

**1.2 Relevant identified uses of substance/mixture and uses advised against**
- Identified uses – Cosmetics
- Uses advised against

**1.3 Details of the supplier of the safety data sheet**

Kingfisher Colours Ltd
10/12 Deacon Way
Tilehurst
Reading, Berkshire RG30 6QQ
England

Telephone +44 1189432000
Fax +44 1189433334
Email sales@kingfishercoloursltd.co.uk

**1.4 Emergency telephone** As above (office hours only)

**Section 2 Hazards Identification**

**2.1 Classification of the substance/mixture**

| 67/548 EC | 1999/45 EC | 2008/1272 EC |
|---|---|---|
| Not classified | | Not classified |

(Full text of all R-phrases is given in section 16)
Hazards summary
- Physical hazards
- Health hazards
- Environmental hazards
- Specific hazards
- Main symptoms

**2.2 Label elements (according to 2008/1272 EC)**

Signal word

Hazard statements

Precautionary statements
Prevention
Response
Storage
Disposal
Supplementary precautionary statements

**2.3 Other hazards**

Page **1** of **5**

Registered in England number 1498805

**Section 3 Composition/information on ingredients**

Substance

| Chemical Name | % Range | CAS Number EINECS Number | CLP Identifier | DSD Classification | Notes |
|---|---|---|---|---|---|
| Pigment Green 17 | 100 | 1308-38-9<br>215-160-9 | | | C.I. 77288 |
| | | | | | |
| | | | | | |

DSD Directive 67/548/EC
CLP Regulation 2008/1272 EC
# This substance has specific workplace exposure limits

**Section 4 First aid measures**

**4.1 Description of first aid measures**
- Inhalation – Remove patient to fresh air.
- Skin contact – Remove affected clothing and wash all exposed skin with mild soap and water.
- Eye contact – Rinse with clean water, holding eyelids open. Obtain medical attention if symptoms persist.
- Ingestion – Do not induce vomiting. Rinse mouth. Obtain emergency medical attention.

**4.2 Most important symptoms and effects, both acute and delayed** – Not expected to present a significant hazard under anticipated conditions of normal use.

**4.3 Indication of immediate medical attention and special treatment**

**Section 5 Fire fighting measures**

General fire hazard

**5.1 Extinguishing media**

☐ Water mist ☐ $CO_2$
☐ Foam ☐ Dry powder
☑ Media suitable for the surrounding materials
(✓ recommended × must not be used)

**5.2 Special hazards arising**

☐ May produce toxic fumes CO
☐ May produce oxides of sulphur and nitrogen
☑ Other – Pigment fume

**5.3 Advice for fire fighters**
- Special protective equipment – Use self-contained breathing apparatus.
- Special fire fighting procedures – Do not use a heavy stream of water. Use water spray or fog. Do not allow waste water to enter drains or groundwater.

**Section 6 Accidental release measures**

**6.1 Personal precautions, protective equipment and emergency procedures**

Use PPE recommended in section 8 of this SDS. Provide adequate ventilation and keep all non-emergency personnel away. Warn everybody of any potential hazard and evacuate if necessary.
- Environmental precautions – Prevent entry to sewers and groundwater.
- Methods and materials for containment and clean up – Use vacuum apparatus to minimise dust formation.

(For personal protection see section 8. For waste disposal see section 13.)

**Section 7 Handling and storage**

**7.1 Precautions for safe handling**

Wash thoroughly after handling. Wear appropriate PPE. Use only with adequate ventilation. Do not eat, drink or smoke in work areas. Replace any contaminated clothing and PPE.

**7.2 Conditions of safe storage, including any incompatibilities**

Store locked up. Keep container closed. Store away from foodstuffs and at room temperature (15-25ºC recommended). Protect from direct heat, sunlight and moisture.
Other specific conditions: Store away from strong oxidising agents.

**7.3 Specific end uses**

**Section 8 Exposure controls/personal protection**

**8.1 Control parameters**

Page **2** of **5**

UK EH40 Workplace Exposure Limits (WEL'S)

| Components | Type | Value |
|---|---|---|
| Chromium (III) compounds (as Cr) | TWA 8h Long term exposure | 0.5 mg/m$^3$ |
| DNEL | | |
| $Cr_2O_3$ | Inhalation | 0.5 mg/m$^3$ |

**8.2 Exposure controls**

Where user operations are likely to generate dust, fume or mist spray, LEV should be employed.

Personal protection equipment

- Eye/face protection. Wear chemical splash goggles, face shield or safety glasses as appropriate for risk.
- Skin protection. Wear appropriate chemical resistant gloves, barrier cream, footwear and protective clothing for risk of exposure.
- Respiratory protection. If engineering controls do not keep airborne concentrations below recommended exposure limits, an approved respirator must be worn which is appropriate for the airborne concentration levels encountered.
- Thermal hazards. Not applicable.
- Hygienic measures. Always observe good hygienic measures. Wash after handling material before eating, drinking or smoking. Routinely wash work clothing and PPE to remove contaminants. Powder colours often have a de-moisturising action on skin. It is recommended that workers use a good quality moisturiser after work.
- Environmental exposure control. Fume scrubbers, filters or other engineering controls may be necessary to ensure that processing equipment complies with the requirements of environmental protection legislation. Pigments are generally not classified for environmental effects due to low water solubility.

## Section 9 Physical and chemical properties

**9.1 Information on basic physical and chemical properties**

Appearance – Green powder
Odour - None
Odour threshold
pH – (10% w/w): approx. 7
Melting/freezing point - 2435˚C
Initial boiling point - 4000˚C
Flash point - NA
Evaporation rate - NA
Flammability (solid, gas) – Non flammable
Flammability limit (lower %)
Flammability limit (upper %)
Vapour pressure - NA
Vapour density - NA
Relative density – 4.5-5.5 g/cm$^3$
Solubility (water) – Insoluble
Partition coefficient (n-octanol/water) - ND
Auto-ignition temperature - NA
Decomposition temperature
Viscocity - NA
Explosive properties – Not explosive
Oxidising properties – Non oxidising

**9.2 Other information**

## Section 10 Stability and Reactivity

**10.1 Reactivity**

**10.2 Chemical stability**

Material is stable under normal conditions.

**10.3 Possibility of hazardous reactions** - NK

**10.4 Conditions to avoid** - NK

**10.5 Incompatible materials** – Strong oxidising agents

**10.6 Hazardous decomposition products** – NK

## Section 11 Toxicological information

**11.1 Information on toxicological effects**

Substance

- Acute toxicity – See specific data
- Skin corrosion/irritation – Slightly irritant
- Serious eye damage

Page **3** of **5**

- Respiratory/skin sensitisation – Non sensitizing
- Germ cell mutagenicity – No known evidence
- Carcinogenicity – No known evidence.
- Reproductive toxicity – No known evidence.
- STOT-single exposure – No known evidence
- STOT-repeated exposure – No known evidence
- Aspiration hazard
- Information on likely routes of exposure
  Ingestion
  Inhalation
  Skin contact
  Eye contact - Dust may irritate the eyes.
- Symptoms
- Specific data

| Components | Test results |
|---|---|
| Acute oral toxicity | $LD_{50}$ (Rat) > 5000 mg/kg |
| Inhalation | $LC_{50}$ (rat) > 5.41 mg/l |

## Section 12 Ecological Information

**12.1 Toxicity** – $LC_{50}$/96h >10000 mg/l (Danio rerio)

**12.2 Persistance and degradability** - NA

**12.3 Bioaccumulative potential** - NA

**12.4 Mobility in soil** – NA

**12.5 Results of PBT or vPvB assessment** - NA

**12.6 Other adverse effects** – Avoid release to the environment.

## Section 13 Disposal considerations

**13.1 Waste treatment methods**

- Product waste. Dispose of in accordance with local regulations.
- Contaminated packaging. Follow warning labels even after container is empty. Empty containers should be taken to an approved waste handling site for recycling or disposal.
- EU Waste Code. This product has no waste code. If a waste code is assigned by the end user (see EU Waste type list 2000/532/EC), disposal should be in cooperation with the disposal firm/producing firm/official authority.

## Section 14 Transport information

General comments. Not considered dangerous for transport purposes.

| | |
|---|---|
| ADR | IMDG |
| RID | ICAO |
| ADN | UN Number |
| IATA | UN Proper shipping name |
| Environmental pollutant | Packaging Group |
| Other | |

## Section 15 Regulatory information

**15.1 Safety, health, environmental regulation/legislation specific for substance/mixture**

- Regulation (EC) № 2000/2037 Substances that deplete the ozone layer. Not listed.
- Regulation (EC) № 2004/856 Persistent organic pollutants. Not listed.
- Regulation (EC) № 2008/689 Export/import of dangerous chemicals. Not listed.
- Regulation (EC) № 2006/1907 REACH. Listed
- Regulation (EC) № 2006/1907 Article 59(1) SVHC candidate list. Not listed

**15.2 Chemical safety assessment**

## Section 16 Other Information

- List of abbreviations
  NA Not applicable ND No data at this time NK Not known ✱Most recent revision
  PPE Personal protective equipment LEV Local exhaust ventilation
- References
- Full text of any statements or R-phrases or H-phrases
- Issue Date January 2013
- Revision Date (Revision )

Page **4** of **5**

- Disclaimer. The information in this SDS relates only to the material listed and may not be valid for such material when used in combination with other materials in process. It is provided to the best of the company's knowledge and belief, as being accurate and reliable. However, we accept no warranties as to its accuracy, reliability or completeness, given the variety of factors that can affect the use or application of the product. The user is strongly advised to thoroughly evaluate the product before use or application. Appropriate warnings and safe handling procedures should be provided to handlers and users. No information provided in this SDS is to be taken as part of the product specification. The product specification is provided separately.

End of Safety Data Sheet

Page **5** of **5**

SDS for HYALURONSAN HA-LQ60 May 26, 2016 Page : 1 of 4

## SAFETY DATA SHEET

Trade Name : HYALURONSAN HA-LQ60
Date Issued : May 26, 2016

**1. Product and Company Identification**

Trade Name : HYALURONSAN HA-LQ60
General use : Ingredient for cosmetics
Manufacturer's Information
Name : Kewpie Corporation
Fine Chemical Division
Address : 1-4-13, Shibuya, Shibuya-Ku, Tokyo 150-0002, JAPAN
Tel No. : +81-3-5384-7779
Fax No. : +81-3-5384-7879
Emergency Telephone Number
Kewpie Corporation (Fine Chemical Division) : +81-3-5384-7779

**2. Hazards Identification**

＊About 0.1～1% of ethanol (CAS No.: 64-17-5) is remained in the final product.
(The ethanol is used in the purification process, and after drying remains about 0.1～1% in the final product)
Hazard of ethanol according to GHS classification is as follows.

Hazards categories according to GHS classification (Ethanol : as a residue of about 1%)

Physical hazards
Not hazardous substance according to GHS.
Health hazards
Serious eye damage/eye irritation : Category 2B
Carcinogenicity : Category 1A
Reproductive toxicity : Category 1A
Specific target organ toxicity, repeated exposure : Category 1 (liver)
Category 2 (central nervous system)

GHS-Labelling
Pictogram :

Signal word : Danger
Hazard statements
Causes eye irritation
May cause cancer
May damage fertility or the unborn child.
Cause damage to organs (liver) through prolonged or repeated exposure.
May cause damage to organs(central nervous system)through prolonged or repeated exposure.
Precautionary statements
Prevention
Obtain SDS before use.
Do not handle until all safety precautions have been read and understood.
Wash the body parts contacted by product thoroughly after handling.
Ware protective gloves/ protective clothing/ eye protection/ face protection.
Do not breathe dust/fume/gas/mist/vapours/spray.
Do not eat, drink or smoke when using this product.
Respomse
If in eyes: Rince cautiously with water for several minutes.Remove contactlenses, if present and easy to do. Continue rinsing.
If eye irritation persists: get medical advice/attention.
If exposed or concerned, get medical advice/attention.
Get medical advice/attention if you feel unwell.
Storage
Store locked up.
Disposal
Dispose of contents/container to in accordance with local/regional/national/international regulation.

SDS for HYALURONSAN HA-LQ60 May 26, 2016 Page : 2 of 4

**3. Composition & Information on Ingredients**

Classification ( mono-substance or mixture ) : Mono-substance
Ingredient Name : Sodium Hyaluronate
Ingredient CAS No. : 9067-32-7 EINECS No. : Not available.

＊About 0.1～1% of ethanol (CAS No.: 64-17-5) is remained in the final product.
(The ethanol is used in the purification process, and after drying remains about 0.1～1% in the final product)

**4. First Aid Measures**

Inhalation : Gargle and blow nose. If you feel unwell during use, immediately stop the work and remove from exposure site to fresh air and rest. If feelling unwell persists, get medical advice/ attention.
Skin contact : Wash with water. If necessary, get medical advice/attention.
Eye contact : Rince cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If necessary, get medical advice/attention.
Ingestion : Gargle and wash with water. If necessary, get medical advice/attention.

**5. Fire Fighting Measures**

Flammable properties : Not flammable.
Extinguishing Media : Water, sand, dry powder, form, and so on.
Extinguishing Measure : Sprinkle and/or spread extinguishing media to the fire sources.

**6. Accidental Release Measures**

Personal precautions : Ware the necessary protective equipment. (Refer to section 8).
Environmental precautions : Do not let product enter drains , sewers or streams.
Methods for clean up : Wipe off the spilled material, then wash off with water.

**7. Handling and Storage**

Handling : Pay attention not to raise the dust during using. Ware the necessary protective equipment. (Refer to section 8).
Storage : Store at ordinary temperature and keep it away from high temperature and direct sunlight.

**8. Exposure Controls & Personal Protection**

Engineering controls : Not specially needed.
Personal protective equipment : Ware the necessary protective equipment (protection-against-dust-mask, protective eye glasses and protective gloves etc) .

**9. Physical & Chemical Properties**

Appearance : White to pale yellow powder.
Odor : Slight characteristic odor.
pH : 6.0～7.0 (0.1% solution)
Melting point : No data available.
Boiling point : No data available.
Flash point : No data available.
Explosion limits : No data available.
Vapor pressure : No data available.
Vapor density : No data available.
Specific gravity : No data available.
Solubility : Soluble in water. Insoluble in organic solvents.
Partition coefficient(n-octanol/water) : No data available.
Auto-ignition temperature : No data available.
Decomposition temperature : No data available.
Viscosity : Not applicable.

**10. Stability & Reactivity Data**

Stability : Stable under normal conditions.
Conditions/materials to avoid : Not specially needed.
Hazardous polymerization products : Hazardous polymerization will not occur.

SDS for HYALURONSAN HA-LQ60 May 26, 2016 Page : 3 of 4

**11. Toxicological Information**

Information of " HYALURONSAN HA-LQ60" are followings.

Acute oral toxicity in mice($LD_{50}$) : Not less than 10g/kg ＊
Skin irritation
Primary skin irritation test : Negative ＊
Cumulative skin irritation test : Negative ＊
Human patch test : Negative ＊
Acute eye irritation test : No data available.
Skin sensitization test : Negative ＊
Mutational toxicity of reproductive cell : No data available.
Carcinogenicity : No data available.
Reproductive and developmental toxicity study :
The non-observed adverse effect level (NOAEL) is considered to be 50mg/kg/day ＊＊
Particular target toxicity : No data available.
Respiratory organs toxicity : No data available.
Acceptable daily intake(ADI) : 34mg/kg/day ＊
(Based on subacute (28-day) toxicity in rats)
Repeated dose study
Repeated dose study by intraperitoneal administering : The NOAEL is considered to be 15mg/kg/day ＊＊
Repeated dose study by administering into the knee joint : The NOAEL is considered to be 12mg/kg/day ＊＊
Mutagenicity study
Ames : Negative ＊
Chromosome aberration study using incubated mammal cells : Negative ＊＊
Micronucleus study using mice : Negative ＊＊
Other toxicity study : in the antigenicity study using mice and guinea pigs , the PCA reaction and active systemic anaphylaxis reaction were both judged negative. ＊＊

＊ : Data of Sodium Hyaluronate of our product.
＊＊ : The summary of safety test result of the food additive"Hyaluronic acid"is reported in"Investigation and research on the safety assessment of existing natural additives -Health Science Research Report in 1996-"edited by Food and Chemical Section, Health Service Bureau, Ministry of Health and Welfare.

Information of " ethanol" according to GHS classification are followings.

Serious eye damage/eye irritation : Category 2B
Two Draize tests were operated on rabbits, and they showed moderate irritation (SIDS).
Carcinogenicity : Category 1A
For the carcinogenicity of taking ethanol contained in alcoholic beverages, it is rated by many data from epidemiologic studies as sufficient evidences (IARC).
Reproductive toxicity : Category 1A
It is well known that taking ethanol prenatally causes fetal alcohol syndrome and so-called congenital malformation (PATTY). In addition, fetal alcohol syndrome is associated with the women who drank a lot and the ones who drank chronically with alcohol dependency.
Specific target organ toxicity, repeated exposure:Category 1(liver),Category 2(central nervous system)
It has been assessed that, for human, long-term and high intake of alcohol will cause liver lesion (DFGOT). In addition, there will cause withdrawal symptom on alcohol abuser and alcoholic (tremor symptoms, epilepsy and mental confusion) (HSDB).

**12. Ecological Information**

Ecotoxicity : No data available.
Persistence and degrability : No data available.
Mobility in soil : No data available.
Other adverse effects : No data available.

**13. Disposal Considerations**

Comply with local/regional/national/international regulations.

SDS for HYALURONSAN HA-LQ60 May 26, 2016 Page : 4 of 4

**14. Transport Information**

International regulation:
ICAO /IATA: There is no special restriction during air transportation regarding this material.
UN Number, UN Category:
This material does not correspond to hazardous material defined in UN Warning.
IMDG:
There is no special restriction during sea transportation regarding this material.
Safety precautions during transportation:
Keep away from high temperature and moisture. Avoid direct sunlight.
Confirm any damage and leaking of container before transportation.
Prevent fall, or drop to avoid getting any damage of container.
When on loading, be careful not to collapse cargo stacks.

**15. Regulatory Information**

Refer to any other national measures that may be relevant.

**16. Other Information**

Not available.

References
NITE(National Institute of Technology and Evaluation)Chemical Risk Information Platform (NITE-CHRIP)
JIS(Japanese Industrial Standards) Z7253:2012
Globally Harmonized System of classification and labeling of chemicals,(5th ed.,2013),UN

This SDS is prepared with being based on our present state of knowledge and presented as reference information for safety use, however, it does not mean that this SDS cover all the relative information. Besides, this should not be construed as guaranteeing the specific properties of the ingredient described or its stability for a particular application. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available
subsequent to the data hereof may suggest modification of the information, we do not assume any responsibility for the results of its use.
Furthermore, the precautions and/or indications are based on the normal handling condition, thus, if the special handling condition would have to be adopted, another measures have to be taken.

Isopropylmethylphenol 2014/11/07

## Safety Data sheet (SDS)

Prepared on: November 7, 2014
Revised on: Day Month, Year

### 1. Chemical product and company information

| | |
|---|---|
| Name of chemical products, etc.: | Isopropylmethylphenol |
| Company name: | Osaka Kasei Co., Ltd. |
| Address: | 2-6-11, Nakajima, Nishiyodogawa-ku, Osaka-shi |
| Department in charge: | Living Environment Group, Sales Headquarters |
| Phone No.: | 06-6474-5492 |
| Fax No.: | 06-6476-2219 |
| Emergency phone No.: | 06-6474-3621 |

### 2. Hazard Identification

GHS classification

| | | |
|---|---|---|
| Physical and chemical hazards: | Explosives | Exempted from classification |
| | Combustible/flammable gases | Exempted from classification |
| | Combustible/flammable aerosols | Exempted from classification |
| | Combustion-supporting/oxidizing gases | Exempted from classification |
| | High-pressure gases | Exempted from classification |
| | Flammable liquids | Exempted from classification |
| | Flammable solids | Unclassifiable |
| | Self-reactive substances | Exempted from classification |
| | Pyrophoric liquids | Exempted from classification |
| | Pyrophoric solids | Unclassifiable |
| | Self-heating substances | Unclassifiable |
| | Substances and mixtures which, in contact with water, emit flammable gases | Out of category |
| | Oxidizing liquids | Exempted from classification |
| | Oxidizing solids | Unclassifiable |
| | Organic peroxides | Exempted from classification |
| | Metal corrosives | Unclassifiable |
| Health hazards: | Acute toxicity (oral) | Exempted from classification |
| | Acute toxicity (dermal) | Unclassifiable |
| | Acute toxicity (Inhalation: gas) | Exempted from classification |
| | Acute toxicity (Inhalation: vapor) | Exempted from classification |
| | Acute toxicity (Inhalation: mist) | Exempted from classification |
| | Acute toxicity (Inhalation: dust) | Category 4 |
| | Skin corrosiveness/irritation | Unclassifiable |
| | Serious eye damage/irritation | Category 2B |
| | Respiratory sensitization | Unclassifiable |
| | Skin sensitization | Unclassifiable |
| | Germ cell mutagenicity | Unclassifiable |
| | Carcinogenicity | Unclassifiable |
| | Reproduction toxicity | Unclassifiable |
| | Specific target organ - systemic toxicity (Single exposure) | Unclassifiable |
| | Specific target organ - systemic toxicity (Repeated exposure) | Unclassifiable |
| | Aspiration hazard | Unclassifiable |
| Environmental hazards: | Acute aquatic toxicity | Unclassifiable |
| | Acute aquatic toxicity | Unclassifiable |

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Harmful effects on ozone layer — Exempted from classification

Label elements
Pictogram or symbol:

Signal word: Warning
Hazard statement(s): Harmful if inhaled.
Eye irritation
Precautionary statement(s):
Safety measures:
- Avoid breathing dust.
- Wash hands thoroughly after handling.
- Use only outdoors or in well-ventilated area.

First aid:
- Inhalation: Remove to fresh air and keep at rest in a position comfortable for breathing.
- Eye contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and it is easy to do so. Continue rinsing.
- Call a doctor if the victim feels unwell.
- If eye irritation persists, seek medical advice/attention.

Disposal:
- Entrust a waste disposer with permission from the prefectural governor, etc. for disposal of contents/container.

**3. Composition/Information on Ingredients**

Substance/Mixture: Chemical substance
Chemical name or generic: 3-methyl-4-isopropylphenol
Molecular formula: $C_{10}H_{14}O$
Ingredient(s):

| Chemical name or generic name | Molecular formula | CAS No. | Reference Number in Gazetted List in Japan | | Concentration or range of concentration |
|---|---|---|---|---|---|
| | | | Japanese Chemical Substances Control Act | Industrial Safety and Health Act | |
| Isopropyl methylphenol | $C_{10}H_{14}O$ | 3228-02-2 | 3-521 | 4-(10)-98 | 95.0% or more |

**4. First Aid Measures**

Inhalation: Move the exposed individual from the area to fresh air and seek medical attention according to the symptoms.
Skin contact: Thoroughly wash the affected area with water and soap
Eye contact: Immediately wash the affected eye with clean water for at least 15 minutes and seek medical attention according to the symptoms.
Ingestion: Wash inside the mouth with water and seek medical attention according to the symptoms.

**5. Fire Fighting Measures**

Extinguishing media: Powder, carbon dioxide gas, and foam fire-extinguisher
Banned extinguishing media: No knowledge available
Particular fire fighting: The product is not subject to Fire Service Law; however, it burns at a high temperature.
Remove the combustion source of fire and use extinguishing media.

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Isopropylmethylphenol 2014/11/07

Protection for fire fighters: Perform fire fighting work from the windward side and wear personal protective equipment such as fire suites.

**6. Accidental Release Measures**

Personal precautions, protective equipment, and emergency actions: Prevent the spill/droplet from entering into the eyes or coming into contact with the skin.
Environmental precautions: Avoid effluent of the product from being discharged to rivers, etc. or affecting the environment.
Methods and equipment/ materials for containment and cleaning up: Wipe off and collect into an empty container.

**7. Handling and Storage**

Handling
Engineering measure (local or general ventilation, etc.): Handle the product in an area with local exhaust ventilation equipment.
Precautions for safe handling: Do not handle with bare hands. Wear protective glasses and solvent-resistant gloves.
Avoidance of contact: No knowledge available

Storage
Conditions for safe storage: Cool dark place avoiding direct sunlight
Safe container and packaging materials: No knowledge available

**8. Exposure Control/Personal Protection**

Engineering control: Use closed equipment or provide local exhaust ventilation
Permissible concentration: Not specified
Protective equipment
Respiratory protection: When generation of dust or gas is assumed, wear gas mask for organic gases
Hand protection: Wear oil-proof gloves
Eye protection: When generation of dust or gas is assumed, wear protective glasses.
Skin and body protection: Wear long-sleeved oil-proof work clothes.

**9. Physical and Chemical Properties**

Appearance: Colorless or white, needle or granular crystal
Odor: No data available
pH: No data available
Melting point/freezing point: 110 to 113℃
Boiling point, initial boiling point and boiling range: 244℃
Flash point: 120℃
Upper limit/lower limit of flammable or explosive range: No data available
Vapor pressure: $2 \times 10^{-3}$ mmHg (20℃)
Specific gravity (relative density): No data available
Solubility: Water 0.01% (25℃), other ethanol 45.2% (25℃)

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Isopropylmethylphenol 2014/11/07

n-Octanol/water partition coefficient: No data available
Spontaneous ignition temperature: No data available
Decomposition temperature: No data available

**10. Stability and Reactivity**

Stability: Stable under normal handling conditions
Reactivity: May absorb ultraviolet light and colors.
Possibility of hazardous reaction: Non-ignitable, non-oxidizing, non-self-reactive, and non-explosive

Conditions to avoid: No data available
Incompatible materials: No data available
Hazardous decomposition products: No data available

**11. Toxicological Information**

Acute toxicity
Oral: LD50 (mouse) 6280 mg/kg
Dermal: No data available
Inhalation: LC50 (rat) > 1.41 mg/L
Skin corrosiveness/irritation: No irritation
Serious eye damage/ Irritation: Slightly irritant
Respiratory sensitization or skin sensitization: No sensitization
Germ cell mutagenicity (mutagenicity): Ames test Negative
Mouse test for lymphadenopathy Negative
Carcinogenicity: No data available
Reproduction toxicity: No data available
Specific target organ/systemic toxicity (Single exposure): No data available

Specific target organ/systemic toxicity (Repeated exposure): Low toxicity/60 days
Low toxicity/90 days

Aspiration hazard: No data available

**12. Ecological Information**

Ecotoxicity
Fish: No data available
Crustacea: No data available
Algae: No data available
Persistence and degradability: COD (130 mg-O/L), BOD (3mg-O/L), TOC (76mg-C/L)
Bioaccumulation: No data available
Mobility in soil: No data available
Harmful effects on ozone layer: No data available

**13. Disposal Considerations**

For disposal, incinerate or entrust a specialized waste disposer with permission from the prefectural governor, etc.

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Isopropylmethylphenol 2014/11/07

**14. Transport Information**

International regulations: Not applicable
Domestic regulations: Not applicable

**15. Regulatory Information**

Fire Service Act: Designated combustible materials (Flammable solids)
Wastes Disposal and Public Cleansing Act: Dispose of in accordance with laws and regulations

**16. Other Information**

Contact for inquiries about the information contained herein: Quality Assurance Department, Osaka Kasei Co., Ltd.
2-6-11, Nakajima, Nishiyodogawa-ku, Osaka-shi
TEL: 06-6474-3624 FAX: 06-6476-4776

The information contained herein has been prepared based on the materials and information available at this time and is subject to revision based on new knowledge.
The precautions provided herein are intended for normal handling of the product; therefore, if the product is handled in a special way, take additional safety measures suitable for the application and usage before use.

5/5

MERQUAT(TM) 550L POLYMER

Lubrizol

**Material Safety Data Sheet**
**MERQUAT(TM) 550L POLYMER**

Prepared according to Global Harmonized System (GHS) standards.

| 1 | **Substance/Product Identification** |
|---|---|

*The Lubrizol Corporation*
*29400 Lakeland Boulevard*
*Wickliffe, Ohio 44092*
*Tel: (440) 943-4200*

**Product Trade Name**: MERQUAT(TM) 550L POLYMER
**CAS Number**: Mixture
**Synonyms**: Polyquaternium-7
**Generic Chemical Name**: 2-Propen-1-aminium, N,N-dimethyl-N-2-propenyl-, chloride, polymer with 2-propenamide
**Recommended Use**: Acrylic Dispersions-Personal Care
**Restrictions on use**: Not determined.
**Created Date**: 25 February 2013
**Preparation/Revision Date**: 21 August 2013
**Transportation Emergency Phone No.**: FOR TRANSPORT EMERGENCY call CHEMTREC: (+1) 703-527-3887 (outside the U.S.), 1-800-424-9300 (in the U.S.)
**MSDS No.**: 13452315-2423228-2018311-102103

| 2 | **Hazards Identification** |
|---|---|

**Appearance**: Colorless to light yellow liquid.
**Odor**: Mild
**Classification**: Hazardous to the aquatic environment (acute hazard) category 3
**Target Organs**: Not determined.
**Signal Word**: Not determined.
**Hazard statement**: Harmful to aquatic life.
**Other Hazards**: None identified.
**Precaution(s)**: Avoid release to the environment.
**Storage Procedures**: Store away from oxidizers.
**Disposal**: All disposal practices must be in accordance with local, national and international regulations.

***See Section 11 for complete health hazard information.***

| 3 | **Composition/Information on Ingredients** |
|---|---|

**Hazardous Ingredients**

| Comp | CAS No. | Percentage (by wt.) | Carcinogen |
|---|---|---|---|
| 2-Propen-1-aminium, N,N-dimethyl-N-2-propenyl-, chloride, polymer with 2-propenamide | 26590-05-6 | From 5 to 9.9 percent | N/E |

| 4 | **First Aid Measures** |
|---|---|

**Eyes**: Flush immediately with water for at least 15 minutes. Get immediate medical attention.
**Skin**: Wash with water for 20 minutes or until chemical is removed Remove contaminated clothing. Get medical attention if irritation develops.
**Inhalation**: Remove exposed person to fresh air if adverse effects are observed. If experiencing respiratory symptoms call a poison center or doctor.
**Ingestion**: Do NOT induce vomiting. Never give anything by mouth to a person who is losing consciousness, unconscious or convulsing. Rinse mouth and then drink plenty of water, seek medical attention. Call a poison center or doctor if exposed or you feel unwell.
**Advice for the protection of first-aid providers**: When providing first aid always protect yourself against exposure to chemicals or blood born diseases by wearing gloves, masks and eye protection. After providing first aid wash your exposed skin with soap and water.
**Additional Information**: Note to physician: Treat symptomatically.

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MERQUAT(TM) 550L POLYMER

| 5 | **Fire Fighting Measures** |
|---|---|

**Flash Point**: Not applicable.
**Extinguishing Media**: CO2, dry chemical, foam, water spray, water fog. Water can be used to cool and protect exposed material.
**Unsuitable Extinguishing Media**: Not determined.
**Firefighting Procedures**: Wear full protective firegear including self-containing breathing apparatus operated in the positive pressure mode with full facepiece, coat, pants, gloves and boots. Water may be ineffective fighting fires. Use water to cool containers exposed to fire. If material is involved in a fire; extinguish fire using agent for type of surrounding fire. If water is used, apply from a distance in flooding quantities as a fog. Do not release chemically contaminated water into drains, soil or surface water.
**Unusual Fire & Explosion Hazards**: Material will not burn until water has been evaporated. Toxic fumes, gases or vapors may evolve on burning. Container may rupture on heating. Toxic nitrogen oxides may evolve when burning. When heated, hazardous gases are released including chlorine, hydrogen chloride, and sulfur dioxide. Combustion products include: carbon monoxide, carbon dioxide, formaldehyde, acrolein and aldehydes. See section 10 for additional information.

| 6 | **Accidental Release Measures** |
|---|---|

**Personal precaution, protective equipment and emergency procedures**: Keep unnecessary personnel away. Only trained personnel should be permitted in area. Personal protective equipment must be worn. Ventilate area if spilled in a confined space or other poorly ventilated area. Material on floor may be slippery.
**Environmental precaution and protective procedures.**: Take precautions to avoid release to the environment. Do not flush into surface water, sanitary sewer or ground water system.
**Methods for clean-up and removal**: Shut off leak if without risk. Pick up free liquid for recycle and/or disposal. Residual liquid can be absorbed on inert material. Small spills: contain spilled material. Transfer to secure containers. Where necessary collect using absorbent media. Larger spills: stop spill and dike area to prevent spreading, pump liquid to salvage tank. remaining liquid may be taken up on sand, clay, earth, floor absorbent or other absorbent material and shoveled into containers. Wash spill area with soap and water.

| 7 | **Handling and Storage** |
|---|---|

**Pumping Temperature**: Not determined.
**Maximum Handling Temperature**: Ambient
**Handling Procedures**: Keep containers closed when not in use. Do not discharge into drains or the environment, dispose to an authorized waste collection point. Use appropriate containment to avoid environmental contamination. Avoid eye contact. Avoid repeated or prolonged skin contact. When handling, do not eat, drink, or smoke. Avoid drinking, tasting, swallowing or ingesting this product. Do not get in eyes. Stir well before use. Do not breath dust, fume, gas, mist, vapors or spray. Minimize contact with air to reduce contamination with mold, fungus, or other organisms which could cause decomposition or spoilage. Skin contact must be prevented. Empty container contains product residue which may exhibit hazards of product. Dispose of packaging or containers in accordance with local, regional, national and international regulations.
**Maximum Storage Temperature**: 5 – 30 °C, 41 – 86 °F
**Storage Procedures**: Store separately from oxidizers. Take precautions to avoid release to the environment. Avoid freezing temperatures. Store in a cool, dry, well-ventilated area. Store separately from incompatible materials. Keep container tightly closed. Keep only in original container. Do not store in open, unlabeled or mislabeled containers. See section 10 for incompatible materials.
**Maximum Loading Temperature**: Not determined.

| 8 | **Exposure Controls/Personal Protection** |
|---|---|

**Exposure Limits**

**EU**
Not applicable.

**UK**
Not applicable.

**Ireland**
Not applicable.

**India**
Not applicable.

**Cyprus**
Not applicable.

**Other Exposure Limits**: None known.
**Engineering Controls**: Use material in well ventilated area only. Additional ventilation or exhaust may be required to maintain air concentrations below recommended exposure limits. Prevent inhalation by providing effective general and, when necessary, local exhaust ventilation to draw spray, aerosol, fume, mist, or vapor away from workers.

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MERQUAT(TM) 550L POLYMER

**Personal Protective Equipment**
**Respiratory Protection**: Use respirator with a combination organic vapor and high efficiency filter cartridge if recommended exposure limit is exceeded. Use self-contained breathing apparatus for entry into confined space, for other poorly ventilated areas and for large spill clean-up sites.
**Eye Protection**: Safety Glasses.
**Gloves Procedures**: Polyvinyl chloride. PVC-coated gloves Consult clothing/glove manufacturer to determine appropriate type of glove for given situation. Gloves should always be inspected before each use and discarded if they show tears, pinholes, or signs of wear.
**Clothing Recommendation**: Do not wear rings, watches or similar apparel that could entrap the material and cause a skin reaction.
**Hygiene Measures**: Wash thoroughly after handling this product. Do not eat, drink or smoke when using this product.

| 9 | **Physical and Chemical Properties** |
|---|---|

**Flash Point**: Not applicable.
**Upper Flammable Limit**: Not determined.
**Lower Flammable Limit**: Not determined.
**Autoignition Point**: Not determined.
**Decomposition Temperature**: Not determined.
**Explosion Data**: Material does not have explosive properties.
**Vapor Pressure**: < 18 mm Hg (25 °C)
**pH**: 6 – 7.5
**Specific Gravity**: 1.01 (25 °C)
**Bulk Density**: 8.45 Lb/gal, 1.01 Kg/L
**Water Solubility**: Soluble.
**Percent Solid**: ~ 9% By Weight
**Percent Volatile**: 90.5 – 91.5% By Weight
**Volatile Organic Compound**: 0.1%
**Vapor Density**: < 1 Air=1
**Evaporation Rate**: < 1 Butyl acetate=1
**Water/Octanol Coefficient**: Not determined.
**Odor**: Mild
**Odor Threshold**: Not determined.
**Appearance**: Colorless to light yellow liquid.
**Viscosity**: < 15000 Centipoise (25 °C)
**Boiling Point**: ~ 100 °C, ~ 212 °F(Typical)
**Boiling Point Range**: Not determined.
**Pour Point Temperature**: Not determined.
**Melting / Freezing Point**: -2 °C, 28.4 °F

***The above data are typical values and do not constitute a specification. Vapor pressure data are calculated unless otherwise noted.***

| 10 | **Stability and Reactivity** |
|---|---|

**Stability**: Material is normally stable at moderately elevated temperatures and pressures.
**Decomposition Temperature**: Not determined.
**Incompatibility**: Strong oxidizing agents. Incompatible with powerful inorganic oxidizers, such as nitric acid Contact with strong oxidizers such as hydrogen peroxide, permanganates and perchlorates can result in intense heat, boiling, flame generation or toxic gas generation.
**Polymerization**: Will not occur.
**Thermal Decomposition**: Smoke, carbon monoxide, carbon dioxide, aldehydes and other products of incomplete combustion. Under combustion conditions, oxides of the following elements will be formed: nitrogen. Irritating and toxic substances may be emitted upon combustion, burning, or decomposition of dry solids. Ammonia. Hydrogen chloride. Nitrogen oxides. Acrylate monomers
**Conditions to Avoid**: Do not freeze.

| 11 | **Toxicological Information** |
|---|---|

– ACUTE EXPOSURE –

**Eye Irritation**: Not expected to cause eye irritation. Based on data from similar materials. Prolonged eye contact may result in irritation and redness.
**Skin Irritation**: Not expected to be a primary skin irritant. Based on data from similar materials. Repeated or prolonged skin contact may cause irritation.

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MERQUAT(TM) 550L POLYMER

**Respiratory Irritation**: No data available to indicate product or components may cause respiratory irritation under normal workplace conditions and good industrial hygiene practices.
**Dermal Toxicity**: The LD50 in rabbits is > 5000 mg/Kg. Based on data from components or similar materials.
**Inhalation Toxicity**: No data available to indicate product or components may be a toxic inhalation hazard.
**Oral Toxicity**: The LD50 in rats is > 10,000 mg/Kg. Based on data from components or similar materials. Ingestion of this material may cause gastrointestinal irritation.
**Dermal Sensitization**: Not expected to cause skin sensitization. Based on data from similar materials.
**Inhalation Sensitization**: No data available to indicate product or components may be respiratory sensitizers.
**Aspiration Hazard**: Not determined.

– CHRONIC EXPOSURE –

**Chronic Toxicity**: No data available to indicate product or components present at greater than 1% are chronic health hazards.
**Carcinogenicity**: No data available to indicate any components present at greater than 0.1% may present a carcinogenic hazard.
**Mutagenicity**: No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
**Reproductive Toxicity**: No data available to indicate either product or components present at greater than 0.1% that may cause reproductive toxicity.
**Teratogenicity**: No data available to indicate product or any components contained at greater than 0.1% may cause birth defects.

– ADDITIONAL INFORMATION –

**Other**: No other health hazards known.

| 12 | **Ecological Information** |
|---|---|

– ENVIRONMENTAL TOXICITY –

**Freshwater Fish Toxicity**: The acute LC50 is 10 - 100 mg/L based on actual data.
**Freshwater Invertebrates Toxicity**: Not determined.
**Algal Inhibition**: Not determined.
**Saltwater Fish Toxicity**: Not determined.
**Saltwater Invertebrates Toxicity**: Not determined.
**Bacteria Toxicity**: Not determined.
**Miscellaneous Toxicity**: Not determined.

– ENVIRONMENTAL FATE –

**Biodegradation**: At least 75% of the components in this product show rapid biodegradation based on OECD 301-type test data. At least 75% of the components in this product show rapid biodegradation based on OECD 302-type test data.
**Bioaccumulation**: 25% or greater of the components display no potential to bioconcentrate.
**Soil Mobility**: Not determined.
**Notes**: None known.

| 13 | **Disposal Considerations** |
|---|---|

**Disposal Considerations**: All disposal practices must be in accordance with local, regional, national and international regulations. Do not dispose in landfill.
**Contaminated Containers or Packaging**: Dispose of packaging or containers in accordance with local, regional, national and international regulations.

| 14 | **Transport Information** |
|---|---|

**ICAO/IATA I**: Not regulated.
**ICAO/IATA II**: Not regulated.
**IMDG**: Not regulated.
**IMDG EMS Fire**: Not applicable.
**IMDG EMS Spill**: Not applicable.
**IMDG MFAG**: Not applicable.
**MARPOL Annex II**: Not determined.
**USCG Compatibility**: Not determined.
**DOT NAERG**: Not applicable.

***Review classification requirements before shipping materials at elevated temperatures.***

| 15 | **Regulatory Information** |
|---|---|

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**– Global Chemical Inventories –**

| | |
|---|---|
| **USA** | This product contains one or more chemical substances not on the TSCA Inventory. It is sold solely for uses subject to regulation under the Federal Food, Drug and Cosmetic Act. |
| **Other TSCA Reg.** | None known. |
| **EU** | To obtain information on the REACH compliance status of this product, please visit Lubrizol.com/REACH, or e-mail us at REACH_MSDS_INQUIRIES@Lubrizol.com |
| **Japan** | All components are in compliance with the Chemical Substances Control Law of Japan. |
| **Australia** | All components are in compliance with chemical notification requirements in Australia. |
| **New Zealand** | All components are in compliance with chemical notification requirements in New Zealand. |
| **Canada** | Exempt from DSL-listing for pharmaceutical or personal care use for substances in F&DA products that were on the market between 1 January 1987 and 13 September 2001. |
| **Switzerland** | All components are in compliance with the Environmentally Hazardous Substances Ordinance in Switzerland. |
| **Korea** | This product contains one or more components that are not included on the Korean Existing Chemicals List (KECL). It is intended for use solely as a cosmetic ingredient in Korea. |
| **Philippines** | This product requires notification before sale in the Philippines. |
| **China** | All components of this product are listed on the Inventory of Existing Chemical Substances in China. |
| **Taiwan** | May require notification before sale in Taiwan. |
| **Miscellaneous Regulatory Information** | Not determined. |

**– Other U.S. Federal Regulations –**

| | |
|---|---|
| **SARA Ext. Haz. Subst.** | This product does not contain greater than 1.0% of any chemical substance on the SARA Extremely Hazardous Substances list. |
| **SARA Section 313** | This product does not contain greater than 1.0% (greater than 0.1% for carcinogenic substance) of any chemical substances listed under SARA Section 313. |

**SARA 311 Classifications**

| | |
|---|---|
| Acute Hazard | No |
| Chronic Hazard | No |
| Fire Hazard | No |
| Reactivity Hazard | No |

**CERCLA Hazardous Substances** None known.

**– State Regulations –**

**Cal. Prop. 65** This product contains the following chemical(s) known to the state of California to cause cancer and/or birth defects based on maximum impurity levels of components: < 1 ppm Acrylamide, CAS no. 79-06-1

**– Product Registrations –**

| | |
|---|---|
| **U.S. Fuel Registration** | Not applicable. |
| **Finnish Registration Number** | Not Registered |
| **Swedish Registration Number** | Not Registered |
| **Norwegian Registration Number** | Not Registered |
| **Danish Registration Number** | Not Registered |
| **Swiss Registration Number** | Not Registered |
| **Italian Registration Number** | Not Registered |

**– Other / International –**

**Miscellaneous Regulatory Information** Not determined.

| 16 | Other Information |
|---|---|

| | |
|---|---|
| **Issuing Department** | Product Safety and Compliance Department (440-943-1200) |
| **Created Date** | 25 February 2013 |
| **Preparation/Revision Date** | 21 August 2013 |

**US NFPA Codes**

| Health | Fire | Reactivity | Special |
|---|---|---|---|
| 1 | 1 | 0 | N/E |

**HMIS Codes**

| Health | Fire | Reactivity |
|---|---|---|
| 1 | 1 | 0 |

**Revision Indicators** This MSDS has no revisions since 21 August 2013





***As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of this product. Information contained herein is believed to be true and accurate but all statements or suggestions are made without warranty, expressed or implied, regarding accuracy of the information, the hazards connected with the use of the material or the results to be obtained from the use thereof. Compliance with all applicable federal, state, and local regulations remains the responsibility of the user.***



REDOX

***Safety Data Sheet***
***Victory Wax - Amber***
***Revision 3, Date 18 Nov 2014***

## 1. IDENTIFICATION

| | |
|---|---|
| **Product Name** | **Victory Wax - Amber** |
| **Other Names** | Cera Microcristallina; Microcrystalline wax; Paraffin waxes and hydrocarbon waxes, microcrystalline |
| **Uses** | No Data Available |
| **Chemical Family** | No Data Available |
| **Chemical Formula** | No Data Available |
| **Chemical Name** | Victory Wax - Amber |
| **Product Description** | No Data Available |

**Contact Details of the Supplier of this Safety Data Sheet**

| Organisation | Location | Telephone |
|---|---|---|
| Redox Pty Ltd | 2 Swettenham Road<br>Minto NSW 2566<br>Australia | +61-2-97333000 |
| Redox Pty Ltd | 11 Mayo Road<br>Wiri Auckland 2104<br>New Zealand | +64-9-2506222 |
| Redox Inc. | 2132A E. Dominguez Street<br>Carson CA 90810<br>USA | +1-424-675-3200 |
| Redox Chemicals Sdn Bhd | Level 2, No. 8, Jalan Sapir 33/7<br>Seksyen 33, Shah Alam Premier Industrial Park<br>40400 Shah Alam<br>Sengalor, Malaysia | +60-3-5614-2111 |

**Emergency Contact Details**

***For emergencies only; DO NOT contact these companies for general product advice.***

| Organisation | Location | Telephone |
|---|---|---|
| Poisons Information Centre | Westmead NSW | 1800-251525<br>131126 |
| Chemcall | Australia | 1800-127406<br>+64-4-9179888 |
| Chemcall | Malaysia | +64-4-9179888 |
| Chemcall | New Zealand | 0800-243622<br>+64-4-9179888 |
| National Poisons Centre | New Zealand | 0800-764766 |
| CHEMTREC | USA & Canada | 1-800-424-9300 CN723420<br>+1-703-527-3887 |

## 2. HAZARD IDENTIFICATION

**Poisons Schedule (Aust)** No Data Available

**Safe Work Australia**
Approved Criteria for Classifying Hazardous Substances (NOHSC:1008(2004))

*Redox Pty Ltd*
Corporate Office Sydney
Locked Bag 15 Minto NSW 2566 Australia
2 Swettenham Road Minto NSW 2566 Australia
All Deliveries: 4 Holmes Road Minto NSW 2566 Australia
Phone +61 2 9733 3000
Fax +61 2 9733 3111
E-mail sydney@redox.com
Web www.redox.com
ABN 92 000 762 345
Australia: Adelaide, Brisbane, Melbourne, Perth, Sydney
New Zealand: Auckland, Christchurch, Hawke's Bay
Malaysia: Kuala Lumpur
USA: Los Angeles





**Hazard Classification** NOT hazardous according to the criteria of Safe Work Australia [NOHSC:1008(2004)]

**National Transport Commission (Australia)**
Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

**Dangerous Goods Classification** NOT Dangerous Goods according to the criteria of the Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

***Ingredients***

| Chemical Entity | Formula | CAS Number | Proportion |
|---|---|---|---|
| Microcrystalline Wax | No Data Available | 63231-60-7 | 90 - 100 % |

## 4. FIRST AID MEASURES

***Description of necessary measures according to routes of exposure***

| | |
|---|---|
| **Swallowed** | Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting. Get medical attention if symptoms occur. |
| **Eye** | Immediately flush eyes with plenty of water for at least 15 minutes occasionally lifting the upper and lower eyelids. In all cases of eye contamination it is a sensible precaution to seek medical attention. |
| **Skin** | Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before re-use. Clean shoes thoroughly before re-use. Seek medical attention if symptoms occur. |
| **Inhaled** | Remove from exposure to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as collar, tie, belt or waistband. Seek medical attention if symptoms occur. |
| **Advice to Doctor** | Treat symptomatically based on judgement of doctor and individual reactions of patient. |
| **Medical Conditions Aggravated by Exposure** | No information available on medical conditions aggravated by exposure to this product. |

## 5. FIRE FIGHTING MEASURES

| | |
|---|---|
| **General Measures** | Clear fire area of all non-emergency personnel. Stay upwind. Keep out of low areas. Eliminate ignition sources. Move fire exposed containers from fire area if it can be done without risk. |
| **Flammability Conditions** | No Data Available |
| **Extinguishing Media** | In case of fire, use appropriate extinguishing media most suitable for surrounding fire conditions. |
| **Fire and Explosion Hazard** | Slightly flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and heat. As with most solid particulate organic materials, high concentrations of dusts from this product suspended in air are an explosion hazard in the presence of sparks, flames, and heat. Do not allow dust to accumulate on equipment and surfaces where this product is used. In the National Fire Protection Association (NFPA) Code 499, a "combustible dust" is any finely divided solid material 420 microns or less in diameter that presents a fire or explosion hazard when dispersed in air. |
| **Hazardous Products of Combustion** | Under normal conditions of storage and use, hazardous decomposition products should not be produced. |
| **Special Fire Fighting Instructions** | Do NOT allow fire fighting water to reach waterways, drains or sewers. Store fire fighting water for treatment. |
| **Personal Protective Equipment** | Fire fighters should wear a positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots and gloves). |
| **Flash Point** | >210 °C Open Cup (Cleveland). |

***Safety Data Sheet Victory Wax - Amber Revision 3, Date 18 Nov 2014***

| | |
|---|---|
| **Lower Explosion Limit** | No Data Available |
| **Upper Explosion Limit** | No Data Available |
| **Auto Ignition Temperature** | No Data Available |
| **Hazchem Code** | No Data Available |

**6. ACCIDENTAL RELEASE MEASURES**

| | |
|---|---|
| **General Response Procedure** | Avoid accidents, clean up immediately. May be slippery when spilt. Eliminate all sources of ignition. Increase ventilation. Avoid generating dust. Stop leak if safe to do so. Isolate the danger area. Use clean, non-sparking tools and equipment. |
| **Clean Up Procedures** | Small Spill: Move containers from spill area. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor. Move containers from spill area.<br>Large Spill: Dike spill area and do not allow product to reach sewage system or surface or ground water. Notify any reportable spill to authorities. (See section 12 for environmental risks and 13 for disposal information.) Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor. To clean the floor and all objects contaminated by this material, use detergent solution. |
| **Containment** | Stop leak if safe to do so. Isolate the danger area. |
| **Environmental Precautionary Measures** | Do NOT let product reach drains or waterways. If product does enter a waterway, advise the Environmental Protection Authority or your local Waste Management. |
| **Evacuation Criteria** | Evacuate all unnecessary personnel. |
| **Personal Precautionary Measures** | Personnel involved in the clean up should wear full protective clothing as listed in section 8. |

**7. HANDLING AND STORAGE**

| | |
|---|---|
| **Handling** | Ensure an eye bath and safety shower are available and ready for use. Observe good personal hygiene practices and recommended procedures. Wash thoroughly after handling. Take precautionary measures against static discharges by bonding and grounding equipment. Avoid contact with eyes, skin and clothing. Do not inhale product dust/fumes. |
| **Storage** | Store in a cool, dry, well-ventilated area. Keep containers tightly closed when not in use. Inspect regularly for deficiencies such as damage or leaks. Protect against physical damage. Store away from incompatible materials as listed in section 10. Store in original container protected from direct sunlight. This product is not classified dangerous for transport according to The Australian Code for the Transport of Dangerous Goods By Road and Rail. |
| **Container** | Store in original packaging as approved by manufacturer. |

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

| | |
|---|---|
| **General** | No exposure standard has been established for this product by the Safe Work Australia (SWA). However, the exposure standard for dust not otherwise specified is 10mg/m3 (for inspirable dust) and 3mg/m3 (for respirable dust).<br>NOTE: The exposure value at the TWA is the average airborne concentration of a particular substance when calculated over a normal 8 hour working day for a 5 day working week.<br>These exposure standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity. |
| **Exposure Limits** | No Data Available |
| **Biological Limits** | No information available on biological limits for this product. |
| **Engineering Measures** | A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. |
| **Personal Protection Equipment** | RESPIRATOR: Use a properly fitted, air purifying or air fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. (AS1715/1716)<br>EYES: Wear chemical safety goggles. When transferring material wear face shield in addition to chemicla safety goggles (AS1336/1337)<br>HANDS: Chemical resistant gloves (AS2161) |

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| | |
|---|---|
| | CLOTHING: Long-sleeved protective clothing and safety footwear (AS3765/2210). |
| **Work Hygienic Practices** | Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. |

**9. PHYSICAL AND CHEMICAL PROPERTIES**

| | |
|---|---|
| **Physical State** | Solid |
| **Appearance** | Solid |
| **Odour** | Odourless |
| **Colour** | White to Yellow |
| **pH** | No Data Available |
| **Vapour Pressure** | < 0.0013 kPa (< 0.01mm Hg) (@ 20 °C) |
| **Relative Vapour Density** | >1 Air = 1 |
| **Boiling Point** | No Data Available |
| **Melting Point** | 76.67 - 82.22 °C |
| **Freezing Point** | 76.67 - 82.22 °C |
| **Solubility** | Insoluble |
| **Specific Gravity** | No Data Available |
| **Flash Point** | >210 °C Open Cup (Cleveland). |
| **Auto Ignition Temp** | No Data Available |
| **Evaporation Rate** | No Data Available |
| **Bulk Density** | No Data Available |
| **Corrosion Rate** | No Data Available |
| **Decomposition Temperature** | No Data Available |
| **Density** | 6.2475 (lbs/gal) - 7.497 (lbs/gal) |
| **Specific Heat** | No Data Available |
| **Molecular Weight** | No Data Available |
| **Net Propellant Weight** | No Data Available |
| **Octanol Water Coefficient** | No Data Available |
| **Particle Size** | No Data Available |
| **Partition Coefficient** | No Data Available |
| **Saturated Vapour Concentration** | No Data Available |
| **Vapour Temperature** | No Data Available |
| **Viscosity** | 10 cP - 25 cP (@ 100 °C) |
| **Volatile Percent** | No Data Available |
| **VOC Volume** | 0 g/L |
| **Additional Characteristics** | Relative Density: 0.75 - 0.90 (93.33 deg C) |
| **Potential for Dust Explosion** | Fine dusts suspended in air present an explosion hazard. |
| **Fast or Intensely Burning Characteristics** | No Data Available |
| **Flame Propagation or Burning Rate of Solid Materials** | No Data Available |
| **Non-Flammables That Could Contribute Unusual Hazards to a Fire** | No Data Available |
| **Properties That May Initiate or Contribute to Fire Intensity** | No Data Available |
| **Reactions That Release Gases or Vapours** | No Data Available |
| **Release of Invisible Flammable Vapours and Gases** | No Data Available |

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***Safety Data Sheet Victory Wax - Amber Revision 3, Date 18 Nov 2014***

**10. STABILITY AND REACTIVITY**

| | |
|---|---|
| **Chemical Stability** | Product is stable under normal conditions of use, storage and temperature. |
| **Conditions to Avoid** | Open flames, sparks, static discharge, heat. |
| **Materials to Avoid** | Oxidizing materials. |
| **Hazardous Decomposition Products** | Under normal conditions of storage and use, hazardous decomposition products should not be produced. |
| **Hazardous Polymerisation** | Under normal conditions of storage and use hazardous polymerisation will not occur. |

**11. TOXICOLOGICAL INFORMATION**

| | |
|---|---|
| **General Information** | No Data Available |
| **Ingestion** | Ingestion may cause gastrointestinal irritation and diarrhea. |
| **Carcinogen Category** | No Data Available |

**12. ECOLOGICAL INFORMATION**

| | |
|---|---|
| **Ecotoxicity** | No adverse effects expected, however, large amounts may cause nausea and |
| **Persistence/Degradability** | This product would be expected to biodegrade slowly, depending upon the conditions to which it is exposed. Under OECD Method 310D, the biodegradability is less than 25% after five days. |
| **Mobility** | Insoluble in water. |
| **Environmental Fate** | Do not allow product to enter drains, waterways or sewers. |
| **Bioaccumulation Potential** | No information available on bioaccumulation for this product. |
| **Environmental Impact** | No Data Available |

**13. DISPOSAL CONSIDERATIONS**

| | |
|---|---|
| **General Information** | Dispose of in accordance with all local, state and federal regulations. All empty packaging should be disposed of in accordance with Local, State and Federal Regulations or recycled/reconditioned at an approved facility. |
| **Special Precautions for Land Fill** | Contact a specialist disposal company or the local waste regulator for advice. |

**14. TRANSPORT INFORMATION**

| | |
|---|---|
| **General Information** | If transported in bulk above 100 deg C product must be shipped as:<br>DG Class 9<br>UN 3257<br>PG: III<br>ELEVATED TEMPERATURE LIQUID N.O.S. at or above 100 deg C and below its flash point (Contains: Microcrystalline Wax)<br>Hazchem : 2W<br>EPG: 15 ELEVATED TEMPERATURE LIQUID, N.O.S. |

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***Safety Data Sheet Victory Wax - Amber Revision 3, Date 18 Nov 2014***

**Land Transport (Australia)**
ADG Code

| | |
|---|---|
| **Proper Shipping Name** | Victory Wax - Amber |
| **Class** | No Data Available |
| **Subsidiary Risk(s)** | No Data Available |
| | No Data Available |
| **UN Number** | No Data Available |
| **Hazchem** | No Data Available |
| **Pack Group** | No Data Available |
| **Special Provision** | No Data Available |
| **Comments** | If transported in bulk above 100 deg C product must be shipped as:<br>DG Class 9<br>UN 3257<br>PG: III<br>ELEVATED TEMPERATURE LIQUID N.O.S. at or above 100 deg C and below its flash point (Contains: Microcrystalline Wax)<br>Hazchem: 2W<br>EPG: 15 ELEVATED TEMPERATURE LIQUID, N.O.S. |

**Land Transport (New Zealand)**
NZS5433

| | |
|---|---|
| **Proper Shipping Name** | Victory Wax - Amber |
| **Class** | No Data Available |
| **Subsidiary Risk(s)** | No Data Available |
| | No Data Available |
| **UN Number** | No Data Available |
| **Hazchem** | No Data Available |
| **Pack Group** | No Data Available |
| **Special Provision** | No Data Available |
| **Comments** | If transported in bulk above 100 deg C product must be shipped as:<br>DG Class 9<br>UN 3257<br>PG: III<br>ELEVATED TEMPERATURE LIQUID N.O.S. at or above 100 deg C and below its flash point (Contains: Microcrystalline Wax)<br>Hazchem: 2W<br>EPG: 15 ELEVATED TEMPERATURE LIQUID, N.O.S. |

**Land Transport (United States of America)**
US DOT

| | |
|---|---|
| **Proper Shipping Name** | Victory Wax - Amber |
| **Class** | No Data Available |
| **Subsidiary Risk(s)** | No Data Available |
| | No Data Available |
| **UN Number** | No Data Available |
| **Hazchem** | No Data Available |
| **Pack Group** | No Data Available |
| **Special Provision** | No Data Available |
| **Comments** | If transported in bulk above 100 deg C product must be shipped as:<br>DG Class 9<br>UN 3257<br>PG: III<br>ELEVATED TEMPERATURE LIQUID N.O.S. at or above 100 deg C and below its flash point (Contains: Microcrystalline Wax)<br>Hazchem: 2W<br>EPG: 15 ELEVATED TEMPERATURE LIQUID, N.O.S. |

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**Sea Transport**
IMDG Code

| | |
|---|---|
| **Proper Shipping Name** | Victory Wax - Amber |
| **Class** | No Data Available |
| **Subsidiary Risk(s)** | No Data Available |
| **UN Number** | No Data Available |
| **Hazchem** | No Data Available |
| **Pack Group** | No Data Available |
| **Special Provision** | No Data Available |
| **EMS** | No Data Available |
| **Marine Pollutant** | No |
| **Comments** | If transported in bulk above 100 deg C product must be shipped as:<br>DG Class 9<br>UN 3257<br>PG: III<br>ELEVATED TEMPERATURE LIQUID N.O.S. at or above 100 deg C and below its flash point (Contains: Microcrystalline Wax)<br>Hazchem: 2W<br>EPG: 15 ELEVATED TEMPERATURE LIQUID, N.O.S. |

**Air Transport**
IATA DGR

| | |
|---|---|
| **Proper Shipping Name** | Victory Wax - Amber |
| **Class** | No Data Available |
| **Subsidiary Risk(s)** | No Data Available |
| **UN Number** | No Data Available |
| **Hazchem** | No Data Available |
| **Pack Group** | No Data Available |
| **Special Provision** | No Data Available |
| **Comments** | If transported in bulk above 100 deg C product must be shipped as:<br>DG Class 9<br>UN 3257<br>PG: III<br>ELEVATED TEMPERATURE LIQUID N.O.S. at or above 100 deg C and below its flash point (Contains: Microcrystalline Wax)<br>Hazchem: 2W<br>EPG: 15 ELEVATED TEMPERATURE LIQUID, N.O.S. |

**National Transport Commission (Australia)**
Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

| | |
|---|---|
| **Dangerous Goods Classification** | NOT Dangerous Goods according to the criteria of the Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code) |

**15. REGULATORY INFORMATION**

| | |
|---|---|
| **General Information** | No Data Available |
| **Poisons Schedule (Aust)** | No Data Available |

**Environmental Protection Authority (New Zealand)**
Hazardous Substances and New Organisms Amendment Act 2015

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| | |
|---|---|
| **Approval Code** | Not Assessed |

**National/Regional Inventories**

| | |
|---|---|
| **Australia (AICS)** | Listed |
| **Canada (DSL)** | Not Determined |
| **Canada (NDSL)** | Not Determined |
| **China (IECSC)** | Not Determined |
| **Europe (EINECS)** | Not Determined |
| **Europe (REACh)** | Not Determined |
| **Japan (ENCS/METI)** | Not Determined |
| **Korea (KECI)** | Not Determined |
| **Malaysia (EHS Register)** | Not Determined |
| **New Zealand (NZIoC)** | Not Determined |
| **Philippines (PICCS)** | Not Determined |
| **Switzerland (Giftliste 1)** | Not Determined |
| **Switzerland (Inventory of Notified Substances)** | Not Determined |
| **Taiwan (NCSR)** | Not Determined |
| **USA (TSCA)** | Not Determined |

**16. OTHER INFORMATION**

**Related Product Codes** WAXMIC8800, WAXMIC2400, WAXMIC2200, WAXMIC8850
**Revision** 3
**Revision Date** 18 Nov 2014
**Key/Legend**
**<** Less Than
**>** Greater Than
**AICS** Australian Inventory of Chemical Substances
**atm** Atmosphere
**CAS** Chemical Abstracts Service (Registry Number)
**$cm^2$** Square Centimetres
**CO2** Carbon Dioxide
**COD** Chemical Oxygen Demand
**deg C (°C)** Degrees Celcius
**EPA (New Zealand)** Environmental Protection Authority of New Zealand
**deg F (°F)** Degrees Farenheit
**g** Grams
**$g/cm^3$** Grams per Cubic Centimetre
**g/l** Grams per Litre
**HSNO** Hazardous Substance and New Organism
**IDLH** Immediately Dangerous to Life and Health
**immiscible** Liquids are insoluble in each other.
**inHg** Inch of Mercury
**inH2O** Inch of Water
**K** Kelvin
**kg** Kilogram
**$kg/m^3$** Kilograms per Cubic Metre

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**lb** Pound
**LC50** LC stands for lethal concentration. LC50 is the concentration of a material in air which causes the death of 50% (one half) of a group of test animals. The material is inhaled over a set period of time, usually 1 or 4 hours.
**LD50** LD stands for Lethal Dose. LD50 is the amount of a material, given all at once, which causes the death of 50% (one half) of a group of test animals.
**ltr** or **L** Litre
**$m^3$** Cubic Metre
**mbar** Millibar
**mg** Milligram
**mg/24H** Milligrams per 24 Hours
**mg/kg** Milligrams per Kilogram
**$mg/m^3$** Milligrams per Cubic Metre
**Misc** or **Miscible** Liquids form one homogeneous liquid phase regardless of the amount of either component present.
**mm** Millimetre
**mmH2O** Millimetres of Water
**mPa.s** Millipascals per Second
**N/A** Not Applicable
**NIOSH** National Institute for Occupational Safety and Health
**NOHSC** National Occupational Heath and Safety Commission
**OECD** Organisation for Economic Co-operation and Development
**Oz** Ounce
**PEL** Permissible Exposure Limit
**Pa** Pascal
**ppb** Parts per Billion
**ppm** Parts per Million
**ppm/2h** Parts per Million per 2 Hours
**ppm/6h** Parts per Million per 6 Hours
**psi** Pounds per Square Inch
**R** Rankine
**RCP** Reciprocal Calculation Procedure
**STEL** Short Term Exposure Limit
**TLV** Threshold Limit Value
**tne** Tonne
**TWA** Time Weighted Average
**ug/24H** Micrograms per 24 Hours
**UN** United Nations
**wt** Weight

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## SAFETY DATA SHEET

**Section 1: Identification**

**Product identifier used on the label;**
**Product name:** UENO METHYL PARABEN NF

**Other means of identification;**
No information

**Recommended use of the chemical and restrictions on use;**
**Recommended use:** Preservative
**Restrictions on use:** No information

**Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party;**

| | |
|---|---|
| **Name:** | UENO FINE CHEMICALS INDUSTRY, LTD. |
| **Department in Charge:** | Quality Assurance Dept. |
| **Address:** | 2-4-8, Koraibashi, Chuo-ku, Osaka, 541-8543, Japan |
| **Telephone number:** | +81-6-6203-0798 |
| **e-mail address:** | chemical_info@ueno-fc.co.jp |

**Emergency phone number**
+81-6-6203-0798 (9:00 – 17:00, JST) Except Sat & Sun

**Section 2: Hazard(s) identification**

**Classification of the chemical in accordance with paragraph (d) of §1910.1200;**

**Physical Hazards**
Not classified

**Health Hazards**
Not classified

**Environmental Hazards**

| | |
|---|---|
| Hazardous to the aquatic environment (acute) | Category 3 |
| Hazardous to the aquatic environment (chronic) | Category 2 |

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**Other Hazards**

No information

**Signal word, hazard statement(s), symbol(s) and precautionary statement(s) in accordance with paragraph (f) of §1910.1200;**

| | |
|---|---|
| **Symbol(s)** | GHS09 |

| | |
|---|---|
| **Signal word** | No signal word |
| **Hazard Statement(s)** | H402 Harmful to aquatic life. |
| | H411 Toxic to aquatic life with long effects. |
| **Precautionary Statement(s)** | |
| [Prevention] | P273 Avoid release to the environment. |
| [Emergency response] | P391 Collect spillage. |
| [Storage] | Not applicable |
| [Disposal] | P501 Dispose of contents/container in accordance with local/regional/national/international regulations. |

**Description of any hazards not otherwise classified;**

No information

**Ingredient with unknown acute toxicity in the mixture**

Not applicable

**Section 3: Composition/information on ingredients**

| | |
|---|---|
| **Chemical name:** | Methyl 4-hydroxybenzoate (Methyl p-hydroxybenzoate ) |
| **CAS No.:** | 99-76-3 |
| **Purity:** | >= 98 - <= 100 % |

**Section 4: First-aid measures**

**Necessary first-aid measures by relevant routes of exposure :**

In the case of accident or if you feel unwell, seek medical advice immediately.
When symptoms persist or in all cases of doubt seek medical advice.

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| | |
|---|---|
| ... INHALED | If inhaled, remove to fresh air. |
| | Get medical attention if symptoms occur. |
| IF ON SKIN | Wash with water and soap. |
| | Get medical attention if symptoms occur. |
| IF IN EYES | If in eyes, rinse well with water. |
| | Get medical attention if irritation develops and persists. |
| IF SWALLOWED | If swallowed, DO NOT induce vomiting. |
| | Get medical attention if symptoms occur. |
| | Rinse mouth thoroughly with water. |

**Most important symptoms/effects, both acute and delayed:**

Contact with dust can cause mechanical irritation or drying of the skin.
Dust contact with the eyes can lead to mechanical irritation.

**Protection of first-aiders:** No special precautions are necessary for first aid responders.

**Notes to physician:** Treat symptomatically and supportively.

**Section 5: Fire-fighting measures**

**Suitable extinguishing media :**

Water spray
Alcohol-resistant foam
Carbon dioxide (CO2)
Dry chemical

**Unsuitable extinguishing media :**

High volume water jet.

**Specific hazards during firefighting :**

Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.
Do not use a solid water stream as it may scatter and spread fire.
Exposure to combustion products may be a hazard to health.

**Hazardous combustion products :** Carbon oxides

**Specific extinguishing methods :**

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Use water spray to cool unopened containers.
Remove undamaged containers from fire area if it is safe to do so.
Evacuate area.

**Special protective equipment and precautions for fire-fighters :**

Wear self-contained breathing apparatus for firefighting if necessary.
Use personal protective equipment.

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**Section 6: Accidental release measures**

**Personal precautions, protective equipment, and emergency procedures:**

Follow safe handling advice and personal protective equipment recommendations.

**Environmental precautions :**

Discharge into the environment must be avoided.
Prevent further leakage or spillage if safe to do so.
Retain and dispose of contaminated wash water.
Local authorities should be advised if significant spillages cannot be contained.

**Methods and materials for containment and cleaning up :**

Sweep up or vacuum up spillage and collect in suitable container for disposal.
Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air).
Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration.
Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.
Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

**Section 7: Handling and storage**

**Technical measures :**

Static electricity may accumulate and ignite suspended dust causing an explosion.
Provide adequate precautions, such as electrical grounding and bonding, or inert atmospheres.

**Local/Total ventilation :** Use only with adequate ventilation.

**Advice on safe handling :**

Do not breathe dust.
Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment.
Minimize dust generation and accumulation.
Keep container closed when not in use.
Keep away from heat and sources of ignition.
Take care to prevent spills, waste and minimize release to the environment.

**Conditions for safe storage :**

Keep in properly labeled containers.
Store in accordance with the particular national regulations.

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**...rials to avoid :**

Do not store with the following product types:
Strong oxidizing agents

**Section 8: Exposure controls/personal protection**

**Occupational Exposure Limits;**

| | |
|---|---|
| OSHA PEL | 5 mg/m$^3$ (Inert or nuisance dust (Respirable fraction)) |
| | 15 mg/m$^3$ (Inert or nuisance dust (Total dust)) |
| ACGIH TLV-TWA (2014) | 3 mg/m$^3$ (Otherwise insoluble respirable particles) |
| | 10 mg/m$^3$ (Otherwise insoluble inhalable particles) |

**Appropriate engineering controls;**

In a work place where dusts generate, ensure to use sealed instrument or local ventilation.

**Individual protection measures, such as personal protective equipment;**

| | |
|---|---|
| Respiratory protection | Respirator must be worn if exposed to dust. |
| | Half mask with a particle filter P2 (EN 143). |
| Hand protection | If hand contact is possible, wear protective gloves. |
| Eye protection | Wear safety glasses or goggles if in eyes. |
| Skin and body protection | Wear protective clothing and apron if necessary. |

**Section 9: Physical and chemical properties**

| | |
|---|---|
| Appearance | Crystalline powder |
| Color | No data available |
| Odor | Very faint characteristic |
| Odor threshold | No data available |
| pH | 5.72 (68 °F / 20°C) (concentration: 1.88 g/L) |
| Melting point/freezing point | 257 °F / 125°C |
| Initial boiling point and boiling range | No data available |
| Flash point | 334 °F / 168°C |
| Evaporation rate | No data available |
| Flammability (solid, gas) | Not classified as a flammability hazard |
| Upper/lower flammability or explosive limits | Lower explosion limit: 70 g/m$^3$ |
| Vapor pressure | 0.000028 Pa (68 °F / 20°C) |
| Vapor density | Relative vapour density: 5.23 (air = 1.0) |

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| | |
|---|---|
| Relative density | No data available |
| Solubility (ies) | Water: 1.88 g/L (68 °F / 20°C) |
| Partition coefficient: *n*-octanol/water | log Pow: 1.98 |
| Auto-ignition temperature | > 1112 °F / > 600°C |
| Decomposition temperature | 518 – 536 °F / 270 - 280°C |
| Viscosity | No data available |

**Other information**
No information

**Section 10: Stability and reactivity**

**Reactivity :** Not classified as a reactivity hazard.
**Chemical stability :** Stable under normal handling conditions.
**Possibility of hazardous reactions :** Dust can form an explosive mixture in air.
Can react with strong oxidizing agents.
**Conditions to avoid :** Avoid dust formation.
**Incompatible materials :** Oxidizing agents
**Hazardous decomposition products :** No hazardous decomposition products are known.

**Section 11: Toxicological information**

**Symptoms related to the physical, chemical and toxicological characteristics :**
**Information on likely routes of exposure :** Inhalation
Skin contact
Ingestion
Eye contact

**Acute toxicity**
Not classified based on available information.
Components:
Methyl 4-hydroxybenzoate:
Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg
Method: OECD Test Guideline 401

**Skin corrosion/irritation**
Not classified based on available information.
Components:
Methyl 4-hydroxybenzoate:
Species : Rabbit
Result : No skin irritation

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**Serious eye damage/eye irritation**
Not classified based on available information.
Components:
Methyl 4-hydroxybenzoate:
Species : Rabbit
Result : No eye irritation

**Respiratory or skin sensitisation**
**Skin sensitisation**
Not classified based on available information.
**Respiratory sensitisation**
Not classified based on available information.
Components:
Methyl 4-hydroxybenzoate

| | |
|---|---|
| Test Type | : Maurer optimisation test |
| Exposure routes | : Skin contact |
| Species | : Guinea pig |
| Method | : OECD Test Guideline 406 |
| Result | : negative |

**Germ cell mutagenicity**
Not classified based on available information.
Components:
Methyl 4-hydroxybenzoate
Genotoxicity in vitro : Test Type : Bacterial reverse mutation assay (AMES)
Method : OECD Test Guideline 471
Result : negative

Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: positive

Genotoxicity in vitro : Test Type: Rodent dominant lethal test (germ cell) (in vivo)
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 478
Result: negative

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**Carcinogenicity**
Not classified based on available information.
**Reproductive toxicity**
Not classified based on available information.
Components:
Methyl 4-hydroxybenzoate:
Effects on foetal development : Test Type : Embryo-foetal development
Species : Rabbit
Application Route : Ingestion
Result : negative

**STOT - single exposure**
Not classified based on available information.
**STOT - repeated exposure**
Not classified based on available information.
**Repeated dose toxicity**
Components:
Methyl 4-hydroxybenzoate:

| | |
|---|---|
| Species | : Rat |
| NOAEL | : 250 mg/kg |
| LOAEL | : 1,000 mg/kg |
| Application Route | : Ingestion |
| Exposure time | : 28 Days |
| Method | : OECD Test Guideline 407 |

**Aspiration toxicity**
Not classified based on available information.

**Section 12: Ecological information**
**Toxicity:**
Components:
Methyl 4-hydroxybenzoate:
**Toxicity to fish :**
LC50 (Oryzias latipes (Japanese medaka)): 59.5 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

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**Toxicity to daphnia and other aquatic invertebrates :**
EC50 (Daphnia magna (Water flea)): 11.2 mg/l
Exposure time: 48 h
Method: ISO 6341
**Toxicity to algae/aquatic plants :**
EC50 (Pseudokirchneriella subcapitata (green algae)): 91 mg/l
Exposure time: 72 h
Method: ISO 8692
EC10 (Pseudokirchneriella subcapitata (green algae)): 31 mg/l
Exposure time: 72 h
Method: ISO 8692
**Toxicity to fish (Chronic toxicity) :**
NOEC: 0.024 mg/l
Exposure time: 70 d
Species: Danio rerio (zebra fish)
**Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) :**
NOEC: 0.2 mg/l
Exposure time: 21 d
Species: Daphnia magna (Water flea)
Method: OECD Test Guideline 211

**Persistence and degradability:**
Readily biodegradable
BOD: 89%
Exposure time: 28 d
Method: OECD Test Guideline 301B

**Bioaccumulative potential:**
Partition coefficient: n-octanol/water : log Pow: 1.98

**Mobility in soil:**
No data available

**Results of PBT and vPvB assessment**
Not relevant

**Other adverse effects:**
No data available

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**...on 13: Disposal considerations**

**Disposal methods**

**Waste from residues :** Dispose of in accordance with local regulations.

**Contaminated packaging**

Empty containers should be taken to an approved waste handling site for recycling or disposal. If not otherwise specified: Dispose of as unused product.

**Section 14: Transport information**

**International Regulations**

**UNRTDG**

UN number : UN 3077
Proper shipping name :
ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Methyl 4-hydroxybenzoate)
Class : 9
Packing group : III Labels : 9

**IATA-DGR**

UN/ID No. : UN 3077
Proper shipping name :
ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Methyl 4-hydroxybenzoate)
Class : 9
Packing group : III
Labels : Miscellaneous,
Packing instruction (cargo aircraft) : 956
Packing instruction (passenger aircraft) : 956
Environmentally hazardous : yes

**IMDG-Code**

UN number : UN 3077
Proper shipping name :
ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Methyl 4-hydroxybenzoate)
Class : 9
Subsidiary risk : ENVIRONM.
Packing group : III
Labels : 9 (ENVIRONM.)
EmS Code : F-A, S-F
Marine pollutant : yes

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**

Not applicable for product as supplied.

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**...estic regulation**

**49 CFR**

UN/ID/NA number : UN 3077
Proper shipping name :
ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Methyl 4-hydroxybenzoate)
Class : 9
Packing group : III
Labels : CLASS 9
ERG Code : 171
Marine pollutant : yes (Methyl 4-hydroxybenzoate)

**Remarks :** Above applies only to containers over 119 gallons or 450 liters., Shipment by ground under DOT is non-regulated; however it may be shipped per the applicable hazard classification to facilitate multi-modal transport involving ICAO (IATA) or IMO.

**Special precautions for user**

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations

**Section 15: Regulatory information**

**EPCRA - Emergency Planning and Community Right-to-Know**

**CERCLA Reportable Quantity**

This material does not contain any components with a CERCLA RQ.

**SARA 304 Extremely Hazardous Substances Reportable Quantity**

This material does not contain any components with a section 304 EHS RQ.

**SARA 302 Extremely Hazardous Substances Threshold Planning Quantity**

This material does not contain any components with a section 302 EHS TPQ.

**SARA 311/312 Hazards :** Combustible dust

**SARA 313 :**

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

**US State Regulations**

**Pennsylvania Right To Know**

Methyl 4-hydroxybenzoate 99-76-3

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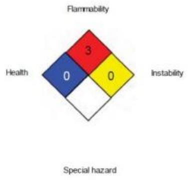
**Section 16: Other information, including date of preparation or last revision**

**Update history:**

Date of issue: 1th April, 2020

**NFPA 704:**




**HMIS® IV:**

HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. The "*" represents a chronic hazard, while the "/" represents the absence of a chronic hazard.

**Full text of other abbreviations**

AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine

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...afety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

**References:**

Information of UENO FINE CHEMICALS INDUSTRY, LTD.
NITE GHS classification results (2015).

**[Disclaimer]**

This SDS has been prepared based on the best available information however, it may not be sufficient in some cases. It is user's responsibility to modify or update any contents in this SDS regarding information on hazardous properties and/or instruction for safe handling of the product when they become available. Precautionary measures in this SDS are only applicable for normal handling conditions and it is necessary to take appropriate additional measures to ensure safe handling which depend on your specific use conditions or situations.

SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

**Niacinamide PC** **5016013**
Version 2.0 Revision Date 06.06.2018 Print Date 06.06.2018

**SECTION 1: Identification of the substance/mixture and of the company/undertaking**

**1.1 Product identifier**

Trade name : Niacinamide PC

REACH Registration Number : 01-2119968268-22
Substance name : 3-Pyridinecarboxamide
CAS-No. : 98-92-0

**1.2 Relevant identified uses of the substance or mixture and uses advised against**

Use of the Substance/Mixture : Ingredient for personal care products

**1.3 Details of the supplier of the safety data sheet**

Company : DSM Nutritional Products Ltd.
PO Box 2676
CH-4002 Basel

Telephone : +41618158888
Telefax : +41618157253
E-mail address of person responsible for the SDS : sds.nutritionalproducts@dsm.com

**1.4 Emergency telephone number**

+41 62 866 2314

**SECTION 2: Hazards identification**

**2.1 Classification of the substance or mixture**

**Classification (REGULATION (EC) No 1272/2008)**

Eye irritation, Category 2 H319: Causes serious eye irritation.

**2.2 Label elements**

**Labelling (REGULATION (EC) No 1272/2008)**

Hazard pictograms :

Signal word : Warning

Hazard statements : H319 Causes serious eye irritation.

Precautionary statements :
**Prevention:**
P264 Wash skin thoroughly after handling.
P280 Wear eye protection/ face protection.
**Response:**
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 If eye irritation persists: Get medical advice/ attention.

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**2.3 Other hazards**

Risk of dust explosion.

**SECTION 3: Composition/information on ingredients**

Synonyms : nicotinic acid amide
Vitamin PP

Brief description of the product : Substance
Molecular formula : C6 H6 N2 O

**3.1 Substances**

**Hazardous components**

| Chemical name | CAS-No.<br>EC-No. | Concentration (% w/w) |
|---|---|---|
| nicotinamide | 98-92-0<br>202-713-4 | >= 90 - <= 100 |

**SECTION 4: First aid measures**

**4.1 Description of first aid measures**

General advice : Move out of dangerous area.
Show this safety data sheet to the doctor in attendance.

If inhaled : Move to fresh air.
Consult a physician after significant exposure.

In case of skin contact : Take off contaminated clothing and shoes immediately.
Wash off with soap and plenty of water.
If symptoms persist, call a physician.

In case of eye contact : Immediately flush eye(s) with plenty of water.
Remove contact lenses.
Protect unharmed eye.
Keep eye wide open while rinsing.
If eye irritation persists, consult a specialist.

If swallowed : Clean mouth with water and drink afterwards plenty of water.
Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.
Obtain medical attention.

**4.2 Most important symptoms and effects, both acute and delayed**

Symptoms : No specific symptoms known.

**4.3 Indication of any immediate medical attention and special treatment needed**

Treatment : Treat symptomatically.

**SECTION 5: Firefighting measures**

**5.1 Extinguishing media**

Suitable extinguishing media : Water
Foam

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**5.2 Special hazards arising from the substance or mixture**

Specific hazards during fire-fighting : None known.

**5.3 Advice for firefighters**

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus.

Further information : Consider dust explosion hazard.

**SECTION 6: Accidental release measures**

**6.1 Personal precautions, protective equipment and emergency procedures**

Use personal protective equipment.
Ensure adequate ventilation.
Avoid dust formation.
Avoid breathing dust.

**6.2 Environmental precautions**

Try to prevent the material from entering drains or water courses.

**6.3 Methods and material for containment and cleaning up**

Pick up and arrange disposal without creating dust.

**6.4 Reference to other sections**

For personal protection see section 8.
For disposal considerations see section 13.

**SECTION 7: Handling and storage**

**7.1 Precautions for safe handling**

Advice on safe handling : Avoid contact with skin and eyes.
For personal protection see section 8.
Smoking, eating and drinking should be prohibited in the application area.

Advice on protection against fire and explosion : Avoid dust formation. Provide appropriate exhaust ventilation at places where dust is formed. Take precautionary measures against static discharges.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

**7.2 Conditions for safe storage, including any incompatibilities**

Requirements for storage areas and containers : No special storage conditions required.

Keep container tightly closed and dry.

**7.3 Specific end use(s)**

Specific use(s) : Not applicable

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**SECTION 8: Exposure controls/personal protection**

**8.1 Control parameters**

Contains no substances with occupational exposure limit values.

**Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006:**

| Substance name | End Use | Exposure routes | Potential health effects | Value |
|---|---|---|---|---|
| Niacinamide PC | Industrial use | Inhalation | Long-term systemic effects | 43.75 mg/m3 |
| | Professional use | Inhalation | Long-term systemic effects | 21.88 mg/m3 |
| | Workers | Skin contact | Long-term systemic effects | 12.5 mg/kg bw/d |
| | Professional use | Ingestion | Long-term systemic effects | 12.5 mg/kg bw/d |

**Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006:**

| Substance name | Environmental Compartment | Value |
|---|---|---|
| Niacinamide PC | Fresh water | 1 mg/l |
| | Marine water | 0.1 mg/l |
| | Fresh water sediment | 1.1 mg/l |
| | Marine sediment | 0.11 mg/l |
| | Sewage treatment plant | 423.5 mg/l |
| | Soil | 0.33 mg/l |

**8.2 Exposure controls**

**Personal protective equipment**

Eye protection : Safety glasses with side-shields

Hand protection : Consider the hazard characteristics of this product and any special workplace conditions when selecting the appropriate type of protective gloves.
Glove material: for example nitrile rubber

Skin and body protection : Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Respiratory protection : In the case of dust or aerosol formation use respirator with an approved filter.

**SECTION 9: Physical and chemical properties**

**9.1 Information on basic physical and chemical properties**

Appearance : Crystalline powder
Colour : white
Odour : odourless
Odour Threshold : No information available.

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| | | |
|---|---|---|
| pH | : | 6.0 - 7.5<br>(as aqueous solution) |
| Melting point/range | : | 128 - 131 °C |
| Boiling point/boiling range | : | 224 °C (20 hPa) |
| Flash point | : | 182 °C |
| Flammability (solid, gas) | : | not highly flammable (Method: Flammability (solids))<br>May form combustible dust concentrations in air. |
| Vapour pressure | : | 0.00045 hPa (25 °C; OECD Test Guideline 104) |
| Relative vapour density | : | Not applicable |
| Density | : | 1.4 g/cm3 (25 °C) |
| Water solubility | : | 500 g/l (25 °C) |
| Solubility in other solvents | : | Ethanol: 660 g/l<br>Diethylether: ca.10 g/l<br>Glycerol: soluble |
| Partition coefficient: n-octanol/water | : | log Pow -0.38 (20 °C; OECD Test Guideline 107) |
| Auto-ignition temperature | : | No self ignition observed in the Grewer oven at temperatures below melting point. |
| Thermal decomposition | : | Not relevant |
| Explosive properties | : | Not explosive |
| Oxidizing properties | : | No data available |

**9.2 Other information**

| | | |
|---|---|---|
| Combustibility index for deposited dust | : | 2 ( 23 °C) |
| | : | 2 ( 100 °C) |
| Dust explosion class | : | St(H)2 (Milled sample, Median value of the tested sample 0.041 mm, Loss on drying 0.5 %; The value was determined in the modified Hartmann tube.) |
| Minimum ignition energy | : | 3 - 10 mJ (Milled sample, Median value of the tested sample 0.041 mm, Loss on drying 0.5 %, EN 13821)<br>The Minimum ignition energy (MIE) of a dust/air mix depends on the particle size the water content and the temperature of the dust. The finer and the dryer the dust the lower the MIE. |
| | : | General remark: The indicated dust explosion characteristics are only valid for this product and are sensitive to the sample's parameters. |
| Powder volume resistivity | : | ca. 5E+09 Ohmm (Product sample, Median value of the tested sample 0.170 mm, Loss on drying 0.2 %) |
| Minimum ignition temperature of a dust/air mix | : | 480 °C (Median value of the tested sample 0.170 mm) determined in the BAM oven |
| Molecular weight | : | 122.13 g/mol |
| Particle size | : | <= 10 % < 0.050 mm |

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| | | |
|---|---|---|
| Dissociation constant | : | pKa 3.35 |
| Impact sensitivity | : | Not impact sensitive. |

**SECTION 10: Stability and reactivity**

**10.1 Reactivity**
No hazards to be specially mentioned.

**10.2 Chemical stability**
Stable under recommended storage conditions.

**10.3 Possibility of hazardous reactions**
Dust may form explosive mixture in air.

**10.4 Conditions to avoid**
Heat

**10.5 Incompatible materials**
Acids and bases
Strong oxidizing agents

**10.6 Hazardous decomposition products**
Nitrogen oxides (NOx)
Carbon oxides

**SECTION 11: Toxicological information**

**11.1 Information on toxicological effects**

| | | |
|---|---|---|
| Acute oral toxicity | : | LD50 (Rat, male and female): > 2,500 mg/kg<br>(OECD Test Guideline 423) |
| | : | LD50 (Mouse): 2,500 mg/kg |
| Acute dermal toxicity | : | LD50 (Rabbit): > 2,000 mg/kg<br>(OECD Test Guideline 402) |
| Skin irritation | : | No skin irritation (Rabbit, OECD Test Guideline 404) |
| | : | May cause skin irritation in susceptible persons. |
| Eye irritation | : | Moderate eye irritation (Rabbit, OECD Test Guideline 405) |
| | : | Irritating to eyes. |
| Sensitisation | : | Did not cause sensitization. (Guinea pig, Buehler Test, OECD Test Guideline 406) |
| Genotoxicity in vitro | : | not mutagenic (Ames test, OECD Test Guideline 471) |

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| | | |
|---|---|---|
| | : | not genotoxic (Chromosome aberration test in vitro, OECD Test Guideline 473) |
| Genotoxicity in vivo | : | not genotoxic (In vivo micronucleus test, Mouse, OECD Test Guideline 474) |
| Carcinogenicity | : | (Mouse )<br>Did not show carcinogenic effects in animal experiments. |
| Reproductive toxicity | : | No indication for adverse effects on fertility known. |
| Teratogenicity | : | not teratogenic<br>(Rabbit, Oral, OECD Test Guideline 414) |
| STOT - single exposure (Acute exposure) | : | The substance or mixture is not classified as specific target organ toxicant, single exposure. |
| STOT - repeated exposure | : | NOAEL (Oral, Rat, 28 d) : 215 mg/kg bw/d<br>Subacute toxicity study (28 days)<br>(OECD Test Guideline 407) |
| Experience with human exposure | : | RDA (Recommended Daily Allowance) 15 - 18 mg |
| Further information | : | May cause irritation of respiratory tract. |
| Aspiration toxicity | : | No aspiration toxicity classification |

**SECTION 12: Ecological information**

**12.1 Toxicity**

| | | |
|---|---|---|
| Toxicity to fish | : | Poecilia reticulata (guppy)<br>LC50 (96 h) > 1,000 mg/l<br>(OECD Test Guideline 203) |
| Toxicity to daphnia and other aquatic invertebrates | : | Daphnia magna (Water flea)<br>EC50 (24 h) > 1,000 mg/l<br>(OECD Test Guideline 202) |
| Toxicity to algae | : | Desmodesmus subspicatus (green algae)<br>IC50 (72 h) > 1,000 mg/l<br>(OECD Test Guideline 201) |
| Toxicity to bacteria | : | Pseudomonas putida<br>EC10 (18 h) 4,235 mg/l |

**12.2 Persistence and degradability**

| | | |
|---|---|---|
| Biodegradability | : | Readily biodegradable. |

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95 % (28 d)
(OECD Test Guideline 301E)

**12.3 Bioaccumulative potential**

| | | |
|---|---|---|
| Bioaccumulation | : | No data available |
| Partition coefficient: n-octanol/water | : | log Pow -0.38 ( 20 °C ; OECD Test Guideline 107) |

**12.4 Mobility in soil**

| | | |
|---|---|---|
| Distribution among environmental compartments | : | No data available |

**12.5 Results of PBT and vPvB assessment**

| | | |
|---|---|---|
| Assessment | : | The substance does not fullfill the PBT criteria. |
| | : | The substance does not fullfill the vPvB criteria. |

**12.6 Other adverse effects**

| | | |
|---|---|---|
| Additional ecological information | : | There is no data available for this product. |

**SECTION 13: Disposal considerations**

**13.1 Waste treatment methods**

| | | |
|---|---|---|
| Product | : | Do not contaminate ponds, waterways or ditches with chemical or used container.<br>Do not dispose of waste into sewer.<br>Offer surplus and non-recyclable solutions to a licensed disposal company. |
| Contaminated packaging | : | Dispose of as unused product.<br>Do not re-use empty containers. |

**SECTION 14: Transport information**

**14.1 UN number**
Not regulated as a dangerous good

**14.2 UN proper shipping name**
Not regulated as a dangerous good

**14.3 Transport hazard class(es)**
Not regulated as a dangerous good

**14.4 Packing group**
Not regulated as a dangerous good

**14.5 Environmental hazards**
Not regulated as a dangerous good

**14.6 Special precautions for user**

| | | |
|---|---|---|
| Remarks | : | Not classified as dangerous in the meaning of transport regu- |

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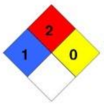
lations.

**14.7 Transport in bulk according to Annex II of Marpol and the IBC Code**
Not applicable for product as supplied.

**SECTION 15: Regulatory information**

**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

**NFPA Classification** : Health hazard: 1
Fire Hazard: 2
Reactivity Hazard: 0




**15.2 Chemical safety assessment**

A Chemical Safety Assessment has been carried out for this substance.

**SECTION 16: Other information**

**Full text of other abbreviations**

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road; AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - Substance of Very High Concern; TCSI - Taiwan Chemical Substance Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Sub-

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stances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

**Further information**

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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**Annex**

| | Title of Exposure Scenario |
|---|---|
| ES 1: | Formulation |
| ES 2: | Used in personal care products / Professional use |
| ES 3: | Private use of cosmetics and personal care products |

**Abbreviations**

ART = Advanced REACH Tool
ECETOC TRA = European Centre for Ecotoxicology and Toxicology Of Chemicals - Targeted Risk Assessment
ES = Exposure scenario
EUSES = European Union System for the Evaluation of Substances
PEC = Predicted exposure concentration
RCR = Risk characterisation ratio: "Level of Exposure/DNEL" or "PEC/PNEC"

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**ES 1: Formulation**

**1. Scenario description**

Main User Groups : **SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites

Process categories : **PROC1:** Use in closed process, no likelihood of exposure
**PROC2:** Use in closed, continuous process with occasional controlled exposure
**PROC3:** Use in closed batch process (synthesis or formulation)
**PROC4:** Use in batch and other process (synthesis) where opportunity for exposure arises
**PROC5:** Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)
**PROC8a:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities
**PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
**PROC9:** Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
**PROC13:** Treatment of articles by dipping and pouring
**PROC14:** Production of preparations or articles by tabletting, compression, extrusion, pelletisation
**PROC15:** Use as laboratory reagent

Environmental Release Categories : **ERC2:** Formulation of preparations

**2.1 Contributing scenario controlling environmental exposure for: ERC2**

**Amount used**
Daily amount per site : <= 0.5 t
Annual amount per site : <= 100 t

**Environment factors not influenced by risk management**
Flow rate of receiving surface water : 18,000 m3/d

**Other given operational conditions affecting environmental exposure**
Emission or Release Factor: Air : 2.5 %
Emission or Release Factor: Water : 2 %
Emission or Release Factor: Soil : 0.01 %

**Conditions and measures related to municipal sewage treatment plant**
Type of Sewage Treatment Plant : Municipal sewage treatment plant
Flow rate of sewage treatment plant effluent : 2,000 m3/d
Effectiveness (of a measure) : 87.4 %

**Conditions and measures related to external treatment of waste for disposal**
Disposal methods : Dispose of contents/container in accordance with local regulation.

**2.2 Contributing scenario controlling worker exposure for: PROC1**

**Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use) : Solid substance

**Frequency and duration of use**
Frequency of use : <= 8 hours/day

**Other operational conditions affecting workers exposure**
Outdoor / Indoor : Indoor use

**Technical conditions and measures**
Handle substance within a closed system. Provide adequate ventilation.

**Organisational measures to prevent /limit releases, dispersion and exposure**
Ensure operatives are trained to minimise exposures.

**Conditions and measures related to personal protection, hygiene and health evaluation**
Wear suitable gloves tested to EN374.

**2.3 Contributing scenario controlling worker exposure for: PROC2, PROC3, PROC13, PROC15**

**Product characteristics**
Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use) : Solid substance

**Frequency and duration of use**
Frequency of use : <= 8 hours/day

**Other operational conditions affecting workers exposure**
Outdoor / Indoor : Indoor use

**Technical conditions and measures**
Provide adequate ventilation.

**Organisational measures to prevent /limit releases, dispersion and exposure**
Ensure operatives are trained to minimise exposures.

**Conditions and measures related to personal protection, hygiene and health evaluation**
Wear suitable gloves tested to EN374.

**2.4 Contributing scenario controlling worker exposure for: PROC4**

**Product characteristics**
Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use) : Solid substance

**Frequency and duration of use**
Frequency of use : <= 8 hours/day

**Other operational conditions affecting workers exposure**
Outdoor / Indoor : Indoor use

**Technical conditions and measures**
Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. (Effectiveness (of a measure): 30 %)

**Organisational measures to prevent /limit releases, dispersion and exposure**
Ensure operatives are trained to minimise exposures.

**Conditions and measures related to personal protection, hygiene and health evaluation**
Wear suitable gloves tested to EN374.

**2.5 Contributing scenario controlling worker exposure for: PROC5**

**Product characteristics**
Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use) : Solid substance

**Frequency and duration of use**
Frequency of use : <= 8 hours/day

**Other operational conditions affecting workers exposure**
Outdoor / Indoor : Indoor use

**Technical conditions and measures**
Ensure adequate ventilation.

**Organisational measures to prevent /limit releases, dispersion and exposure**
Ensure operatives are trained to minimise exposures.

**Conditions and measures related to personal protection, hygiene and health evaluation**
Wear suitable gloves tested to EN374.

**2.6 Contributing scenario controlling worker exposure for: PROC8a**

**Product characteristics**
Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use) : Solid substance

**Frequency and duration of use**
Frequency of use : <= 8 hours/day

**Other operational conditions affecting workers exposure**
Outdoor / Indoor : Indoor use

**Technical conditions and measures**
Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). (Effectiveness (of a measure): 70 %)

**Organisational measures to prevent /limit releases, dispersion and exposure**
Ensure operatives are trained to minimise exposures.

**Conditions and measures related to personal protection, hygiene and health evaluation**
Wear suitable gloves tested to EN374.

**2.7 Contributing scenario controlling worker exposure for: PROC8b, PROC9**

**Product characteristics**
Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use) : Solid substance

**Frequency and duration of use**
Frequency of use : <= 8 hours/day

**Other operational conditions affecting workers exposure**
Outdoor / Indoor : Indoor use

**Technical conditions and measures**
Ensure adequate ventilation.

**Organisational measures to prevent /limit releases, dispersion and exposure**
Ensure operatives are trained to minimise exposures.

**Conditions and measures related to personal protection, hygiene and health evaluation**
Wear suitable gloves tested to EN374.

**2.8 Contributing scenario controlling worker exposure for: PROC14**

**Product characteristics**
Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use) : Solid substance

**Frequency and duration of use**
Frequency of use : <= 8 hours/day

**Other operational conditions affecting workers exposure**
Outdoor / Indoor : Indoor use

**Technical conditions and measures**
Ensure adequate ventilation.

**Organisational measures to prevent /limit releases, dispersion and exposure**
Ensure operatives are trained to minimise exposures.

**Conditions and measures related to personal protection, hygiene and health evaluation**
Wear suitable gloves tested to EN374.

**3. Exposure estimation and reference to its source**

**Environment**

| Contributing Scenario | Exposure Assessment Method | Specific conditions | Compartment | Value | Level of Exposure (PEC) | RCR |
|---|---|---|---|---|---|---|
| ERC2 | EUSES | | Fresh water | | 0.065 mg/l | 0.065 |
| | | | Fresh water sediment | | 0.332 mg/kg dry weight | 0.3 |
| | | | Marine water | | 0.007 mg/l | 0.065 |
| | | | Marine sediment | | 0.033 mg/kg dry weight | 0.3 |
| | | | Sewage treatment plant | | 0.632 mg/l | < 0.01 |
| | | | Soil | | 0.027 mg/kg dry weight | 0.081 |

**Workers**

| Contributing Scenario | Exposure Assessment Method | Specific conditions | Value | Level of Exposure | RCR |
|---|---|---|---|---|---|
| PROC1 | ECETOC TRA | Worker (Industrial) | Inhalation: long-term, systemic | 0.01 mg/m³ | < 0.01 |
| PROC1 | | | Dermal: long-term, systemic | 0.007 mg/kg bw/d | < 0.01 |
| PROC2, PROC3, PROC13, PROC15 | ECETOC TRA | Worker (Industrial) | Inhalation: long-term, systemic | 5 mg/m³ | 0.114 |
| PROC2, PROC3, PROC13, PROC15 | | | Dermal: long-term, systemic | <= 2.7 mg/kg bw/d | <= 0.22 |
| PROC4 | ECETOC TRA | Worker (Industrial) | Inhalation: long-term, systemic | 35 mg/m³ | 0.8 |
| PROC4 | | | Dermal: long-term, systemic | 1.4 mg/kg bw/d | 0.11 |
| PROC5 | ECETOC TRA | Worker (Industrial) | Inhalation: long-term, systemic | 25 mg/m³ | 0.57 |
| PROC5 | | | Dermal: long-term, systemic | 2.7 mg/kg bw/d | 0.22 |
| PROC8a | ECETOC TRA | Worker (Industrial) | Inhalation: long-term, systemic | 15 mg/m³ | 0.34 |
| PROC8a | | | Dermal: long-term, systemic | 2.7 mg/kg bw/d | 0.22 |
| PROC8b, PROC9 | ECETOC TRA | Worker (Industrial) | Inhalation: long-term, systemic | <= 25 mg/m³ | <= 0.57 |
| PROC8b, PROC9 | | | Dermal: long-term, systemic | <= 2.7 mg/kg bw/d | <= 0.22 |
| PROC14 | ECETOC TRA | Worker (Industrial) | Inhalation: long-term, systemic | 10 mg/m³ | 0.23 |
| PROC14 | | | Dermal: long-term, systemic | 0.7 mg/kg bw/d | 0.06 |

For complete exposure estimation, the values for different routes of exposure and activities may have to be summed up.

**4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario**

EUSES = EUSES version 2.1.2

**ES 2: Used in personal care products / Professional use**

**1. Scenario description**

Main User Groups : **SU 22:** Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

Process categories : **PROC5:** Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)
**PROC8a:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities
**PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
**PROC9:** Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
**PROC13:** Treatment of articles by dipping and pouring
**PROC14:** Production of preparations or articles by tabletting, compression, extrusion, pelletisation
**PROC15:** Use as laboratory reagent

Environmental Release Categories : **ERC8a:** Wide dispersive indoor use of processing aids in open systems

**2.1 Contributing scenario controlling environmental exposure for: ERC8a**

**Product characteristics**
Annual amount per site (Msafe) : 999,000 kg
Remarks : Msafe is the maximum amount of substance or product which may be used safely under the conditions defined in the environmental part of the exposure scenario.

**Frequency and duration of use**
Continuous exposure : 365 days/year

**Environment factors not influenced by risk management**
Flow rate of receiving surface water : 18,000 m3/d

**Other given operational conditions affecting environmental exposure**
Emission or Release Factor: Air : 0 %
Emission or Release Factor: Water : 100 %
Emission or Release Factor: Soil : 0 %

**Conditions and measures related to municipal sewage treatment plant**
Type of Sewage Treatment Plant : Municipal sewage treatment plant
Flow rate of sewage treatment plant effluent : 2,000 m3/d
Effectiveness (of a measure) : 87.4 %

**Conditions and measures related to external treatment of waste for disposal**
Disposal methods : Dispose of contents/container in accordance with local regulation.

**2.2 Contributing scenario controlling worker exposure for: PROC5, PROC8a, PROC8b, PROC9, PROC13, PROC14, PROC15**

**Product characteristics**
Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 5%.
Physical Form (at time of use) : Solid mixture, Dustiness: Low

**Frequency and duration of use**
Frequency of use : <= 8 hours/day

**Other operational conditions affecting workers exposure**
Outdoor / Indoor : Indoor use

**Technical conditions and measures**
No specific risk management measures required.

**3. Exposure estimation and reference to its source**

**Environment**

| Contributing Scenario | Exposure Assessment Method | Specific conditions | Compartment | Value | Level of Exposure (PEC) | RCR |
|---|---|---|---|---|---|---|
| ERC8a | EUSES | | Fresh water | | 0.005 mg/l | < 0.01 |
| | | | Fresh water sediment | | 0.028 mg/kg dry weight | 0.025 |
| | | | Marine water | | 0.0005 mg/l | < 0.01 |
| | | | Marine sediment | | 0.003 mg/kg dry weight | 0.025 |
| | | | Sewage treatment plant | | 0.035 mg/l | < 0.01 |
| | | | Soil | | 0.007 mg/kg dry weight | 0.02 |

**Workers**

| Contributing Scenario | Exposure Assessment Method | Specific conditions | Value | Level of Exposure | RCR |
|---|---|---|---|---|---|
| PROC5, PROC8a, PROC8b, PROC9, PROC13, PROC14, PROC15 | ART | Worker (Professional) | Inhalation: long-term, systemic | <= 5 mg/m³ | <= 0.23 |
| see above | ECETOC TRA | | Dermal: long-term, systemic | <= 2.7 mg/kg bw/d | <= 0.22 |

**4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario**

EUSES = EUSES version 2.1.2

SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

**Niacinamide PC** **5016013**
Version 2.0 Revision Date 06.06.2018 Date of last issue: 26.07.2017

**ES 3: Private use of cosmetics and personal care products**

**1. Scenario description**

Main User Groups : **SU 21:** Consumer uses: Private households (= general public = consumers)
Chemical product category : **PC39:** Cosmetics, personal care products

Environmental Release Categories : **ERC8a:** Wide dispersive indoor use of processing aids in open systems

**2.1 Contributing scenario controlling environmental exposure for: ERC8a**

Annual amount supplied into the consumer use(s) (Msafe) : 999,000 kg
Remarks : Msafe is the maximum amount of substance or product which may be used safely under the conditions defined in the environmental part of the exposure scenario.

**Frequency and duration of use**
Continuous exposure : 365 days/year

**Environment factors not influenced by risk management**
Flow rate : 18,000 m3/d

**Other given operational conditions affecting environmental exposure**

Emission or Release Factor: Air : 0 %
Emission or Release Factor: Water : 100 %
Emission or Release Factor: Soil : 0 %

**Conditions and measures related to municipal sewage treatment plant**
Type of Sewage Treatment Plant : Municipal sewage treatment plant
Flow rate of sewage treatment plant effluent : 2,000 m3/d
Effectiveness (of a measure) : 87.4 %

**Conditions and measures related to external treatment of waste for disposal**
Disposal methods : Dispose of contents/container in accordance with local regulation.

**3. Exposure estimation and reference to its source**

**Environment**

| Contributing Scenario | Exposure Assessment Method | Specific conditions | Compartment | Value | Level of Exposure (PEC) | RCR |
|---|---|---|---|---|---|---|
| ERC8a | EUSES | | Fresh water | | 0.005 mg/l | < 0.01 |
| | | | Fresh water sediment | | 0.028 mg/kg dry weight | 0.025 |
| | | | Marine water | | 0.0005 mg/l | < 0.01 |
| | | | Marine sediment | | 0.003 mg/kg dry weight | 0.025 |
| | | | Sewage treatment plant | | 0.035 mg/l | < 0.01 |
| | | | Soil | | 0.007 mg/kg dry weight | 0.02 |

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SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

**Niacinamide PC** **5016013**
Version 2.0 Revision Date 06.06.2018 Date of last issue: 26.07.2017

Risk to consumers' health does not need to be assessed as this is already covered by the Cosmetic Directive 76/768/EEC.

**4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario**

EUSES = EUSES version 2.1.2

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NIKKOL GROUP NIKKO CHEMICALS
1-4-8 Nihonbashi-Bakurocho, Chuoku, Tokyo 103-0002 JAPAN
https://www.nikkol.co.jp/en

Set up date : December 18, 2006
Revised date : November 01, 2016
Ver. : 04

Code : S005427

## SAFETY DATA SHEET

### 1. PRODUCT AND COMPANY IDENTIFICATION

Product Name : NIKKOL MGS-ASEV
Company : NIPPON SURFACTANT INDUSTRIES CO.,LTD.
Address : 7-14 Hiraide Kogyo Danchi Utsunomiya, Tochigi 321-0905, JAPAN
Division : QUALITY ASSURANCE
Tel. No. : 028-661-6121
Fax No. : 028-663-0426
E-Mail address : info-msds@nikkol.co.jp
Emergency tel. No. : NIKKO CHEMICALS CO., LTD. +81-3-3661-1677

Recommended use and restrictions on use :

### 2. HAZARDS IDENTIFICATION

Most Important Hazards and Effects :
GHS Classification
Physical and Chemical Hazards : Not classified
Health Hazards
Acute Toxicity (Oral) : CATEGORY 5
Acute Toxicity (Dermal) : Classification not possible
Acute Toxicity (Inhalation : gases) : Not applicable
Acute Toxicity (Inhalation : vapors) : Classification not possible
Acute Toxicity (Inhalation : dust, mists) : Classification not possible
Skin Corrosion / Irritation : Not classified
Serious Eye Damage / Eye Irritation : Not classified
Respiratory Sensitization : Classification not possible
Skin Sensitization : Not classified
Germ Cell Mutagenicity : Classification not possible
Carcinogenicity : Classification not possible
Reproductive Toxicity : Classification not possible
Specific Target Organ Systemic Toxicity (Single Exposure) : Classification not possible
Specific Target Organ Systemic Toxicity (Repeated Exposure) : Classification not possible
Aspiration Hazard : Classification not possible
Environmental Hazards
Hazardous to The Aquatic Environment : Classification not possible
Hazardous to The Aquatic Environment : Classification not possible
Hazardous to The Ozone Layer : Classification not possible

GHS Label Elements
Pictograms or Symbols :

Signal Word : Warning

Hazard Statements : [H303] May be harmful if swallowed

Precautionary Statements

NIKKOL MGS-ASEV 1/5

NIKKOL GROUP NIKKO CHEMICALS
1-4-8 Nihonbashi-Bakurocho, Chuoku, Tokyo 103-0002 JAPAN
https://www.nikkol.co.jp/en

[Prevention] : [P264] Wash thoroughly after handling.
[Response] : [P301+P312] IF SWALLOWED: Call a doctor/physician if you feel unwell.
[P302+P352] IF ON SKIN: Wash with plenty of soap and water.
[P305+P351+P338] IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
[Storage] : [P403+P233] Store in a well-ventilated place. Keep container tightly closed.
[Disposal] : [P501] Dispose of contents/container in accordance with local/regional/national/international regulation(to be specified).
[Safe Handling Advice] : Refer to SDS

### 3. COMPOSITION / INFORMATION ON INGREDIENTS

Substance or Mixture : Substance
Ingredients and Concentration Range :

| Ingredient (INCI Name) | concentration (%) | CAS No. |
|---|---|---|
| Glyceryl Monostearate (Self-emulsifying type) (Glyceryl Stearate SE) | 100 | 11099-07-3 |

### 4. FIRST-AID MEASURES

In Case of Inhalation : Take victim to a place of fresh air and keep at rest in a position comfortable for breathing.
In Case of Skin Contact : Wash with plenty of soap and water.
Take off contaminated clothing and wash before reuse.
In Case of Eye Contact : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Get medical advice/attention if eye irritation persists:
In Case of Ingestion : Rinse mouth with water, and provide 1-2 cups of water or milk to drink.
Call a doctor/physician if you feel unwell.
In the event that the victim is not conscious, do not feed anything through the mouth.

### 5. FIRE-FIGHTING MEASURES

Extinguishing Media : Powder, alcohol-resistant form, carbon dioxide, sand, water spray.
Not Suitable Extinguishing Media : No information available
Special Hazards : During a fire, toxic gases (e.g., carbon monoxide, nitrogen oxide etc) may be generated. Avoid inhaling smoke during fire extinguishing.
Special Methods : Remove all combustible objects away from the fire and use adequate extinguishing media. Preferably extinguish the fire from the same direction of the wind. Evacuate personnel not involved in fire extinguishing to safe area. Equipment and machinery in proximity of fire must be sprayed with water to cool. Water used to extinguish a fire should not be allowed to enter the drainage system or water courses.
Protection of Fire Fighters : Use goggles in combination with dust mask. During a fire, toxic gases (e.g., carbon monoxide, nitrogen oxide etc) may be generated. Avoid inhaling smoke during fire extinguishing.

### 6. ACCIDENTAL RELEASE MEASURES

Special Methods : Use goggles and protective gloves. In case of large spills, remove person to safety. Ensure adequate ventilation.
Environmental Precautions : Do not discharge into river or sewer.

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https://www.nikkol.co.jp/en

Methods for Cleaning Up : In case of a small spill, absorb with liquid-binding material (sand, soil, cloth) and wipe away the remains with cloth or fabric. Flush surroundings with large amounts of water. In case of a large spill, surround it with the mound of sand or soil to prevent elution and collect into drums or other containers.
Prevention of Secondary Hazards : Promptly remove all combustible objects away from the spill and prepare fire extinguishing media. The spills on the floor must be cleaned promptly, otherwise they present a risk of traumatic accident. Avoid walking or stepping on the spills. While cleaning the spill use adequate tools that do not promote sparks of fire.

### 7. HANDLING AND STORAGE

Handling
Technical Measures : The shower with water (for washing of eyes and body) must be installed near the handling facility.
Precautions : Keep away from source of ignition.
Safe Handling Advice : Use adequate ventilation. Use goggles and protective gloves. Wash thoroughly after handling.
Storage
Suitable Storage Conditions : Store in a well-ventilated place. Keep cool.
Safe Packaging Materials : No information available

### 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Measures : Exhaust system must be installed in case steam, fume or mist is generated at the operation facility. Shower with water (for washing eyes and body) must be installed near the handling facility.
Limit Values
ACGIH : Not established (2008Y)
Protective Equipment
Respiratory Protection : Not needed in case of standard handling.
Hand Protection : Impermeable protective gloves.
Eye Protection : Goggles or protective glasses with side protectors.
Skin and Body Protection : Workwear with long sleeves.
Hygiene Measures : No information available

### 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical States
Form : Solid
Color : White to pale yellow
Odor : Faint characteristic odor
pH : No data available
Specific Temperatures / temperature Ranges at which Changes in Physical State Occur
Boiling Point : No data available
Melting Point (Congealing point) : 55~65° C
Flash Point : No data available
Flammability or Explosive Properties :
Flammability or Explosive Limits : Upper Limit : no data Lower Limit : no data
Vapour Pressure : No data available
Vapour Density : No data available
Specific Gravity : 0.92(70° C) (Reference)
Water Solubility : Dispersion
Solvent Solubility : No data available
Partition Coefficient : : No data available

NIKKOL MGS-ASEV 3/5

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https://www.nikkol.co.jp/en

Auto-Ignition Temperature : No data available
Decomposition Temperature : No data available
Odor Threshold : No data available
Evaporation Rate : No data available
Flammability (solid, gas) : No data available
Other Data :

### 10. STABILITY AND REACTIVITY

Chemical Stability : Stable in general.
Possibility of Hazardous Reactions : Stable in general.
Condition to Avoid : No information available
Incompatible Materials : No information available
Hazardous Decomposition Products : Carbon monoxide, Nitrogen compound
Others :

### 11. TOXICOLOGICAL INFORMATION

Acute Toxicity (oral) : LD50: Rat, 100%, >5,000mg/kg*
Acute Toxicity (dermal) : No data available
Acute Toxicity (Inhalation : gases) : No data available
Acute Toxicity (Inhalation : vapors) : No data available
Acute Toxicity (Inhalation : dust, mists) : No data available
Skin Corrosion / Irritation : Primary skin irritation test: Rabbit., 100%, Fhala test., Non irritant*
Serious Eye Damage / Irritation : Rabbit, Draize test, 100%, After eye drop, Eye wash and No eye wash, Non irritant*
Respiratory or Skin Sensitization : Guinea pig, Landsteiner/Jacobs test, No sensitizing property*
Mutagenicity (germ cell mutagenicity) : Rat, Three generations, 15-25% in feedstuff, Negative*
Carcinogenicity :
IARC : Not available
NTP : Not available
Reproductive Toxicity : No information available
Special Methods : No information available
Special Methods : No information available
Aspiration Hazard : No information available

### 12. ECOLOGICAL INFORMATION

Ecotoxicity : No data available
Persistence / Degradability : No information available
Bioaccumulative Potential : No information available
Mobility in Soil : No information available
Hazardous to The Ozone Layer : No information available

### 13. DISPOSAL CINSIDERATIONS

### 14. TRANSPORT INFORMATION

UN Class / UN Number : Not applicable
:
Special Precautions for User : Review "Section 7 : "Handling and Storage".
Ensure containers without breakage or leakage.
Ensure containers tightly fixed.

### 15. REGULATORY INFORMATION

Inventories :

NIKKOL MGS-ASEV 4/5

NIKKOL GROUP NIKKO CHEMICALS
1-4-8 Nihonbashi-Bakurocho, Chuo-ku, Tokyo 103-0002 JAPAN
https://www.nikkol.co.jp/en

ENCS(Japan) : 2-669
TSCA(USA) : Yes
EINECS(EU) : 234-325-6
AICS(Australia) : Yes
DSL(Canada) : Yes
ECL(Korea) : KE-26367
IECSC(China) : Yes

**16. OTHER INFORMATION**

Reference : International Chemical Safety Cards (ICSC)Compiler's Guide
•Cosmetics Handbook NIKKOL CHEMICALS CO., LTD.(2006)

The information described herein is based on the documents, information and data, etc. on this product that are currently available to us, but the values, such as contents of ingredients, physical and chemical properties, are not necessarily identical to those in the specification. In addition, the precautions are intended for the cases where this product is handled and used under normal conditions. Thus, in cases of special uses or handling, users should use and handle it, taking appropriate safety measures in accordance with the intended uses and how to use the product.

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Product Name : NIKKOL MYS-2V 1/6

Set up Date : March. 07, 2008
Revised date : November.01,2014
Ver. : 04

Code : S005824

**SAFETY DATA SHEET**

**1. PRODUCT AND COMPANY IDENTIFICATION**

Product Name : **NIKKOL MYS-2V**
Company : NIHON SURFACTANT KOGYO K.K.
Address : 7-14 Hiraide Kogyo Danchi Utsunomiya, Tochigi 321-0905, JAPAN
Division : QUALITY ASSURANCE
Tel. No. : 028-661-6131
Fax No. : 028-663-0436
E-Mail address : info-mode@nikkol.co.jp
Emergency tel. No. : NIKKO CHEMICALS CO., LTD. +81-3-3661-1677
Recommended use and restrictions on use :
:

**2. HAZARDS IDENTIFICATION**

Most Important Hazards and Effects :
GHS Classification
Physical and Chemical Hazards : Not classified
Health Hazards
Acute Toxicity (Oral) : Not classified
Acute Toxicity (Dermal) : Classification not possible
Acute Toxicity (Inhalation : gases) : Not applicable
Acute Toxicity (Inhalation : vapors) : Classification not possible
Acute Toxicity (Inhalation : dust, mists) : Classification not possible
Skin Corrosion / Irritation : Not classified
Serious Eye Damage / Eye Irritation : Not classified
Respiratory Sensitization : Classification not possible
Skin Sensitization : Not classified
Germ Cell Mutagenicity : Classification not possible
Carcinogenicity : Classification not possible
Reproductive Toxicity : Classification not possible
Specific Target Organ Systemic Toxicity (Single Exposure) : Classification not possible
Specific Target Organ Systemic Toxicity (Repeated Exposure) : Classification not possible
Aspiration Hazard : Classification not possible
Environmental Hazards
Hazardous to The Aquatic Environment - Acute Toxicity : Classification not possible
Hazardous to The Aquatic Environment - Chronic Toxicity : Classification not possible
Hazardous to The Ozone Layer : Classification not possible

GHS Label Elements
Pictograms or Symbols :

Signal Word : -
Hazard Statements : Not classified
Precautionary Statements
[Prevention] : Wash thoroughly after handling.
Wear protective gloves/protective clothing/eye protection/face protection.
[Response] : IF SWALLOWED: Call a doctor/physician if you feel unwell.
IF ON SKIN: Wash with plenty of soap and water.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
[Storage] : Store in a well-ventilated place. Keep container tightly closed.
[Disposal] : Dispose of contents/container in accordance with local/regional/national/international regulation(to be specified).
[Safe Handling Advice] : Refer to SDS
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Product Name : NIKKOL MYS-2V 2/6

**3. COMPOSITION / INFORMATION ON INGREDIENTS**

Substance or Mixture : Substance
Ingredients and Concentration Range :

| Ingredient (INCI Name) | concentration (%) | CAS No. |
|---|---|---|
| PEG(2EO) Monostearate (PEG-2 Stearate) | 100 | 106-11-6 |

**4. FIRST-AID MEASURES**

In Case of Inhalation : Take victim to a place of fresh air and keep at rest in a position comfortable for breathing.
In Case of Skin Contact : Wash with plenty of soap and water.
Take off contaminated clothing and wash before reuse.
In Case of Eye Contact : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Get medical advice/attention if eye irritation persists.
In Case of Ingestion : Rinse mouth with water, and provide 1-2 cups of water or milk to drink.
Get immediate medical advice/attention.
In the event that the victim is not conscious, do not feed anything through the mouth.

**5. FIRE-FIGHTING MEASURES**

Extinguishing Media : Powder, alcohol-resistant form, carbon dioxide, sand, water spray.
Not Suitable Extinguishing Media : No information available
Special Hazards : During a fire, toxic gases (e.g., carbon monoxide, nitrogen oxide etc) may be generated. Avoid inhaling smoke during fire extinguishing.
Special Methods : Remove all combustible objects away from the fire and use adequate extinguishing media. Preferably extinguish the fire from the same direction of the wind. Evacuate personnel not involved in fire extinguishing to safe area. Equipment and machinery in proximity of fire must be sprayed with water to cool. Water used to extinguish a fire should not be allowed to enter the drainage system or water courses.
Protection of Fire Fighters : Use goggles in combination with dust mask. During a fire, toxic gases (e.g., carbon monoxide, nitrogen oxide etc) may be generated. Avoid inhaling smoke during fire extinguishing.

**6. ACCIDENTAL RELEASE MEASURES**

Special Methods : Use goggles and protective gloves. In case of large spills, remove person to safety. Ensure adequate ventilation.
Environmental Precautions : Do not discharge into river or sewer.
Methods for Cleaning Up : In case of a small spill, absorb with liquid-binding material (sand, soil, cloth) and wipe away the remains with cloth or fabric. Flush surroundings with large amounts of water. In case of a large spill, surround it with the mound of sand or soil to prevent elution and collect into drums or other containers.
Prevention of Secondary Hazards : Promptly remove all combustible objects away from the spill and prepare fire extinguishing media. The spills on the floor must be cleaned promptly, otherwise they present a risk of traumatic accident. Avoid walking or stepping on the spills. While cleaning the spill use adequate tools that do not promote sparks of fire.

**7. HANDLING AND STORAGE**

Handling
Technical Measures : The shower with water (for washing of eyes and body) must be installed near the handling facility.
Precautions : Keep away from source of ignition.
Safe Handling Advice : Use adequate ventilation. Use goggles and protective gloves. Wash thoroughly after handling.
Storage
Suitable Storage Conditions : Store in a well-ventilated place. Keep cool.
Safe Packaging Materials : No information available

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

Engineering Measures : Exhaust system must be installed in case steam, fume or mist is generated at the operation facility. Shower with water (for washing eyes and body) must be installed near the handling facility.
Limit Values
ACGIH : Not established (2008Y)
Protective Equipment
Respiratory Protection : Not needed in case of standard handling.
Hand Protection : Impermeable protective gloves.
Eye Protection : Goggles or protective glasses with side protectors.
Skin and Body Protection : Workwear with long sleeves.
Hygiene Measures : No information available

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Product Name : NIKKOL MYS-2V 3/6

**9. PHYSICAL AND CHEMICAL PROPERTIES**

Physical States
Form : Solid
Color : White to pale yellow
Odor : Faint characteristic odor
pH : 5.0 ~ 7.5 (5% aq.sol.)
Specific Temperatures / temperature Ranges at which Changes in Physical State Occur
Boiling Point : No data available
Melting Point (Congealing point) : Melting point :47~53° C(Reference)
Flash Point : No data available
Flammability or Explosive Properties :
Flammability or Explosive Limits : Upper Limit : no data Lower Limit : no data
Vapour Pressure : No data available
Vapour Density : No data available
Specific Gravity : No data available
Solubility Water Solubility : Insoluble
Solvent Solubility : No data available
Partition Coefficient : : No data available
Auto-Ignition Temperature : No data available
Decomposition Temperature : No data available
Odor Threshold : No data available
Evaporation Rate : No data available
Flammability (solid, gas) : No data available
Other Data :

**10. STABILITY AND REACTIVITY**

Chemical Stability : Stable in general.
Possibility of Hazardous Reactions : Stable in general.
Condition to Avoid : High temperature
Incompatible Materials : No information available
Hazardous Decomposition Products : Carbon monoxide, Nitrogen compound
Others :

**11. TOXICOLOGICAL INFORMATION**

Acute Toxicity (oral) : Rat:LD50, PEG(2~150)Stearate [4]
PEG2 Stearate LD50>10g/kg
PEG6 Stearate LD50>34.8g/kg
PEG8 Stearate LD50>10g/kg
PEG20 Stearate LD50:19.85, >10g/kg
PEG40 Stearate LD50>32g/kg
PEG100 Stearate LD50>25.1g/kg
PEG150 Stearate LD50>10g/kg
Acute Toxicity (dermal) : No data available
Acute Toxicity (Inhalation : gases) : No data available
Acute Toxicity (Inhalation : vapors) : No data available
Acute Toxicity (Inhalation : dust, mists) : No data available
Skin Corrosion / Irritation : Rabbit, Draize test [4]
PEG8, 12 Stearate: Moderately irritating~Mildly irritating
PEG2 Stearate PII:0.17/8.00(Maximum possible score)
PEG8 Stearate PII:0.5~3.42/8.00
PEG12 Stearate PII:2.42/8.00
PEG40 Stearate PII:0.0~1.26/8.00
PEG150 Stearate PII:0.34/8.00
Serious Eye Damage / Irritation : Rabbit, Draize test [1]
PEG2 Stearate Score:6.2(24h), 1.5(48h), 0.0(72h)/110(Maximum possible score)
PEG8 Stearate Score:3.0, 0.0(24h later)/110
PEG20 Stearate Score:2.0(No eye wash), 0.0(2~4s Eye wash)/110
PEG40 Stearate Score:2.7, 1.33/110
PEG50 Stearate Score:0.67(1h), 0.33(24h)/110
PEG150 Stearate Score:2.0/110
Respiratory or Skin Sensitization : Marmot [4]
PEG8 Stearate, PEG40 Stearate
Skin Sensitization: Negative
Mutagenicity (germ cell mutagenicity) : No data available
Carcinogenicity :
IARC : Not available
NTP : Not available
Reproductive Toxicity : No information available
Special Methods : No information available
Special Methods : No information available
Aspiration Hazard : No information available

Product Name : NIKKOL MYS-2V 4/5

**12. ECOLOGICAL INFORMATION**
Ecotoxicity : No data available
Persistence / Degradability : No information available
Bioaccumulative Potential : No information available
Mobility in Soil : No information available
Hazardous to The Ozone Layer : No information available

**13. DISPOSAL CONSIDERATIONS**

**14. TRANSPORT INFORMATION**
UN Class / UN Number : Not applicable
Special Precautions for User : Review "Section 7 : "Handling and Storage".
Ensure containers without breakage or leakage.
Ensure containers tightly fixed.
Follow all regulations in your country or region.

**15. REGULATORY INFORMATION**
Inventories :
ENCS(Japan) : 7-88
TSCA(USA) : Yes
EINECS(EU) : 203-363-5
AICS(Australia) : Yes
DSL(Canada) : Yes
ECL(Korea) : KE-26376
IECSC(China) : Yes

**16. OTHER INFORMATION**
Reference : International Chemical Safety Cards (ICSC)Compiler's Guide
1)Guigance on the preparation of GHS MSDS of surfactant(2010 edition)

The information described herein is based on the documents, information and data, etc. on this product that are currently available to us, but the values, such as contents of ingredients, physical and chemical properties, are not necessarily identical to those in the specification. In addition, the precautions are intended for the cases where this product is handled and used under normal conditions. Thus, in cases of special uses or handling, users should use and handle it, taking appropriate safety measures in accordance with the intended uses and how to use the product.

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NIKKOL GROUP NIKKO CHEMICALS
1-4-8 Nihonbashi-Bakurocho, Chuoku, Tokyo 103-0002 JAPAN
https://www.nikkol.co.jp/en

Set up date : February 23, 2004
Revised date : November 01, 2016
Code : S009799 Ver. : 5

**SAFETY DATA SHEET**

**1. PRODUCT AND COMPANY IDENTIFICATION**
Product Name : **NIKKOL OLIVE OIL**
Company : NIPPON SURFACTANT INDUSTRIES CO.,LTD.
Address : 7-14 Hiraide Kogyo Danchi Utsunomiya, Tochigi 321-0905, JAPAN
Division : QUALITY ASSURANCE
Tel. No. : 028-661-6121
Fax No. : 028-663-0426
E-Mail address : info-msds@nikkol.co.jp
Emergency tel. No. : NIKKO CHEMICALS CO., LTD.
+81-3-3661-1677
Recommended use and restrictions on use :

**2. HAZARDS IDENTIFICATION**
Most Important Hazards and Effects :
GHS Classification
Physical and Chemical Hazards : Not classified
Health Hazards
Acute Toxicity (Oral) : Classification not possible
Acute Toxicity (Dermal) : Classification not possible
Acute Toxicity (Inhalation : gases) : Not applicable
Acute Toxicity (Inhalation : vapors) : Classification not possible
Acute Toxicity (Inhalation : dust, mists) : Classification not possible
Skin Corrosion / Irritation : Classification not possible
Serious Eye Damage / Eye Irritation : Classification not possible
Respiratory Sensitization : Classification not possible
Skin Sensitization : Classification not possible
Germ Cell Mutagenicity : Classification not possible
Carcinogenicity : Classification not possible
Reproductive Toxicity : Classification not possible
Specific Target Organ Systemic Toxicity (Single Exposure) : Classification not possible
Specific Target Organ Systemic Toxicity (Repeated Exposure) : Classification not possible
Aspiration Hazard : Classification not possible
Environmental Hazards
Hazardous to The Aquatic Environment : Classification not possible
Hazardous to The Aquatic Environment : Classification not possible
Hazardous to The Ozone Layer Not classified

GHS Label Elements
Pictograms or Symbols :

Signal Word : -

Hazard Statements : [PH000] Not classified

Precautionary Statements

NIKKOL OLIVE OIL 1/5

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[Prevention] : [P264] Wash thoroughly after handling.
[Response] : [P301+P312] IF SWALLOWED: Call a doctor/physician if you feel unwell.
[P302+P352] IF ON SKIN: Wash with plenty of soap and water.
[P305+P351+P338] IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
[Storage] : [P404] Store in a closed container.
[Disposal] : [P501] Dispose of contents/container in accordance with local/regional/national/international regulation(to be specified).
[Safe Handling Advice] : Refer to SDS

**3. COMPOSITION / INFORMATION ON INGREDIENTS**
Substance or Mixture : Substance
Ingredients and Concentration Range :

| Ingredient (INCI Name) | concentration (%) | CAS No. |
|---|---|---|
| OLIVE OIL<br>OLEA EUROPAEA (OLIVE) FRUIT OIL | 100 | 8001-25-0 |

**4. FIRST-AID MEASURES**
In Case of Inhalation : Take victim to a place of fresh air and keep at rest in a position comfortable for breathing.
In Case of Skin Contact : Wash with plenty of soap and water.
Take off contaminated clothing and wash before reuse.
In Case of Eye Contact : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Get medical advice/attention if eye irritation persists:
In Case of Ingestion : Rinse mouth with water, and provide 1-2 cups of water or milk to drink.
Get immediate medical advice/attention.
In the event that the victim is not conscious, do not feed anything through the mouth.

**5. FIRE-FIGHTING MEASURES**
Extinguishing Media : Powder, alcohol-resistant form, carbon dioxide, sand, water spray.
Not Suitable Extinguishing Media : No information available
Special Hazards : During a fire, toxic gases (e.g., carbon monoxide, nitrogen oxide etc) may be generated. Avoid inhaling smoke during fire extinguishing.
Special Methods : Remove all combustible objects away from the fire and use adequate extinguishing media. Preferably extinguish the fire from the same direction of the wind. Evacuate personnel not involved in fire extinguishing to safe area. Equipment and machinery in proximity of fire must be sprayed with water to cool. Water used to extinguish a fire should not be allowed to enter the drainage system or water courses.
Protection of Fire Fighters : Use goggles in combination with dust mask. During a fire, toxic gases (e.g., carbon monoxide, nitrogen oxide etc) may be generated. Avoid inhaling smoke during fire extinguishing.

**6. ACCIDENTAL RELEASE MEASURES**
Special Methods : Use goggles and protective gloves. In case of large spills, remove person to safety. Ensure adequate ventilation.
Environmental Precautions : Do not discharge into river or sewer.

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Methods for Cleaning Up : In case of a small spill, absorb with liquid-binding material (sand, soil, cloth) and wipe away the remains with cloth or fabric. Flush surroundings with large amounts of water. In case of a large spill, surround it with the mound of sand or soil to prevent elution and collect into drums or other containers.
Prevention of Secondary Hazards : Promptly remove all combustible objects away from the spill and prepare fire extinguishing media. The spills on the floor must be cleaned promptly, otherwise they present a risk of traumatic accident. Avoid walking or stepping on the spills. While cleaning the spill use adequate tools that do not promote sparks of fire.

**7. HANDLING AND STORAGE**
Handling
Technical Measures : The shower with water (for washing of eyes and body) must be installed near the handling facility.
Precautions : Keep away from source of ignition.
Safe Handling Advice : Use adequate ventilation. Use goggles and protective gloves. Wash thoroughly after handling.
Storage
Suitable Storage Conditions : Store in a well-ventilated place. Keep cool.
Safe Packaging Materials : No information available

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**
Engineering Measures : Exhaust system must be installed in case steam, fume or mist is generated at the operation facility. Shower with water (for washing eyes and body) must be installed near the handling facility.
Limit Values
ACGIH : Not established
(2008Y)
Protective Equipment
Respiratory Protection : Not needed in case of standard handling.
Hand Protection : Impermeable protective gloves.
Eye Protection : Goggles or protective glasses with side protectors.
Skin and Body Protection : Workwear with long sleeves.
Hygiene Measures : No information available

**9. PHYSICAL AND CHEMICAL PROPERTIES**
Physical States
Form : Liquid
Color : Pale yellow
Odor : No data
pH : No data
Specific Temperatures / temperature Ranges at which Changes in Physical State Occur
Boiling Point : No data
Melting Point (Congealing point) : No data
Flash Point : 300° C min.
Flammability or Explosive Properties :
Flammability or Explosive Limits : No data
Vapour Pressure : No data
Vapour Density : No data
Specific Gravity : 0.9 ( 20° C)
Water Solubility : Insoluble.
Solvent Solubility : No data
Partition Coefficient : : No data

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| | |
|---|---|
| Auto-Ignition Temperature | : No data |
| Decomposition Temperature | : No data |
| Odor Threshold | : No data |
| Evaporation Rate | : No data |
| Flammability (solid, gas) | : No data |
| Other Data | : |

**10. STABILITY AND REACTIVITY**

| | |
|---|---|
| Chemical Stability | : No information available |
| Possibility of Hazardous Reactions | : No information available |
| Condition to Avoid | : No information available |
| Incompatible Materials | : No information available |
| Hazardous Decomposition Products | : Carbon monoxide, Nitrogen compound |
| Others | : |

**11. TOXICOLOGICAL INFORMATION**

| | |
|---|---|
| Acute Toxicity (oral) | : No data |
| Acute Toxicity (dermal) | : No data |
| Acute Toxicity (Inhalation : gases) | : No data |
| Acute Toxicity (Inhalation : vapors) | : No data |
| Acute Toxicity (Inhalation : dust, mists) | : No data |
| Skin Corrosion / Irritation | : No data |
| Serious Eye Damage / Irritation | : No data |
| Respiratory or Skin Sensitization | : No data |
| Mutagenicity (germ cell mutagenicity) | : No data |
| Carcinogenicity | : |
| IARC | : Not applicable |
| NTP | : Not applicable |
| Reproductive Toxicity | : No information available |
| Special Methods | : No information available |
| Special Methods | : No information available |
| Aspiration Hazard | : No information available |

**12. ECOLOGICAL INFORMATION**

| | |
|---|---|
| Ecotoxicity | : No data |
| Persistence / Degradability | : No information available |
| Bioaccumulative Potential | : No information available |
| Mobility in Soil | : No information available |

**13. DISPOSAL CINSIDERATIONS**

**14. TRANSPORT INFORMATION**

UN Class / UN Number : Not applicable

Special Precautions for User : Review "Section 7 : "Handling and Storage".
Ensure containers without breakage or leakage.
Ensure containers tightly fixed.
Follow all regulations in your country or region.

**15. REGULATORY INFORMATION**

Inventories :

| | |
|---|---|
| ENCS(Japan) | : Yes |

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| | |
|---|---|
| TSCA(USA) | : Yes |
| EINECS(EU) | : 232-277-0 |
| AICS(Australia) | : Yes |
| DSL(Canada) | : Yes |
| ECL(Korea) | : KE-27401 |
| IECSC(China) | : Yes |

**16. OTHER INFORMATION**

Reference

The information described herein is based on the documents, information and data, etc. on this product that are currently available to us, but the values, such as contents of ingredients, physical and chemical properties, are not necessarily identical to those in the specification. In addition, the precautions are intended for the cases where this product is handled and used under normal conditions. Thus, in cases of special uses or handling, users should use and handle it, taking appropriate safety measures in accordance with the intended uses and how to use the product.

NIKKOL OLIVE OIL 5/5

SEPPIC

Complying with 29 CFR 1910.1200 standard (HazCom 2012)

**SAFETY DATA SHEET**

**ORAMIX L 30**

## Section 1. Identification

| | |
|---|---|
| Product trade name | : ORAMIX L 30 |
| Product code | : 37195E |
| Material uses | : Anionic surfactant. |
| Supplier | : SEPPIC S.A.<br>22 Terrasse Bellini - Paris La Défense<br>92806 Puteaux CEDEX - France<br>Phone: +33(0)1 42 91 40 00<br>Fax: +33(0)1 42 91 41 41 |
| e-mail address of person responsible for this SDS | : MSDSinfo.SEPPIC@airliquide.com |
| Emergency telephone number (with hours of operation) | : 1-800-424-9300; INTNL: 1-703-527-3887 |

## Section 2. Hazards identification

| | |
|---|---|
| OSHA/HCS status | : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200). |
| Classification of the substance or mixture | : ACUTE TOXICITY (inhalation) - Category 4<br>SKIN CORROSION/IRRITATION - Category 2<br>SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1 |
| Classification code : | : Acute Tox. 4, H332<br>Skin Irrit. 2, H315<br>Eye Dam. 1, H318 |
| Hazards not otherwise classified | : None known. |

<u>GHS label elements</u>

Hazard pictograms :

| | |
|---|---|
| Signal word | : Danger |
| Hazard statements | : Harmful if inhaled. Causes serious eye damage. Causes skin irritation. |
| Contains | : sodium N-lauroylsarcosinate |

<u>Precautionary statements</u>

| | |
|---|---|
| Prevention | : Wear suitable gloves. Wear eye or face protection. Use only outdoors or in a well-ventilated area. Avoid breathing vapor. Wash hands thoroughly after handling. |
| Response | : IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing. Wash contaminated clothing before reuse. If skin irritation occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician. |

<u>ADDITIONAL INFORMATION</u>

| | |
|---|---|
| Storage | : PROTECT FROM FROST. |

*Date of issue/Date of revision : 25/10/2017 1/9*

Complying with 29 CFR 1910.1200 standard (HazCom 2012)

*ORAMIX L 30*

## Section 3. Composition/information on ingredients

| | |
|---|---|
| Substance/mixture | : Mixture |
| Product description | : Solution In water. |
| INCI Name: | : SODIUM LAUROYL SARCOSINATE |
| EC number | : 205-281-5 |

| Ingredient name | Identifiers | % |
|---|---|---|
| sodium N-lauroylsarcosinate | 205-281-5 | 20 - 40 |

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

**There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.**

**Occupational exposure limits, if available, are listed in Section 8.**

## Section 4. First aid measures

<u>Description of necessary first aid measures</u>

| | |
|---|---|
| Eye contact | : Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. |
| Inhalation | : Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours. |
| Skin contact | : Get medical attention immediately. Call a poison center or physician. Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. Wash clothing before reuse. Clean shoes thoroughly before reuse. |
| Ingestion | : Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. |

<u>Most important symptoms/effects, acute and delayed</u>

<u>Potential acute health effects</u>

| | |
|---|---|
| Eye contact | : Causes serious eye damage. |
| Inhalation | : Harmful if inhaled. |
| Skin contact | : Causes skin irritation. |
| Ingestion | : May cause burns to mouth, throat and stomach. |

<u>Over-exposure signs/symptoms</u>

| | |
|---|---|
| Eye contact | : Adverse symptoms may include the following:<br>pain<br>watering<br>redness |
| Inhalation | : No specific data. |

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Complying with 29 CFR 1910.1200 standard (HazCom 2012)

*ORAMIX L 30*

## Section 4. First aid measures

**Skin contact** : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur

**Ingestion** : Adverse symptoms may include the following:
stomach pains

**Indication of immediate medical attention and special treatment needed, if necessary**

**Notes to physician** : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

**Specific treatments** : No specific treatment.

**Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

**See toxicological information (Section 11)**

## Section 5. Fire-fighting measures

**Extinguishing media**

**Suitable extinguishing media** : Use an extinguishing agent suitable for the surrounding fire.

**Unsuitable extinguishing media** : None known.

**Specific hazards arising from the chemical** : In a fire or if heated, a pressure increase will occur and the container may burst.

**Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides
metal oxide/oxides

**Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

**Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

## Section 6. Accidental release measures

**Personal precautions, protective equipment and emergency procedures**

**For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

**For emergency responders** : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

**Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

**Methods and materials for containment and cleaning up**

**Small spill** : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

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Complying with 29 CFR 1910.1200 standard (HazCom 2012)

*ORAMIX L 30*

## Section 6. Accidental release measures

**Large spill** : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

## Section 7. Handling and storage

**Precautions for safe handling** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

**Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.
PROTECT FROM FROST.

## Section 8. Exposure controls/personal protection

**Control parameters**

**Occupational exposure limits**

| Ingredient name | Exposure limits |
|---|---|
| sodium N-lauroylsarcosinate | None. |

**Appropriate engineering controls** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

**Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

**Individual protection measures**

**Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

**Eye/face protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

**Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Recommended : PVC, nitrile rubber.

**Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

*Date of issue/Date of revision* : 25/10/2017 4/9

Complying with 29 CFR 1910.1200 standard (HazCom 2012)

*ORAMIX L 30*

## Section 8. Exposure controls/personal protection

**Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Respiratory protection** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

## Section 9. Physical and chemical properties

**Appearance**

**Physical state** : Liquid.
**Color** : Transparent , Colorless to light yellow.
**pH** : 7.5 to 8.5 [Conc. (% w/w): 3%]
**Boiling point** : 100°C (212°F)
**Flash point** : Closed cup: >100°C (>212°F) [Estimated.]
**Flammability of the product** : None available.
**Density** : 1,03 g/cm³ **to** 20 °C
**Solubility** : Soluble in the following materials: cold water.

The information presented in this section does not serve as specifications.

## Section 10. Stability and reactivity

**Reactivity** : No specific test data related to reactivity available for this product or its ingredients.

**Chemical stability** : The product is stable.

**Conditions of instability** : Keep away from oxidizing agents.

**Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.

**Conditions to avoid** : No specific data.

**Incompatible materials** : No specific data.

**Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## Section 11. Toxicological information

**Information on toxicological effects**

**Acute toxicity**

**Conclusion/Summary** : Harmful by inhalation.

**Irritation/Corrosion**

**Conclusion/Summary** :
**Skin** : Causes skin irritation.
**Eyes** : Causes serious eye damage.

**Sensitization**

**Conclusion/Summary** :
**Skin** : Non-sensitizer.

**Mutagenicity**

*Date of issue/Date of revision* : 25/10/2017 5/9

Complying with 29 CFR 1910.1200 standard (HazCom 2012)

*ORAMIX L 30*

## Section 11. Toxicological information

| Product/ingredient name | Test | Experiment | Result |
|---|---|---|---|
| sodium N-lauroylsarcosinate | OCDE 471 | Experiment: In vitro<br>Subject: Bacteria | Negative |
| | OCDE 476 | Experiment: In vitro<br>Subject: Mammalian-Animal | Negative |
| | OCDE 473 | Experiment: In vitro<br>Subject: Mammalian-Human | Negative |

**Carcinogenicity**

**Conclusion/Summary** : Not classified as dangerous

**Reproductive toxicity**

| Product/ingredient name | Maternal toxicity | Fertility | Development toxin | Test | Dose | Exposure |
|---|---|---|---|---|---|---|
| sodium N-lauroylsarcosinate | Negative | - | - | OCDE 414 | Oral: 30 mg/ kg bw/day | - |
| | - | Negative | Negative | OCDE 414 | Oral: 250 mg/ kg bw/day | - |

**Conclusion/Summary** : Not categorized.

**Teratogenicity**

**Conclusion/Summary** : Not available.

**Specific target organ toxicity (single exposure)**

Not available.

**Specific target organ toxicity (repeated exposure)**

Not available.

**Aspiration hazard**

Not available.

**Delayed and immediate effects and also chronic effects from short and long term exposure**

**Short term exposure**

**Potential immediate effects** : Not available.
**Potential delayed effects** : Not available.

**Long term exposure**

**Potential immediate effects** : Not available.
**Potential delayed effects** : Not available.

**Potential chronic health effects**

| Product/ingredient name | Result | Test | Dose | Exposure |
|---|---|---|---|---|
| sodium N-lauroylsarcosinate | Sub-chronic NOAEL Oral | OCDE 408 | 250 mg/kg bw/day systemic toxicity | - |
| | Chronic NOAEL Oral | - | 1000 mg/kg bw/day | - |

**Conclusion/Summary** : Not classified as dangerous
**General** : No known significant effects or critical hazards.
**Carcinogenicity** : No known significant effects or critical hazards.
**Mutagenicity** : No known significant effects or critical hazards.
**Teratogenicity** : No known significant effects or critical hazards.
**Developmental effects** : No known significant effects or critical hazards.
**Fertility effects** : No known significant effects or critical hazards.

*Date of issue/Date of revision* : 25/10/2017 6/9

Complying with 29 CFR 1910.1200 standard (HazCom 2012)

*ORAMIX L 30*

## Section 12. Ecological information

**Toxicity**

| Product/ingredient name | Result | Test | Species | Exposure |
|---|---|---|---|---|
| sodium N-lauroylsarcosinate | Acute EC50 79 mg/l Fresh water | OCDE 201 | Algae | 72 hours |
| | Acute EC50 29.7 mg/l Fresh water | OCDE 202 | Daphnia - Daphnia magna | 48 hours |
| | Acute EC50 >1000 mg/l Fresh water | OCDE 209 | Micro-organism | 3 hours |
| | Acute LC50 107 mg/l Fresh water | OCDE 203 | Fish - Danio rerio | 96 hours |

**Conclusion/Summary** : Not classified as dangerous

**Persistence and degradability**

| Product/ingredient name | Test | Result | Dose | Inoculum |
|---|---|---|---|---|
| sodium N-lauroylsarcosinate | ISO 14593 | 82 % - Readily - 28 days | - | - |

**Conclusion/Summary** : Readily biodegradable

| Product/ingredient name | Aquatic half-life | Photolysis | Biodegradability |
|---|---|---|---|
| sodium N-lauroylsarcosinate | - | - | Readily |

**Bioaccumulative potential**

| Product/ingredient name | $LogP_{ow}$ | BCF | Potential |
|---|---|---|---|
| sodium N-lauroylsarcosinate | 0,37 | - | low |

**Mobility in soil**

**Soil/water partition coefficient ($K_{OC}$)** : Not available.

**Other adverse effects** : No known significant effects or critical hazards.

## Section 13. Disposal considerations

**Disposal methods** : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

## Section 14. Transport information

| | DOT Classification | TDG Classification | Mexico Classification | IMDG | IATA |
|---|---|---|---|---|---|
| UN number | Not regulated. | Not regulated. | Not regulated. | Not regulated. | Not regulated. |
| UN proper shipping name | - | - | - | - | - |
| | | | | | |

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Complying with 29 CFR 1910.1200 standard (HazCom 2012)

*ORAMIX L 30*

## Section 14. Transport information

| | | | | | |
|---|---|---|---|---|---|
| Transport hazard class(es) | - | - | - | - | - |
| Packing group | - | - | - | - | - |
| Environmental hazards | No. | No. | No. | No. | No. |
| Additional information | - | - | - | - | - |

**Special precautions for user** : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code** : Not available.

## Section 15. Regulatory information

**Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs)** : Not listed

**Clean Air Act Section 602 Class I Substances** : Not listed

**Clean Air Act Section 602 Class II Substances** : Not listed

**DEA List I Chemicals (Precursor Chemicals)** : Not listed

**DEA List II Chemicals (Essential Chemicals)** : Not listed

**SARA 302/304**

**Composition/information on ingredients**

No products were found.

**SARA 304 RQ** : Not applicable.

**SARA 311/312**

**Classification** : Immediate (acute) health hazard

**Composition/information on ingredients**

| Name | % | Fire hazard | Sudden release of pressure | Reactive | Immediate (acute) health hazard | Delayed (chronic) health hazard |
|---|---|---|---|---|---|---|
| sodium N-lauroylsarcosinate | 20 - 40 | No. | No. | No. | Yes. | No. |

## Section 16. Other information

**Hazardous Material Information System (U.S.A.)**

| | |
|---|---|
| Health | 2 |
| Flammability | 0 |
| Physical hazards | 0 |

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Complying with 29 CFR 1910.1200 standard (HazCom 2012)

*ORAMIX L 30*

## Section 16. Other information

**Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.**

**The customer is responsible for determining the PPE code for this material.**

**National Fire Protection Association (U.S.A.)**

Flammability

Health Instability/Reactivity


Special

**Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.**

**Procedure used to derive the classification**

| Classification | Justification |
|---|---|
| Acute Tox. 4, H332<br>Skin Irrit. 2, H315<br>Eye Dam. 1, H318 | Expert judgment<br>Calculation method<br>Calculation method |

**History**

**Date of printing** : 25/10/2017

**Date of issue/Date of revision** : 25/10/2017

**Date of previous issue** : 13/10/2014

**Version** : 3

**Key to abbreviations** : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

**References** : Not available.

**Indicates information that has changed from previously issued version.**

**Notice to reader**

**The information contained in this document is provided as a guideline; it is based on the extent of SEPPIC's knowledge regarding the product on the date indicated above. It applies to the product as is, in conformity with the specifications provided by SEPPIC*.**
**Should the product undergo chemical transformation or be combined or mixed with other substances, it is the sole responsibility of the user to ensure that no new danger appear. Given that the use of this information is beyond the control of SEPPIC*, SEPPIC* provides no warranty, whether express or implied, and assumes no responsibility, regarding the use of this information and of the user's product.**
**SEPPIC* being SEPPIC SA and its subsidiaries (addresses available on www.seppic.com )**

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*Date of issue/Date of revision* : 25/10/2017 9/9

SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

DSM

**D-Panthenol** **0413852**

Version 3.2 Revision Date 02.03.2018 Date of last issue: 15.10.2014

### SECTION 1: Identification of the substance/mixture and of the company/undertaking

**1.1 Product identifier**

Trade name : D-Panthenol

REACH Registration Number : 01-2119953737-24-0000
Substance name : Butanamide, 2,4-dihydroxy-N-(3-hydroxypropyl)-3,3-dimethyl-, (2R)-
CAS-No. : 81-13-0

**1.2 Relevant identified uses of the substance or mixture and uses advised against**

Use of the Substance/Mixture : Ingredient for pharmaceutical products, Ingredient for personal care products

**1.3 Details of the supplier of the safety data sheet**

Company : DSM Nutritional Products Ltd.
PO Box 2676
CH-4002 Basel

Telephone : +41618158888
Telefax : +41618157253
E-mail address of person responsible for the SDS : sds.nutritionalproducts@dsm.com

**1.4 Emergency telephone number**

+41 62 866 2314

### SECTION 2: Hazards identification

**2.1 Classification of the substance or mixture**

**Classification (REGULATION (EC) No 1272/2008)**

Not a hazardous substance or mixture.

**2.2 Label elements**

**Labelling (REGULATION (EC) No 1272/2008)**

Not a hazardous substance or mixture.

**2.3 Other hazards**

None known.

### SECTION 3: Composition/information on ingredients

Synonyms : (R)-2,4-dihydroxy-N-(3-hydroxypropyl)-3,3-dimethylbutyramide

Brief description of the product : Substance
Molecular formula : C9-H19-N-O4

**3.1 Substances**

**Hazardous components**

Remarks : No hazardous ingredients

**Further ingredients**

| Chemical name | CAS-No. | GHS Classification | Concentration |
|---|---|---|---|

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| | EC-No.<br>Registration number | | [%] |
|---|---|---|---|
| dexpanthenol (provitamin B5) | 81-13-0<br>201-327-3<br>01-2119953737-24 | | >= 98 - <= 100 |

**SECTION 4: First aid measures**

**4.1 Description of first aid measures**

| | |
|---|---|
| General advice | : No hazards which require special first aid measures. |
| If inhaled | : Move to fresh air.<br>If symptoms persist, call a physician. |
| In case of skin contact | : Take off contaminated clothing and shoes immediately.<br>Wash off with soap and plenty of water. |
| In case of eye contact | : Flush eyes with water as a precaution.<br>Remove contact lenses.<br>Protect unharmed eye.<br>Keep eye wide open while rinsing. |
| If swallowed | : Clean mouth with water and drink afterwards plenty of water.<br>Do not give milk or alcoholic beverages.<br>Never give anything by mouth to an unconscious person. |

**4.2 Most important symptoms and effects, both acute and delayed**

Symptoms : No specific symptoms known.

**4.3 Indication of any immediate medical attention and special treatment needed**

Treatment : Treat symptomatically.

**SECTION 5: Firefighting measures**

**5.1 Extinguishing media**

Suitable extinguishing media : Alcohol-resistant foam
Dry chemical
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

**5.2 Special hazards arising from the substance or mixture**

Specific hazards during firefighting : Heating or fire can release toxic gas.

**5.3 Advice for firefighters**

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus.

Further information : Standard procedure for chemical fires.

**SECTION 6: Accidental release measures**

**6.1 Personal precautions, protective equipment and emergency procedures**

Use personal protective equipment.





**6.2 Environmental precautions**

Try to prevent the material from entering drains or water courses.

**6.3 Methods and material for containment and cleaning up**

Wipe up with absorbent material (e.g. cloth, fleece).
Keep in suitable, closed containers for disposal.

**6.4 Reference to other sections**

For personal protection see section 8.
For disposal considerations see section 13.

**SECTION 7: Handling and storage**

**7.1 Precautions for safe handling**

| | |
|---|---|
| Advice on safe handling | : For personal protection see section 8. |
| Advice on protection against fire and explosion | : Take necessary action to avoid static electricity discharge.<br>Product will burn under fire conditions. |
| Hygiene measures | : General industrial hygiene practice. |

**7.2 Conditions for safe storage, including any incompatibilities**

| | |
|---|---|
| Requirements for storage areas and containers | : To maintain product quality, do not store in heat or direct sunlight.<br>Keep container tightly closed and dry. |
| Advice on common storage | : No special restrictions on storage with other products. |

**7.3 Specific end use(s)**

Specific use(s) : Not applicable

**SECTION 8: Exposure controls/personal protection**

**8.1 Control parameters**

Contains no substances with occupational exposure limit values.

**8.2 Exposure controls**

**Personal protective equipment**

| | |
|---|---|
| Eye protection | : Safety glasses |
| Hand protection | : Glove material: for example nitrile rubber |
| Skin and body protection | : Lightweight protective clothing |
| Respiratory protection | : No personal respiratory protective equipment normally required. |

**SECTION 9: Physical and chemical properties**

**9.1 Information on basic physical and chemical properties**





| | |
|---|---|
| Appearance | : clear, viscous liquid |
| Colour | : colourless - pale yellow |
| Odour | : odourless |
| Odour Threshold | : No information available. |
| pH | : 9.0 - 10.5 (5%)<br>(as aqueous solution) |
| Freezing point | : -25.0 °C (995 hPa; OECD Test Guideline 102) |
| Boiling point/boiling range | : 235.6 °C (995 hPa; OECD Test Guideline 103)<br>with decomposition<br>118 - 120 °C (0.027 hPa) |
| Flash point | : 150.5 °C (closed cup, Tested according to Directive 92/69/EEC.) |
| Evaporation rate | : not determined |
| Lower explosion limit | : not determined |
| Upper explosion limit | : not determined |
| Vapour pressure | : < 0.00001 hPa (25 °C; OECD Test Guideline 104)<br>0.0017 hPa (70 °C; OECD Test Guideline 104)<br>0.039 hPa (90 °C; OECD Test Guideline 104) |
| Relative vapour density | : not determined |
| Density | : 1.2 g/cm3 (20 °C) |
| Water solubility | : > 509 g/l (22 °C; OECD Test Guideline 105) |
| Solubility in other solvents | : Methanol: easily soluble<br>Ethanol: easily soluble<br>Diethylether: slightly soluble<br>Oils and fats: insoluble |
| Partition coefficient: n-octanol/water | : log Pow -1.06 (22 °C, pH 8; OECD Test Guideline 107) |
| Auto-ignition temperature | : not pyrophoric |
| Ignition temperature | : > 400 °C (ca. 1,030 hPa, Tested according to Directive 92/69/EEC.) |
| Thermal decomposition | : Not relevant |
| Viscosity, dynamic | : > 200,000 mPa.s (20 °C)<br>Very viscous<br>ca. 128 mPa.s (100 °C) |
| Explosive properties | : Not explosive |
| Oxidizing properties | : No data available |

**9.2 Other information**

| | |
|---|---|
| Refractive index | : 1.497 - 1.501 (589 nm) |
| Molecular weight | : 205.25 g/mol |
| Further information | : hygroscopic |





**SECTION 10: Stability and reactivity**

**10.1 Reactivity**

No hazards to be specially mentioned.

**10.2 Chemical stability**

Stable under recommended storage conditions.

**10.3 Possibility of hazardous reactions**

Possible incompatibility with materials listed under section 10.5.

**10.4 Conditions to avoid**

Heat

**10.5 Incompatible materials**

Strong acids and strong bases
Strong oxidizing agents

**10.6 Hazardous decomposition products**

Nitrogen oxides (NOx)
Carbon oxides

**SECTION 11: Toxicological information**

**11.1 Information on toxicological effects**

| | |
|---|---|
| Acute oral toxicity | : LD50 (Rat): > 10,000 mg/kg<br>: LD50 (Mouse): 15,000 mg/kg |
| Acute inhalation toxicity | : No data available |
| Acute dermal toxicity | : LD50 (Rat): > 3,500 mg/kg |
| Skin irritation | : No skin irritation (Rabbit, OECD Test Guideline 404)<br>: no phototoxic skin reaction (Guinea pig, CTFA Test Guideline) |
| Eye irritation | : No eye irritation (Rabbit, OECD Test Guideline 405) |
| Sensitisation | : Did not cause sensitization. (Guinea pig)<br>: no photoallergenic skin reaction (Guinea pig, CTFA Test Guideline) |
| Genotoxicity in vitro | : not mutagenic (In vitro gene mutation study in mammalian cells, OECD Test Guideline 476)<br>: not genotoxic (Chromosome aberration test in vitro, OECD Test Guideline 473) |

| | |
|---|---|
| Carcinogenicity | : No indication for carcinogenicity known. |
| Reproductive toxicity | : This information is not available. |
| Teratogenicity | : No human information is available. |
| STOT - single exposure (Acute exposure) | : The substance or mixture is not classified as specific target organ toxicant, single exposure. |
| STOT - repeated exposure | : NOAEL (Oral, Rat) : 200 mg/kg bw/d<br>Sub-chronic toxicity study (90-day) |
| Experience with human exposure | : Hypervitaminosis from provitamin B5 and vitamin B5 is unknown. |
| Experience with human exposure: Skin contact | : Allergic contact dermatitis<br>(Cases have been reported rarely.) |
| Aspiration toxicity | : No aspiration toxicity classification |

**SECTION 12: Ecological information**

**12.1 Toxicity**

| | |
|---|---|
| Toxicity to fish | : Oncorhynchus mykiss (rainbow trout)<br>LC50 (96 h) > 1,000 mg/l<br>(OECD Test Guideline 203) |
| Toxicity to daphnia and other aquatic invertebrates | : Daphnia magna (Water flea)<br>EC50 (48 h) > 100 mg/l<br>(OECD Test Guideline 202) |
| Toxicity to algae | : Desmodesmus subspicatus (green algae)<br>EbC50 (72 h) > 100 mg/l<br>(OECD Test Guideline 201)<br>: NOEC (72 h) 100 mg/l |
| Toxicity to bacteria | : activated sludge<br>NOEC 569 mg/l<br>No inhibition was observed under the biodegradation test conditions.<br>(OECD Test Guideline 302B)<br>: Pseudomonas putida<br>EC50 (17 h) > 10,000 mg/l<br>(nominal concentration)<br>(DIN 38412) |

**12.2 Persistence and degradability**





| | |
|---|---|
| Biodegradability | : Readily biodegradable.<br>97 % (21 d)<br>(OECD Test Guideline 301A) |

**12.3 Bioaccumulative potential**

| | |
|---|---|
| Partition coefficient: n-octanol/water | : log Pow -1.06 ( 22 °C , pH 8; OECD Test Guideline 107) |

**12.4 Mobility in soil**

| | |
|---|---|
| Distribution among environmental compartments | : No data available |

**12.5 Results of PBT and vPvB assessment**

| | |
|---|---|
| Assessment | : The substance does not fullfill the PBT criteria.<br>: The substance does not fullfill the vPvB criteria. |

**12.6 Other adverse effects**

| | |
|---|---|
| Additional ecological information | : There is no data available for this product. |

**SECTION 13: Disposal considerations**

**13.1 Waste treatment methods**

| | |
|---|---|
| Product | : Offer surplus and non-recyclable solutions to a licensed disposal company. |
| Contaminated packaging | : Empty containers should be taken to an approved waste handling site for recycling or disposal. |

**SECTION 14: Transport information**

**14.1 UN number**

Not regulated as a dangerous good

**14.2 UN proper shipping name**

Not regulated as a dangerous good

**14.3 Transport hazard class(es)**

Not regulated as a dangerous good

**14.4 Packing group**

Not regulated as a dangerous good

**14.5 Environmental hazards**

Not regulated as a dangerous good

**14.6 Special precautions for user**

| | |
|---|---|
| Remarks | : Not classified as dangerous in the meaning of transport regulations. |

**14.7 Transport in bulk according to Annex II of Marpol and the IBC Code**

Not applicable for product as supplied.

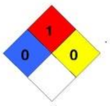




**SECTION 15: Regulatory information**

**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

| | |
|---|---|
| **NFPA Classification** | : Health hazard: 0<br>Fire Hazard: 1<br>Reactivity Hazard: 0 |




**15.2 Chemical safety assessment**

A Chemical Safety Assessment is not required for this substance.

**SECTION 16: Other information**

**Full text of other abbreviations**

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road; AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

**Further information**

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not





to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006
Revision Date 26.05.2017 Version 11.4

**SECTION 1. Identification of the substance/mixture and of the company/undertaking**

**1.1 Product identifier**

| | |
|---|---|
| Catalogue No. | 104935 |
| Product name | Potassium chloride EMPROVE® ESSENTIAL Ph Eur,BP,JP,USP,FCC,E 508 |
| REACH Registration Number | A registration number is not available for this substance as the substance or its use are exempted from registration according to Article 2 REACH Regulation (EC) No 1907/2006, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline. |
| CAS-No. | 7447-40-7 |

**1.2 Relevant identified uses of the substance or mixture and uses advised against**

Identified uses: Pharmaceutical production, Cosmetic raw material. For additional information on uses please refer to the Merck Chemicals portal (www.merckgroup.com).

**1.3 Details of the supplier of the safety data sheet**

| | |
|---|---|
| Company | Merck KGaA * 64271 Darmstadt * Germany * Phone:+49 6151 72-0 |
| Responsible Department | LS-QHC * e-mail: prodsafe@merckgroup.com |

**1.4 Emergency telephone number** **Please contact the regional company representation in your country.**

**SECTION 2. Hazards identification**

**2.1 Classification of the substance or mixture**

This substance is not classified as dangerous according to European Union legislation.

The life science business of Merck operates as MilliporeSigma in the US and Canada

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SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

| | |
|---|---|
| Catalogue No. | 104935 |
| Product name | Potassium chloride EMPROVE® ESSENTIAL Ph Eur,BP,JP,USP,FCC,E 508 |

**2.2 Label elements**

**Labelling (REGULATION (EC) No 1272/2008)**

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.

**2.3 Other hazards**

None known.

**SECTION 3. Composition/information on ingredients**

**3.1 Substance**

| | | |
|---|---|---|
| Formula | KCl | ClK (Hill) |
| EC-No. | 231-211-8 | |
| Molar mass | 74,55 g/mol | |

Remarks: No disclosure requirement according to Regulation (EC) No. 1907/2006

**3.2 Mixture**

Not applicable

**SECTION 4. First aid measures**

**4.1 Description of first aid measures**

After inhalation: fresh air.

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

After eye contact: rinse out with plenty of water.

After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

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SAFETY DATA SHEET
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| | |
|---|---|
| Catalogue No. | 104935 |
| Product name | Potassium chloride EMPROVE® ESSENTIAL Ph Eur,BP,JP,USP,FCC,E 508 |

**4.2 Most important symptoms and effects, both acute and delayed**

irritant effects, Nausea, Vomiting, cardiovascular disorders

**4.3 Indication of any immediate medical attention and special treatment needed**

No information available.

**SECTION 5. Firefighting measures**

**5.1 Extinguishing media**

*Suitable extinguishing media*

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

*Unsuitable extinguishing media*

For this substance/mixture no limitations of extinguishing agents are given.

**5.2 Special hazards arising from the substance or mixture**

Not combustible.
Ambient fire may liberate hazardous vapours.
Fire may cause evolution of:
Hydrogen chloride gas

**5.3 Advice for firefighters**

*Special protective equipment for firefighters*

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

*Further information*

Suppress (knock down) gases/vapours/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

**SECTION 6. Accidental release measures**

**6.1 Personal precautions, protective equipment and emergency procedures**

Advice for non-emergency personnel: Avoid inhalation of dusts. Evacuate the danger area, observe emergency procedures, consult an expert.

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Advice for emergency responders:

Protective equipment see section 8.

**6.2 Environmental precautions**

Do not let product enter drains.

**6.3 Methods and materials for containment and cleaning up**

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

**6.4 Reference to other sections**

Indications about waste treatment see section 13.

**SECTION 7. Handling and storage**

**7.1 Precautions for safe handling**

*Advice on safe handling*

Observe label precautions.

*Hygiene measures*

Change contaminated clothing. Wash hands after working with substance.

**7.2 Conditions for safe storage, including any incompatibilities**

*Storage conditions*

Tightly closed. Dry.

Recommended storage temperature see product label.

**7.3 Specific end use(s)**

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated.

**SECTION 8. Exposure controls/personal protection**

**8.1 Control parameters**

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| Product name | Potassium chloride EMPROVE® ESSENTIAL Ph Eur,BP,JP,USP,FCC,E 508 |

**8.2 Exposure controls**

**Engineering measures**
Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

See section 7.1.

**Individual protection measures**
Protective clothing needs to be selected specifically for the workplace, depending on concentrations and quantities of the hazardous substances handled. The chemical resistance of the protective equipment should be enquired at the respective supplier.

*Eye/face protection*
Safety glasses

*Hand protection*
full contact:

| | |
|---|---|
| Glove material: | Nitrile rubber |
| Glove thickness: | 0,11 mm |
| Break through time: | > 480 min |

splash contact:

| | |
|---|---|
| Glove material: | Nitrile rubber |
| Glove thickness: | 0,11 mm |
| Break through time: | > 480 min |

The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374, for example KCL 741 Dermatril® L (full contact), KCL 741 Dermatril® L (splash contact).
The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN374 with samples of the recommended glove types.
This recommendation applies only to the product stated in the safety data sheet<(>,<)> supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

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*Respiratory protection*
required when dusts are generated.
Recommended Filter type: Filter P 1 (acc. to DIN 3181) for solid particles of inert substances
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

**Environmental exposure controls**
Do not let product enter drains.

**SECTION 9. Physical and chemical properties**

**9.1 Information on basic physical and chemical properties**

| | |
|---|---|
| Form | solid |
| Colour | white |
| Odour | odourless |
| Odour Threshold | Not applicable |
| pH | 5,5 - 8,0<br>at 50 g/l<br>25 °C |
| Melting point | 773 °C |
| Boiling point/boiling range | 1.413 °C<br>at 1.013 hPa |
| Flash point | Not applicable |
| Evaporation rate | No information available. |

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| Catalogue No. | 104935 |
|---|---|
| Product name | Potassium chloride EMPROVE® ESSENTIAL Ph Eur,BP,JP,USP,FCC,E 508 |

| | |
|---|---|
| Flammability (solid, gas) | The product is not flammable. |
| Lower explosion limit | Not applicable |
| Upper explosion limit | Not applicable |
| Vapour pressure | No information available. |
| Relative vapour density | No information available. |
| Density | 1,98 g/cm3<br>at 20 °C |
| Relative density | No information available. |
| Water solubility | 347 g/l<br>at 20 °C |
| Partition coefficient: n-octanol/water | No information available. |
| Auto-ignition temperature | No information available. |
| Decomposition temperature | No information available. |
| Viscosity, dynamic | No information available. |
| Explosive properties | Not classified as explosive. |
| Oxidizing properties | none |

**9.2 Other data**

| | |
|---|---|
| Sublimation point | 1.500 °C |
| Ignition temperature | not combustible |

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|---|---|
| Product name | Potassium chloride EMPROVE® ESSENTIAL Ph Eur,BP,JP,USP,FCC,E 508 |

| | |
|---|---|
| Bulk density | ca.1.000 kg/m3 |

**SECTION 10. Stability and reactivity**

**10.1 Reactivity**
See section 10.3

**10.2 Chemical stability**
The product is chemically stable under standard ambient conditions (room temperature) .

**10.3 Possibility of hazardous reactions**
Violent reactions possible with:
Strong oxidizing agents

**10.4 Conditions to avoid**
no information available

**10.5 Incompatible materials**
no information available

**10.6 Hazardous decomposition products**
in the event of fire: See section 5.

**SECTION 11. Toxicological information**

**11.1 Information on toxicological effects**

*Acute oral toxicity*
LD50 Rat: 2.600 mg/kg

(RTECS)

*Acute inhalation toxicity*
This information is not available.

*Acute dermal toxicity*
This information is not available.

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| | |
|---|---|
| Catalogue No. | 104935 |
| Product name | Potassium chloride EMPROVE® ESSENTIAL Ph Eur,BP,JP,USP,FCC,E 508 |

*Skin irritation*
This information is not available.

*Eye irritation*

Possible damages: slight irritation

*Sensitisation*
This information is not available.

*Germ cell mutagenicity*
*Genotoxicity in vitro*
Ames test
Salmonella typhimurium
Result: negative

(National Toxicology Program)

*Carcinogenicity*
This information is not available.

*Reproductive toxicity*
This information is not available.

*Teratogenicity*
This information is not available.

*Specific target organ toxicity - single exposure*
This information is not available.

*Specific target organ toxicity - repeated exposure*
This information is not available.

*Aspiration hazard*
This information is not available.

**11.2 Further information**
After swallowing of large amounts:
Nausea, Vomiting, cardiovascular disorders, Cardiac irregularities
However, when the product is handled appropriately, hazardous effects are unlikely to occur.
Handle in accordance with good industrial hygiene and safety practice.

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| | |
|---|---|
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| Product name | Potassium chloride EMPROVE® ESSENTIAL Ph Eur,BP,JP,USP,FCC,E 508 |

**SECTION 12. Ecological information**

**12.1 Toxicity**
*Toxicity to fish*
LC50 Gambusia affinis (Mosquito fish): 920 mg/l; 96 h
(IUCLID)

*Toxicity to daphnia and other aquatic invertebrates*
EC50 Daphnia magna (Water flea): 825 mg/l; 48 h
DIN 38412
(IUCLID)

*Toxicity to algae*
IC50 Desmodesmus subspicatus (green algae): 2.500 mg/l; 72 h
(IUCLID)

**12.2 Persistence and degradability**
*Biodegradability*

The methods for determining the biological degradability are not applicable to inorganic substances.

**12.3 Bioaccumulative potential**
No information available.

**12.4 Mobility in soil**
No information available.

**12.5 Results of PBT and vPvB assessment**
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted.

**12.6 Other adverse effects**
Discharge into the environment must be avoided.

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**SECTION 13. Disposal considerations**
*Waste treatment methods*
See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

**SECTION 14. Transport information**

**Land transport (ADR/RID)**

| | |
|---|---|
| **14.1 - 14.6** | Not classified as dangerous in the meaning of transport regulations. |

**Inland waterway transport (ADN)**
Not relevant

**Air transport (IATA)**

| | |
|---|---|
| **14.1 - 14.6** | Not classified as dangerous in the meaning of transport regulations. |

**Sea transport (IMDG)**

| | |
|---|---|
| **14.1 - 14.6** | Not classified as dangerous in the meaning of transport regulations. |

**14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**
Not relevant

**SECTION 15. Regulatory information**
**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
*EU regulations*

| | |
|---|---|
| Major Accident Hazard Legislation | SEVESO III Not applicable |
| Regulation (EC) No 1005/2009 on substances that deplete the ozone layer | not regulated |

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|---|---|
| Catalogue No. | 104935 |
| Product name | Potassium chloride EMPROVE® ESSENTIAL Ph Eur,BP,JP,USP,FCC,E 508 |

| | |
|---|---|
| Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC | not regulated |
| Substances of very high concern (SVHC) | This product does not contain substances of very high concern according to Regulation (EC) No 1907/2006 (REACH), Article 57 above the respective regulatory concentration limit of ≥ 0.1 % (w/w). |

*National legislation*
Storage class 10 - 13

**15.2 Chemical safety assessment**
For this product a chemical safety assessment was not carried out.

**SECTION 16. Other information**

**Training advice**
Provide adequate information, instruction and training for operators.

**Key or legend to abbreviations and acronyms used in the safety data sheet**
Used abbreviations and acronyms can be looked up at www.wikipedia.org.

**Regional representation**
This information is given on the authorised Safety Data Sheet for your country.

*The information contained herein is based on the present state of our knowledge. It characterises the product with regard to the appropriate safety precautions. It does not represent a guarantee of any properties of the product.*

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SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

Revision Date 26.05.2017 Version 11.4

**SECTION 1. Identification of the substance/mixture and of the company/undertaking**

**1.1 Product identifier**

| | |
|---|---|
| Catalogue No. | 104935 |
| Product name | Potassium chloride EMPROVE® ESSENTIAL Ph Eur,BP,JP,USP,FCC,E 508 |
| REACH Registration Number | A registration number is not available for this substance as the substance or its use are exempted from registration according to Article 2 REACH Regulation (EC) No 1907/2006, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline. |
| CAS-No. | 7447-40-7 |

**1.2 Relevant identified uses of the substance or mixture and uses advised against**

| | |
|---|---|
| Identified uses | Pharmaceutical production, Cosmetic raw material<br>For additional information on uses please refer to the Merck Chemicals portal (www.merckgroup.com). |

**1.3 Details of the supplier of the safety data sheet**

| | |
|---|---|
| Company | Merck KGaA * 64271 Darmstadt * Germany * Phone:+49 6151 72-0 |
| Responsible Department | LS-QHC * e-mail: prodsafe@merckgroup.com |

**1.4 Emergency telephone number** **Please contact the regional company representation in your country.**

**SECTION 2. Hazards identification**

**2.1 Classification of the substance or mixture**

This substance is not classified as dangerous according to European Union legislation.

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| | |
|---|---|
| Catalogue No. | 104935 |
| Product name | Potassium chloride EMPROVE® ESSENTIAL Ph Eur,BP,JP,USP,FCC,E 508 |

**2.2 Label elements**

**Labelling (REGULATION (EC) No 1272/2008)**

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.

**2.3 Other hazards**

None known.

**SECTION 3. Composition/information on ingredients**

**3.1 Substance**

| | | |
|---|---|---|
| Formula | KCl | ClK (Hill) |
| EC-No. | 231-211-8 | |
| Molar mass | 74,55 g/mol | |

| | |
|---|---|
| Remarks | No disclosure requirement according to Regulation (EC) No. 1907/2006 |

**3.2 Mixture**

Not applicable

**SECTION 4. First aid measures**

**4.1 Description of first aid measures**

After inhalation: fresh air.

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

After eye contact: rinse out with plenty of water.

After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

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**4.2 Most important symptoms and effects, both acute and delayed**

irritant effects, Nausea, Vomiting, cardiovascular disorders

**4.3 Indication of any immediate medical attention and special treatment needed**

No information available.

**SECTION 5. Firefighting measures**

**5.1 Extinguishing media**

*Suitable extinguishing media*

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

*Unsuitable extinguishing media*

For this substance/mixture no limitations of extinguishing agents are given.

**5.2 Special hazards arising from the substance or mixture**

Not combustible.
Ambient fire may liberate hazardous vapours.
Fire may cause evolution of:
Hydrogen chloride gas

**5.3 Advice for firefighters**

*Special protective equipment for firefighters*

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

*Further information*

Suppress (knock down) gases/vapours/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

**SECTION 6. Accidental release measures**

**6.1 Personal precautions, protective equipment and emergency procedures**

Advice for non-emergency personnel: Avoid inhalation of dusts. Evacuate the danger area, observe emergency procedures, consult an expert.

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Advice for emergency responders:

Protective equipment see section 8.

**6.2 Environmental precautions**

Do not let product enter drains.

**6.3 Methods and materials for containment and cleaning up**

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

**6.4 Reference to other sections**

Indications about waste treatment see section 13.

**SECTION 7. Handling and storage**

**7.1 Precautions for safe handling**

*Advice on safe handling*

Observe label precautions.

*Hygiene measures*

Change contaminated clothing. Wash hands after working with substance.

**7.2 Conditions for safe storage, including any incompatibilities**

*Storage conditions*

Tightly closed. Dry.

Recommended storage temperature see product label.

**7.3 Specific end use(s)**

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated.

**SECTION 8. Exposure controls/personal protection**

**8.1 Control parameters**

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**8.2 Exposure controls**

**Engineering measures**
Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

See section 7.1.

**Individual protection measures**
Protective clothing needs to be selected specifically for the workplace, depending on concentrations and quantities of the hazardous substances handled. The chemical resistance of the protective equipment should be enquired at the respective supplier.

*Eye/face protection*
Safety glasses

*Hand protection*
full contact:

| | | |
|---|---|---|
| | Glove material: | Nitrile rubber |
| | Glove thickness: | 0,11 mm |
| | Break through time: | > 480 min |

splash contact:

| | | |
|---|---|---|
| | Glove material: | Nitrile rubber |
| | Glove thickness: | 0,11 mm |
| | Break through time: | > 480 min |

The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374, for example KCL 741 Dermatril® L (full contact), KCL 741 Dermatril® L (splash contact).
The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN374 with samples of the recommended glove types.
This recommendation applies only to the product stated in the safety data sheet<(>,<)> supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

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| Catalogue No. | 104935 |
| Product name | Potassium chloride EMPROVE® ESSENTIAL Ph Eur,BP,JP,USP,FCC,E 508 |

*Respiratory protection*
required when dusts are generated.
Recommended Filter type: Filter P 1 (acc. to DIN 3181) for solid particles of inert substances
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

**Environmental exposure controls**
Do not let product enter drains.

**SECTION 9. Physical and chemical properties**

**9.1 Information on basic physical and chemical properties**

| | |
|---|---|
| Form | solid |
| Colour | white |
| Odour | odourless |
| Odour Threshold | Not applicable |
| pH | 5,5 - 8,0<br>at 50 g/l<br>25 °C |
| Melting point | 773 °C |
| Boiling point/boiling range | 1.413 °C<br>at 1.013 hPa |
| Flash point | Not applicable |
| Evaporation rate | No information available. |

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|---|---|
| Catalogue No. | 104935 |
| Product name | Potassium chloride EMPROVE® ESSENTIAL Ph Eur,BP,JP,USP,FCC,E 508 |

| | |
|---|---|
| Flammability (solid, gas) | The product is not flammable. |
| Lower explosion limit | Not applicable |
| Upper explosion limit | Not applicable |
| Vapour pressure | No information available. |
| Relative vapour density | No information available. |
| Density | 1,98 g/cm3<br>at 20 °C |
| Relative density | No information available. |
| Water solubility | 347 g/l<br>at 20 °C |
| Partition coefficient: n-octanol/water | No information available. |
| Auto-ignition temperature | No information available. |
| Decomposition temperature | No information available. |
| Viscosity, dynamic | No information available. |
| Explosive properties | Not classified as explosive. |
| Oxidizing properties | none |

**9.2 Other data**

| | |
|---|---|
| Sublimation point | 1.500 °C |
| Ignition temperature | not combustible |

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|---|---|
| Catalogue No. | 104935 |
| Product name | Potassium chloride EMPROVE® ESSENTIAL Ph Eur,BP,JP,USP,FCC,E 508 |

| | |
|---|---|
| Bulk density | ca.1.000 kg/m3 |

**SECTION 10. Stability and reactivity**

**10.1 Reactivity**
See section 10.3

**10.2 Chemical stability**
The product is chemically stable under standard ambient conditions (room temperature) .

**10.3 Possibility of hazardous reactions**
Violent reactions possible with:
Strong oxidizing agents

**10.4 Conditions to avoid**
no information available

**10.5 Incompatible materials**
no information available

**10.6 Hazardous decomposition products**
in the event of fire: See section 5.

**SECTION 11. Toxicological information**

**11.1 Information on toxicological effects**

*Acute oral toxicity*
LD50 Rat: 2.600 mg/kg

(RTECS)

*Acute inhalation toxicity*
This information is not available.

*Acute dermal toxicity*
This information is not available.

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| Product name | Potassium chloride EMPROVE® ESSENTIAL Ph Eur,BP,JP,USP,FCC,E 508 |

*Skin irritation*

This information is not available.

*Eye irritation*

Possible damages: slight irritation

*Sensitisation*

This information is not available.

*Germ cell mutagenicity*

*Genotoxicity in vitro*

Ames test

Salmonella typhimurium

Result: negative

(National Toxicology Program)

*Carcinogenicity*

This information is not available.

*Reproductive toxicity*

This information is not available.

*Teratogenicity*

This information is not available.

*Specific target organ toxicity - single exposure*

This information is not available.

*Specific target organ toxicity - repeated exposure*

This information is not available.

*Aspiration hazard*

This information is not available.

**11.2 Further information**

After swallowing of large amounts:

Nausea, Vomiting, cardiovascular disorders, Cardiac irregularities

However, when the product is handled appropriately, hazardous effects are unlikely to occur.

Handle in accordance with good industrial hygiene and safety practice.

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| Product name | Potassium chloride EMPROVE® ESSENTIAL Ph Eur,BP,JP,USP,FCC,E 508 |

**SECTION 12. Ecological information**

**12.1 Toxicity**

*Toxicity to fish*

LC50 Gambusia affinis (Mosquito fish): 920 mg/l; 96 h

(IUCLID)

*Toxicity to daphnia and other aquatic invertebrates*

EC50 Daphnia magna (Water flea): 825 mg/l; 48 h

DIN 38412

(IUCLID)

*Toxicity to algae*

IC50 Desmodesmus subspicatus (green algae): 2.500 mg/l; 72 h

(IUCLID)

**12.2 Persistence and degradability**

*Biodegradability*

The methods for determining the biological degradability are not applicable to inorganic substances.

**12.3 Bioaccumulative potential**

No information available.

**12.4 Mobility in soil**

No information available.

**12.5 Results of PBT and vPvB assessment**

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted.

**12.6 Other adverse effects**

Discharge into the environment must be avoided.

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| Catalogue No. | 104935 |
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**SECTION 13. Disposal considerations**

*Waste treatment methods*

See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

**SECTION 14. Transport information**

**Land transport (ADR/RID)**

| | |
|---|---|
| **14.1 - 14.6** | Not classified as dangerous in the meaning of transport regulations. |

**Inland waterway transport (ADN)**

Not relevant

**Air transport (IATA)**

| | |
|---|---|
| **14.1 - 14.6** | Not classified as dangerous in the meaning of transport regulations. |

**Sea transport (IMDG)**

| | |
|---|---|
| **14.1 - 14.6** | Not classified as dangerous in the meaning of transport regulations. |

**14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**

Not relevant

**SECTION 15. Regulatory information**

**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

*EU regulations*

| | |
|---|---|
| Major Accident Hazard Legislation | SEVESO III Not applicable |
| Regulation (EC) No 1005/2009 on substances that deplete the ozone layer | not regulated |

The life science business of Merck operates as MilliporeSigma in the US and Canada

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SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

| | |
|---|---|
| Catalogue No. | 104935 |
| Product name | Potassium chloride EMPROVE® ESSENTIAL Ph Eur,BP,JP,USP,FCC,E 508 |

| | |
|---|---|
| Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC | not regulated |
| Substances of very high concern (SVHC) | This product does not contain substances of very high concern according to Regulation (EC) No 1907/2006 (REACH), Article 57 above the respective regulatory concentration limit of ≥ 0.1 % (w/w). |

*National legislation*

Storage class 10 - 13

**15.2 Chemical safety assessment**

For this product a chemical safety assessment was not carried out.

**SECTION 16. Other information**

**Training advice**

Provide adequate information, instruction and training for operators.

**Key or legend to abbreviations and acronyms used in the safety data sheet**

Used abbreviations and acronyms can be looked up at www.wikipedia.org.

**Regional representation**

This information is given on the authorised Safety Data Sheet for your country.

*The information contained herein is based on the present state of our knowledge. It characterises the product with regard to the appropriate safety precautions. It does not represent a guarantee of any properties of the product.*

The life science business of Merck operates as MilliporeSigma in the US and Canada

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## SAFETY DATA SHEET

### 1. Identification of the substancemixture and of the company/undertaking

Trade name : Caustic Potash Flakes
Company/undertaking identification
**Manufacturer** : TOAGOSEI CO.,LTD.
Address : 1-14-1, Nishi-shimbashi, Minato-ku, Tokyo, 105-8419 Japan
Department in charge : Commodity Chemicals Department
Tel. : +81−3−3597−7269
Fax : +81−3−3597−7368
**Importer** :
Address :
Tel. :
Fax :
Emergency telephone number :
Recommended uses and restrictions : This product is for industrial use. Its main application is The production of the various caustic potash, green soap, pharmaceutical product(preservative), bleach, fusion agent, carbon dioxide absorbent, dye(indigo product), petrochemistry, oxalic acid, the raw material of the dimethyl terephthalic acid(synthetic fiber use). In using to the special applications for instance food, medical or agricultural chemicals, please check the safety in advance on your own. Please do not use this product for the implantation injected into the body, and also do not use it for the purpose that a portion of the product remains in the body.

### 2. Hazards identification

**【GHS classification】**
Physical hazards
: Explosive : Not applicable
: Flammable gases : Not applicable
: Aerosols : Not applicable
: Oxidising gases : Not applicable
: Gases under pressure : Not applicable
: Flammable liquids : Not applicable
: Flammable solids : Not classified
: Self-reactive substances and mixtures : Not applicable
: Pyrophoric liquids : Not applicable
: Pyrophoric solids : Not classified
: Self-heating substances and mixtures : Not classified
: Substances and mixtures which in contact with water emit flammable gases : Not classified
: Oxidising liquids : Not applicable

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: Oxidising solids : Classification not possible
: Organic peroxide : Not applicable
: Corrosive to metals : Classification not possible
Health hazards
: Acute toxicity (oral) : Category 3
: Acute toxicity (dermal) : Classification not possible
: Acute toxicity (inhalation:gas) : Not applicable
: Acute toxicity (inhalation:vapour) : Classification not possible
: Acute toxicity (inhalation:dust) : Classification not possible
: Acute toxicity (inhalation:mist) : Not applicable
: Skin corrosion/irritation : Category 1B
: Serious eye damage/eye irritation : Category 1
: Respiratory sensitisation : Classification not possible
: Skin sensitisation : Not classified
: Germ cell mutagenicity : Not classified
: Carcinogenicity : Classification not possible
: Reproductive toxicity : Classification not possible
: Specific target organ toxicity (single exposure) : Category 1
: Specific target organ toxicity (repeated exposure) : Classification not possible
: Aspiration hazard : Category 1
Environmental hazards
: Hazardous to the aquatic environment - Short-term (acute) Hazard : Classification not possible
: Hazardous to the aquatic environment - Long-term (chronic) Hazard : Classification not possible
: Hazardous to the ozone layer : Classification not possible

**【Label elements】**
Hazard pictograms (GHS-JP)

Signal word (GHS-JP) : Danger
Hazard statements (GHS-JP) : Toxic if swallowed (H301)
May be fatal if swallowed and enters airways. (H304)
Causes severe skin burns and eye damage. (H314)
Causes damage to organs (respiratory system) (Inhalation). (H370)
Precautionary statements
【Prevention】 : Do not breathe dust, fume, mist. (P260)
Wash hands thoroughly after handling. (P264)
Do not eat, drink or smoke when using this product. (P270)
Wear protective gloves, protective clothing, eye protection, face protection. (P280)
【Response】 : IF SWALLOWED: immediately call a POISON CENTER or

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doctor/physician. (P301+P310)
IF SWALLOWED: rinse mouth. Do NOT induce vomiting. (P301+P330+P331)
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. (P303+P361+P353)
If inhaled： Remove to fresh air and keep at rest in a position comfortable for breathing. (P304+P340)
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. (P305+P351+P338)
IF exposed or concerned: Call a POISON CENTER or doctor/physician. (P308+P311)
If on skin, if in eyes, if swallowed, and if inhaled: immediately call a doctor. (P310)
Specific treatment (P321)
If swallowed, rinse mouth. (P330)
Do NOT induce vomiting. (P331)
Wash contaminated clothing before reuse. (P363)
【Storage】 : Store locked up. (P405)
【Disposal】 : Dispose of contents/container in accordance with local/regional/national/international regulations. (P501)

### 3. Composition/information on ingredients

Distinction of substance or mixture : Substance
Generic name : Potassium hydroxide

| Name | Concentration (%) | Formula | Inventory Lists (JAPAN) ENCS No | CAS No |
|---|---|---|---|---|
| Potassium hydroxide | >= 95 | KOH | (1)-369 | 1310-58-3 |
| Water | <= 5 | H2O | Not applicable | 7732-18-5 |

Impurities and/or Stabilizing Additives which Contribute to the Classification : No data available.

### 4. First aid measures

First-aid measures after inhalation : Remove to fresh air and keep at rest in a position comfortable for breathing.
Call a physician immediately.
First-aid measures after skin contact : Remove/Take off immediately all contaminated clothing.
Rinse skin with water/shower.
If skin irritation or rash occurs: Get medical advice/attention
First-aid measures after eye contact : Rinse cautiously with water for several minutes.
Remove contact lenses, if present and easy to do. Continue rinsing.
Immediately call a POISON CENTER or doctor/physician.
Do not apply oil or any other medical product, except on the advice of a physician.
First-aid measures after : Rinse mouth.

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ingestion
Immediately call a POISON CENTER or doctor/physician.
Milk, water or raw eggs are helpful in some cases; however, strictly follow the advice of a physician because treatment may be different in each case.
Do not induce vomiting.
Most Important Symptoms/Effects : Erythema, pain, pulmonary edema, abdominal pain, shock
- Inhalation: Burning sensation, sore throat, coughing, breathing difficulty, shortness of breath Symptoms may be delayed.
- Skin contact: Erythema, pain, severe skin burns, blisters.
- Eye contact: Erythema, pain, blurred vision, severe burns.
- Ingestion: Burning sensation, abdominal pain, shock/prostration.

Personal Protection in First Aid and Measures : Wear protective gloves, protective clothing, eye protection, face protection.
Notes to physician : Treat according to symptoms (decontamination, vital functions).

### 5. Fire fighting measures

Suitable extinguishing media : This material is non-flammable. Use extinguishing media appropriate for surrounding fire.
Unsuitable extinguishing media : No additional available
Personal protection (Emergency response) : Wear full chemical protective clothing. Use appropriate respiratory protection.
Fire hazard : The product itself does not burn.
Specific fire fighting : Only allow access to authorised staff.
Move undamaged containers from immediate hazard area if it can be done safely.
Approach fire from upwind.
After extinguishing, cool the container using a large amount of water.

### 6. Accidental release measures

Personal Precautions, Protective Equipment and Emergency Procedures : See protective measures of SECTION 7 and 8.
Only allow access to authorised staff.
Avoid generation of dust.
Wear breathing apparatus if exposed to vapours/dusts.
Wear personal protection equipment.
Stay upwind, and keep out of low areas.
Environmental precautions : Do not release into the environment.
Take great care not to allow the spill to spread into the environment via river systems etc.

Decontamination/Absorption/Sweeping/Vacuming/Neutralization
In case of small leakage : Wipe up with absorbent material (e.g. Cloth, Fleece,Dry sand).Clear contaminated areas thoroughly.Collect in closed containers for disposal.
In case of large leakage : Avoid generation of dust.
Collect in closed and suitable containers for disposal.Spilled product must never be returned to the original container for

recycling.

Methods and Equipment for Containment and Cleaning up : Suitable material for diluting or neutralizing: dilute hydrochloric acid, dilute sulfuric acid, acetic acid
Take up mechanically, placing in appropriate containers for disposal.

Prevention Measures for Secondary Accidents : Prevent inflow drainage into ditch, sewer, cellars and enclosed spaces.
Remove all sources of ignition immediately. (Smoking, naked flames and sparks prohibited nearby.)

## 7. Handling and storage

Handling

Technical measures : Follow the section Engineering measures in 8. EXPOSURE CONTROLS / PERSONAL PROTECTION, and wear personal protective equipment.

Precautions for safe handling : Wear cold insulating gloves, face protection, eye protection.
Do not eat, drink or smoke when using this product.
Contaminated work clothing should not be allowed out of the workplace.
Use only outdoors or in a well-ventilated area.
Do not get in eyes, on skin, or on clothing.
provide sufficient washing facilities.
Do not breathe dust.

Prevents handling of incompatible substances or mixtures : Refer to SECTION 10.

Hygiene measures : Do not eat, drink or smoke when using this product.
Wash hands thoroughly after handling.
Wash contaminated clothing before reuse.

Storage

Technical measures : Keep cool. Protect from sunlight.Store in a closed container.

Incompatible substances or mixtures : Refer to SECTION 10.

Storage conditions : Store locked up.
Keep container tightly closed.
Store in a well-ventilated place.
Keep away from strong acids, metals, food or feed.

Material used in packaging/containers : Use the UN packaging container.
Suitable material for Container:Stainless steel, Polyethylene.
Unsuitable materials for Container:iron, Steel, Zinc, Aluminium, Copper.

## 8. Exposure controls / Personal protection equipment

Japan administration level : Refer to the following table.

Exposure limits (JSOH) : <= 2 $mg/m^3$



Exposure limits (ACGIH) : <= 2 $mg/m^3$

| Name of Ingredients | Japan administration level | Exposure limits (JSOH) | Exposure limits (ACGIH) |
|---|---|---|---|
| Potassium hydroxide | — | 2$mg/m^3$ | TWA -,<br>STEL C 2 $mg/m^3$ |

Appropriate engineering controls : Install a hand wash basin, eye wash fountain and shower near the handling area. Indicate their locations clearly.
If handled uncovered, arrangements with local exhaust ventilation have to be used.
Provide sufficient washing facilities.
Provide eye wash and label its location conspicuously.

Protective equipment

Respiratory protection : Wear respiratory protection.
Wear appropriate mask.

Hand protection : Wear suitable gloves.

Eye protection : Chemical goggles or face shield.
Suitable eye protection:Framed glasses.Goggles.Face protection umbrella.
Wear eye/face protection.

Skin and body protection : Wear suitable protective clothing.
Chemical resistant safety shoes.
Chemical resistant suit.
Full protection suit.
Apron.
Boots.
Protective sleeves.

## 9. Physical and chemical properties

Appearance

Physical state : Solid:Flakes [1]

Colour : White [1]

Odour : Odourless [1]

pH : Not less than 14 (48% aqueous solution) [1]

Melting point : 380 °C [3]

Initial boiling point and boiling range : 1324 °C [3]

Flash point : Non-flammable [3]

Upper/lower flammability or explosive limits : Non-flammable [3]

Vapour pressure : 133 Pa (714°C) [3]

Relative vapour density at 20 °C : No data available

Specific gravity : 2.044 [3]



Solubility : 118g/100ml (25°C) (water) [3]
34.8g/100ml (30°C) (90% ethanol solution) [3]

Partition coefficient n-octanol /water (log Kow) : -3.88 [4]

Auto-ignition temperature : Non-flammable [3]

Decomposition temperature : No data available

Viscosity : No data available

Other properties : Deliquescent material [3]

## 10. Stability and reactivity

Reactivity : Explosives:
Containing no chemical groups with explosive properties.
Self-reactive substances and mixtures:
There are no chemical groups associated with explosive or self-reactive properties present in the molecule.
Hypergolicity:
Not pyrophoric when in contact with air at ordinary temperatures.
Self-heating substances and mixtures:
Non-flammable substances.
Substances and mixtures, which in contact with water, emit flammable gases:
It does not generate a flammable gas when in contact with water.
Oxidation:
No data available.
Organic peroxides:
Inorganic compound.
Corrosive to metals:
No data available.

Chemical stability : Stable in normal handling.

Possibility of hazardous reactions : React with strong acids.
Generating flammable hydrogen gas by reacting with the metal.

Conditions to avoid : Heat, water, humidity

Incompatible materials : Strong acids, metals, water

Hazardous decomposition products : Thermal decomposition generates :
Corrosive vapours

## 11. Toxicological information

Acute toxicity (oral) - Description : Category 3 based on SPECIES: Rat; ENDPOINT: LD50; VALUE: 284mg/kg; REFERENCE SOURCE: Priority 1 [2]

Acute toxicity (dermal) - Description : No data available.

Acute toxicity (gas) - Description : Solid (GHS definition)

Acute toxicity (vapour) - Description : No data available.

Acute toxicity (dust) - : No data available.



Description

Acute toxicity (mist) - Description : Solid (GHS definition)

Skin corrosion/irritation - Description : Since there are descriptions that it was corrosive in rabbit test (SIDS (2001)) and that it has corrosivity on humans (SIDS (2001)), and its UN classification is class 8II. Therefore it was classified as Category 1B. [2]

Serious eye damage/eye irritation - Description : Since there are statements of irreversible damage with humans (SIDS (2001)), and of corrosive in rabbit test (SIDS (2001)), and since skin caustic / stimulative GHS classifications are in Category 1B, it was categoried into Category 1. [2]

Germ cell mutagenicity - Description : With regard to in vitro tests of potassium hydroxide, there are negative data from the Ames test (SIDS (2001)), but there are no in vivo test data. But sodium hydroxide is negative in in vivo mutagenicity tests in somatic cells (micronucleus tests) and it is also negative in in vivo mutagenicity tests in germ cells (detection of aneuploidy in oocytes), though under restricted conditions (SIDS (2001)). So by analogy we presumed that data from potassium hydroxide could be the same and we judge that it will be appropriate to regard potassium hydroxide as outside the categories. [2]

Carcinogenicity - Description : There is no reliable data and there is also no report of evaluation organizations, such as International Agency for Res. on Cancer. So it cannot classify. [2]

Reproductive toxicity - Description : Classification not possible due to lack of data on potassium hydroxide.

Specific target organ toxicity (single exposure) - Description : It was classified into Category 1(respiratory systems) according to the statement that inhalation exposure to the particles or the mist will cause such damages as burns to the nose and bronchial tube and result even in lung edemas (SIDS (2001), ACGIH (2001) and PATTY (5th, 2001)). [2]

Specific target organ toxicity (repeated exposure) - Description : The example for repeated dose in toxicity research of potassium hydroxide is not found. It cannot be classified without a report on humans. [2]

Aspiration hazard - Description : It was classified into Category 1 based on the statement of die of pneumonia by aspiration (ACGIH (2001)). [2]

## 12. Ecological information

Ecotoxicity

Hazardous to Aquatic Environment - Short-term (acute) Hazard : Insufficient data available.

Hazardous to Aquatic Environment - Long-term (chronic) Hazard : Classification not possible due to lack of data.

Persistence and degradability : No data available.

Bioaccumulative potential : No data available.

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| | |
|---|---|
| Ecology - soil | : No data available. |
| Hazardous to the ozone layer | : Any ingredient listed in Annexes to the Montreal Protocol is not in the mixture; Classification not possible. |

**13. Disposal considerations**

| | |
|---|---|
| Ecology - waste materials | : Dispose of contents/container in accordance with local/regional/national/international regulations. For waste disposer, notice of risk and hazardousness when dealing with waste. |
| Contaminated container and packaging | : After cleaning, recycle or dispose of in compliance with current legislation. Prior to disposal for empty container, remove contents completely. |

**14. Transport information**

International Regulations

| | |
|---|---|
| Regulatory information by sea | : Conform to the provisions of IMO. |
| UN-No. | : UN1813 |
| Proper Shipping Name | : POTASSIUM HYDROXIDE, SOLID |
| Class | : 8 |
| Packing group | : II |
| Marine pollutant | : Not applicable. |
| Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code | : CODE Y(Potassium hydroxide solution) |
| Regulatory information by air | : Conform to the provisions of ICAO/IATA. |
| UN-No. | : UN1813 |
| Proper Shipping Name | : POTASSIUM HYDROXIDE, SOLID |
| Class | : 8 |
| Packing group | : II |

Regulations in Japan

| | |
|---|---|
| Regulatory information by road or rail | : Conform to the provisions of the Fire Service Act,the Poisonous and Deleterious Substances Control Law, the High Pressure Gas Safet |
| Regulatory information by sea | : Conform to the provisions of the Ship Safety Law. |
| UN-No. | : UN1813 |
| Proper Shipping Name | : POTASSIUM HYDROXIDE, SOLID |
| Class | : 8 |
| Packing group | : II |
| Marine pollutant | : Not applicable. |
| Law Relating to the Prevention of Marine Pollution and Maritime Disaster (Bulk transportation) | : CODE Y (Potassium hydroxide solution) |
| Regulatory information by air | : Conform to the provisions of the Civil Aeronautics Law. |

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| | |
|---|---|
| UN-No. | : UN1813 |
| Proper Shipping Name | : POTASSIUM HYDROXIDE, SOLID |
| Class | : 8 |
| Packing group | : II |
| ERG No. | : 154 |

**15. Regulatory information**

Chemical Substances Control Law(Japan) : General Chemical Substances

**16. Other information**

Data sources :
1) Data measured by TOAGOSEI
2) NITE public data
3) Japan Advanced Information center of Safety and Health public SDS
4) U.S. Environmental Protection Agency for EPI Suite

This Safety Data Sheet (SDS) has been prepared in compliance with the JIS Z 7252：2014、JIS Z 7253：2012.

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

NPE-FP_US_en

UENO

UENO PROPYL PARABEN NF
UENO FINE CHEMICALS INDUSTRY, LTD.
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**SAFETY DATA SHEET**

**Section 1: Identification**

**Product identifier used on the label;**
**Product name:** UENO PROPYL PARABEN NF

**Other means of identification;**
No information

**Recommended use of the chemical and restrictions on use;**
**Recommended use:** Preservative
**Restrictions on use:** No information

**Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party;**

| | |
|---|---|
| **Name:** | UENO FINE CHEMICALS INDUSTRY, LTD. |
| **Department in Charge:** | Quality Assurance Dept. |
| **Address:** | 2-4-8, Koraibashi, Chuo-ku, Osaka, 541-8543, Japan |
| **Telephone number:** | +81-6-6203-0798 |
| **Fax number:** | |
| **e-mail address:** | chemical_info@ueno-fc.co.jp |

**Emergency phone number**
+81-6-6203-0798 (9:00 – 17:00, JST) Except Sat & Sun

**Section 2: Hazard(s) identification**

**Classification of the chemical in accordance with paragraph (d) of §1910.1200;**

**Physical Hazards**
Not classified

**Health Hazards**
Not classified

**Environmental Hazards**
Hazardous to the aquatic environment (acute) — Category 3

**Other Hazards**
No information

**Signal word, hazard statement(s), symbol(s) and precautionary statement(s) in accordance with paragraph (f) of §1910.1200;**

| | |
|---|---|
| **Symbol(s)** | Not applicable |
| **Signal word** | No signal word |
| **Hazard Statement(s)** | Harmful to aquatic life |

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**Precautionary Statement(s)**

| | |
|---|---|
| [Prevention] | Avoid release to the environment. |
| [Emergency response] | Not applicable |
| [Storage] | Not applicable |
| [Disposal] | Dispose of contents/container in accordance with local/regional/national/international regulations. |

**Description of any hazards not otherwise classified;**
No information

**Ingredient with unknown acute toxicity in the mixture**
Not applicable

**Section 3: Composition/information on ingredients**

| | |
|---|---|
| **Chemical name:** | Propyl 4-hydroxybenzoate |
| **Synonym:** | |
| **CAS No.:** | 94-13-3 |
| **Purity:** | 98-100% |

**Section 4: First-aid measures**

**Necessary first-aid measures by relevant routes of exposure;**

| | |
|---|---|
| IF INHALED | Remove victim to fresh air and keep at rest in a position comfortable for breathing. If symptoms continue, call a doctor/physician. |
| IF ON SKIN | Rinse with plenty of water. If symptoms continue, call a doctor/physician. |
| IF IN EYES | Immediately rinse cautiously with water for 15 - 20 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If symptoms continue, call a doctor/physician. |
| IF SWALLOWED | Rinse mouth. Immediately get medical advice/attention. |

**Most important symptoms/effects, acute and delayed;**
No information

**Indication of immediate medical attention and special treatment needed, if necessary;**
No information

**Section 5: Fire-fighting measures**

**Suitable (and unsuitable) extinguishing media;**

**Suitable extinguishing media:**
Use water mist, dry chemical powder, fire foam or carbon dioxide.

**Unsuitable extinguishing media**
Applying direct water may be dangerous because fire may expand to surroundings.

**Specific hazards arising from the chemical;**

General caution; powdered materials may cause dust explosions under certain conditions.

**Special protective equipment and precautions for fire-fighters;**

Cut off any ignition sources and extinguish with an appropriate agent.
Cool the surrounding tank and the buildings with direct water jet to avoid risk of fire spreading.
Take action from windward.
Keep out except responsible personnel.
Move container to a safe area if it can be done without risk.

**Section 6: Accidental release measures**

**Personal precautions, protective equipment, and emergency procedures;**

Keep out except responsible personnel.
Wear suitable protective equipment described in "Section 8: Exposure controls/personal protection".
Avoid release into the environment because product may cause local effects.

**Methods and materials for containment and cleaning up;**

Sweep up scattered materials or vacuum them using a vacuum cleaner so as not to cause dust then collect them into an empty container.
Do not eat or drink near handling and storage locations.
Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area).
Prevent to flowing into drains, sewers, basements or closed areas.

**Section 7: Handling and storage**

**Precautions for safe handling**

**Protective measures:**

Install appropriate equipment and wear suitable protective apparatus described in "Section 8: Exposure controls/ personal protection".
Do not eat, drink or smoke when using this product.
Avoid the generation of dust.

**Advice on general occupational hygiene:**

Wash hands thoroughly after handling.

**Conditions for safe storage, including any incompatibilities**

**Technical measures:**

In the storage area, install adequate light and ventilation systems to handle hazardous materials.
Take precautionary measures against static discharge.

**Incompatible materials:**

Bases, Oxidizing agents

**Conditions for safe storage:**

Avoid storing under high temperature and high humidity. Store at room temperature.

**Packing material:**



Use a sealed container without damage or leakage.

**Section 8: Exposure controls/personal protection**

**Occupational Exposure Limits;**

| | |
|---|---|
| OSHA PEL | 5 mg/m$^3$ (Inert or nuisance dust (Respirable fraction))<br>15 mg/m$^3$ (Inert or nuisance dust (Total dust)) |
| ACGIH TLV-TWA (2014) | 3 mg/m$^3$ (Otherwise insoluble respirable particles)<br>10 mg/m$^3$ (Otherwise insoluble inhalable particles) |

**Appropriate engineering controls;**

In a work place where dusts generate, ensure to use sealed instrument or local ventilation.

**Individual protection measures, such as personal protective equipment;**

| | |
|---|---|
| Respiratory protection | Respirator must be worn if exposed to dust.<br>Half mask with a particle filter P2 (EN 143). |
| Hand protection | If hand contact is possible, wear protective gloves. |
| Eye protection | Wear safety glasses or goggles if in eyes. |
| Skin and body protection | Wear protective clothing and apron if necessary. |

**Section 9: Physical and chemical properties**

| | |
|---|---|
| Appearance (physical state, color, etc.) | Crystalline powder, white |
| Odor | Very faint characteristic |
| Odor threshold | No information |
| pH | No information |
| Melting point/freezing point | 96 - 98°C |
| Initial boiling point and boiling range | 133°C at 1.3 hPa |
| Flash point | No information |
| Evaporation rate | No information |
| Flammability (solid, gas) | No information |
| Upper/lower flammability or explosive limits | Lower explosion limit: 35 g/m$^3$ |
| Vapor pressure | 0.00074 hPa |
| Vapor density | Relative vapour density: 6.21 (air = 1.0) |
| Relative density | 1.067 g/cm$^3$ |
| Solubility (ies) | Water: practically insoluble at 25°C |
| Partition coefficient: *n*-octanol/water | log Pow: 3.04 |
| Auto-ignition temperature | > 600°C |
| Decomposition temperature | No information |
| Viscosity | No information |

**Other information**

No information



**Section 10: Stability and reactivity**

**Reactivity**

Stable under normal handling condition.

**Chemical stability**

Stable under normal handling condition.

**Possibility of hazardous reactions**

No hazardous reaction expected under normal handling.

**Conditions to avoid**

Avoid sunlight. Store in a cool place.

**Incompatible materials**

Bases, Oxidizing agents

**Hazardous decomposition products**

In case of fire, toxic decomposition products may be generated such as: Carbon dioxide ($CO_2$), carbon monoxide (CO), oxides of nitrogen (NOx), dense black smoke.

**Section 11: Toxicological information**

**Symptoms related to the physical, chemical and toxicological characteristics;**

| | |
|---|---|
| Acute toxicity (oral): | Mouse $LD_{50}$ > 6,332 mg/kg<br>Rat $LD_{50}$ > 15,000 mg/kg |
| Acute toxicity (dermal): | Mouse $LD_{50}$ > 1,650 mg/kg |
| Skin corrosion/irritation: | Slight irritation |
| Serious eye damage/irritation: | No eye irritation |
| Respiratory sensitization: | Gunea pig (Draize test): Did not cause sensitisation on laboratory animals. |
| Skin sensitization: | Gunea pig (Draize test): Did not cause sensitisation on laboratory animals. |
| Germ cell mutagenicity: | Ames test: negative<br>Chromosome aberration test in vitro: negative |

**Delayed and immediate effects and also chronic effects from short- and long-term exposure;**

No information

**Numerical measures of toxicity (such as acute toxicity estimates);**

Not applicable

**Whether the chemical is listed in the NTP Report on Carcinogens or has been found to be a potential carcinogen in the IARC Monographs, or by OSHA;**

IARC: Not listed as Group 1, Group 2A or Group 2B
NTP Report: Not listed
OSHA: Not listed



**Section 12: Ecological information**

**Ecotoxicity:**

| | |
|---|---|
| Aquatic acute toxicity: | Fishes ( *Leuciscus idus* (Golden orfe)) 48-hr$LC_0$ = 10 mg/L<br>(Note: Data from similar compositions)<br>Crustacea (*Daphnia magna*) 48-hr $EC_{50}$ > 10 - 100 mg/L |

**Persistence and degradability:**

Readily biodegradable

**Bioaccumulative potential:**

No information

**Mobility in soil:**

No information

**Other adverse effects:**

No information

**Section 13: Disposal considerations**

**Waste treatment methods**

Dispose of waste in accordance with applicable local, regional and international regulations and standards.
When disposing, consult to a certificated waste trader or local offices if they deal with the waste.
Used container should be recycled after cleaning or dispose of in compliance with related laws and local regulations.
Contents should be removed completely when dispose of empty containers.

**Section 14: Transport information**

| | |
|---|---|
| **UN number** | Not applicable |
| **UN proper shipping name** | Not applicable |
| **Transport hazard class(es)** | Not applicable |
| **Packing group** | Not applicable |
| **Environmental hazards** | Not applicable |

**Transport in bulk according to Annex II of MARPOL 73/78 and IBC code**

Not applicable

**Special precautions for user**

When transporting, avoid direct sunlight. Confirm no leakage to containers. When loading, prevent containers from falling, dropping off or damaging. Take preventive measures of collapse.

**Section 15: Regulatory information**

| | |
|---|---|
| **OSHA:** | Hazardous chemical |
| **TSCA inventory:** | This product is listed on the TSCA Inventory. |
| **TSCA SNUR:** | Not listed |

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UENO PROPYL PARABEN NF
UENO FINE CHEMICALS INDUSTRY, LTD.
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UENO

**SARA Title III:** Section 302 (Extremely Hazardous Substances): Not listed
Section 304 (Hazardous Substances): Not listed
Section 313 (TRI Chemicals): Not listed

**CERCLA Reportable Quantity:**
Not listed

**Clean Air Act:** This product does not contain any substances regulated as hazardous air pollutants under Section 112 of the Clean Air Act.

**Clean Water Act:** This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act.

**Section 16: Other information, including date of preparation or last revision**

**Update history:**
Date of issue: 1th November, 2018

**References:**
Information of UENO FINE CHEMICALS INDUSTRY, LTD.

**[Disclaimer]**
This SDS has been prepared based on the best available information however, it may not be sufficient in some cases. It is user's responsibility to modify or update any contents in this SDS regarding information on hazardous properties and/or instruction for safe handling of the product when they become available. Precautionary measures in this SDS are only applicable for normal handling conditions and it is necessary to take appropriate additional measures to ensure safe handling which depend on your specific use conditions or situations.

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SAFETY DATA SHEET

**Revision Date** 26/07/2019
**Date of the previous version** 12/03/2018

**SAFETY DATA SHEET**
**Version** 3.1 - EN

## SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

**1.1. Product identifier**

**Product Name** **Buffered S-lactic acid**

**Trade name** PURAC® BF P/41

**1.2. Relevant identified uses of the substance or mixture and uses advised against**

**Recommended Use** Food additive, Specialty chemical.
**Uses advised against** No information available.

**1.3. Details of the supplier of the safety data sheet**

Purac Biochem bv
Arkelsedijk 46
NL-4206 AC Gorinchem
The Netherlands
Tel.: +31 183 695695
Fax: +31 183 695604
E-mail: sds@corbion.com

**1.4. Emergency telephone number**

UK National Health Service (NHS) call 111 or, in life-threatening emergencies, call 999

WAL National Health Service (NHS) call 0845 46 47

IE National Poisons Information Centre
+353 1 809 2566 or +353 1 837 9964 (only for healthcare professionals)

Purac Biochem
+31 183 695695

## SECTION 2: HAZARDS IDENTIFICATION

**2.1 Classification of the substance or mixture**

**Classification according to EU Regulation 1272/2008/EC**
**Skin corrosion/irritation** Category 2 - H315
**Serious eye damage/eye irritation** Category 1 - H318

For the full text of the H-Statements mentioned in this section, see Section 16.

**2.2 Label elements**

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SAFETY DATA SHEET

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**Signal word** Danger

**Hazard Statements** H318 - Causes serious eye damage
H315 - Causes skin irritation

**Precautionary Statements** P264 - Wash hands thoroughly after handling
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P302 + P352 - IF ON SKIN: Wash with plenty of water and soap
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a POISON CENTER/doctor

**Contains** S-lactic acid

**2.3 Other hazards**

This product does not meet the criteria for PBT or vPvB in accordance with Annex XIII of REACH.

## SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

**3.2 Mixtures**

| Substance name | EC-No | CAS-No | Weight % | Classification (1272/2008/EC) | REACH Registration Number |
|---|---|---|---|---|---|
| Potassium (S)-lactate | 288-752-8 | 85895-78-9 | 45 - 47 | - | 01-2120783320-60-0000 |
| S-lactic acid | 201-196-2 | 79-33-4 | 18.5-20.5 | Skin Irrit. 2 H315 Eye Dam. 1 H318 | 01-2119474164-39-0000 |

For the full text of the H-Statements mentioned in this section, see Section 16.

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## SECTION 4: FIRST AID MEASURES

**4.1. Description of first aid measures**

**General advice** Keep person warm and at rest. When symptoms persist or in all cases of doubt seek medical advice. Wash contaminated clothing before reuse.

**Eye contact** Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Consult a physician.

**Skin contact** Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Consult a physician.

**Ingestion** Rinse mouth. Get medical attention immediately if symptoms occur.

**Inhalation** Move to fresh air. Get medical attention immediately if symptoms occur.

**Protection of first-aiders** Use personal protective equipment. Avoid contact with skin, eyes and clothing.

**4.2. Most important symptoms and effects, both acute and delayed**

**Main symptoms** Causes severe damage to eyes: Burning feeling, Redness, Pain. Causes skin irritation: Itching, Redness.

**4.3. Indication of any immediate medical attention and special treatment needed**

**Notes to physician** Treat symptomatically. If breathing is difficult, give oxygen. Keep victim under observation. Symptoms may be delayed.

## SECTION 5: FIREFIGHTING MEASURES

**5.1. Extinguishing media**

**Suitable Extinguishing Media** Water spray, Foam, Dry powder, Carbon dioxide ($CO_2$).

**Unsuitable Extinguishing Media** Do not use a solid water stream as it may scatter and spread fire.

**5.2. Special hazards arising from the substance or mixture**

**Special Hazard** Hazardous decomposition products formed under fire conditions.

**5.3. Advice for firefighters**

**Fire fighting measures** Evacuate non-essential personnel. Move containers from fire area if you can do it without risk. Keep containers and surroundings cool with water spray. Prevent fire extinguishing water from contaminating surface water or the ground water system.

**Special protective equipment for fire-fighters** Wear self-contained breathing apparatus and protective suit.

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## SECTION 6: ACCIDENTAL RELEASE MEASURES

**6.1. Personal precautions, protective equipment and emergency procedures**

Evacuate personnel to safe areas. Do not touch or walk through spilled material. Avoid contact with skin, eyes and clothing. Avoid breathing vapours or mists. Use personal protective equipment. Ensure adequate ventilation.

**6.2. Environmental precautions**

Should not be released into the environment. Prevent further leakage or spillage if safe to do so.

**6.3 Methods and material for containment and cleaning up**

Large amounts: Prevent further leakage or spillage if safe to do so. Dike to collect large spills. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Following product recovery, flush area with water. Small amounts: Wipe up with absorbent material (e.g. cloth, fleece). After cleaning, flush away traces with water. Never return spills in original containers for re-use.

**6.4. Reference to other sections**

See sections 8 and 13.

## SECTION 7: HANDLING AND STORAGE

**7.1 Precautions for safe handling**

Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing. Avoid breathing vapours or mists. Ensure adequate ventilation. Wear personal protective equipment. Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product.

**7.2. Conditions for safe storage, including any incompatibilities**

Store in accordance with local regulations. Keep containers tightly closed in a cool, well-ventilated place. Incompatible with oxidising agents.

**7.3. Specific end use(s)**

**Exposure scenario** Not available.

**Other information** Not available.

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## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

**8.1. Control parameters**

**Exposure Limits** Contains no substances with occupational exposure limit values.

**Biological Limit Values** Not established.

**Recommended monitoring procedures** No information available.

**Derived No Effect Level (DNEL)** Not determined.

**Predicted No Effect Concentration (PNEC)**

| Substance name | Freshwater | Marine water | Intermittent release | Sewage treatment plant | Freshwater sediment | Marine sediment | Soil | Oral |
|---|---|---|---|---|---|---|---|---|
| S-lactic acid | 1.3 mg/L | | | 10 mg/L | | | | |

**8.2. Exposure controls**

**Appropriate engineering controls** Ensure adequate ventilation, especially in confined areas. Keep at temperatures below 200 °C / 392 °F. Ensure that eyewash stations and safety showers are close to the workstation location.

**Individual protection measures, such as personal protective equipment**

**Eye protection** Safety glasses with side-shields (EN166).

**Hand Protection** Protective gloves (EN374): Butyl rubber. Glove thickness: 0.5 mm. Break through time: >8 hours. Unsuitable materials: Natural Rubber, Nitrile rubber, Fluorinated rubber, PVC.

**Skin and body protection** Long sleeved clothing.

**Respiratory protection** In case of inadequate ventilation wear respiratory protection (APF).

**Recommended Filter Type** A, Brown.

**Hygiene Measures** Handle in accordance with good industrial hygiene and safety practice. Workers must be trained in the proper use and handling of this product as required under applicable regulations. Do not eat, drink or smoke when using this product. Wash hands before breaks and immediately after handling the product. Wash contaminated clothing before re-use.

**Environmental Exposure Controls** The product should not be allowed to enter drains, water courses or the soil.

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## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

**9.1. Information on basic physical and chemical properties**

| | |
|---|---|
| **Physical state @20°C** | Liquid |
| **Appearance** | Clear |
| **Colour** | Light yellow |
| **Odour** | Characteristic |
| **pH** | 4.0-4.3 (10% solution) (@ 25°C / 77°F) |
| **Melting/freezing point** | No information available |
| **Boiling point/boiling range** | 105 - 115 °C / 221 - 239 °F |
| **Flash point** | Not applicable |
| **Evaporation rate** | No information available |
| **Flammability (solid, gas)** | No information available |
| **Flammability Limits in Air** | No information available |
| **Explosive limits** | Not applicable |
| **Vapour pressure** | No information available |
| **Vapour density** | No information available |
| **Relative density** | No information available |
| **Solubility** | |
| **Water solubility** | Soluble |
| **Partition Coefficient (n-octanol/water)** | No information available |
| **Autoignition temperature** | Not applicable |
| **Decomposition temperature** | > 200 °C |
| **Viscosity, dynamic** | No information available |
| **Explosive properties** | No information available |
| **Oxidising properties** | No information available |

**9.2 Other information**

**Density** 1200 - 1260 kg/m³ ( 73 - 84% solution )

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## SECTION 10: STABILITY AND REACTIVITY

**10.1. Reactivity**

None known.

**10.2. Chemical stability**

Stable under recommended storage conditions.

**10.3 Possibility of hazardous reactions**

No information available.

**10.4. Conditions to avoid**

Temperatures above 200 °C / 392 °F.

**10.5. Incompatible materials**

Oxidizing agents.

**10.6. Hazardous decomposition products**

Hazardous decomposition products formed under fire conditions.

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## SECTION 11: TOXICOLOGICAL INFORMATION

**11.1. Information on toxicological effects**

**Acute toxicity**
**Ingestion** No known effect.
**Skin contact** No known effect.
**Inhalation** No known effect.

| Substance name | LD50 Oral | LD50 Dermal | LC50 Inhalation |
|---|---|---|---|
| S-lactic acid | 3543 mg/kg ( Rat, female )<br>4936 mg/kg ( Rat, male ) | 2000 mg/kg ( Rabbit ) | >7.94 mg/L ( Rat ) 4h mist |

**Skin corrosion/irritation** Mixture: Irritating to skin.

**Serious eye damage/irritation** Mixture: Causes serious eye damage.

| Substance name | Skin corrosion/irritation | Serious eye damage/irritation |
|---|---|---|
| S-lactic acid | OECD 404, In vivo, Rabbit, solution (88 %)<br>Result: Irritating | CEET, Ex vivo, solution (88 %)<br>Result: Severe eye irritation |

**Respiratory or skin sensitisation** No known effect.

**Germ cell mutagenicity** Not known to cause heritable genetic damage.

**Carcinogenicity** Contains no ingredient listed as a carcinogen.

**Reproductive toxicity** Not known to cause birth defects or have a deleterious effect on a developing fetus. Not known to adversely affect reproductive functions and organs.

**STOT-single exposure** No known effect.

**STOT-repeated exposure** No known effect.

**Aspiration hazard** No known effect.

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## SECTION 12: ECOLOGICAL INFORMATION

**12.1. Toxicity**

This product is not known to be hazardous to the environment.

| Substance name | Toxicity to algae | Toxicity to fish | Toxicity to microorganisms | Toxicity to daphnia and other aquatic invertebrates |
|---|---|---|---|---|
| S-lactic acid | EC50: >2.8 g/L 72h Pseudokirchnerella subcapitata<br>EC50: 3.5 g/L 72h Pseudokirchnerella subcapitata | LC50: 130 mg/L 96h Oncorhynchus mykiss<br>LC50: 320 mg/L 96h Danio rerio | LC50: >88.2 mg/L 3h | EC50: 130 mg/L 48h Daphnia magna<br>EC50: 250 mg/L 48h Daphnia magna |

**12.2. Persistence and degradability**

No information available.

**12.3. Bioaccumulative potential**

Does not bioaccumulate.

| Substance name | Log $P_{ow}$ | Bioconcentration factor (BCF) |
|---|---|---|
| S-lactic acid | -0.62 | |

**12.4. Mobility in soil**

No information available.

**12.5. Results of PBT and vPvB assessment**

This product is not considered to be persistent, bioaccumulative and toxic (PBT) or very persistent and very bioaccumulative (vPvB).

**12.6. Other adverse effects**

No information available.

## SECTION 13: DISPOSAL CONSIDERATIONS

**13.1. Waste treatment methods**

**Waste from residues / unused products** Dispose of in accordance with local regulations.

**Contaminated packaging** Empty containers should be taken to an approved waste handling site for recycling or disposal.

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## SECTION 14: TRANSPORT INFORMATION

According to: ADR, RID, ADN, IMDG, IATA/ICAO.

**14.1. UN number**

Not regulated.

**14.2. UN proper shipping name**

Not regulated.

**14.3. Transport hazard class(es)**

Not regulated.

**14.4. Packing group**

Not regulated.

**14.5 Environmental hazards**

Not applicable.

**14.6 Special precautions for user**

Not applicable.

**14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code**

Not applicable.

## SECTION 15: REGULATORY INFORMATION

**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**

**Restrictions on use** None.

**Other Regulations** No information available.

**15.2 Chemical safety assessment**

Not available.

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**Buffered S-lactic acid** Revision Date 26/07/2019

## SECTION 16: OTHER INFORMATION

**Full text of H-Statements referred to under sections 2 and 3**
H315 - Causes skin irritation
H318 - Causes serious eye damage

**Revision Note** Indication of the changes made to the previous version of the SDS: Trade name.

**Training Advice** Workers must be trained in the proper use and handling of this product as required under applicable regulations.

**Abbreviations and acronyms**
REACH: Registration, Evaluation, Authorisation and Restriction of Chemical substances
EC: European Commission
STOT: Specific Target Organ Toxicity
PBT: Persistent, Bioaccumulative, Toxic
vPvB: very Persistent and very Bioaccumulating
PROC: Process Category
ADR: Accord européen relatif au transport international des marchandises Dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
ADN: Accord européen relatif au transport international des marchandises Dangereuses par voies de Navigation intérieures (European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways)
IMDG: International Maritime Dangerous Goods Code
ICAO: International Civil Aviation Organization

**SDS No.** CO00046
**Subformat** COEU

**This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006 and Regulation (EC) No. 2015/830. Label element according to Regulation (EC) No 1272/2008.**

Disclaimer
**The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.**

**End of Safety Data Sheet**

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**SAFETY DATA SHEET**
according to 1907/2006/EC, Article 31

**Lactic Acid** Revision Date **07.04.2014**
Ref. **SD2400/2014-01**

**1. IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND THE COMPANY / UNDERTAKING**

| | | |
|---|---|---|
| **Product name** | PURAC®<br>PURAC® 80<br>PURAC® 80-DW<br>PURAC® 88-T<br>PURAC® 93-T<br>PURAC® FCC<br>PURAC® HiPure<br>PURAC® HS<br>PURAC® PF<br>PURAC® PH<br>PURAC® Sanilac<br>PURAC® Vin<br>PURAC® UltraPure 50<br>PURAC® UltraPure 90 | |
| **REACH registration nr.** | 01-2119474164-39-0000 | |
| **Use of the Substance** | Food additive, Specialty chemical | |
| **Supplier** | Purac Biochem<br>Arkelsedijk 46<br>NL-4206 AC Gorinchem<br>The Netherlands | Purac Bioquimica<br>Gran Vial 19 -25<br>08160 Montmelo-Barcelona<br>Spain |
| **Telephone** | +31 183 695695 | +34 93 568 6300 |
| **Fax** | +31 183 695604 | +34 93 568 3955 |
| **Emergency telephone** | +31 183 695695 | +34 93 568 6300 (Ext 222) |
| **# Supplier** | Purac Sinteses<br>Av. Rui Barbosa, 521<br>Campos dos Goytacazes-RJ<br>CEP 28013-000<br>Brazil | Purac America, Inc.<br>7905 Quivira Rd.<br>Lenexa, KS 66215<br><br>USA |
| **Telephone** | +55 22 2737 7200 | +1 800 669 4092 |
| **Fax** | +55 22 2737 7210 | +1 913 888 4970 |
| **Emergency telephone** | +55 22 2737 7200 | +1 800 669 4092 |
| **Supplier** | Purac Thailand<br>3 Moo 2 – Ásia Industrial Estate<br>T. Banchang, A. Banchang<br>Rayong 21130<br>Thailand | |
| **Telephone** | +66 (38) 698 800 | |
| **Fax** | +66 (38) 698 801 | |
| **Emergency telephone** | +66 (38) 698 800 | |
| **Contact person** | T. van Dongen | |
| **E-mail** | t.van.dongen@corbion.com | |

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**SAFETY DATA SHEET**
according to 1907/2006/EC, Article 31

**Lactic Acid** Revision Date **07.04.2014**
Ref. **SD2400/2014-01**

**2. HAZARDS IDENTIFICATION**

**Classification of the substance or mixture**
The substance has been assessed and/or tested for its physical, health and environmental hazards and the following classification applies.

**Classification according to Directive 67/548/EEC or 1999/45/EC as amended**

**Classification**
Xi;R38-41
The full text for all R-phrases is displayed in section 16.

**Health hazards**
Serious eye damage/eye irritation Category 1 Causes serious eye damage.

**Classification according to Regulation (EC) No 1272/2008 as amended**
Skin corrosion/irritation Category 2 Causes skin irritation.

**Hazard summary**
**Physical hazards**
Not classified for physical hazards.

**Health hazards**
Irritating to skin. Risk of serious damage to eyes.

**Environmental hazards**
Not classified for hazards to the environment.

**Specific hazards**
Not available.

**Label elements**
**Label according to Regulation (EC) No. 1272/2008 as amended**

**Contains**: L-(+)-Lactic acid

**Signal word**
Danger

**Hazard statements**
Causes serious eye damage. Causes skin irritation.

**Precautionary statements**
**Prevention**
Wear protective gloves. Wear eye/face protection. Wash thoroughly after handling.

**Response**
IF ON SKIN: Wash with plenty of soap and water. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician. Take off contaminated clothing and wash before reuse.

**Storage**
Not available.

**Disposal**

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**SAFETY DATA SHEET**
according to 1907/2006/EC, Article 31

**Lactic Acid** Revision Date **07.04.2014**
Ref. **SD2400/2014-01**

Not available.

**Supplemental label information**
Not applicable.

**Other hazards**
**Results of PBT and vPvB assessment**
**PBT**
Not applicable.

**VPvB**
Not applicable.

**3. COMPOSITION / INFORMATION ON INGREDIENTS**

**Mixture**
**General information**

| Chemical name | % | CAS-No. | EC No. |
|---|---|---|---|
| L-(+)-Lactic acid | ≥ 50 | 79-33-4 | 201-196-2 |

**REACH registration nr.** 01-2119474164-39-0000

**Classification**
**DSD**: Xi;R38-41
**CLP**: Skin Irrit. 2;H315, Eye Dam. 1;H318

CLP: Regulation No. 1272/2008.
DSD: Directive 67/548/EEC.
#: This substance has workplace exposure limit(s).
PBT: persistent, bioaccumulative and toxic substance.
vPvB: very persistent and very bioaccumulative substance.

**Composition comments**
The full text for all R- and H-phrases is displayed in section 16.

**4. FIRST AID MEASURES**

**General information**
If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Wash contaminated clothing before reuse.

**Description of first aid measures**
**Inhalation**
Move to fresh air. Call a physician if symptoms develop or persist.

**Skin contact**
Remove contaminated clothing. Wash off with soap and plenty of water. If skin irritation occurs: Get medical advice/attention.

**Eye contact**
Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control centre immediately.

**Ingestion**
Call a POISON CENTER or doctor/physician if you feel unwell. Rinse mouth.

**Most important symptoms and effects, both acute and delayed**
No further relevant information available.

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**Indication of any immediate medical attention and special treatment needed**
In case of shortness of breath, give oxygen. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

**5. FIRE-FIGHTING MEASURES**

**General fire hazards**
Not available.

**Extinguishing media**
**Suitable extinguishing media**
Water spray, foam, dry powder or carbon dioxide.

**Unsuitable extinguishing media**
Do not use water jet as an extinguisher, as this will spread the fire.

**Special hazards arising from the substance or mixture**
Not available.

**Advice for firefighters**
**Special protective equipment for firefighters**
Not available.

**Special firefighting procedures**
Not available.

**6. ACCIDENTAL RELEASE MEASURES**

**Personal precautions, protective equipment and emergency procedures**
**For non-emergency personnel**
Keep unnecessary personnel away. Do not touch or walk through spilled material.

**Environmental precautions**
Prevent further leakage or spillage if safe to do so.

**Methods and material for containment and cleaning up**
Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills in original containers for re-use. For waste disposal, see section 13.

**7. HANDLING AND STORAGE**

**Precautions for safe handling**
Do not get this material in contact with eyes. Avoid contact with skin. Wash hands thoroughly after handling.

**Conditions for safe storage, including any incompatibilities**
Keep container tightly closed. Keep out of the reach of children. Avoid temperatures above 392°F (200°C).

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## 8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

**Control parameters**
**Occupational exposure limits**
No exposure limits noted for the ingredient(s).

**Biological limit values**
No biological exposure limits noted for the ingredient(s).

**Recommended monitoring procedures**
Not available.

**DNEL**
Not available.
**PNEC**
Not available.

**Exposure controls**
**Appropriate engineering controls**
Not available.

**Individual protection measures, such as personal protective equipment**
**General information**
Eye wash fountain is recommended.

**Eye/face protection**
Wear eye/face protection (e.g. EN 166).

**Skin protection**
**Hand protection**
Wear protective gloves (e.g. EN 374).

**Other**
Wear suitable protective clothing.

**Respiratory protection**
Use a positive-pressure air-supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air-purifying respirators may not provide adequate protection.

**Hygiene measures**
Do not get in eyes. Avoid contact with skin. Keep away from food and drink. Handle in accordance with good industrial hygiene and safety practices.



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## 9. PHYSICAL AND CHEMICAL PROPERTIES

**Information on basic physical and chemical properties**

| | |
|---|---|
| **Appearance** | Clear |
| **Physical state** | Liquid |
| **Form** | Aqueous solution |
| **Colour** | Colourless or yellowish liquid |
| **Odour** | Characteristic |
| **Odour threshold** | Not available |
| **pH** | < 1.2 @ 25°C |
| **Melting point/freezing point** | Not available |
| **Boiling point, initial boiling point, and boiling range** | 120 - 130 °C (248 - 266 °F) @ 1013 hPa |
| **Flash point** | Not applicable |
| **Auto-ignition temperature** | Not applicable |
| **Flammability (solid, gas)** | Not available |
| **Flammability limit – lower (%)** | Not available |
| **Flammability limit – upper (%)** | Not available |
| **Oxidising properties** | Not applicable |
| **Explosive properties** | Not applicable |
| **Explosive limit** | Not applicable |
| **Vapour pressure** | Not applicable |
| **Vapour density** | Not applicable |
| **Evaporation rate** | Not applicable |
| **Relative density** | Not available |
| **Density** | 1.2 g/cm³ |
| **Solubility (water)** | miscible |
| **Partition coefficient (n-octanol/water)** | -0.62 |
| **Decomposition temperature** | > 200 °C (> 392 °F) |
| **Viscosity** | 5 - 60 mPa·s @ 25°C |
| **Percent volatile** | Not available |

**Other data**

| | |
|---|---|
| **Surface tension** | 44 - 50 mN/m @ 50% - 90% |

**Other information**
No relevant additional information available.

## 10. STABILITY AND REACTIVITY

**Reactivity**
None known.

**Chemical stability**
Material is stable under normal conditions.

**Possibility of hazardous reactions**
Not available.

**Conditions to avoid**
Temperatures above 200 °C.

**Incompatible materials**
Oxidizing agents.

**Hazardous decomposition products**
No dangerous reaction known under conditions of normal use.



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## 11. TOXICOLOGICAL INFORMATION

**General information**
Not available.

**Information on likely routes of exposure**
**Skin contact**
Causes skin irritation.

**Eye contact**
Causes serious eye damage.

**Information on toxicological effects**
**Acute toxicity**
Not available.

| **Product** | **Test results** |
|---|---|
| Lactic acid | Acute Dermal LD50 Rabbit: > 2000 mg/kg |

| **Components** | **Test results** |
|---|---|
| L-(+)-Lactic acid (79-33-4) | Acute Inhalation LC50 Rat: 7.94 mg/l 4 Hours<br>Acute Oral LD50 Mouse: 4875 mg/kg<br>Acute Oral LD50 Rat: 3730 mg/kg |

**Skin corrosion/irritation**
Causes skin irritation.

**Serious eye damage/eye irritation**
Causes serious eye damage.

**Respiratory sensitisation**
Not available.

**Skin sensitisation**
Not available.

**Germ cell mutagenicity**
Not available.

**Carcinogenicity**
Not classified.

**Reproductive toxicity**
Not available.



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## 12. ECOLOGICAL INFORMATION

**Toxicity**

| **Product** | **Test results** |
|---|---|
| Lactic acid | EC50 Algae: 3500 mg/l<br>EC50 Daphnia: 240 mg/l 48 hours<br>LC50 Fish: 320 mg/l 48 hours |

**Persistence and degradability**
The product is easily biodegradable.

**Bioaccumulative potential**
Not available.

**Mobility**
Not available.

**Environmental fate - Partition coefficient**
Not available.

**Mobility in soil**
Not available.

**Results of PBT and vPvB assessment**
Not applicable.

**Other adverse effects**
Not available.

## 13. DISPOSAL CONSIDERATIONS

**Waste treatment methods**
**Residual waste**
Not available.

**Contaminated packaging**
Empty containers should be taken to an approved waste handling site for recycling or disposal.

**EU waste code**
Not available.

**Disposal methods/information**
Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.



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**14. TRANSPORT INFORMATION**

**ADR**
Not regulated as dangerous goods.

**RID**
Not regulated as dangerous goods.

**ADN**
Not regulated as dangerous goods.

**IATA**
Not regulated as dangerous goods.

**IMDG**
Not regulated as dangerous goods.

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**
No information available.

**15. REGULATORY INFORMATION**

**Safety, health and environmental regulations/legislation specific for the substance or mixture**
**EU Regulations**
Regulation (EC) No. 2037/2000 on substances that deplete the ozone layer, Annex I
Not listed.
Regulation (EC) No. 2037/2000 on substances that deplete the ozone layer, Annex II
Not listed.
Regulation (EC) No. 850/2004 on persistent organic pollutants, Annex I
Not listed.
Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 1
Not listed.
Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 2
Not listed.
Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 3
Not listed.
Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex V
Not listed.
Directive 96/61/EC concerning integrated pollution prevention and control (IPPC): Article 15, European Pollution Emission
Registery (EPER)
Not listed.
Regulation (EC) No. 1907/2006, Article 59(1). Candidate List
Not listed.

**Other regulations**
This Safety Data Sheet complies with the requirements of Regulation (EC) No 1907/2006.

**National regulations**
Not available.

**Chemical safety assessment**
Chemical Safety Assessment has been carried out.

**16. OTHER INFORMATION**

**List of abbreviations**
Not available.

**References**
Not available.

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**Information on evaluation method leading to the classification of mixture**
Not available.

**Full text of any statements or R-phrases and H-phrases under Sections 2 to 15**
R38 Irritating to skin.
R41 Risk of serious damage to eyes.
H315 - Causes skin irritation.
H318 - Causes serious eye damage.

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# indicates updated section.

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**Safety data sheet**

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Date / Revised: 22.11.2017 Version: 2.0
Product: **Pyridoxine Hydrochloride (Chin. orig.)**
(ID no. 30253690/SDS_GEN_EU/EN)
Date of print 10.12.2018

**SECTION 1: Identification of the substance/mixture and of the company/undertaking**

**1.1. Product identifier**

**Pyridoxine Hydrochloride (Chin. orig.)**

Chemical name: Pyridoxine hydrochloride
CAS Number: 58-56-0

**1.2. Relevant identified uses of the substance or mixture and uses advised against**

Relevant identified uses: Vitamin

**1.3. Details of the supplier of the safety data sheet**

Company:
BASF SE
67056 Ludwigshafen
GERMANY
Operating Division Nutrition and Health

Telephone: +49 621 60-48434
E-mail address: EN-global-safety-data@basf.com

**1.4. Emergency telephone number**

International emergency number:
Telephone: +49 180 2273-112

**SECTION 2: Hazards Identification**

**2.1. Classification of the substance or mixture**

According to Regulation (EC) No 1272/2008 [CLP]

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No need for classification according to GHS criteria for this product.

**2.2. Label elements**

Globally Harmonized System, EU (GHS)

The product does not require a hazard warning label in accordance with GHS criteria.

**2.3. Other hazards**

According to Regulation (EC) No 1272/2008 [CLP]

The product is under certain conditions capable of dust explosion. The product does not fulfill the criteria for PBT (Persistent/bioaccumulative/toxic) and vPvB (very persistent/very bioaccumulative).

**SECTION 3: Composition/Information on Ingredients**

**3.1. Substances**

Chemical nature

Pyridoxine hydrochloride
CAS Number: 58-56-0
EC-Number: 200-386-2

**3.2. Mixtures**

Not applicable

**SECTION 4: First-Aid Measures**

**4.1. Description of first aid measures**
First aid personnel should pay attention to their own safety. If the patient is likely to become unconscious, place and transport in stable sideways position (recovery position). Remove contaminated clothing.

If inhaled:
Keep patient calm, remove to fresh air.

On skin contact:
Wash thoroughly with soap and water. If difficulties occur: Seek medical attention.

On contact with eyes:
Wash affected eyes for at least 15 minutes under running water with eyelids held open. If irritation develops, seek medical attention.

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On ingestion:
Rinse mouth and then drink plenty of water. Seek medical attention.

**4.2. Most important symptoms and effects, both acute and delayed**
Symptoms: The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11., Further important symptoms and effects are so far not known.

**4.3. Indication of any immediate medical attention and special treatment needed**
Treatment: Treat according to symptoms (decontamination, vital functions), no known specific antidote.

**SECTION 5: Fire-Fighting Measures**

**5.1. Extinguishing media**
Suitable extinguishing media:
water spray, carbon dioxide, dry powder, foam

**5.2. Special hazards arising from the substance or mixture**
Carbon dioxide, hydrogen chloride, cyanides
The substances/groups of substances mentioned can be released in case of fire. Dust explosion hazard.

**5.3. Advice for fire-fighters**
Special protective equipment:
Wear self-contained breathing apparatus and chemical-protective clothing.

Further information:
Dispose of fire debris and contaminated extinguishing water in accordance with official regulations.

**SECTION 6: Accidental Release Measures**

Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air). Avoid the formation and build-up of dust - danger of dust explosion.

**6.1. Personal precautions, protective equipment and emergency procedures**
Avoid dust formation. Use breathing apparatus if exposed to vapours/dust/aerosol. Avoid contact with the skin, eyes and clothing.

**6.2. Environmental precautions**
Discharge into the environment must be avoided.

**6.3. Methods and material for containment and cleaning up**
For small amounts: Sweep/shovel up.
For large amounts: Sweep/shovel up.
Dispose of absorbed material in accordance with regulations. Avoid raising dust.

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**6.4. Reference to other sections**
Information regarding exposure controls/personal protection and disposal considerations can be found in section 8 and 13.

**SECTION 7: Handling and Storage**

**7.1. Precautions for safe handling**
Breathing must be protected when large quantities are decanted without local exhaust ventilation. Wear suitable protective clothing and gloves.

Protection against fire and explosion:
Avoid dust formation. Take precautionary measures against static discharges. Keep away from sources of ignition - No smoking.

**7.2. Conditions for safe storage, including any incompatibilities**

Suitable materials for containers: High density polyethylene (HDPE), Low density polyethylene (LDPE)
Further information on storage conditions: Keep container tightly closed in a cool, well-ventilated place. Keep at temperature not exceeding 25 °C.

**7.3. Specific end use(s)**
For the relevant identified use(s) listed in Section 1 the advice mentioned in this section 7 is to be observed.

**SECTION 8: Exposure Controls/Personal Protection**

**8.1. Control parameters**

Components with occupational exposure limits

58-56-0: Pyridoxine hydrochloride

**8.2. Exposure controls**

Personal protective equipment

Respiratory protection:
Breathing protection if breathable aerosols/dust are formed. Particle filter with low efficiency for solid particles (e.g. EN 143 or 149, Type P1or FFP1)

Hand protection:
Suitable chemical resistant safety gloves (EN 374) also with prolonged, direct contact (Recommended: Protective index 6, corresponding > 480 minutes of permeation time according to EN 374): E.g. nitrile rubber (0.4 mm), chloroprene rubber (0.5 mm), butyl rubber (0.7 mm) etc.

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Supplementary note: The specifications are based on tests, literature data and information of glove manufacturers or are derived from similar substances by analogy. Due to many conditions (e.g. temperature) it must be considered, that the practical usage of a chemical-protective glove in practice may be much shorter than the permeation time determined through testing.

Eye protection:
Safety glasses with side-shields (frame goggles) (e.g. EN 166)

Body protection:
Body protection must be chosen based on level of activity and exposure.

General safety and hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Avoid contact with the skin, eyes and clothing. Hands and/or face should be washed before breaks and at the end of the shift.

**SECTION 9: Physical and Chemical Properties**

**9.1. Information on basic physical and chemical properties**

| | | |
|---|---|---|
| Form: | crystalline, powder | |
| Colour: | white | |
| Odour: | odourless | |
| Odour threshold: | not determined | |
| pH value: | 2.4 - 3.0 (50 g/l, 20 °C) | |
| Melting point: | approx. 206 °C | |
| Boiling point: | The substance / product decomposes therefore not determined. | |
| Flash point: | The substance / product decomposes therefore not determined. | |
| Evaporation rate: | The product is a non-volatile solid. | |
| Flammability: | not highly flammable | (other) |
| Lower explosion limit: | For solids not relevant for classification and labelling. | |
| Upper explosion limit: | For solids not relevant for classification and labelling. | |
| Ignition temperature: | > 500 °C | |
| Vapour pressure: | negligible | |

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| | | |
|---|---|---|
| Solubility in water: | 220 g/l (approx. 20 °C) | |
| Partitioning coefficient n-octanol/water (log Kow): | -4.32 (25 °C) | (calculated) |
| Self ignition: | The substance does not heat itself up at temperatures below the melting point. | |
| Thermal decomposition: | Stable up to the melting point. | |
| Viscosity, dynamic: | not relevant | |
| Viscosity, kinematic: | not relevant | |
| Explosion hazard: | Product is not explosive, however a dust explosion could result from an air / dust mixture. | |
| Fire promoting properties: | Based on its structural properties the product is not classified as oxidizing. | |

**9.2. Other information**

Bulk density: 560 - 920 kg/m3

**SECTION 10: Stability and Reactivity**

**10.1. Reactivity**
No hazardous reactions if stored and handled as prescribed/indicated.

Corrosion to metals: Corrosive effect on metals.

**10.2. Chemical stability**
The product is stable if stored and handled as prescribed/indicated.

**10.3. Possibility of hazardous reactions**
Dust explosion hazard. If product is heated above decomposition temperature toxic vapours may be released.

**10.4. Conditions to avoid**
See MSDS section 7 - Handling and storage.

**10.5. Incompatible materials**

Substances to avoid:
atmospheric moisture

**10.6. Hazardous decomposition products**

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No hazardous decomposition products if stored and handled as prescribed/indicated.

## SECTION 11: Toxicological Information

### 11.1. Information on toxicological effects

Acute toxicity

Assessment of acute toxicity:
Of low toxicity after single ingestion.

Experimental/calculated data:
LD50 rat (oral): 4,000 mg/kg
Literature data.

Irritation

Assessment of irritating effects:
Not irritating to eyes and skin.

Experimental/calculated data:
Skin corrosion/irritation rabbit: non-irritant (OECD Guideline 404)

Serious eye damage/irritation rabbit: non-irritant (OECD Guideline 405)

Respiratory/Skin sensitization

Assessment of sensitization:
No data available.

Germ cell mutagenicity

Assessment of mutagenicity:
No mutagenic effect was found in various tests with bacteria and mammalian cell culture.

Carcinogenicity

No data available.

Reproductive toxicity

Assessment of reproduction toxicity:
No data available.

Developmental toxicity

Assessment of teratogenicity:
No indications of a developmental toxic / teratogenic effect were seen in animal studies.

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Specific target organ toxicity (single exposure)

No data available.

Repeated dose toxicity and Specific target organ toxicity (repeated exposure)

Assessment of repeated dose toxicity:
No data available.

Aspiration hazard

No data available.

## SECTION 12: Ecological Information

### 12.1. Toxicity

Assessment of aquatic toxicity:
Acutely toxic for aquatic organisms. The inhibition of the degradation activity of activated sludge is not anticipated when introduced to biological treatment plants in appropriate low concentrations.

Toxicity to fish:
LC50 (96 h) > 100 mg/l, Oncorhynchus mykiss (OECD Guideline 203)
The details of the toxic effect relate to the nominal concentration.

Aquatic invertebrates:
EC50 (48 h) > 100 mg/l, Daphnia magna (OECD Guideline 202, part 1)
The details of the toxic effect relate to the nominal concentration.

Aquatic plants:
EC50 (72 h) 5.3 mg/l (biomass), Scenedesmus subspicatus (OECD Guideline 201)
The details of the toxic effect relate to the nominal concentration.

Microorganisms/Effect on activated sludge:
EC20 (30 min) > 1,000 mg/l, activated sludge, domestic (OECD Guideline 209, aerobic)

### 12.2. Persistence and degradability

Assessment biodegradation and elimination (H2O):
Readily biodegradable (according to OECD criteria).

Elimination information:
94 % DOC reduction (28 d) (OECD 301E/92/69/EEC, C.4-B) (aerobic, activated sludge, domestic)

### 12.3. Bioaccumulative potential

Bioaccumulation potential:

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Accumulation in organisms is not to be expected. Because of the n-octanol/water distribution coefficient (log Pow) accumulation in organisms is not to be expected.

### 12.4. Mobility in soil

Assessment transport between environmental compartments:
Adsorption in soil: Adsorption to solid soil phase is not expected.

### 12.5. Results of PBT and vPvB assessment

According to Annex XIII of Regulation (EC) No.1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain a substance fulfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/very bioaccumulative) criteria. Self classification

### 12.6. Other adverse effects

The substance is not listed in Regulation (EC) 1005/2009 on substances that deplete the ozone layer.

## SECTION 13: Disposal Considerations

### 13.1. Waste treatment methods

Incinerate in suitable incineration plant, observing local authority regulations.

## SECTION 14: Transport Information

**Land transport**

ADR

| | |
|---|---|
| | Not classified as a dangerous good under transport regulations |
| UN number: | Not applicable |
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |
| Environmental hazards: | Not applicable |
| Special precautions for user | None known |

RID

| | |
|---|---|
| | Not classified as a dangerous good under transport regulations |
| UN number: | Not applicable |
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |

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BASF Safety data sheet according to Regulation (EC) No. 1907/2006 as amended from time to time.
Date / Revised: 22.11.2017 Version: 2.0
Product: **Pyridoxine Hydrochloride (Chin. orig.)**
(ID no. 30253690/SDS_GEN_EU/EN)
Date of print 10.12.2018

| | |
|---|---|
| Environmental hazards: | Not applicable |
| Special precautions for user | None known |

**Inland waterway transport**
ADN

| | |
|---|---|
| | Not classified as a dangerous good under transport regulations |
| UN number: | Not applicable |
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |
| Environmental hazards: | Not applicable |
| Special precautions for user: | None known |

Transport in inland waterway vessel
Not evaluated

**Sea transport**

IMDG

| | |
|---|---|
| | Not classified as a dangerous good under transport regulations |
| UN number: | Not applicable |
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |
| Environmental hazards: | Not applicable |
| Special precautions for user | None known |

**Air transport**

IATA/ICAO

| | |
|---|---|
| | Not classified as a dangerous good under transport regulations |
| UN number: | Not applicable |
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |
| Environmental hazards: | Not applicable |
| Special precautions for user | None known |

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BASF Safety data sheet according to Regulation (EC) No. 1907/2006 as amended from time to time.
Date / Revised: 22.11.2017 Version: 2.0
Product: **Pyridoxine Hydrochloride (Chin. orig.)**
(ID no. 30253690/SDS_GEN_EU/EN)
Date of print 10.12.2018

**14.1. UN number**
See corresponding entries for "UN number" for the respective regulations in the tables above.

**14.2. UN proper shipping name**
See corresponding entries for "UN proper shipping name" for the respective regulations in the tables above.

**14.3. Transport hazard class(es)**
See corresponding entries for "Transport hazard class(es)" for the respective regulations in the tables above.

**14.4. Packing group**
See corresponding entries for "Packing group" for the respective regulations in the tables above.

**14.5. Environmental hazards**
See corresponding entries for "Environmental hazards" for the respective regulations in the tables above.

**14.6. Special precautions for user**
See corresponding entries for "Special precautions for user" for the respective regulations in the tables above.

**14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code**

| | |
|---|---|
| Regulation: | Not evaluated |
| Shipment approved: | Not evaluated |
| Pollution name: | Not evaluated |
| Pollution category: | Not evaluated |
| Ship Type: | Not evaluated |

**SECTION 15: Regulatory Information**

**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**

If other regulatory information applies that is not already provided elsewhere in this safety data sheet, then it is described in this subsection.

**SECTION 16: Other Information**

Any other intended applications should be discussed with the manufacturer. Corresponding occupational protection measurements must be followed.

The data contained in this safety data sheet are based on our current knowledge and experience and describe the product only with regard to safety requirements. This safety data sheet is neither a Certificate of Analysis (CoA) nor technical data sheet and shall not be mistaken for a specification agreement. Identified uses in this safety data sheet do neither represent an agreement on the

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BASF Safety data sheet according to Regulation (EC) No. 1907/2006 as amended from time to time.
Date / Revised: 22.11.2017 Version: 2.0
Product: **Pyridoxine Hydrochloride (Chin. orig.)**
(ID no. 30253690/SDS_GEN_EU/EN)
Date of print 10.12.2018

corresponding contractual quality of the substance/mixture nor a contractually designated use. It is the responsibility of the recipient of the product to ensure any proprietary rights and existing laws and legislation are observed.

Vertical lines in the left hand margin indicate an amendment from the previous version.

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## SAFETY DATA SHEET

**1. Identification**

**Product identifier: REWODERM LI S 80**

**Chemical name:** Aqueous solution of a modified fatty acid glyceride polyethoxylate

**Other means of identification**

**Recommended use:** Industrial Use
**Recommended restrictions:** None known.

**Manufacturer/Importer/Distributor Information**

| | | |
|---|---|---|
| Company Name | : | Evonik Nutrition & Care GmbH<br>Goldschmidtstr. 100<br>45127 Essen<br>Germany |
| Telephone | : | +49 201 173 01 |
| Fax | : | +49 201 173 3000 |
| E-mail | : | productsafety-cs@evonik.com |

**Emergency telephone number:**

| | | |
|---|---|---|
| 24-Hour Health Emergency | : | +49 2365 49 2232<br>+49 2365 49 4423 (Fax) |

**2. Hazard(s) identification**

**According to Hazardous Product Regulations**
Not classified

**Label Elements**

| | |
|---|---|
| **Hazard Symbol:** | No symbol |
| **Signal Word:** | No signal word. |
| **Hazard Statement:** | Not applicable |
| **Precautionary Statements** | Not applicable |

**Other hazards:** None known.

**3. Composition/information on ingredients**

**Chemical name:**
Aqueous solution of a modified fatty acid glyceride polyethoxylate

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**Mixtures**

**Composition Comments:** No hazardous ingredients.

**4. First-aid measures**

**Description of necessary first-aid measures**

| | |
|---|---|
| **General information:** | Remove contaminated clothing. |
| **Inhalation:** | Remove the casualty into fresh air and keep him calm. |
| **Skin Contact:** | In case of contact with skin wash off immediately with plenty of water |
| **Eye contact:** | In case of contact with eyes rinse thoroughly with plenty of water. If symptoms persist, seek medical advice. |
| **Ingestion:** | Thoroughly clean the mouth with water In the event of symptoms seek medical advice. |
| **Personal Protection for First-aid Responders:** | Do not inhale explosion and/or combustion gases, Use self-contained breathing apparatus and wear protective suit |

**Most important symptoms/effects, acute and delayed**

| | |
|---|---|
| **Symptoms:** | The following symptoms may occur: - gastrointestinal complaints |
| **Hazards:** | No data available. |

**Indication of immediate medical attention and special treatment needed**

| | |
|---|---|
| **Treatment:** | If swallowed, flush stomach. |

**5. Fire-fighting measures**

| | |
|---|---|
| **General Fire Hazards:** | Fire residues and contaminated firefighting water must be disposed of in accordance with the local regulations. Cool endangered containers with water spray jet. |

**Suitable (and unsuitable) extinguishing media**

| | |
|---|---|
| **Suitable extinguishing media:** | foam, carbon dioxide, dry powder, water spray. |
| **Unsuitable extinguishing media:** | Full water jet |
| **Specific hazards arising from the chemical:** | In the event of fire the following can be released: - carbon dioxide, carbon monoxide |

**Special protective equipment and precautions for firefighters**

| | |
|---|---|
| **Special fire fighting procedures:** | No specific precautions. |

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| | |
|---|---|
| **Special protective equipment for fire-fighters:** | Do not inhale explosion and/or combustion gases Use self-contained breathing apparatus and wear protective suit |

**6. Accidental release measures**

| | |
|---|---|
| **Personal precautions, protective equipment and emergency procedures:** | High risk of slipping due to leakage/spillage of product. Use personal protective equipment. |
| **Methods and material for containment and cleaning up:** | Take up with absorbent material (eg sand, kieselguhr, universal binder) Dispose of absorbed material in accordance with the regulations. |
| **Environmental Precautions:** | Do not allow to enter drains or waterways Do not discharge into the subsoil/soil. |

**7. Handling and storage**

| | |
|---|---|
| **Precautions for safe handling:** | Avoid contact with eyes. No special measures necessary if stored and handled as prescribed. |
| **Conditions for safe storage, including any incompatibilities:** | Keep tightly sealed in original packing. |

**8. Exposure controls/personal protection**

**Control Parameters**

**Occupational Exposure Limits**
Observe national threshold limit values.

**Biological Limit Values**
Observe national threshold limit values.

**Appropriate Engineering Controls** — No data available.

**Individual protection measures, such as personal protective equipment**

| | |
|---|---|
| **General information:** | No data available. |
| **Eye/face protection:** | when handling the concentrate: goggles with side pieces |
| **Skin Protection** | |
| **Hand Protection:** | Material: gloves made of chloroprene (CR, e.g. Neoprene)<br>Break-through time: 480 min<br>Material: gloves made of nitril (NBR)<br>Break-through time: 480 min<br>Material: gloves made of butyl (IIR)<br>Break-through time: 480 min<br>Material: gloves made of natural latex<br>Break-through time: 480 min |
| **Other:** | light protective clothing |



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| | |
|---|---|
| **Respiratory Protection:** | If ventilation or extraction insufficient: Respiratory protection mask with combination filter A-P2 |
| **Hygiene measures:** | Keep away from foodstuffs and beverages. Wash hands before breaks and immediately after handling the product. Do not eat, drink or smoke when working. |

**9. Physical and chemical properties**

| | |
|---|---|
| **Appearance** | |
| **Physical state:** | liquid |
| **Form:** | Liquid, viscous |
| **Color:** | yellowish, dull |
| **Odor:** | Characteristic |
| **Odor Threshold:** | not measured |
| **pH:** | 6,0 - 8,0 (50 g/l, 20 °C) Water. |
| **Freezing point:** | approx. -5 °C |
| **Boiling Point:** | approx. 100 °C |
| **Flash Point:** | Not applicable |
| **Evaporation Rate:** | No data available. |
| **Flammability (solid, gas):** | no data available |
| **Flammability Limit - Upper (%):** | Not applicable |
| **Flammability Limit - Lower (%):** | Not applicable |
| **Vapor pressure:** | No data available. |
| **Vapor density (air=1):** | No data available. |
| **Density:** | approx. 1,09 g/cm3 (20 °C) (DGF-C-IV-2) |
| **Relative density:** | No data available. |
| **Solubility(ies)** | |
| **Solubility in Water:** | (20 °C) easily soluble |
| **Solubility (other):** | not measured |
| **Partition coefficient (n-octanol/water):** | not measured |
| **Autoignition Temperature:** | not measured |
| **Decomposition Temperature:** | not measured |
| **Kinematic viscosity:** | No data available. |
| **Dynamic viscosity:** | 3.000 - 6.000 mPa.s (20 °C, Brookfield) |
| **Explosive properties:** | not measured |
| **Oxidizing properties:** | not measured |
| **Other information** | |
| **Dust Explosion Limit, Upper:** | Not applicable |
| **Dust Explosion Limit, Lower:** | Not applicable |
| **Minimum ignition temperature:** | Not applicable |
| **Metal Corrosion:** | not measured |
| **Self Ignition Temperature:** | not measured |

**10. Stability and reactivity**

| | |
|---|---|
| **Reactivity:** | see section "Possibility of hazardous reactions" |



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| | |
|---|---|
| **Chemical Stability:** | The product is stable under normal conditions. |
| **Possibility of hazardous reactions:** | No hazardous reactions with proper storage and handling. |
| **Conditions to avoid:** | Unknown |
| **Incompatible Materials:** | Unknown |
| **Hazardous Decomposition Products:** | None with proper storage and handling. |

**11. Toxicological information**

**Information on likely routes of exposure**

| | |
|---|---|
| **Inhalation:** | If handled correctly, not a relevant route of exposure. Information on effects are given below. |
| **Skin Contact:** | Relevant route of exposure. Information on effects are given below. |
| **Eye contact:** | Relevant route of exposure. Information on effects are given below. |
| **Ingestion:** | If handled correctly, not a relevant route of exposure. Information on effects are given below. |

**Symptoms related to the physical, chemical and toxicological characteristics**

| | |
|---|---|
| **Inhalation:** | No data available. |
| **Skin Contact:** | No data available. |
| **Eye contact:** | No data available. |
| **Ingestion:** | No data available. |

**Information on toxicological effects**

**Acute toxicity (list all possible routes of exposure)**

| | |
|---|---|
| **Oral** | |
| **Product:** | LD 50 (Rat): > 2.000 mg/kg |
| **Dermal** | |
| **Product:** | no data availableNo data available. |
| **Inhalation** | |
| **Product:** | no data availableNo data available. |
| **Repeated dose toxicity** | |
| **Product:** | no data available |
| **Skin Corrosion/Irritation** | |
| **Product:** | non-irritant<br>OECD 404 (Rabbit): non-irritant Undiluted product |



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| | |
|---|---|
| **Serious Eye Damage/Eye Irritation** | |
| **Product:** | non-irritant<br>rabbit eye: non-irritant |
| **Respiratory or Skin Sensitization** | |
| **Product:** | , OECD 406 (according to Magnusson and Kligman) (Guinea Pig)non-sensitizing |
| **Carcinogenicity** | |
| **Product:** | No data available. |
| **Germ Cell Mutagenicity** | |
| **In vitro** | |
| **Product:** | No data available. |
| **In vivo** | |
| **Product:** | No data available. |
| **Reproductive toxicity** | |
| **Product:** | No data available. |
| **Specific Target Organ Toxicity - Single Exposure** | |
| **Product:** | no data available |
| **Specific Target Organ Toxicity - Repeated Exposure** | |
| **Product:** | no data available |
| **Aspiration Hazard** | |
| **Product:** | Not classified |
| **Other effects:** | Proper use provided, no adverse health effects have been observed or have been come to our knowledge. By analogy with a product of similar composition |

**12. Ecological information**

**Ecotoxicity:**

**Acute hazards to the aquatic environment:**

| | |
|---|---|
| **Fish** | |
| **Product:** | No data available. |
| **Aquatic Invertebrates** | |
| **Product:** | No data available. |

**Chronic hazards to the aquatic environment:**

| | |
|---|---|
| **Fish** | |
| **Product:** | No data available. |
| **Aquatic Invertebrates** | |
| **Product:** | No data available. |

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**Toxicity to Aquatic Plants**
**Product:** No data available.

**Persistence and Degradability**

**Biodegradation**
**Product:** 42 % (28 d, OECD 301 E) The product is not readily biodegradable according to OECD criteria but is inherently biodegradable.

**BOD/COD Ratio**
**Product:** No data available.

**Bioaccumulative potential**
**Bioconcentration Factor (BCF)**
**Product:** No data available.

**Partition Coefficient n-octanol / water (log Kow)**
**Product:** Log Kow: not measured

**Mobility in soil:** No data available.

**Other adverse effects:** Do not allow to enter soil, waterways or waste water canal. The product is classified as slightly hazardous to waters (according to the German Regulation on the Classification of Substances Hazardous to Waters (WwSV).

### 13. Disposal considerations

**Disposal methods:** In accordance with local authority regulations, take to special waste incineration plant

**Contaminated Packaging:** If empty contaminated containers are recycled or disposed of, the receiver must be informed about possible hazards.

### 14. Transport information

**International Regulations**

**UNRTDG**
Not regulated as a dangerous good

**IATA-DGR**
Not regulated as a dangerous good

**IMDG-Code**
Not regulated as a dangerous good

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**
Not applicable for product as supplied.

### 15. Regulatory information

**International regulations**

**Montreal protocol**

**Stockholm convention**

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**Rotterdam convention**

**Kyoto protocol**

### 16.Other information, including date of preparation or last revision

**Issue Date:** 04.03.2019

**Revision Date:** No data available.

**Version #:** 1.0
**Further Information:** No data available.

**Disclaimer:** This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used.

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ThermoFisher
SCIENTIFIC

## SAFETY DATA SHEET

**Creation Date** 24-Nov-2009 **Revision Date** 14-Feb-2020 **Revision Number** 3

### 1. Identification

**Product Name** Salicylic acid

**Cat No. :** 30782

**CAS-No** 69-72-7
**Synonyms** 2-Hydroxybenzoic acid

**Recommended Use** Laboratory chemicals.
**Uses advised against** Food, drug, pesticide or biocidal product use.
**Details of the supplier of the safety data sheet**

**Company**
Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
**Email:** tech@alfa.com
www.alfa.com

**Emergency Telephone Number**
During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660.
After normal business hours, call Carechem 24 at (866) 928-0789.

### 2. Hazard(s) Identification

**Classification**
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

| | |
|---|---|
| Acute oral toxicity | Category 4 |
| Serious Eye Damage/Eye Irritation | Category 1 |
| Reproductive Toxicity | Category 2 |

**Label Elements**

**Signal Word**
Danger

**Hazard Statements**
Harmful if swallowed
Causes serious eye damage
Suspected of damaging the unborn child

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**Salicylic acid** **Revision Date** 14-Feb-2020

**Precautionary Statements**
**Prevention**
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
**Response**
IF exposed or concerned: Get medical attention/advice
**Eyes**
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Immediately call a POISON CENTER or doctor/physician
**Ingestion**
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth
**Storage**
Store locked up
Store in a well-ventilated place. Keep container tightly closed
**Disposal**
Dispose of contents/container to an approved waste disposal plant
**Hazards not otherwise classified (HNOC)**
None identified

### 3. Composition/Information on Ingredients

| Component | CAS-No | Weight % |
|---|---|---|
| Salicylic acid | 69-72-7 | >95 |

### 4. First-aid measures

**General Advice** If symptoms persist, call a physician.

**Eye Contact** Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

**Skin Contact** Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.

**Inhalation** Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.

**Ingestion** Clean mouth with water and drink afterwards plenty of water. Get medical attention if symptoms occur.

**Most important symptoms and effects** Causes severe eye damage.
**Notes to Physician** Treat symptomatically

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**Salicylic acid** — **Revision Date** 14-Feb-2020

## 5. Fire-fighting measures

**Suitable Extinguishing Media** Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam.

**Unsuitable Extinguishing Media** No information available

**Flash Point** 157 °C / 314.6 °F

**Method -** No information available

**Autoignition Temperature** 535 °C / 995 °F

**Explosion Limits**
**Upper** No data available
**Lower** 1.1% @ 200°C
**Sensitivity to Mechanical Impact** No information available
**Sensitivity to Static Discharge** No information available

**Specific Hazards Arising from the Chemical**
Dust can form an explosive mixture with air. Fine dust dispersed in air may ignite. Thermal decomposition can lead to release of irritating gases and vapors. Keep product and empty container away from heat and sources of ignition.

**Hazardous Combustion Products**
Carbon monoxide (CO). Carbon dioxide ($CO_2$).
**Protective Equipment and Precautions for Firefighters**
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

**NFPA**

| Health | Flammability | Instability | Physical hazards |
|---|---|---|---|
| 2 | 1 | 0 | N/A |

## 6. Accidental release measures

**Personal Precautions** Use personal protective equipment as required. Ensure adequate ventilation. Avoid dust formation.
**Environmental Precautions** Should not be released into the environment.

**Methods for Containment and Clean Up** Sweep up and shovel into suitable containers for disposal. Keep in suitable, closed containers for disposal.

## 7. Handling and storage

**Handling** Wear personal protective equipment/face protection. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Avoid dust formation.

**Storage** Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from direct sunlight.

## 8. Exposure controls / personal protection

**Exposure Guidelines** This product does not contain any hazardous materials with occupational exposure limitsestablished by the region specific regulatory bodies.

**Engineering Measures** Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas.

**Personal Protective Equipment**

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**Salicylic acid** — **Revision Date** 14-Feb-2020

**Eye/face Protection** Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

**Skin and body protection** Wear appropriate protective gloves and clothing to prevent skin exposure.

**Respiratory Protection** Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

**Hygiene Measures** Handle in accordance with good industrial hygiene and safety practice.

## 9. Physical and chemical properties

**Physical State** Solid
**Appearance** Off-white
**Odor** Slight
**Odor Threshold** No information available
**pH** 3.6 sat. solution
**Melting Point/Range** 158 - 161 °C / 316.4 - 321.8 °F
**Boiling Point/Range** 211 °C / 411.8 °F @ 20 mmHg
**Flash Point** 157 °C / 314.6 °F
**Evaporation Rate** Not applicable
**Flammability (solid,gas)** No information available
**Flammability or explosive limits**
**Upper** No data available
**Lower** 1.1% @ 200°C
**Vapor Pressure** 0.3 mbar @ 95 °C
**Vapor Density** Not applicable
**Specific Gravity** No information available
**Solubility** Soluble in water
**Partition coefficient; n-octanol/water** No data available
**Autoignition Temperature** 535 °C / 995 °F
**Decomposition Temperature** No information available
**Viscosity** Not applicable
**Molecular Formula** C7 H6 O3
**Molecular Weight** 138.12

## 10. Stability and reactivity

**Reactive Hazard** None known, based on information available

**Stability** Stable under normal conditions. Light sensitive. Moisture sensitive.

**Conditions to Avoid** Avoid dust formation. Incompatible products. Excess heat. Exposure to moisture. Exposure to light.

**Incompatible Materials** Strong oxidizing agents

**Hazardous Decomposition Products** Carbon monoxide (CO), Carbon dioxide ($CO_2$)

**Hazardous Polymerization** Hazardous polymerization does not occur.

**Hazardous Reactions** None under normal processing.

## 11. Toxicological information

**Acute Toxicity**

**Product Information**

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**Salicylic acid** — **Revision Date** 14-Feb-2020

**Component Information**

| Component | LD50 Oral | LD50 Dermal | LC50 Inhalation |
|---|---|---|---|
| Salicylic acid | 891 mg/kg ( Rat ) | > 2 g/kg ( Rat ) | >0.9 mg/L ( Rat ) 1 h |

**Toxicologically Synergistic Products** No information available
**Delayed and immediate effects as well as chronic effects from short and long-term exposure**

**Irritation** Severe eye irritant

**Sensitization** No information available

**Carcinogenicity** The table below indicates whether each agency has listed any ingredient as a carcinogen.

| Component | CAS-No | IARC | NTP | ACGIH | OSHA | Mexico |
|---|---|---|---|---|---|---|
| Salicylic acid | 69-72-7 | Not listed | Not listed | Not listed | Not listed | Not listed |

**Mutagenic Effects** No information available

**Reproductive Effects** No information available.

**Developmental Effects** No information available.

**Teratogenicity** No information available.

**STOT - single exposure** None known
**STOT - repeated exposure** None known

**Aspiration hazard** No information available

**Symptoms / effects,both acute and delayed** No information available

**Endocrine Disruptor Information** No information available

**Other Adverse Effects** The toxicological properties have not been fully investigated.

## 12. Ecological information

**Ecotoxicity**
.

| Component | Freshwater Algae | Freshwater Fish | Microtox | Water Flea |
|---|---|---|---|---|
| Salicylic acid | Not listed | LC50: = 90 mg/L, 48h static (Leuciscus idus) | EC50 = 138 mg/L 1 h<br>EC50 = 214 mg/L 5 min<br>EC50 = 552 mg/L 1 h<br>EC50 = 78 mg/L 210 min | EC50: 105 mg/L/24h |

**Persistence and Degradability** Persistence is unlikely

**Bioaccumulation/ Accumulation** No information available.

**Mobility** . Will likely be mobile in the environment due to its water solubility.

| Component | log Pow |
|---|---|
| Salicylic acid | 2.26 |

## 13. Disposal considerations

**Waste Disposal Methods** Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

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**Salicylic acid** — **Revision Date** 14-Feb-2020

## 14. Transport information

**DOT** Not regulated
**TDG** Not regulated
**IATA** Not regulated
**IMDG/IMO** Not regulated

## 15. Regulatory information

**United States of America Inventory**

| Component | CAS-No | TSCA | TSCA Inventory notification - Active/Inactive | TSCA - EPA Regulatory Flags |
|---|---|---|---|---|
| Salicylic acid | 69-72-7 | X | ACTIVE | - |

**Legend:**
**TSCA** - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

**TSCA 12(b)** - Notices of Export Not applicable

**International Inventories**
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

| Component | CAS-No | DSL | NDSL | EINECS | PICCS | ENCS | AICS | IECSC | KECL |
|---|---|---|---|---|---|---|---|---|---|
| Salicylic acid | 69-72-7 | X | - | 200-712-3 | X | X | X | X | KE-20367 |

**U.S. Federal Regulations**

**SARA 313** Not applicable

**SARA 311/312 Hazard Categories** See section 2 for more information

**CWA (Clean Water Act)** Not applicable

**Clean Air Act** Not applicable

**OSHA** - Occupational Safety and Health Administration Not applicable

**CERCLA** Not applicable

**California Proposition 65** This product does not contain any Proposition 65 chemicals.

**U.S. State Right-to-Know Regulations** Not applicable

**U.S. Department of Transportation**
Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

**U.S. Department of Homeland Security** This product does not contain any DHS chemicals.

**Other International Regulations**

**Mexico - Grade** Slight risk, Grade 1

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**Salicylic acid** **Revision Date** 14-Feb-2020

**16. Other information**

| | |
|---|---|
| **Prepared By** | Health, Safety and Environmental Department<br>Email: tech@alfa.com<br>www.alfa.com |
| **Creation Date** | 24-Nov-2009 |
| **Revision Date** | 14-Feb-2020 |
| **Print Date** | 14-Feb-2020 |
| **Revision Summary** | SDS authoring systems update, replaces ChemGes SDS No. 69-72-7. |

**Disclaimer**
**The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text**

**End of SDS**

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BASF
We create chemistry

# 安全データシート

ページ: 1/9
BASF 安全データシート
日付 / 改訂: 02. 12. 2016　　バージョン: 5.0
製品: **Sodium Ascorbyl Phosphate / リン酸L-アスコルビルナトリウム**
(30222192/SDS_COS_JP/JA)
印刷日 11.06.2019

**1. 製品及び会社情報**

Sodium Ascorbyl Phosphate
リン酸L-アスコルビルナトリウム

用途: 化粧品成分

会社名:
BASFジャパン株式会社
東京都中央区日本橋室町3丁目4番4号
OVOL 日本橋ビル 3階
電話番号: +81-3-5290-3000
FAX番号: +81-3-5290-3333

緊急連絡先:
電話番号: 03-6634-2245
+49 180 2273-112 (International emergency number)

**2. 危険有害性の要約**

【ＧＨＳ分類】:
本製品は、ＧＨＳ分類基準に該当しない。

【ＧＨＳラベル要素】:

本製品は、ＧＨＳ基準により有害性警告表示を必要としない。

他の危険有害性:
本品は、条件によっては粉塵爆発を起こす可能性がある。

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**3. 組成及び成分情報**

**化学特性**

単一製品・混合物の区別: 単一製品

INCI名称: Sodium Ascorbyl Phosphate

2-ホスホ-L-アスコルビン酸三ナトリウム
CAS番号: 66170-10-3
化審法番号: (5)-6477
労働安全衛生法: 8-(4)-1198

**4. 応急措置**

[一般的なアドバイス]:
もしも、健康への悪影響が進むようであるなら、病院で診察を受けること。

[吸入した場合]:
安静にし、新鮮な空気の場所に移動させること。

[皮膚に付着した場合]:
石鹸と水で完全に洗い流すこと。

[眼に入った場合]:
直ちにまぶたを開き流水で15分以上洗い流した後、眼科医の診察を受ける。

必要に応じて医師の治療を受ける。

[飲み込んだ場合]:
直ちに口をすすぎ多量の水を飲ませる。

[医師に対する特別な注意事項]:
症状: 製品が未分類のため、重篤な症状の予想はされていない。
危険有害事項: 意図された用途と適切な取り扱いをすれば、危険性はないと考えられる。
処置: 症状に応じて処置(洗浄・機能回復)を講じる。

**5. 火災時の措置**

[適切な消火剤]:
噴霧水, 粉末, 泡

[使ってはならない消火剤]:
二酸化炭素

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[特有の危険有害性]:
有害な蒸気
フューム/霧の発生 火災の場合、前述の物質／物質グループが放出される可能性がある。

[消火を行う者の保護具]:
自給式呼吸器を着用のこと。

[追加情報]:
汚染された消火廃水は法令に従って適切に処分する。

**6. 漏出時の措置**

[人体に対する注意事項]:
粉塵を発生させない。

保護具を着用する。 保護具に関する情報については8項を参照のこと。

[環境に対する注意事項]:
排水溝等に流出させない。

[封じ込め及び浄化の方法及び機材]:
小量の場合: 粉塵結合剤で回収し、廃棄すること。
大量の場合: 粉塵結合剤で回収し、廃棄すること。
法令に従って吸着剤を廃棄すること。

**7. 取扱い及び保管上の注意**

[取扱い]

換気装置なしに大量に取り扱う場合は呼吸保護具を着用する。

安全取扱注意事項:
粉塵を発生させない。 本品は粉塵爆発を起こす危険性がある。 静電気放電に対する予防措置を講ずること。 あらゆる着火源 (熱、スパーク、裸火など) を近づけない。

[保管]

適切な包装容器材料: 低密度ポリエチレン (LDPE), ガラス, ステンレス鋼 1.4301 (V2), ステンレス鋼 1.4401 (V4), 高密度ポリエチレン (HDPE)
保管条件に関する追加情報: 製品を光に当てない。 容器は密閉して乾燥した換気の良い冷暗所に保管する。

保管安定性:
保管温度: < 25 ° C

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**8. ばく露防止及び保護措置**

許容濃度

職業暴露限度は、不明である。

【保護具】

[呼吸用保護具]:
呼吸保護具（もしエアゾール/粉塵が発生した場合） 固体粒子に対して低効率の微粒子フィルター（例：EN 143もしくは149タイプP1もしくはFFP1）

[手の保護具]:
長時間にわたる直接接触でも問題ない素材でできた耐薬品性保護手袋（EN 374）（保護指針6に準ずることが望ましい。EN 374によると、透過時間は480分以上であること）：ニトリルゴム（0.4 mm）、クロロプレンゴム（0.5 mm）、ブチルゴム（0.7 mm）など。
補足：仕様は、試験、文献データ及び手袋製造業者の情報に基づくもの、あるいは類似の物質から類推されたものである。条件が多いため（温度など）、耐薬品性保護手袋の実際の使用時間は試験で別途得られた物質透過時間よりもかなり短いと考えなければならない。

[眼の保護具]:
サイドシールド（フレームゴーグル）（EN 166準拠）付き安全眼鏡

[皮膚及び身体の保護具]:
作業および予想暴露量に基づいて、保護具を選択すること。前掛け、保護靴、耐薬品性保護衣等（飛散の場合は、EN 14605に従い、粉塵の場合は、EN ISO 13982に従う。）。

[一般的な安全及び衛生対策]:
労働安全衛生に関する実施基準に従い、取り扱うこと。 上下一体型作業衣の着用が望ましい。 作業場では飲食や喫煙をしない。 労働安全衛生に関する実施基準に従い、取り扱うこと。

**9. 物理的及び化学的性質**

| | | |
|---|---|---|
| 形状: | 粉末 | |
| 色: | 白色～淡ベージュ色 | |
| 臭い: | 無臭 | |
| 臭いのしきい値: | 適用せず、臭気を知覚できない | |
| pH: | 9 - 10<br>(3 %(m), 20 ° C) | |
| 融点（分解）: | 約 260 ° C<br>分解する。 | |
| 沸点: | 物質が分解するため、測定不能。 | (その他) |

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| | | |
|---|---|---|
| 引火点: | 固体のため、未測定 | |
| 蒸発率: | この製品は、不揮発性固体である。 | |
| 燃焼性 (固体/ガス): | 可燃性低い。 | |
| 爆発範囲の下限: | 分類と表示に関係しない固体用に関するものである。 | |
| 爆発範囲の上限: | 分類と表示に関係しない固体用に関するものである。 | |
| 発火温度: | > 500 ° C | (VDI 2263, sheet 1, 2.6) |
| 熱分解: | > 200 ° C | |
| 自己発火性: | 温度: 238 ° C | (測定方法: EU指令 84/449/EEC, A.16) |
| 最小発火エネルギー: | 1 - 4 J<br>誘導性: 1 mH<br>本品は粉塵爆発を起こす危険性がある。 | (VDI 2263, sheet 1, 2.1.1) |
| 爆発危険有害事項: | 爆発性なし。 | (その他) |
| 火災を引き起こす性質: | 火災伝播性はない。 | |
| 蒸気圧: | < 0.00001 hPa<br>(20 ° C) | (EU指令 92/69/EEC, A.4) |
| 密度: | 1.94 g/cm3<br>(20 ° C) | (EU指令 92/69/EEC, A.3) |
| 嵩密度: | 約 290 kg/m3 | |
| 相対蒸気密度（空気）: | この製品は、不揮発性固体である。 | |
| 水に対する溶解性: | 789 g/l<br>(20 ° C) | |
| n - オクタノール/水分配係数（log Pow）: | 約 < -4<br>(20 ° C) | |
| 表面張力: | 69.5 mN/m<br>(20 ° C; 1 g/l) | (EU指令 92/69/EEC, A.5, OECD harmonized ring method) |
| 粘度: | 固体のため、未測定 | |
| 動粘性率: | 固体のため、未測定 | |

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その他の情報:
必要に応じ、この章にその他の物理的、化学的パラメーターの情報が記載される。
追加情報なし。

**10. 安定性及び反応性**

[避けるべき条件]:
製品安全データシートの第７項の取り扱い及び保管上の注意を参照すること。 粉塵を発生させない。

熱分解:　　> 200 ° C

[混触危険物質]:
強塩基, 強酸

[危険有害な分解生成物]:
粉塵爆発の危険性あり。

[危険分解物]:
通常の取扱い条件下で危険分解物なし。

**11. 有害性情報**

**急性毒性**

急性毒性の評価:
単回の経口摂取であれば、実質上毒性はなし。 単回の皮膚付着であれば、実質上毒性はなし。

実験または計算によるデータ:
LD50（半数致死量） ラット (経口): > 5,000 mg/kg (OECDテストガイドライン401)

LD50（半数致死量） ラット (経皮): > 2,000 mg/kg (OECDテストガイドライン402)

**刺激性**

刺激性作用の評価:
皮膚刺激性なし。 眼刺激性なし。

実験または計算によるデータ:
皮膚腐食性及び皮膚刺激性 ウサギ: 刺激性なし (OECDテストガイドライン404)

眼に対する重篤な損傷性又は眼刺激性 ウサギ: 刺激性なし (OECDテストガイドライン405)

**呼吸器感作性又は皮膚感作性**

感作性の評価:
動物実験では、皮膚感作性は認められなかった。

実験または計算によるデータ:

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モルモットに対するmaximization法 モルモット: 感作性なし (OECDテストガイドライン406)

**生殖細胞変異原性**

変異原性の評価:
細菌類に対して変異原性を示さなかった。 哺乳類の培養細胞に対して変異原性を示さなかった。

**発がん性**

発がん性の評価:
高用量の本物質が飼料経由で投与された長期動物試験では、発癌性は認められなかった。 本品は未試験である。記述は、本品の類似の構造または組成に基づくものである。

**生殖毒性**

生殖毒性の評価:
動物実験の結果から、生殖能力低下は認められなかった。 本品は未試験である。記述は、本品の類似の構造または組成に基づくものである。

**発生毒性**

催奇形性の評価:
動物実験では、発生毒性／催奇形性は認められなかった。 本品は未試験である。記述は、本品の類似の構造または組成に基づくものである。

**特定標的臓器毒性、単回ばく露:**

単回暴露評価:
入手可能なデータに基づくと、分類基準に該当しない。

**反復投与毒性と特定標的臓器毒性、反復ばく露**

反復投与毒性の評価:
知見なし

**吸引性呼吸器有害性**

予測される吸入危険性はない。

**12. 環境影響情報**

**環境毒性**

水生生物に対する毒性の評価:
水生生物に対して急性の有害性はほとんどないと考えられる。 廃水処理施設に低濃度で適切に流入すれば、活性汚泥の分解活性を阻害しない。

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魚類に対する毒性:
LC50（半数致死濃度） (96 h) > 1,000 mg/l, ゼブラフィッシュ（学名：Brachydanio rerio）(OECDテストガイドライン203、ISO 7346、84/449/EEC, C.，止水式)
毒性作用の詳細は、名目濃度に関連性あり。

水生無脊椎動物:
EC50 (48 h) > 100 mg/l, オオミジンコ（学名：Daphnia magna） (EU指令 79/831/EEC, 止水式)
毒性作用の詳細は、名目濃度に関連性あり。

水生植物:
EC50 (72 h) > 100 mg/l (成長率), 緑藻（学名：Scenedesmus subspicatus） (92/69/EEC, C.3, 止水式)
毒性作用の詳細は、名目濃度に関連性あり。

微生物/活性汚泥への影響:
EC10（10%影響濃度） (16 h) > 1,000 mg/l, プチダ菌（学名：Pseudomonas putida） (DIN EN ISO 10712, 好気性)

**移動性**

環境区分間の輸送評価:
高い水溶性のため、製品の一部は、すぐに溶解します。

**残留性・分解性**

除去情報:
20 - 30 % ThOD（theoretical oxygen demand：理論的酸素要求量）に対するBOD (28 日) (OECDテストガイドライン301F、ISO 9408、92/69EEC, C.4-) (好気性, 家庭廃水由来の活性汚泥)

**生体蓄積性**

生体蓄積性:
n-オクタノール／水の分配係数（log Pow) より、生体への濃縮性はないと考えられる。

## 13. 廃棄上の注意

国内の法令に従い廃棄するか焼却すること。

[汚染された容器]:
汚染されていない容器は再利用できる。
汚染された容器は製品と同様に廃棄する。

## 14. 輸送上の注意

**国際陸上輸送:**
輸送規則では危険有害性物質に分類されていない



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**海上輸送**
IMDG
輸送規則では危険有害性物質に分類されていない

**Sea transport**
IMDG
Not classified as a dangerous good under transport regulations

**航空輸送**
IATA/ICAO
輸送規則では危険有害性物質に分類されていない

**Air transport**
IATA/ICAO
Not classified as a dangerous good under transport regulations

## 15. 適用法令

消防法: 非危険物

**<u>その他の規則</u>**

もしも、このＳＤＳの他の章に記載されていない法的情報がある場合には、この章に記載されます。

## 16. その他の情報

用途に関する情報： 本品は工業用品質であり、記載または合意のないかぎり、用途は工業用のみとする。 上述および推奨の使用法に記載されている。 他の用途については、製造業者に問い合わせること。 特に、特別な基準や規制の対象である製品に適用される。

左余白の縦線は前バージョンからの改訂部分を示す。

本安全データシートに含まれるデータは、当社の最新の知識及び経験に基づいて製品を安全性基準の観点からのみ説明するものであり、製品の特性（製品規格）を説明するものではありません。また、当該製品が特定の目的に適した性能・特性を有しているか否かを判断するためのものでもありません。本製品の使用者は自己の責任において製品に関わる特許等の所有権を尊重し現行の法律及び規則を遵守して下さい。

EXSDS01-04

Tomita

## SAFETY DATA SHEET

Issue date : Sep.17,2013
Revision date : Oct.16, 2019
Versoin : 3

**SECTION 1　Product and company identification**

| | |
|---|---|
| Product Name | 日本薬局方　塩化ナトリウム |
| Name of supplier | Tomita Pharmaceutical Co., Ltd. |
| Address | 85-1, Maruyama, Akinokami, Seto-cho, Naruto, Tokushima 771-0360, Japan. |
| Division | Quality Assurance Department |
| Phone | +81-88-688-0511 |
| FAX | +81-88-688-0565 |
| e-mail | webmaster@tomitaph.co.jp |
| Emergency phone number | +1-201-944-3904 (New Jersey)<br>+81-6-6229-3800 (Osaka) |

**SECTION 2　Hazards identification**

GHS classification

| |
|---|
| Not classified |

GHS label elements, including precautionary statements

| | |
|---|---|
| Pictogram | |
| Signal Word | — |
| Hazard statement | Not classified |
| Precautionary statement | 【Prevention】 Not applicable |
| | 【Response】 Not applicable |
| | 【Storage】 Not applicable |
| | 【Disposal】 Not applicable |

**SECTION 3　Composition / information on ingredients**

Substance or mixture　:　Substance

| Chemical Name | CAS No. | Composition |
|---|---|---|
| Sodium chloride | 7647-14-5 | 100% |

**SECTION 4　First aid measures**

| | |
|---|---|
| Inhalation | ·Remove person to fresh air and keep comfortable for breathing. |
| Skin contact | ·Wash off immediately with plenty of water. |
| Eye contact | ·Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention, if eye irritation persists |
| Ingestion | · Wash out mouth with water. Call a poison center or |

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| | |
|---|---|
| | doctor/physician if you feel unwell. |
| Most important symptoms/effects, acute and delayed | ·No information available |
| Protection of first aiders | ·Use personal protective equipment as required. |

**SECTION 5　Fire fighting measures**

| | |
|---|---|
| Suitable extinguishing media | ·Use water spry, alcohol-resistant foam, dry chemical or carbon dioxide. |
| Unsuitable extinguishing media | ·No information available |
| Special hazards arising from the substance or mixture | ·Hydrogen chloride gas, Sodium oxides |
| Specific extinction method | ·At the fire of surrounding area, remove movable containers to safer area. |
| Special protective equipment for precautions for firefighting | ·Use personal protective equipment as required. Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. |

**SECTION 6　Accidental release measures**

| | |
|---|---|
| Personal precautions, protective equipment and emergency procedures | ·While working, wear appropriate protective equipments to prevent skin from contacting with airborne droplet, or inhaling the dust. |
| Environmental precautions | ·To be careful not discharged to the environment without being properly handled waste water contaminated. |
| Methods and materials for containment and cleaning up | ·Sweep the material into a container, and wash the spill site with water. |
| Recoverly, neutralization | ·No information available |
| Secondary disaster prevention measures | ·Picked up the substance |

**SECTION 7　Handling and storage**

Handling

| | |
|---|---|
| Technical measures | ·Wear appropriate personal protective equipment.<br>·Install exhaust ventilation. |
| Safety handling precautions | ·Do not eat, drink or smoke in working areas.<br>·Wash hands thoroughly after handling.<br>·Wear appropriate protective equipments to prevent skin from contacting with airborne droplet, or inhaling the dust. |

Storage

| | |
|---|---|
| Safe storage conditions | ·Keep container tightly closed and store in cold dark place. |
| Safe packaging material | ·Closed container |
| Incompatible substances | ·Strong oxidiaing agents |

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**SECTION 8 Exposure controls / personal protection**

Control parameters

| | |
|---|---|
| Control value | ・Not available |
| Adopted value | ・Not available |

Appropriate engineering controls

| | |
|---|---|
| Engineering controls | ・Keep source tightly closed or install exhaust ventilation.<br>・Provide shower and vanity unit nearby and make clear the location of these. |

Personal protective equipment

| | |
|---|---|
| Respiratory protection | ・Protective mask |
| Hand protection | ・Protective gloves |
| Eye protection | ・Protective eyeglasses or chemical safety goggles |
| Skin and body protection | ・Long-sleeved work clothes |

**SECTION 9 Physical and chemical properties**

| | |
|---|---|
| Appearance (physical state, color etc) | Colorless or white, crystals or crystalline powder. |
| Odor | Odorless |
| Odor threshold | No information available |
| pH | 7 |
| Melting point / freezing point | 800℃ |
| Boiling point, Initial boiling point and boiling range | 1413℃ |
| Flash point | Incombustible |
| Evaporation rate | No information available |
| Flammability (solid, gas) | No information available |
| Upper / lower flammability or explosive limits | No information available |
| Vapour pressure | No information available |
| Vapour density | No information available |
| Relative density | 2.163 |
| Solubility | 35.8 g/100 g (Water 0℃) |
| n-Octanol / water partition coefficient | No information available |
| Auto-ignition temperature | No information available |
| Decomposition temperature | No information available |
| Viscosity | No information available |

**SECTION 10 Stability and reactivity**

| | |
|---|---|
| Chemical stability | ・Stable under normal processing conditions. |
| Possibility of hazardous reactions | ・None under normal processing. |
| Conditions to avoid | ・High temperature, Direct sunlight |

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| | |
|---|---|
| Incompatible materials | ・Strong oxidiaing agents |
| Hazardous decomposition products | ・In the event of fire : See section5. |

**SECTION 11 Toxicological information**

| | |
|---|---|
| Acute toxicity | LD50 (rat / oral) :3,000 mg/kg |
| Skin corrosion /irritation | skin-rbt 500 mg/24H mild |
| Serious eye damage / irritation | eye-rbt 100 mg/24H Moderate |
| Respiratory or skin sensitization | No information available |
| Germ cell mutagenicity | No information available |
| Carcinogenicity | No information available |
| Reproductive toxicity | orl-rat TDLo:145gm/kg(7D pre/1-22D preg)<br>ipr-rat TDLo:1710mg/kg(13D preg) |
| Specific target organ toxicity —single exposure | No information available |
| Specific target organ toxicity —repeated exposure | No information available |
| Aspiration hazard | No information available |

**SECTION 12 Ecological information**

| | |
|---|---|
| Ecotoxicity | LC50 (Bluegill) :5.84 g/L - 96hr |
| Persistence and degradability | No information available |
| Bioaccumulative potential | No information available |
| Mobility in soil | No information available |
| Other adverse effects | No information available |

**SECTION 13 Disposal considerations**

| | |
|---|---|
| Waste from residues | Disposal should be in accordance with applicable regional, national and local laws and regulations. |
| Contaminated container and contaminated packaging | Disposal should be in accordance with applicable regional, national and local laws and regulations. |

**SECTION 14 Transport information**

International regulations

| | ADR | IMDG | IATA |
|---|---|---|---|
| UN number | — | — | — |
| UN proper shipping name | — | — | — |
| Transport hazard class | — | — | — |
| Packing group | — | — | — |

National regulations

| | |
|---|---|
| Land regulations | Depending on the rules of Fire Service Act. |
| Maritime regulation | Depending on the rules of Ship Safety Act. |
| Aviation regulation | Depending on the rules of Civil Aeronautics Act. |

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**SECTION 15 Regulatory information**

Not applicable

**SECTION 16 Other information**

| | |
|---|---|
| Key literature references and sources for date etc. | ・STN international: RTECS<br>・NITE Chemical Risk Information Platform (NITE-CHRIP)<br>・TOXNET |

To the best of our knowledge, the information contained herein is accurate. However, we cannot assume any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards, which exist.

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5/15/2020 SODIUM METABISULFITE

MSDS Number: **S4378** * * * * * *Effective Date:* ***08/20/08*** * * * * * *Supercedes:* ***11/10/05***

**MSDS** MATERIAL SAFETY DATA SHEET
---------------------------
**CHEMTREC:** 800-424-9300 (USA)
703-527-3887(Outside USA and Canada)
**CANUTEC:** 613-996-6666

**From:** Mallinckrodt Baker, Inc
222 Red School Lane
Phillipsburg, NJ 08865

NOTE: Use CHEMTREC and CANUTEC phone numbers only in the event of a chemical emergency.

Emergency Telephone Number: 908-859-2151

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

**M A L L I N C K R O D T** **J. T. B A K E R**

# SODIUM METABISULFITE

## 1. Product Identification

**Synonyms:** Sodium pyrosulfite; pyrosulfurous acid, disodium salt
**CAS No.:** 7681-57-4 Sodium Metabisulfite; 7631-90-5 Sodium Bisulfite.
**Molecular Weight:** 190.11
**Chemical Formula:** Na2S2O5 (sodium metabisulfite) and NaHSO3 (sodium bisulfite)
**Product Codes:**
J.T. Baker: 3550, 3551
Mallinckrodt: 7776, 7777

## 2. Composition/Information on Ingredients

| Ingredient | CAS No | Percent | Hazardous |
|---|---|---|---|
| Sodium Metabisulfite | 7681-57-4 | 100% | Yes |
| Sodium Bisulfite | 7631-90-5 | < 0.001% | No |

## 3. Hazards Identification

**Emergency Overview**
--------------------------
WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. MAY CAUSE ALLERGIC RESPIRATORY REACTION. REACTS WITH ACIDS AND WATER RELEASING TOXIC SULFUR DIOXIDE GAS.

**J.T. Baker SAF-T-DATA**(tm) Ratings (Provided here for your convenience)
-----------------------------------------------------------------------------------------------------------

Health Rating: 2 - Moderate
Flammability Rating: 0 - None
Reactivity Rating: 2 - Moderate

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Contact Rating: 3 - Severe
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: Green (General Storage)
-----------------------------------------------------------------------------------------------

**Potential Health Effects**
----------------------------------

**Inhalation:**
Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath. May cause allergic reaction in sensitive individuals.
**Ingestion:**
May cause gastric irritation by the liberation of sulfurous acid. An asthmatic reaction may occur after ingestion. Large doses may result in nausea, vomiting, diarrhea, abdominal pains, circulatory disturbance, and central nervous system depression. Estimated fatal dose is 10 gm.
**Skin Contact:**
Causes irritation to skin. Symptoms include redness, itching, and pain.
**Eye Contact:**
Causes irritation, redness, and pain. Contact may cause irreversible eye damage. Symptoms may include stinging, tearing, redness, swelling, corneal damage and blindness.
**Chronic Exposure:**
No information found.
**Aggravation of Pre-existing Conditions:**
Some individuals are said to be dangerously sensitive to minute amounts of sulfites in foods. Symptoms may include broncho constriction, shock, gastrointestinal disturbances, angio edema, flushing, and tingling sensations. Once allergy develops, future exposures can cause asthma attacks with shortness of breath, wheezing, and cough.

## 4. First Aid Measures

**Inhalation:**
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
**Ingestion:**
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.
**Skin Contact:**
Wipe off excess material from skin then immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
**Eye Contact:**
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

## 5. Fire Fighting Measures

**Fire:**
Not considered to be a fire hazard.
**Explosion:**
Not considered to be an explosion hazard.
**Fire Extinguishing Media:**
Use any means suitable for extinguishing surrounding fire. Do not allow water runoff to enter sewers or waterways.
**Special Information:**
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.





## 6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust. Cautiously spray residue with plenty of water, providing ventilation to clear sulfur dioxide fumes generated from water contact. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

## 7. Handling and Storage

Keep in a tightly closed container. Protect from physical damage. Store in a cool, dry, ventilated area away from sources of heat, moisture and incompatibilities. Releases toxic sulfur dioxide gas when in contact with water, ice. Keep away from acids, water, ice, and oxidizing agents. Use only with appropriate protective equipment. Do not use in unventilated areas such as holds of fishing boats, walk in coolers or confined spaces. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**
-ACGIH Threshold Limit Value (TLV):
5mg/m3 (TWA) for sodium bisulfite & for sodium metabisulfite, A4 Not classifiable as a human carcinogen.
**Ventilation System:**
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
**Personal Respirators (NIOSH Approved):**
If the exposure limit is exceeded, a half-face respirator with an acid gas cartridge may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece respirator with an acid gas cartridge may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
**Skin Protection:**
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. (neoprene, polyvinyl chloride).
**Eye Protection:**
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

## 9. Physical and Chemical Properties

**Appearance:**
White to yellow white crystalline granules.
**Odor:**
Slight odor of sulfur dioxide.
**Solubility:**
Very soluble in water, insoluble in alcohol.





**Specific Gravity:**
1.48
**pH:**
Aqueous solution is acidic.
**% Volatiles by volume @ 21C (70F):**
0
**Boiling Point:**
Not applicable.
**Melting Point:**
150C (302F)
**Vapor Density (Air=1):**
No information found.
**Vapor Pressure (mm Hg):**
No information found.
**Evaporation Rate (BuAc=1):**
No information found.

## 10. Stability and Reactivity

**Stability:**
Strength diminishes somewhat with age. Gradually decomposes in air to sulfate, generating sulfurous acid gas. Contact with moisture (water, wet ice, etc.), will release toxic sulfur dioxide gas.
**Hazardous Decomposition Products:**
Oxides of sulfur and sodium may form when heated to decomposition.
**Hazardous Polymerization:**
Will not occur.
**Incompatibilities:**
Water, acids, alkalis, sodium nitrite, oxidizers, aluminum powder.
**Conditions to Avoid:**
Moisture, heat, flames, ignition sources and incompatibles.

## 11. Toxicological Information

Sodium Metabisulfite [7681-57-4]: No LD50/LC50 information found relating to normal routes of occupational exposure. Investigated as a tumorigen, mutagen and reproductive effector. Sodium Bisulfite [7631-90-5]: Oral rat LD50: 2000 mg/kg. Investigated as a tumorigen and mutagen.

--------\Cancer Lists\------------------------------------------------------

| Ingredient | ---NTP Carcinogen--- Known | Anticipated | IARC Category |
|---|---|---|---|
| Sodium Metabisulfite (7681-57-4) | No | No | 3 |
| Sodium Bisulfite (7631-90-5) | No | No | 3 |

## 12. Ecological Information

**Environmental Fate:**
No information found.
**Environmental Toxicity:**
No information found.

## 13. Disposal Considerations





Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. Transport Information

Not regulated.

## 15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

| Ingredient | TSCA | EC | Japan | Australia |
|---|---|---|---|---|
| Sodium Metabisulfite (7681-57-4) | Yes | Yes | Yes | Yes |
| Sodium Bisulfite (7631-90-5) | Yes | Yes | Yes | Yes |

--------\Chemical Inventory Status - Part 2\---------------------------------

| Ingredient | Korea | --Canada-- DSL | NDSL | Phil. |
|---|---|---|---|---|
| Sodium Metabisulfite (7681-57-4) | Yes | Yes | No | Yes |
| Sodium Bisulfite (7631-90-5) | Yes | Yes | No | Yes |

--------\Federal, State & International Regulations - Part 1\----------------

| Ingredient | -SARA 302- RQ | TPQ | ------SARA 313------ List | Chemical Catg. |
|---|---|---|---|---|
| Sodium Metabisulfite (7681-57-4) | No | No | No | No |
| Sodium Bisulfite (7631-90-5) | No | No | No | No |

--------\Federal, State & International Regulations - Part 2\----------------

| Ingredient | CERCLA | -RCRA- 261.33 | -TSCA- 8(d) |
|---|---|---|---|
| Sodium Metabisulfite (7681-57-4) | No | No | Yes |
| Sodium Bisulfite (7631-90-5) | 5000 | No | Yes |

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: No Fire: No Pressure: No
Reactivity: Yes (Mixture / Solid)

**Australian Hazchem Code:** None allocated.
**Poison Schedule:** None allocated.
**WHMIS:**
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

## 16. Other Information

**NFPA Ratings:** Health: **3** Flammability: **0** Reactivity: **1**
**Label Hazard Warning:**
WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. MAY CAUSE ALLERGIC RESPIRATORY REACTION. REACTS WITH ACIDS AND WATER RELEASING TOXIC SULFUR DIOXIDE GAS.
**Label Precautions:**
Avoid contact with eyes, skin and clothing.

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Avoid breathing dust.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
For Reagent and Technical Grades: Not For Food Use.For TAC Grades: Do not use in meats or in foods recognized as a source of Vitamin B-1, nor in fruits or vegetables to be served or sold raw to consumers or to be presented to consumers as fresh.

**Label First Aid:**
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, wipe off excess material from skin then immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.

**Product Use:**
Laboratory Reagent.

**Revision Information:**
No Changes.

**Disclaimer:**
**************************************************************************************************
**Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.**
**************************************************************************************************

**Prepared by:** Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

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KCDS-No 002332-09 SORBITOL KAO Kao Corporation 1 / 6
Revised Date July 15, 2014
Set Up Date July 04, 1997

## SAFETY DATA SHEET

[1.PRODUCT AND COMPANY IDENTIFICATION]

PRODUCT NAME : SORBITOL KAO
SUPPLIER : Kao Corporation
ADDRESS : 1-3,Bunka 2-chome,Sumida-ku,Tokyo 131-8501 Japan
DIVISION : Global Chemical Business
TELEPHONE NUMBER : 81-3-5630-7700
FAX NUMBER : 81-3-5630-7889
E-MAIL ADDRESS : chemical@kao.co.jp
EMERGENCY TELEPHONE NUMBER : 81-3-5630-7700
RECOMMENDED USE AND RESTRICTIONS ON USE :

[2.HAZARDS IDENTIFICATION]

GHS CLASSIFICATION
PHYSICAL AND CHEMICAL HAZARDS : Not classified
HEALTH HAZARDS
ACUTE TOXICITY (Oral) : Not classified
ACUTE TOXICITY (Dermal) : Not classified
ACUTE TOXICITY (Inhalation) : Classification not possible(Vapours)
SKIN CORROSION / IRRITATION : Classification not possible
SERIOUS EYE DAMAGE / EYE IRRITATION : Classification not possible
RESPIRATORY SENSITIZATION : Classification not possible
SKIN SENSITIZATION : Classification not possible
GERM CELL MUTAGENICITY : Classification not possible
CARCINOGENICITY : Classification not possible
REPRODUCTIVE TOXICITY : Classification not possible
SPECIFIC TARGET ORGAN TOXICITY
- SINGLE EXPOSURE : Classification not possible
- REPEATED EXPOSURE : Classification not possible
ASPIRATION HAZARD : Classification not possible
ENVIRONMENTAL HAZARDS
HAZARDOUS TO THE AQUATIC ENVIRONMENT
- ACUTE HAZARD : Classification not possible
- LONG-TERM HAZARD : Classification not possible
- HAZARDOUS TO THE OZONE LAYER : Classification not possible
GHS LABEL ELEMENTS
PICTOGRAMS OR SYMBOLS : Not applicable
SIGNAL WORD : Not applicable
HAZARD STATEMENTS : Not applicable
PRECAUTIONARY STATEMENTS
PREVENTION : Wash thoroughly after handling.
If needed, use personal protective equipment as required.
RESPONSE : IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF ON SKIN: Gently wash with plenty of water and soap.
Call a POISON CENTER or doctor if you feel unwell.
STORAGE : Store in well-ventilated place.
DISPOSAL :

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Revised Date July 15, 2014

SAFE HANDLING ADVICE : Refer to SDS.

[3.COMPOSITION / INFORMATION ON INGREDIENTS]

SUBSTANCE OR MIXTURE : Mixture
INGREDIENTS AND CONCENTRATION RANGE

| Ingredients | Concentration Range(%) | CAS RN |
|---|---|---|
| D-Sorbitol | 70 | 50-70-4 |
| Water | 30 | 7732-18-5 |

[4.FIRST-AID MEASURES]

IN CASE OF INHALATION : Remove person to fresh air and keep comfortable for breathing.
IN CASE OF SKIN CONTACT : Gently wash with plenty of soap and water.
IN CASE OF EYE CONTACT : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IN CASE OF INGESTION : Call a POISON CENTER or doctor if you feel unwell.

[5.FIRE-FIGHTING MEASURES]

EXTINGUISHING MEDIA : Powder, alcohol-resistant foam, water spray, carbon dioxide,sand
NOT SUITABLE EXTINGUISHING MEDIA : No information available
SPECIFIC HAZARDS : No information available
SPECIFIC METHODS : Keep away from sources of ignition and use appropriate extinguishing media.Fight fire from upwind position if possible.
Product itself is non-combustible.
PROTECTION OF FIRE FIGHTERS : Use goggles in combination with dust mask, and other protections as appropriate to situation.

[6.ACCIDENTAL RELEASE MEASURES]

PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURE : Use goggles and protective gloves.
Large spills : Remove person to safety.
Ensure adequate ventilation.
ENVIRONMENTAL PRECAUTIONS : Do not discharge into the drains, surface waters or ground water directly.
METHODS FOR CLEANING UP : Small spills: Absorb spills with sand, inert absorbent, waste cloth or sawdust. Then wipe up remainder in waste cloth.
Large spills: Dike spills and dispose of in safe area.
PREVENTION OF SECONDARY HAZARDS : No information available

[7.HANDLING AND STORAGE]

HANDLING
TECHNICAL MEASURES : Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.
PRECAUTIONS : Under heating this material is inferior in quality.
SAFE HANDLING ADVICE : Use an adequate ventilation.
Wash thoroughly after handling.
If needed, use personal protective equipment as required.
STORAGE
SUITABLE STORAGE CONDITIONS : Store container tightly closed in well-ventilated place.
SAFE PACKAGING MATERIALS : No information available

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[8.EXPOSURE CONTROLS / PERSONAL PROTECTION]

ENGINEERING MEASURES : Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.
Use an adequate ventilation.
LIMIT VALUES
ACGIH (TLV) : Not established
OSHA (PEL) : Not established
PERSONAL PROTECTIVE EQUIPMENT
RESPIRATORY PROTECTION : Use as appropriate to situation.
HAND PROTECTION : Rubber gloves
EYE PROTECTION : Safety glasses
SKIN AND BODY PROTECTION : Full-body suit
HYGIENE MEASURES : No information available

[9.PHYSICAL AND CHEMICAL PROPERTIES]

APPEARANCE
PHYSICAL STATE : Viscous liquid
COLOUR : Colorless clear
ODOUR : No information available
pH : 5.5 - 7 (50% solution)
SPECIFIC TEMPERATURES / TEMPERATURE RANGES AT WHICH CHANGES IN PHYSICAL STATE OCCUR
BOILING POINT : 105 °C ( 221 °F)
MELTING POINT : No information available
FLASH POINT : Not applicable
FLAMMABILITY OR EXPLOSIVE PROPERTIES
FLAMMABILITY OR EXPLOSIVE LIMITS : UPPER LIMIT : No information available LOWER LIMIT : No information available
VAPOUR PRESSURE : No information available
VAPOUR DENSITY : No information available
DENSITY (SPECIFIC GRAVITY) : 1.3 g/mL ( 25 °C) ( 77 °F)
SOLUBILITY
WATER SOLUBILITY : Soluble
SOLVENT SOLUBILITY : No information available
PARTITION COEFFICIENT: n-OCTANOL / WATER (log Pow) : No information available
AUTO-IGNITION TEMPERATURE : No information available
DECOMPOSITION TEMPERATURE : No information available
ODOUR THRESHOLD : No information available
EVAPORATION RATE : No information available
FLAMMABILITY (SOLID,GAS) : No information available
VISCOSITY : No information available
OTHER DATA : No information available

[10.STABILITY AND REACTIVITY]

CHEMICAL STABILITY : Stable in general.
POSSIBILITY OF HAZARDOUS REACTIONS : Stable in general.
CONDITIONS TO AVOID : No information available
INCOMPATIBLE MATERIALS : No information available

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| | | |
|---|---|---|
| HAZARDOUS DECOMPOSITION PRODUCTS | : | No special hazardous and harmful combustion or decomposition products. |
| OTHERS | : | No information available |

[11.TOXICOLOGICAL INFORMATION]

| | | |
|---|---|---|
| ACUTE TOXICITY | | |
| Oral | | |
| INFORMATION ON PRODUCT | : | Mouse, LD50 : 23.2 g/kg (male) |
| | | Mouse, LD50 : 25.7 g/kg (female) |
| Dermal | | |
| INFORMATION ON PRODUCT | : | No information available |
| INFORMATION ON INGREDIENTS | : | No information available |
| Inhalation | | |
| INFORMATION ON PRODUCT | : | No information available |
| INFORMATION ON INGREDIENTS | : | No information available |
| | | 70% of the mixture consists of ingredients of unknown toxicity. |
| SKIN CORROSION / IRRITATION | | |
| INFORMATION ON PRODUCT | : | No information available |
| INFORMATION ON INGREDIENTS | : | No information available |
| SERIOUS EYE DAMAGE / IRRITATION | | |
| INFORMATION ON PRODUCT | : | No information available |
| INFORMATION ON INGREDIENTS | : | No information available |
| RESPIRATORY OR SKIN SENSITIZATION | | |
| RESPIRATORY | | |
| INFORMATION ON PRODUCT | : | No information available |
| INFORMATION ON INGREDIENTS | : | No information available |
| SKIN | | |
| INFORMATION ON PRODUCT | : | No information available |
| INFORMATION ON INGREDIENTS | : | No information available |
| MUTAGENICITY (GERM CELL MUTAGENICITY) | | |
| INFORMATION ON PRODUCT | : | No information available |
| INFORMATION ON INGREDIENTS | : | No information available |
| CARCINOGENICITY | | |
| INFORMATION ON PRODUCT | : | No information available |
| INFORMATION ON INGREDIENTS | : | No information available |
| IARC | : | Not listed |
| NTP | : | Not listed |
| EU | : | Not listed |
| OSHA | : | Not listed |
| REPRODUCTIVE TOXICITY | | |
| INFORMATION ON PRODUCT | : | No information available |
| INFORMATION ON INGREDIENTS | : | No information available |
| SPECIFIC TARGET ORGAN TOXICITY | | |
| - SINGLE EXPOSURE | | |
| INFORMATION ON PRODUCT | : | No information available |
| INFORMATION ON INGREDIENTS | : | No information available |
| - REPEATED EXPOSURE | | |
| INFORMATION ON PRODUCT | : | No information available |
| INFORMATION ON INGREDIENTS | : | No information available |

KCDS-No 002332-09 | SORBITOL KAO, Kao Corporation | 5 / 6 | Revised Date July 15, 2014

| | | |
|---|---|---|
| ASPIRATION HAZARD | | |
| INFORMATION ON PRODUCT | : | No information available |
| INFORMATION ON INGREDIENTS | : | No information available |
| OTHER INFORMATION | : | Humam, 40g / 1 day dosage : No reaction<br>50g / over 1 day dosage : It may cause a diarrhea. |

[12.ECOLOGICAL INFORMATION]

| | | |
|---|---|---|
| ECOTOXICITY | : | No information available |
| PERSISTENCE / DEGRADABILITY | : | No information available |
| MOBILITY IN SOIL | : | No information available |
| BIOACCUMULATIVE POTENTIAL | : | No information available |
| OTHER ADVERSE EFFECTS | : | No information available |

[13.DISPOSAL CONSIDERATIONS]

Review "HANDLING AND STORAGE (Section 7)".
Passed to a licensed waste contractor.

Dispose of waste in accordance with local,state and federal regulations.

[14.TRANSPORT INFORMATION]

Follow all regulations in your country or region

| | | |
|---|---|---|
| INTERNATIONAL REGULATIONS | | |
| UN CLASS / UN NUMBER | : | Not applicable (IMDG, IATA) |
| SPECIAL PRECAUTIONS FOR USER | : | Review "ACCIDENTAL RELEASE MEASURES (Section 6)".<br>Review "HANDLING AND STORAGE (Section 7)".<br>Ensure containers without breakage or leakage.<br>Ensure containers tightly fixed.<br>Follow all regulations in your country or region. |

[15.REGULATORY INFORMATION]

Follow all regulations in your country or region.

| | | | |
|---|---|---|---|
| INVENTORIES | : | ENCS(Japan) | 8-50 |
| | | TSCA(USA) | Yes |
| | | EINECS(EU) | Yes |
| | | AICS(Australia) | Yes |
| | | DSL(Canada) | Yes |
| | | ECL(Korea) | Yes |
| | | PICCS(Philippines) | Yes |
| | | IECSC(China) | Yes |

KAO Corporation is not able to check up the regulatory information in regard to the substances in your country or region,therefore,we request this matter would be filled by your responsibility.

[16.OTHER INFORMATION]

| | | |
|---|---|---|
| REFERENCE | : | -Safety data sheet for chemical products - Part 1: Content and order of sections(ISO 11014-1)<br>-International Chemical Safety Cards(ICSC) (Compiler's Guide)(1994) |

KCDS-No 002332-09 | SORBITOL KAO, Kao Corporation | 6 / 6 | Revised Date July 15, 2014

To the best of the manufacturer's knowledge,the information contained herein is accurate. However, neither the manufacturer, nor any of its affiliates, make any representations or warranties (expressed or implied), nor assumes any liability(including liability for any direct, incidental, consequential, or other damages) with respect to the accuracy or completeness of the information contained herein. Such information may be (without limitation) invalid if the specified material is used in combination with another ,in a particular process, or under unusual conditions. Determination of suitability of any material for any given purpose is the sole responsibility of the user who assumes all risk and responsibility therefore. All materials may present unknown hazards and should be used with appropriate caution. The manufacturer cannot and does not guarantee that the hazards described herein are the only ones that exist.

STEARYL GLYCYRRHETINATE | MARUZEN PHARMACEUTICALS Co., Ltd. | Revised: 2019/02/07

## SAFETY DATA SHEET

1.Product and Company Identification

| | | | | |
|---|---|---|---|---|
| ProductName | STEARYL GLYCYRRHETINATE | | | |
| First issue | 2015/11/13 | | | |
| Revised | 2019/02/07 | | | |
| Company | Name: | MARUZEN PHARMACEUTICALS Co., Ltd. | | |
| | Address: | 14703-10 Mukaihigashi Cho Onomichi City Hiroshima 722-0062 Japan | | |
| | Name of Section: | QUALITY ASSURANCE DIVISION | | |
| | TEL: | 81-848-44-2217 | FAX: | 81-848-20-6114 |

2.Hazards Identification

[GHS CLASSIFICATION]

PHYSICO-CHEMICAL HAZARDS

| | | |
|---|---|---|
| Explosives | : | Not applicable |
| Flammable aerosols | : | Not applicable |
| Flammable solids | : | Not applicable |
| Self-reactive substances and mixtures | : | Not applicable |
| Pyrophoric solids | : | Not applicable |
| Self-heating substances and mixtures | : | Not applicable |
| Substances and mixtures which, in contact with water, emit flammable gases | : | Not applicable |
| Oxidizing solids | : | Not applicable |
| Organic peroxides | : | Not applicable |
| Corrosive to metals | : | Not applicable |

HEALTH HAZARDS

| | | |
|---|---|---|
| Acute toxicity(oral) | : | Not classified |
| Acute toxicity(dermal) | : | No data available |
| Acute toxicity(gases) | : | Not applicable |
| Acute toxicity(vapours) | : | No data available |
| Acute toxicity(dusts and mists) | : | No data available |
| Skin corrosion/irritation | : | No data available |
| Serious eye damage/eye irritation | : | No data available |
| Respiratory sensitization | : | No data available |
| Skin sensitization | : | No data available |
| Germ cell mutagenicity | : | No data available |
| Carcinogenicity | : | No data available |
| Reproductive toxicity | : | No data available |
| Specific target organ systemic toxicity(single exposure) | : | No data available |
| Specific target organ systemic toxicity(repeated exposure) | : | No data available |

1/4

Aspiration hazard : No data available

ENVIRONMENTAL HAZARDS

Hazard to the aquatic environment (acute) : No data available

Hazard to the aquatic environment (chronic) : No data available

[GHS LABEL ELEMENTS]

Pictogram : No data available

Signal word : No data available

Hazard statement : No data available

Precautionary statement : No data available

3.Composition/Information on Ingredients

Substance or preparation : Substance

| CAS No. | INCI Name |
|---|---|
| 13832-70-7 | Stearyl Glycyrrhetinate |

| EINECS No. | INCI Name(EU) |
|---|---|
| 419-580-5(ELINCS) | STEARYL GLYCYRRHETINATE |

| Concentration(%) | Component name |
|---|---|
| 100.00 | Stearyl glycyrrhetinate |

4.First Aid Measures

Eye : Flush eyes well with a large amount of running water immediately, consult a physician.

Skin : Rinse skin with running water.

Ingestion : Consult a physician.
: Rinse mouth well, give plenty of drinking water (adult:4 to 5 cups) to dilute the substance. Never give anything by mouth to an unconscious person.

Inhalation : Immediately move victim to fresh air.
: If breathing is difficult, qualified personnel should give oxygen or mouth to mouth resuscitation.
: If irritation persists, consult a physician.

5.Fire Fighting measures

Extinguishing Media : Water, dry chemical powder, carbon dioxide, dry sand

Extinguishing media that do not use it : No comment in particular.

Specific extinguishing method : Eliminate all ignition sources, use appropriate media for extinction if safe to do so.

Specific protective equipment for firefighters : In the case of fire-extinguishing work, if required, an air inhalator and the protection clothes for chemistry will be worn.

6.Accidental Release Measure

Personal precautions : Indoor spillage area should be well aired after treatment.
: The spillage area should be roped off and sign posted to prevent entry.





Enviromental precautions : Prevent spills from entering rivers and/or watercourses to protect the environment.

Methods for clean up : Removes as much powder as possible, and wash the area with water.

7.Handling and Storage

Handling : Beware of escaping dust and water absorbance.

Technological measures : Workers should refer to 'section 8 -exposure prevention and protection measures'
And take appropriate measures such as wearing protective clothing.

Precaution for safe handling : Avoid contact with eyes, skin and clothing.
: Wearing protective clothing is suggested.
: Do not subject to rough handling such as falling/dropping/damage to avoid spilling of content at transportation.

Conditions for safe storage : Due to the material's hygroscopicity, avoiding leaving it outside.
: Store in an airtight container in the dark at room temperature .

8.Exposure Control/Personal Protection

Engineering control : Use exhaust ventilation to keep airborne concentrations below exposure limits.

Personal protection

Respiratory protection : Protective mask from dust

Hand protection : Protective gloves

Eye protection : Safety glasses(goggles)

Skin protection : Protective clothing and boots

Appropriate sanitary requirement : If on skin ; Wash with plenty of soap and water.

9.Physical and Chemical Properties

Color : White to yellowish white

Odor : Odorless

10.Stability and Reactivity

Stability : No data

Conditions to avoid : Sunlight, heat, high temperatures and moisuture

Hazardous reactions/decomposition products : No data

11.Toxicological Information

【Information on Product】

Acute toxicity(oral) : LD50>2000mg/kg(rat) 1995/11

Primary skin irritation test : Non irritant Concentration of test solution:100%(rabbit) 1995/11, 2.5%, 0.25%(rabbit) 2003/4

Skin sensitization test : Negative Concentration of test solution:1st induction 25%, 2nd induction 50%, challenge 50%, 25%, 10%(guinea pig) 1995/11

Eye irritation test : Mildly irritant Concentration of test solution:100%(rabbit) 1995/11

Reverse mutation test : Negative Concentration of test solution:5000 μg/plate(TA98, TA100, TA1535, TA1537, WP2uvrA) 1996/6





12.Ecological Information

Ecotoxicity and toxicity to fish : No information available

Ecotoxicity and invertebrate toxicity : No information available

Ecotoxicity and algal toxicity : No information available

Persistence and biodegradability : No information available

Bioaccumulative potential : No information available

Mobility in soil : No information available

13.Disposal Considerations

Any disposal practice must be in compliance with country, local, state, and federal laws and regulations.

(contact country, local or state environmental agency for specific rules)

14.Transport Information

Please refer to national measures that may be relevant.

UN Number : N.A.

UN Class : N.A.

15.Regulatory Information

Please refer to national measures that may be relevant.

16.Other Information

The above information is based on the best of our knowledge and available information at this point but does not purport to be all inclusive and shall be used only as a guide.

This product is intended to be used by expert persons having chemical knowledge and skill, at their own discretion and risk and Maruzen shall not be held liable for any damageresulting from handling or from contact with the above material.



SouthernCross BOTANICALS
IFF | Lucas Meyer Cosmetics Company

**Superox-C™ AF**

Safety Data Sheet
according to Regulation (EC) No. 453/2010
Date of issue: 06 August 2018 Version 4.0

**SECTION 1: Identification of the substance/mixture and of the company/undertaking**

**1.1. Product identifier**

Product form : Mixture
Name : Superox-C™ AF

**1.2. Relevant identified uses of the substance or mixture and uses advised against**

**1.2.1. Relevant identified uses**

Use of the substance/mixture : Cosmetic ingredient

**1.2.2. Uses advised against**

No additional information available

**1.3. Details of the supplier of the safety data sheet**

**French representative**
Lucas Meyer Cosmetics S.A.S
ZA Les Belles Fontaines – 99 route de Versailles
91160 Champlan – France
T +33 1 69 10 69 69 – F +33 1 69 10 69 70
info@lucasmeyercosmetics.com

**Manufacturer**
Southern Cross Botanicals Pty Ltd
226 Hinterland Way – Knockrow NSW 2479
Australia
T (+61 2) 6687 8828 – F (+61 2) 6686 8737
inquiry@scbotanicals.com.au

**1.4. Emergency telephone number**

| Country | Organisation/Company | Address | Emergency number |
|---|---|---|---|
| Australia | Southern Cross Botanicals Pty Ltd | 226 Hinterland Way – Knockrow NSW 2479 | +61-2-6687-8828 (Monday – Thursday : 8.30 am – 5.00 pm) – Friday : 8.00 am – 1.30 pm |

**SECTION 2: Hazards identification**

**2.1. Classification of the substance or mixture**

**Classification according to Regulation (EC) No. 1272/2008 [CLP]**
Not classified

**Adverse physicochemical, human health and environmental effects**
To our knowledge, this product does not present any particular risk, provided it is handled in accordance with good occupational hygiene and safety practice.

**2.2. Label elements**

**Labelling according to Regulation (EC) No. 1272/2008 [CLP]**
EUH phrases : EUH210 – Safety data sheet available on request

**2.3. Other hazards**

No additional information available

**SECTION 3: Composition/information on ingredients**

**3.1. Substance**

Not applicable

**3.2. Mixture**

| Name | Product identifier | % | Classification according to Regulation (EC) No. 1272/2008 [CLP] |
|---|---|---|---|
| Glycerin<br>Substance with national workplace exposure limit(s) (GB) | (CAS No) 56-81-5<br>(EC no) 200-289-5 | 68 | Not classified |
| Water | (CAS No) 7732-18-5<br>(EC no) 231-791-2 | 30 | Not classified |
| Terminalia Ferdinandiana Fruit Extract | (CAS No) 1176234-54-0<br>(EC No) – | 2 | Not classified |

SouthernCross BOTANICALS
IFF | Lucas Meyer Cosmetics Company

**Superox-C™ AF**
Safety Data Sheet
according to Regulation (EC) No. 453/2010

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

First-aid measures general : In all cases of doubt, or when symptoms persist, seek medical attention.
First-aid measures after inhalation : Move affected person away from the contaminated area into the fresh air.
First-aid measures after skin contact : Wash with plenty of soap and water.
First-aid measures after eye contact : Remove contact lenses, if present and easy to do. Continue rinsing. Rinse immediately and thoroughly, pulling the eyelids well away from the eye (15 minutes minimum). If irritation persists, consult an eye specialist.
First-aid measures after ingestion : Do not induce vomiting. If necessary seek medical advice.

### 4.2. Most important symptoms and effects, both acute and delayed

No additional information available

### 4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

Suitable extinguishing media : Water spray. Carbon dioxide (CO2). Powder. Alcohol resistant foam.
Unsuitable extinguishing media : None to our knowledge. If there is a fire close by, use suitable extinguishing agents.

### 5.2. Special hazards arising from the substance or mixture

Hazardous decomposition products in case of fire : During combustion : Toxic fumes may be released, Carbon oxides (CO, CO2).

### 5.3. Advice for firefighters

Firefighting instructions : Contain the extinguishing fluids by bunding. Do not discharge into drains or the environment.
Protection during firefighting : Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

## SECTION 6: Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

#### 6.1.1 For non-emergency personnel

Emergency procedures : Avoid contact with skin and eyes. Do not smoke.

#### 6.1.2. For emergency responders

Protective equipment : Do not attempt to take action without suitable protective equipment. For further information refer To section 8: "Exposure controls/personal protection".

### 6.2. Environmental precautions

Contain the spilled material by bunding. Do not allow product to spread into the environment.

### 6.3. Method and material for containment and cleaning up

For containment : Soak up with inert absorbent material (for example sand, sawdust, a universal binder, silica gel).
Methods for cleaning up : Wash away residue with large amounts of water.
Other information : Dispose of at a licensed waste collection centre.

### 6.4. Other hazards

For further information refer top section 13.

## SECTION 7: Handling and storage

### 7.1. Precautions and safe handling

Precautions for safe handling : Does not require any specific or particular technical measures. Avoid contact with skin and eyes.
Hygiene measures : Do not drink, eat or smoke in the workplace. Always wash hands after handling the product.

### 7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Does not require any specific or particular technical measures
Storage conditions : Keep container tightly closed. Store in dry, cool, well-ventilated area.
Incompatible products : Strong oxidizing agents. Strong bases.
Packaging materials : Original packaging.




SouthernCross BOTANICALS
IFF | Lucas Meyer Cosmetics Company

**Superox-C™ AF**
Safety Data Sheet
according to Regulation (EC) No. 453/2010


### 7.3. Specific end use(s)

Cosmetics

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

| Glycerin (56-81-5) | | |
|---|---|---|
| United Kingdom | Local name | Glycerin, mist |
| United Kingdom | WEL TWA (mg/m³) | 10 mg/m³ |

### 8.2. Exposure controls

Appropriate engineering controls : Ensure good ventilation of the work station
Hand protection : Protective gloves made of rubber. The protective gloves to be used must comply with the specifications of EC directive 89/686/EEC and the resultant standard EN 374. Breakthrough time : refer to the recommendations of the supplier
Eye protection : Safety glasses.
Skin and body protection : Protective clothing
Respiratory protection : Not necessary.

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

Physical state : Liquid
Appearance : Clear to slightly cloudy.
Colour : Pale yellow to yellow-brown.
Odour : characteristic.
Odour threshold : Not established
pH : 3,0 – 5,0
Relative evaporation rate (butyl acetate=1) : No data available
Melting point : No data available
Freezing point : No data available
Boiling point : No data available
Flash point : >100°C (closed cup)
Auto-ignition temperature : No data available
Decomposition temperature : No data available
Flammability (solid, gas) : Not applicable
Vapour pressure : No data available
Relative vapour density at 20 °C : No data available
Relative density : 1,100 – 1,250
Solubility : Soluble in water
Long Pow : No data available
Viscosity, kinematic : No data available
Viscosity, dynamic : No data available
Explosive properties : Not explosive
Oxidising properties : Non oxidizing material according to EC criteria.
Explosive limits : No data available

### 9.2. Other information

No additional information available

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

To our knowledge, the product does not present any particular risk.

### 10.2. Chemical stability

Stable at ambient temperature and under normal conditions of use.

### 10.3. Possibility of hazardous reactions

To our knowledge, the product does not present any particular risk.

### 10.4. Conditions to avoid

Keep away from incompatible materials. Remove all sources of ignition. Heat.




SouthernCross BOTANICALS
IFF | Lucas Meyer Cosmetics Company

**Superox-C™ AF**
Safety Data Sheet
according to Regulation (EC) No. 453/2010


### 10.5. Incompatible materials

Strong oxidizing agents : Strong bases. Strong acids. Nitrates. Chlorine.

### 10.6. Hazardous decomposition products

On combustion or on thermal decomposition (pyrolysis) releases : Carbon oxydes (CO, CO2).

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

Acute toxicity : Not classified (Based on available data, the classification criteria are not met)

| Glycerin (56-81-5) | |
|---|---|
| LD50 oral rat | 25000 mg/kg |

Skin corrosion/irritation : Not classified (Based on available date, the classification criteria are not met) pH: 3,0 – 5,0 (20°C)
Serious eye damage/irritation : Not classified (Based on available data, the classification criteria are not met)

| Superox-C™ | |
|---|---|
| EpiOcular™<br>Product diluated at 50% in water | Non-irritant |

Respiratory or skin sensitization : Not classified (Based on available date, the classification criteria are not met)

| Superox-C™ | |
|---|---|
| HRIPT<br>Product tested at 12.5% | No evidence of irritation or sensitization |

Germ cell mutagenicity : Not classified (Based on available date, the classification criteria are not met)

| Superox-C™ | |
|---|---|
| AMES Test (OECD 471)<br>Pure product | Non mutagenic |

Phototoxicity : Not classified (Based on available date, the classification criteria are not met)

| Superox-C™ | |
|---|---|
| UV spectrum<br>2% in water | No potential phototoxicity |

Carcinogenicity : Not classified (Based on available date, the classification criteria are not met)
Reproductive toxicity : Not classified (Based on available date, the classification criteria are not met)
Specific target organ toxicity (single exposure) : Not classified (Based on available date, the classification criteria are not met)
Specific target organ toxicity (repeated exposure) : Not classified (Based on available date, the classification criteria are not met)
Aspiration hazard : Not classified (Based on available date, the classification criteria are not met)

## SECTION 12: Ecological information

### 12.1. Toxicity

Ecology - general : To our knowledge, the product does not present any particular risk.

| Glycerin (56-81-5) | |
|---|---|
| LC50 fishes | > 1000 mg/l/96h |

| Superox-C™ | |
|---|---|
| EC50 Daphnia | 72.95 mg/l/48h (*Daphnia magna*) |

### 12.2. Persistence and degradability

| Glycerin (56-81-5) | |
|---|---|
| Persistence and degradability | Biodegradable. |




SouthernCross BOTANICALS
IFF | Lucas Meyer Cosmetics Company

**Superox-C™ AF**
Safety Data Sheet
according to Regulation (EC) No. 453/2010


| Superox-C™ | |
|---|---|
| Biodegradability<br>(OECD 301 D) | Easily biodegradable |

### 12.3. Bioaccumulative potential

| Glycerin (56-81-5) | |
|---|---|
| Log Pow | -1,76 |

### 12.4. Mobility in soil

No additional information available

### 12.5. Results of PBT and vPvB assessment

No additional information available

### 12.6. Other adverse effects

No additional information available

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

Waste treatment methods : Dispose of in accordance with relevant local regulations.

## SECTION 14: Transport information

In accordance with ADR / RID / IMDG / IATA / ADN

### 14.1. UN number

No dangerous good in sense of transport regulations

### 14.2. UN proper shipping name

Not applicable

### 14.3. Transport hazard class(es)

Not applicable

### 14.4. Packing group

Not applicable

### 14.5. Environmental hazards

Dangerous for the environment : No
Marine pollutant : No
Other information : No supplementary information available

### 14.6. Special precautions for user

#### 14.6.1. Overland transport

No additional information available

#### 14.6.2. Transport by sea

No additional information available

#### 14.6.3. Air transport

No additional information available

#### 14.6.4. Inland waterway transport

No additional information available

### 14.7. Transport in bulk according to Annex II or MARPOL 73/78 and the IBC Code

Not applicable

SouthernCross BOTANICALS

**Superox-C™ AF**
Safety Data Sheet
according to Regulation (EC) No. 453/2010

**SECTION 15: Regulatory information**

**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**

**15.1.1. EU-Regulations**

No REACH Annex XVII restrictions

Contains no REACH candidate substance

**15.1.2. National regulations**

No additional information available

**15.2. Chemical safety assessment**

No chemical safety assessment has been carried out

**SECTION 16: Other information**

Data sources : SDS of suppliers. ECHA – European Chemical Agency

SDS EU (REACH Annex II)

*This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product*

06 August 2018 EN (English) 6/6

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BASF
We create chemistry

**Safety data sheet**

Page: 1/14
BASF Safety data sheet according to Regulation (EC) No. 1907/2006 as amended from time to time.
Date / Revised: 06.12.2017 Version: 5.0
Product: **Texapon® N 70 T**
(ID no. 30528351/SDS_GEN_EU/EN)
Date of print 07.12.2017

**SECTION 1: Identification of the substance/mixture and of the company/undertaking**

**1.1. Product identifier**

**Texapon® N 70 T**

**1.2. Relevant identified uses of the substance or mixture and uses advised against**

Relevant identified uses: surfactants, cosmetic ingredient

For the detailed identified uses of the product see appendix of the safety data sheet.

**1.3. Details of the supplier of the safety data sheet**

Company:
BASF SE
67056 Ludwigshafen
GERMANY
Operating Division Care Chemicals

Telephone: +49 211 7940-2222
E-mail address: emc-ehs-masterdata@basf.com

**1.4. Emergency telephone number**

International emergency number:
Telephone: +49 180 2273-112

**SECTION 2: Hazards Identification**

**2.1. Classification of the substance or mixture**

According to Regulation (EC) No 1272/2008 [CLP]

Skin Corr./Irrit. 2

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Page: 2/14
BASF Safety data sheet according to Regulation (EC) No. 1907/2006 as amended from time to time.
Date / Revised: 06.12.2017 Version: 5.0
Product: **Texapon® N 70 T**
(ID no. 30528351/SDS_GEN_EU/EN)
Date of print 07.12.2017

Eye Dam./Irrit. 1
Aquatic Chronic 3

H318, H315, H412

For the classifications not written out in full in this section the full text can be found in section 16.

**2.2. Label elements**

According to Regulation (EC) No 1272/2008 [CLP]

Pictogram:

Signal Word:
Danger

Hazard Statement:

| | |
|---|---|
| H318 | Causes serious eye damage. |
| H315 | Causes skin irritation. |
| H412 | Harmful to aquatic life with long lasting effects. |

Precautionary Statements (Prevention):

| | |
|---|---|
| P280 | Wear protective gloves and eye/face protection. |
| P273 | Avoid release to the environment. |
| P264 | Wash with plenty of water and soap thoroughly after handling. |

Precautionary Statements (Response):

| | |
|---|---|
| P305 + P351 + P338 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. |
| P310 | Immediately call a POISON CENTER or doctor/physician. |
| P303 + P352 | IF ON SKIN (or hair): Wash with plenty of soap and water. |
| P332 + P313 | If skin irritation occurs: Get medical advice/attention. |
| P362 + P364 | Take off contaminated clothing and wash it before reuse. |

Precautionary Statements (Disposal):

| | |
|---|---|
| P501 | Dispose of contents/container to hazardous or special waste collection point. |

According to Regulation (EC) No 1272/2008 [CLP]

Hazard determining component(s) for labelling: Alcohols, C12-14, ethoxylated, sulfates, sodium salts (> 1 < 2.5 mol EO)

**2.3. Other hazards**

---

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According to Regulation (EC) No 1272/2008 [CLP]

No specific dangers known, if the regulations/notes for storage and handling are considered.

**SECTION 3: Composition/Information on Ingredients**

**3.1. Substances**

Not applicable

**3.2. Mixtures**

Chemical nature

Aqueous solution based on: Alcohols, C12-14, ethoxylated, sulfates, sodium salts (> 1 < 2.5 mol EO)

Hazardous ingredients (GHS)
according to Regulation (EC) No. 1272/2008

Alcohols, C12-14, ethoxylated, sulfates, sodium salts (> 1 < 2.5 mol EO)

| | |
|---|---|
| Content (W/W): >= 60 % - < 75 %<br>CAS Number: 68891-38-3<br>EC-Number: 500-234-8<br>REACH registration number: 01-2119488639-16 | Skin Corr./Irrit. 2<br>Eye Dam./Irrit. 1<br>Aquatic Chronic 3<br>H318, H315, H412<br><br>Specific concentration limit:<br>Eye Dam./Irrit. 2A: 5 - 10 %<br>Eye Dam./Irrit. 1: > 10 % |

For the classifications not written out in full in this section, including the hazard classes and the hazard statements, the full text is listed in section 16.

**SECTION 4: First-Aid Measures**

**4.1. Description of first aid measures**
If adverse health effects develop seek medical attention.

If inhaled:
not relevant.

On skin contact:
After contact with skin, wash immediately with plenty of water. Change contaminated clothing and shoes.

On contact with eyes:

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Rinse immediately with plenty of running water (for 10 minutes), seek medical attention from a specialist.

On ingestion:
Rinse mouth and then drink 200-300 ml of water.

**4.2. Most important symptoms and effects, both acute and delayed**
Symptoms: The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11., Further important symptoms and effects are so far not known.

Hazards: No hazard is expected under intended use and appropriate handling.

**4.3. Indication of any immediate medical attention and special treatment needed**
Treatment: Treat symptomatically.

**SECTION 5: Fire-Fighting Measures**

**5.1. Extinguishing media**
Suitable extinguishing media:
water spray, carbon dioxide, dry powder, foam

**5.2. Special hazards arising from the substance or mixture**
harmful vapours
Evolution of fumes/fog. The substances/groups of substances mentioned can be released in case of fire.

**5.3. Advice for fire-fighters**
Special protective equipment:
Wear a self-contained breathing apparatus.

Further information:
Dispose of fire debris and contaminated extinguishing water in accordance with official regulations.

**SECTION 6: Accidental Release Measures**

**6.1. Personal precautions, protective equipment and emergency procedures**
Use personal protective clothing.

**6.2. Environmental precautions**
Do not discharge into drains/surface waters/groundwater.

**6.3. Methods and material for containment and cleaning up**
For small amounts: Pick up with suitable absorbent material.
For large amounts: Dike spillage. Pump off product.
Dispose of absorbed material in accordance with regulations.

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**6.4. Reference to other sections**
Information regarding exposure controls/personal protection and disposal considerations can be found in section 8 and 13.

**SECTION 7: Handling and Storage**

**7.1. Precautions for safe handling**
Handle in accordance with good industrial hygiene and safety practice.

Protection against fire and explosion:
Take precautionary measures against static discharges. Avoid all sources of ignition: heat, sparks, open flame.

**7.2. Conditions for safe storage, including any incompatibilities**

Suitable materials for containers: High density polyethylene (HDPE), Stainless steel 1.4571
Further information on storage conditions: Keep container tightly closed and dry; store in a cool place.
Store protected against freezing.
Below temperature limit the product properties will change. The property change is reversible by stirring and heating. Bulk shipping (Tank car/truck, container) of the product has to be coordinated with the product owner in advance. Please refer to the technical leaflet for further information. A reduction of the active matter is possible. Please check! Below 10 °C , the product is no longer pumpable.

Storage stability:
Storage temperature: 20 - 40 °C

Protect from temperatures below: 0 °C
The packed product is not damaged by low temperatures or by frost.
Protect from temperatures above: 50 °C
Changes in the properties of the product may occur if substance/product is stored above indicated temperature for extended periods of time.

**7.3. Specific end use(s)**
For the relevant identified use(s) listed in Section 1 the advice mentioned in this section 7 is to be observed.

**SECTION 8: Exposure Controls/Personal Protection**

**8.1. Control parameters**

Components with occupational exposure limits

144-55-8: Sodium hydrogencarbonate

PNEC

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Data refer to the dissolved main component

Components with PNEC

68891-38-3: Alcohols, C12-14, ethoxylated, sulfates, sodium salts (> 1 < 2.5 mol EO)
freshwater: 0.24 mg/l
marine water: 0.024 mg/l
intermittent release: 0.071 mg/l
STP: 10000 mg/l
sediment (freshwater): 0.9168 mg/kg
sediment (marine water): 0.09168 mg/kg
soil: 7.5 mg/kg
oral (secondary poisoning):
No PNEC oral derived, as accumulation in organisms is not to be expected.

DNEL
Data refer to the dissolved main component

Components with DNEL

68891-38-3: Alcohols, C12-14, ethoxylated, sulfates, sodium salts (> 1 < 2.5 mol EO)
worker: Long-term exposure- systemic effects, dermal: 2750 mg/kg
worker: Long-term exposure- systemic effects, Inhalation: 175 mg/m3
consumer: Long-term exposure- systemic effects, dermal: 1650 mg/kg
consumer: Long-term exposure- systemic effects, Inhalation: 52 mg/m3
consumer: Long-term exposure- systemic effects, oral: 15 mg/kg

**8.2. Exposure controls**

Personal protective equipment

Respiratory protection:
Wear respiratory protection if ventilation is inadequate.

Hand protection:
Suitable are protective gloves with the following specification. The recommendation is valid for laboratory conditions, specific workplace conditions must be taken into consideration separately. Suitable materials also with prolonged, direct contact (Recommended: Protective index 6, corresponding > 480 minutes of permeation time according to EN 374):
nitrile rubber (NBR) - 0.4 mm coating thickness

Eye protection:
Tightly fitting safety goggles (splash goggles) (e.g. EN 166)

Body protection:
Body protection must be chosen depending on activity and possible exposure, e.g. apron, protecting boots, chemical-protection suit (according to EN 14605 in case of splashes or EN ISO 13982 in case of dust).

General safety and hygiene measures

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Handle in accordance with good industrial hygiene and safety practice. No eating, drinking, smoking or tobacco use at the place of work. Handle in accordance with good industrial hygiene and safety practice.

**SECTION 9: Physical and Chemical Properties**

**9.1. Information on basic physical and chemical properties**

| | | |
|---|---|---|
| Form: | paste, pasty | |
| Colour: | yellowish | |
| Odour: | odourless | |
| Odour threshold: | not applicable | |
| pH value: | 7.0 - 9.0 (water, 20 °C) | (DGF-H-III 1) |
| pour point: | >= 20.0 °C | (DIN ISO 3016) |
| Melting point: | >= 20.0 °C | |
| decomposition point: | > 206 °C The substance / product decomposes. | |
| boiling temperature: | > 100 °C | |
| Flash point: | > 101 °C Aqueous preparation | |
| Evaporation rate: | Value can be approximated from Henry's Law Constant or vapor pressure. | |
| Flammability: | Not flammable. | |
| Flammability of Aerosol Products: | not applicable, the product does not form flammable aerosoles | |
| Lower explosion limit: | For liquids not relevant for classification and labelling. | |
| Upper explosion limit: | For liquids not relevant for classification and labelling. | |
| Ignition temperature: | 250 °C | |
| Vapour pressure: | not determined | |
| Density: | 1.07 - 1.1 g/cm3 (20 °C) | (DGF C-IV 2; QP1100.0; Density) |
| Relative vapour density (air): | not applicable | |
| Solubility in water: | soluble 280 g/l (20 °C) | |
| Solubility (qualitative) solvent(s): distilled water | soluble, forms a gel | |

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Partitioning coefficient n-octanol/water (log Kow): 0.3 (measured)
(23 °C)
Self ignition: Temperature: 250 °C

Thermal decomposition: No decomposition if stored and handled as prescribed/indicated.
Viscosity, dynamic: > 10,000 mPa*s
(20 °C)
Viscosity, kinematic: > 8,000 mm2/s
(20 °C)
Explosion hazard: not explosive
Fire promoting properties: not fire-propagating

**9.2. Other information**

Other Information:
If necessary, information on other physical and chemical parameters is indicated in this section.
No further information available.

**SECTION 10: Stability and Reactivity**

**10.1. Reactivity**
No hazardous reactions if stored and handled as prescribed/indicated.

**10.2. Chemical stability**
The product is stable if stored and handled as prescribed/indicated.

**10.3. Possibility of hazardous reactions**
None if used for intended purpose.

**10.4. Conditions to avoid**
See MSDS section 7 - Handling and storage.

**10.5. Incompatible materials**

Substances to avoid:
No substances known that should be avoided.

**10.6. Hazardous decomposition products**

No hazardous decomposition products known.

**SECTION 11: Toxicological Information**

**11.1. Information on toxicological effects**

Acute toxicity

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Assessment of acute toxicity:
Virtually nontoxic after a single skin contact.

Virtually nontoxic by inhalation.

Virtually nontoxic after a single ingestion.

Experimental/calculated data:
LD50 rat (oral): > 5,000 mg/kg (OECD Guideline 401)

LD50 rat (dermal): > 2,000 mg/kg (OECD Guideline 402)

Irritation

Assessment of irritating effects:
May cause severe damage to the eyes.

Skin contact causes irritation.

Experimental/calculated data:
Skin corrosion/irritation rabbit: Irritant. (OECD Guideline 404)

Serious eye damage/irritation rabbit: irreversible damage (OECD Guideline 405)

Respiratory/Skin sensitization

Assessment of sensitization:
No sensitizing effect.

Experimental/calculated data:
guinea pig: Non-sensitizing. (OECD Guideline 406)

Germ cell mutagenicity

Assessment of mutagenicity:
The chemical structure does not suggest a specific alert for such an effect.

Experimental/calculated data:
Ames-test
Bacteria: negative (OECD Guideline 471)

Carcinogenicity

Assessment of carcinogenicity:
The whole of the information assessable provides no indication of a carcinogenic effect.

Reproductive toxicity

Assessment of reproduction toxicity:

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The information available on the product provides no indication of reproductive toxicity.

Specific target organ toxicity (single exposure)

Assessment of STOT single:
Based on the available information there is no specific target organ toxicity to be expected after a single exposure.

Repeated dose toxicity and Specific target organ toxicity (repeated exposure)

Assessment of repeated dose toxicity:
The information available on the product provides no indication of toxicity on target organs after repeated exposure.

Aspiration hazard

No aspiration hazard expected.

**SECTION 12: Ecological Information**

**12.1. Toxicity**

Toxicity to fish:
LC50 > 10 - 100 mg/l, Leuciscus idus (Screening (style of OECD 203))

Aquatic invertebrates:
EC50 > 10 - 100 mg/l, Daphnia magna (OECD Guideline 202, part 1)

Aquatic plants:
EC50 > 10 - 100 mg/l, Scenedesmus subspicatus (OECD Guideline 201)

Microorganisms/Effect on activated sludge:
EC0 > 100 mg/l, Pseudomonas putida (DIN 38412 Part 27 (draft))

Chronic toxicity to fish:
No observed effect concentration > 1 - 10 mg/l, Leuciscus idus

Chronic toxicity to aquatic invertebrates:
No observed effect concentration > 0.1 - 1 mg/l, Daphnia magna

**12.2. Persistence and degradability**

Assessment biodegradation and elimination (H2O):
Readily biodegradable (according to OECD criteria).

Elimination information:
(Annex III , part A) The surfactant(s) contained in this preparation complies(comply) with the biodegradability criteria as laid down in Regulation (EC) No.648/2004 on detergents. Data to support

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this assertion are held at the disposal of the competent authorities of the Member States and will be made available to them at their direct request or at the request of a detergent manufacturer.

**12.3. Bioaccumulative potential**

Assessment bioaccumulation potential:
Significant accumulation in organisms is not to be expected.

**12.4. Mobility in soil**

Assessment transport between environmental compartments:
Volatility: The substance will not evaporate into the atmosphere from the water surface.
Adsorption in soil: Following exposure to soil, the product trickles away and can - dependant on degradation - be transported to deeper soil areas with larger water loads. Study scientifically not justified.

**12.5. Results of PBT and vPvB assessment**

According to Annex XIV of Regulation (EC) No.1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain a substance fulfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/very bioaccumulative) criteria. Self classification

**12.6. Other adverse effects**

The product does not contain substances that are listed in Regulation (EC) 1005/2009 on substances that deplete the ozone layer.

**SECTION 13: Disposal Considerations**

**13.1. Waste treatment methods**

Must be disposed of or incinerated in accordance with local regulations.

**SECTION 14: Transport Information**

**Land transport**

ADR

| | |
|---|---|
| | Not classified as a dangerous good under transport regulations |
| UN number: | Not applicable |
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |
| Environmental hazards: | Not applicable |
| Special precautions for | None known |

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user

RID

Not classified as a dangerous good under transport regulations

| | |
|---|---|
| UN number: | Not applicable |
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |
| Environmental hazards: | Not applicable |
| Special precautions for user | None known |

**Inland waterway transport**
ADN

Not classified as a dangerous good under transport regulations

| | |
|---|---|
| UN number: | Not applicable |
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |
| Environmental hazards: | Not applicable |
| Special precautions for user: | None known |

Transport in inland waterway vessel
Not evaluated

**Sea transport**

IMDG

Not classified as a dangerous good under transport regulations

| | |
|---|---|
| UN number: | Not applicable |
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |
| Environmental hazards: | Not applicable |
| Special precautions for user | None known |

**Air transport**

IATA/ICAO

Not classified as a dangerous good under transport regulations

| | |
|---|---|
| UN number: | Not applicable |

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| | |
|---|---|
| UN proper shipping name: | Not applicable |
| Transport hazard class(es): | Not applicable |
| Packing group: | Not applicable |
| Environmental hazards: | Not applicable |
| Special precautions for user | None known |

**14.1. UN number**
See corresponding entries for "UN number" for the respective regulations in the tables above.

**14.2. UN proper shipping name**
See corresponding entries for "UN proper shipping name" for the respective regulations in the tables above.

**14.3. Transport hazard class(es)**
See corresponding entries for "Transport hazard class(es)" for the respective regulations in the tables above.

**14.4. Packing group**
See corresponding entries for "Packing group" for the respective regulations in the tables above.

**14.5. Environmental hazards**
See corresponding entries for "Environmental hazards" for the respective regulations in the tables above.

**14.6. Special precautions for user**
See corresponding entries for "Special precautions for user" for the respective regulations in the tables above.

**14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code**

| | |
|---|---|
| Regulation: | Not evaluated |
| Shipment approved: | Not evaluated |
| Pollution name: | Not evaluated |
| Pollution category: | Not evaluated |
| Ship Type: | Not evaluated |

**SECTION 15: Regulatory Information**

**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**

**15.2. Chemical Safety Assessment**

Chemical Safety Assessment performed

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**SECTION 16: Other Information**

Information on intended use: This product is of industrial quality and unless otherwise specified or agreed intended exclusively for industrial use. This includes the mentioned and recommended usage. Any other intended applications should be discussed with the manufacturer. In particular this concerns the application for products that are the object of special standards and regulations.

Full text of the classifications, including the hazard classes and the hazard statements, if mentioned in section 2 or 3:

| | |
|---|---|
| Skin Corr./Irrit. | Skin corrosion/irritation |
| Eye Dam./Irrit. | Serious eye damage/eye irritation |
| Aquatic Chronic | Hazardous to the aquatic environment - chronic |
| H318 | Causes serious eye damage. |
| H315 | Causes skin irritation. |
| H412 | Harmful to aquatic life with long lasting effects. |

The data contained in this safety data sheet are based on our current knowledge and experience and describe the product only with regard to safety requirements. This safety data sheet is neither a Certificate of Analysis (CoA) nor technical data sheet and shall not be mistaken for a specification agreement. Identified uses in this safety data sheet do neither represent an agreement on the corresponding contractual quality of the substance/mixture nor a contractually designated use. It is the responsibility of the recipient of the product to ensure any proprietary rights and existing laws and legislation are observed.

Vertical lines in the left hand margin indicate an amendment from the previous version.

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**Safety data sheet**

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**SECTION 1: Identification of the substance/mixture and of the company/undertaking**

**1.1. Product identifier**

**Tinogard® TL**

Chemical name: Phenol, 2-(2H-benzotriazol-2-yl)-6-dodecyl-4-methyl-, branched and linear

REACH registration number: 01-0000015153-80-0000, 01-2119922172-49-0000

**1.2. Relevant identified uses of the substance or mixture and uses advised against**

Relevant identified uses: Chemical for soaps, detergents and cosmetic

**1.3. Details of the supplier of the safety data sheet**

Company:
BASF SE
67056 Ludwigshafen
GERMANY
Operating Division Care Chemicals

Telephone: +49 211 7940-2222
E-mail address: emc-ehs-masterdata@basf.com

**1.4. Emergency telephone number**

International emergency number:
Telephone: +49 180 2273-112

**SECTION 2: Hazards Identification**

**2.1. Classification of the substance or mixture**

According to Regulation (EC) No 1272/2008 [CLP]

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Aquatic Chronic 2

H411

For the classifications not written out in full in this section the full text can be found in section 16.

**2.2. Label elements**

According to Regulation (EC) No 1272/2008 [CLP]

Pictogram:

Hazard Statement:
H411 Toxic to aquatic life with long lasting effects.

Precautionary Statements (Prevention):
P273 Avoid release to the environment.

Precautionary Statements (Response):
P391 Collect spillage.

Precautionary Statements (Disposal):
P501 Dispose of contents/container to hazardous or special waste collection point.

**2.3. Other hazards**

According to Regulation (EC) No 1272/2008 [CLP]

If applicable information is provided in this section on other hazards which do not result in classification but which may contribute to the overall hazards of the substance or mixture.

**SECTION 3: Composition/Information on Ingredients**

**3.1. Substances**

Chemical nature

stabilizer
Reaction mass of 2-(2H-benzotriazol-2-yl)-6-dodecyl-4-methylphenol, 2-(2H-benzotriazol-2-yl)-4-methyl-6-tetracosylphenol and 6-(2H-benzotriazol-2-yl)-2,3-didodecyl-4-methylphenol
EC-Number: 401-680-5

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Hazardous ingredients (GHS)
according to Regulation (EC) No. 1272/2008

2-(2H-Benzotriazol-2-yl)-p-cresol

| | |
|---|---|
| Content (W/W): >= 0.3 % - < 1 % | Skin Sens. 1B |
| CAS Number: 2440-22-4 | Aquatic Chronic 1 |
| EC-Number: 219-470-5 | M-factor chronic: 1 |
| | H317, H410 |

For the classifications not written out in full in this section, including the hazard classes and the hazard statements, the full text is listed in section 16.

**3.2. Mixtures**

Not applicable

**SECTION 4: First-Aid Measures**

**4.1. Description of first aid measures**
Remove contaminated clothing.

If inhaled:
Keep patient calm, remove to fresh air, seek medical attention.

On skin contact:
Wash thoroughly with soap and water.

On contact with eyes:
Wash affected eyes for at least 15 minutes under running water with eyelids held open.

On ingestion:
Rinse mouth and then drink plenty of water.

**4.2. Most important symptoms and effects, both acute and delayed**
Symptoms: The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11.

Further important symptoms and effects are so far not known.

**4.3. Indication of any immediate medical attention and special treatment needed**
Treatment: Treat according to symptoms (decontamination, vital functions), no known specific antidote.

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**SECTION 5: Fire-Fighting Measures**

**5.1. Extinguishing media**
Suitable extinguishing media:
water spray, dry powder, foam

Unsuitable extinguishing media for safety reasons:
water jet

**5.2. Special hazards arising from the substance or mixture**
harmful vapours
Evolution of fumes/fog. The substances/groups of substances mentioned can be released in case of fire.

**5.3. Advice for fire-fighters**
Special protective equipment:
Wear a self-contained breathing apparatus.

Further information:
The degree of risk is governed by the burning substance and the fire conditions. Contaminated extinguishing water must be disposed of in accordance with official regulations.

**SECTION 6: Accidental Release Measures**

**6.1. Personal precautions, protective equipment and emergency procedures**
Use personal protective clothing. Breathing protection required.

**6.2. Environmental precautions**
Contain contaminated water/firefighting water. Do not discharge into drains/surface waters/groundwater.

**6.3. Methods and material for containment and cleaning up**
For large amounts: Pump off product.
For residues: Pick up with suitable absorbent material. Dispose of absorbed material in accordance with regulations.

**6.4. Reference to other sections**
Information regarding exposure controls/personal protection and disposal considerations can be found in section 8 and 13.

**SECTION 7: Handling and Storage**

**7.1. Precautions for safe handling**
No special measures necessary provided product is used correctly.

Protection against fire and explosion:
Take precautionary measures against static discharges.

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**7.2. Conditions for safe storage, including any incompatibilities**
Segregate from acids and bases. Segregate from strong oxidizing agents. Segregate from foods and animal feeds.
Further information on storage conditions: Keep container tightly closed in a cool, well-ventilated place. Keep only in the original container.

**7.3. Specific end use(s)**
For the relevant identified use(s) listed in Section 1 the advice mentioned in this section 7 is to be observed.

**SECTION 8: Exposure Controls/Personal Protection**

**8.1. Control parameters**

Components with occupational exposure limits

No occupational exposure limits known.

**8.2. Exposure controls**

Personal protective equipment

Respiratory protection:
Respiratory protection in case of vapour/aerosol release. Particle filter with medium efficiency for solid and liquid particles (e.g. EN 143 or 149, Type P2 or FFP2)

Hand protection:
Chemical resistant protective gloves (EN 374)
Suitable materials for short-term contact (recommended: At least protective index 2, corresponding > 30 minutes of permeation time according to EN 374)
butyl rubber (butyl) - 0.7 mm coating thickness
nitrile rubber (NBR) - 0.4 mm coating thickness
Supplementary note: The specifications are based on tests, literature data and information of glove manufacturers or are derived from similar substances by analogy. Due to many conditions (e.g. temperature) it must be considered, that the practical usage of a chemical-protective glove in practice may be much shorter than the permeation time determined through testing.
Manufacturer's directions for use should be observed because of great diversity of types.

Eye protection:
Safety glasses with side-shields (frame goggles) (e.g. EN 166)

Body protection:
Body protection must be chosen based on level of activity and exposure.

General safety and hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wearing of closed work clothing is recommended. When using, do not eat, drink or smoke. Hands and/or face should be washed before breaks and at the end of the shift. At the end of the shift the skin should be cleaned and skin-care agents applied.

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Environmental exposure controls
For information regarding environmental exposure controls, see Section 6.

**SECTION 9: Physical and Chemical Properties**

**9.1. Information on basic physical and chemical properties**

| | | |
|---|---|---|
| Form: | liquid | |
| Colour: | yellow | |
| Odour: | faint odour | |
| Odour threshold: | No applicable information available. | |
| pH value: | 5.4 (10 g/l, 20 - 25 °C) | |
| Melting temperature: | -54 °C | |
| Boiling point: | 174 °C (0.11 hPa) | (OECD Guideline 103) |
| Flash point: | > 200 °C | (DIN 51758) |
| Evaporation rate: | Value can be approximated from Henry's Law Constant or vapor pressure. | |
| Flammability: | not flammable | |
| Lower explosion limit: | For liquids not relevant for classification and labelling., The lower explosion point may be 5 - 15 °C below the flash point. | |
| Upper explosion limit: | For liquids not relevant for classification and labelling. | |
| Ignition temperature: | 410 °C | (DIN 51794) |
| Vapour pressure: | 0.1 hPa (20 °C) | |
| Density: | 1.003 g/cm3 (20 °C) | |
| Solubility in water: | insoluble < 0.0003 g/l (20 °C) | |
| Solubility (qualitative) solvent(s): | organic solvents soluble | |
| Solubility (quantitative) solvent(s): | acetone; propan-2-one; propanone > 500 g/l (20 °C) | |
| Partitioning coefficient n-octanol/water (log Kow): | 8.9 (20 - 25 °C) | |
| Self ignition: | Temperature: 410 °C | |

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| | |
|---|---|
| Thermal decomposition: | > 350 °C No decomposition if stored and handled as prescribed/indicated. |
| Viscosity, dynamic: | 1,800 - 2,000 mPa.s (20 °C) |
| Explosion hazard: | not explosive |
| Fire promoting properties: | not fire-propagating |

**9.2. Other information**

Other Information:
If necessary, information on other physical and chemical parameters is indicated in this section.

**SECTION 10: Stability and Reactivity**

**10.1. Reactivity**
No hazardous reactions if stored and handled as prescribed/indicated.

Corrosion to metals: No corrosive effect on metal.

**10.2. Chemical stability**
The product is stable if stored and handled as prescribed/indicated.

**10.3. Possibility of hazardous reactions**
No hazardous reactions when stored and handled according to instructions.

**10.4. Conditions to avoid**
Avoid all sources of ignition: heat, sparks, open flame. Avoid electro-static discharge.

**10.5. Incompatible materials**

Substances to avoid:
strong acids, strong bases, strong oxidizing agents

**10.6. Hazardous decomposition products**

No hazardous decomposition products if stored and handled as prescribed/indicated.

**SECTION 11: Toxicological Information**

**11.1. Information on toxicological effects**

Acute toxicity

Assessment of acute toxicity:
Virtually nontoxic after a single skin contact. Virtually nontoxic by inhalation. Virtually nontoxic after a single ingestion.

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Experimental/calculated data:
LD50 rat (oral): > 2,000 mg/kg (OECD Guideline 401)

LD50 rat (dermal): > 2,000 mg/kg (OECD Guideline 402)
----------------------------------

Irritation

Experimental/calculated data:
Skin corrosion/irritation rabbit: non-irritant (OECD Guideline 404)

Serious eye damage/irritation rabbit: non-irritant (OECD Guideline 405)

Respiratory/Skin sensitization

Experimental/calculated data:
other guinea pig: Non-sensitizing.

Germ cell mutagenicity

Assessment of mutagenicity:
The substance was not mutagenic in a test with mammals. No mutagenic effect was found in various tests with bacteria and mammalian cell culture.

Carcinogenicity

Assessment of carcinogenicity:
The whole of the information assessable provides no indication of a carcinogenic effect.

Reproductive toxicity

Assessment of reproduction toxicity:
The results of animal studies gave no indication of a fertility impairing effect.

Specific target organ toxicity (single exposure)

Assessment of STOT single:
Based on the available information there is no specific target organ toxicity to be expected after a single exposure.

Repeated dose toxicity and Specific target organ toxicity (repeated exposure)

No data available.

Aspiration hazard

No aspiration hazard expected.

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**SECTION 12: Ecological Information**

**12.1. Toxicity**

Assessment of aquatic toxicity:
Toxic to aquatic life with long lasting effects.
Acutely toxic for aquatic organisms. May cause long-term adverse effects in the aquatic environment.

Toxicity to fish:
LC50 (96 h) > 100 mg/l, Brachydanio rerio (OECD Guideline 203)

Aquatic invertebrates:
EC50 (24 h) > 100 mg/l, Daphnia magna (OECD Guideline 202, part 1)

Aquatic plants:
EC50 (72 h) > 5 mg/l, Scenedesmus sp. (OECD Guideline 201)
No effects at the highest test concentration. Tested above maximum solubility.

Microorganisms/Effect on activated sludge:
EC50 (3 h) > 100 mg/l, activated sludge

Chronic toxicity to aquatic invertebrates:
No observed effect concentration (21 d) 0.2 mg/l, Daphnia magna (OECD Guideline 211, semistatic)
No toxic effects occur within the range of solubility.

Soil living organisms:
No observed effect concentration (14 d) > 1,000 mg/kg, Eisenia foetida (OECD Guideline 222, artificial soil)

**12.2. Persistence and degradability**

Elimination information:
(OECD 301B; ISO 9439; 92/69/EEC, C.4-C) Non-biodegradable.

**12.3. Bioaccumulative potential**

Bioaccumulation potential:
Because of the n-octanol/water distribution coefficient (log Pow) accumulation in organisms is possible.

**12.4. Mobility in soil**

Assessment transport between environmental compartments:
Volatility: The substance will not evaporate into the atmosphere from the water surface.
Adsorption in soil: No data available.

**12.5. Results of PBT and vPvB assessment**

According to Annex XIII of Regulation (EC) No.1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain a substance fulfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/very bioaccumulative) criteria.

**12.6. Other adverse effects**

The substance is not listed in Regulation (EC) 1005/2009 on substances that deplete the ozone layer.

**12.7. Additional information**

Other ecotoxicological advice:
Do not allow to enter soil, waterways or waste water channels. Inhibition of degradation activity in activated sludge is not to be anticipated during correct introduction of low concentrations.

**SECTION 13: Disposal Considerations**

**13.1. Waste treatment methods**

Must be disposed of or incinerated in accordance with local regulations.

Waste key:
07 02 08¤ other still bottoms and reaction residues

Contaminated packaging:
Uncontaminated packaging can be re-used.
Packs that cannot be cleaned should be disposed of in the same manner as the contents.

**SECTION 14: Transport Information**

**Land transport**

ADR

| | |
|---|---|
| UN number | UN3082 |
| UN proper shipping name: | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains HYDROXYPHENYL BENZOTRIAZOLE DERIVATIVE) |
| Transport hazard class(es): | 9, EHSM |
| Packing group: | III |
| Environmental hazards: | yes |
| Special precautions for user: | None known |

RID



| | |
|---|---|
| UN number | UN3082 |
| UN proper shipping name: | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains HYDROXYPHENYL BENZOTRIAZOLE DERIVATIVE) |
| Transport hazard class(es): | 9, EHSM |
| Packing group: | III |
| Environmental hazards: | yes |
| Special precautions for user: | None known |

**Inland waterway transport**
ADN

| | |
|---|---|
| UN number | UN3082 |
| UN proper shipping name: | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains HYDROXYPHENYL BENZOTRIAZOLE DERIVATIVE) |
| Transport hazard class(es): | 9, EHSM |
| Packing group: | III |
| Environmental hazards: | yes |
| Special precautions for user: | None known |

Transport in inland waterway vessel
Not evaluated

**Sea transport**

IMDG

| | |
|---|---|
| UN number: | UN 3082 |
| UN proper shipping name: | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains HYDROXYPHENYL BENZOTRIAZOLE DERIVATIVE) |
| Transport hazard class(es): | 9, EHSM |
| Packing group: | III |
| Environmental hazards: | yes<br>Marine pollutant: YES |
| Special precautions for user: | None known |

**Air transport**

IATA/ICAO

| | |
|---|---|
| UN number: | UN 3082 |



| | |
|---|---|
| UN proper shipping name: | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains HYDROXYPHENYL BENZOTRIAZOLE DERIVATIVE) |
| Transport hazard class(es): | 9, EHSM |
| Packing group: | III |
| Environmental hazards: | yes |
| Special precautions for user: | None known |

**14.1. UN number**
See corresponding entries for "UN number" for the respective regulations in the tables above.

**14.2. UN proper shipping name**
See corresponding entries for "UN proper shipping name" for the respective regulations in the tables above.

**14.3. Transport hazard class(es)**
See corresponding entries for "Transport hazard class(es)" for the respective regulations in the tables above.

**14.4. Packing group**
See corresponding entries for "Packing group" for the respective regulations in the tables above.

**14.5. Environmental hazards**
See corresponding entries for "Environmental hazards" for the respective regulations in the tables above.

**14.6. Special precautions for user**
See corresponding entries for "Special precautions for user" for the respective regulations in the tables above.

**14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code**

| | |
|---|---|
| Regulation: | Not evaluated |
| Shipment approved: | Not evaluated |
| Pollution name: | Not evaluated |
| Pollution category: | Not evaluated |
| Ship Type: | Not evaluated |

**SECTION 15: Regulatory Information**

**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**

Prohibitions, Restrictions and Authorizations

Annex XVII of Regulation (EC) No 1907/2006
Restrictions of Regulation (EC) No 1907/2006, Annex XVII, do not apply for the intended use(s) of the product given in this MSDS.



If other regulatory information applies that is not already provided elsewhere in this safety data sheet, then it is described in this subsection.

**15.2. Chemical Safety Assessment**

Chemical Safety Assessment not yet performed due to registration timelines

**SECTION 16: Other Information**

Assessment of the hazard classes according to UN GHS criteria (most recent version)

Aquatic Chronic 2

Full text of the classifications, including the hazard classes and the hazard statements, if mentioned in section 2 or 3:

| | |
|---|---|
| Aquatic Chronic | Hazardous to the aquatic environment - chronic |
| Skin Sens. | Skin sensitization |
| H411 | Toxic to aquatic life with long lasting effects. |
| H317 | May cause an allergic skin reaction. |
| H410 | Very toxic to aquatic life with long lasting effects. |

The data contained in this safety data sheet are based on our current knowledge and experience and describe the product only with regard to safety requirements. This safety data sheet is neither a Certificate of Analysis (CoA) nor technical data sheet and shall not be mistaken for a specification agreement. Identified uses in this safety data sheet do neither represent an agreement on the corresponding contractual quality of the substance/mixture nor a contractually designated use. It is the responsibility of the recipient of the product to ensure any proprietary rights and existing laws and legislation are observed.

Vertical lines in the left hand margin indicate an amendment from the previous version.

To add 65

BASF
We create chemistry

**Safety Data Sheet**
**Vitamin A-Palmitate 1.0 Mio IU/G stabilized with Tocopherol**
Revision date : 2018/10/10 Page: 1/11
Version: 3.1 (30041043/SDS_GEN_US/EN)

**1. Identification**

**Product identifier used on the label**

**Vitamin A-Palmitate 1.0 Mio IU/G stabilized with Tocopherol**

**Recommended use of the chemical and restriction on use**

Recommended use*: food additive(s)

*** The "Recommended use" identified for this product is provided solely to comply with a Federal requirement and is not part of** the seller's published specification. The terms of this Safety Data Sheet (SDS) do not create or infer any warranty, express or implied, including by incorporation into or reference in the seller's sales agreement.

**Details of the supplier of the safety data sheet**

| Company: | Contact address: |
|---|---|
| BASF Japan Ltd. | BASF CORPORATION |
| OVOL Nihonbashi Building 3F | 100 Park Avenue |
| 3-4-4 Nihonbashi Muromachi, Chuo-ku | Florham Park, NJ 07932 |
| Tokyo, 103-0022, JAPAN | USA |
| | Telephone: +1 973 245-6000 |

**Emergency telephone number**

CHEMTREC: 1-800-424-9300
BASF HOTLINE: 1-800-832-HELP (4357)

**Other means of identification**
Synonyms: Preparation based on: Retinyl palmitate

**2. Hazards Identification**

**According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200**

**Classification of the product**

| | | |
|---|---|---|
| Skin Sens. | 1 | Skin sensitization |
| Repr. | 1B (unborn child) | Reproductive toxicity |
| Aquatic Chronic | 4 | Hazardous to the aquatic environment - chronic |

**Label elements**

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Pictogram:

Signal Word:
Danger

Hazard Statement:

| | |
|---|---|
| H317 | May cause an allergic skin reaction. |
| H360 | May damage the unborn child. |
| H413 | May cause long lasting harmful effects to aquatic life. |

Precautionary Statements (Prevention):

| | |
|---|---|
| P280 | Wear protective gloves/protective clothing/eye protection/face protection. |
| P261 | Avoid breathing dust/fume/gas/mist/vapours/spray. |
| P201 | Obtain special instructions before use. |
| P273 | Avoid release to the environment. |
| P202 | Do not handle until all safety precautions have been read and understood. |
| P272 | Contaminated work clothing should not be allowed out of the workplace. |

Precautionary Statements (Response):

| | |
|---|---|
| P303 + P352 | IF ON SKIN (or hair): Wash with plenty of soap and water. |
| P333 + P311 | If skin irritation or rash occurs: Call a POISON CENTER or doctor/physician. |
| P308 + P311 | IF exposed or concerned: Call a POISON CENTER or doctor/physician. |
| P362 + P364 | Take off contaminated clothing and wash it before reuse. |

Precautionary Statements (Storage):

| | |
|---|---|
| P405 | Store locked up. |

Precautionary Statements (Disposal):

| | |
|---|---|
| P501 | Dispose of contents/container to hazardous or special waste collection point. |

**Hazards not otherwise classified**

When finely distributed, self-ignition is possible. The product does not contain a substance fulfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/very bioaccumulative) criteria.

**3. Composition / Information on Ingredients**

**According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200**

| CAS Number | Weight % | Chemical name |
|---|---|---|
| 79-81-2 | 40.0 - 60.0% | Vitamin A palmitate |
| 10191-41-0 | 1.0 - 3.0% | D,L-alpha-Tocopherol |
| 8001-21-6 | 30.0 - 50.0% | Sunflower oil |

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**4. First-Aid Measures**

**Description of first aid measures**

**General advice:**
First aid personnel should pay attention to their own safety. If the patient is likely to become unconscious, place and transport in stable sideways position (recovery position). Immediately remove contaminated clothing.

**If inhaled:**
Keep patient calm, remove to fresh air, seek medical attention.

**If on skin:**
Immediately wash thoroughly with soap and water, seek medical attention.

**If in eyes:**
Wash affected eyes for at least 15 minutes under running water with eyelids held open.

**If swallowed:**
Immediately rinse mouth and then drink 200-300 ml of water, seek medical attention.

**Most important symptoms and effects, both acute and delayed**

Symptoms: The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11., (Further) symptoms and / or effects are not known so far

**Indication of any immediate medical attention and special treatment needed**

Note to physician
Treatment: Treat according to symptoms (decontamination, vital functions), no known specific antidote.

**5. Fire-Fighting Measures**

**Extinguishing media**

Suitable extinguishing media:
water spray, carbon dioxide, dry powder, foam

Unsuitable extinguishing media for safety reasons:
water jet

**Special hazards arising from the substance or mixture**
Hazards during fire-fighting:
2-propenal, carbon oxides, harmful vapours
The substances/groups of substances mentioned can be released in case of fire. Evolution of fumes/fog.

**Advice for fire-fighters**
Protective equipment for fire-fighting:
Firefighters should be equipped with self-contained breathing apparatus and turn-out gear.

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**Further information:**
In case of combustion evolution of toxic gases/vapours possible. Cool endangered containers with water-spray. Collect contaminated extinguishing water separately, do not allow to reach sewage or effluent systems. Dispose of fire debris and contaminated extinguishing water in accordance with official regulations.

**6. Accidental release measures**

**Personal precautions, protective equipment and emergency procedures**
Use personal protective clothing. Information regarding personal protective measures see, section 8. Ensure adequate ventilation. Do not breathe vapour/aerosol/spray mists. Avoid contact with the skin, eyes and clothing.

**Environmental precautions**
Do not discharge into drains/surface waters/groundwater. Inform authorities in the event of product spillage to water courses or sewage systems.

May be harmful to the aquatic environment. Prevent entry into drains and surface waters.

**Methods and material for containment and cleaning up**
For small amounts: Pick up with suitable absorbent material. After taking up material in containers, cover immediately with water layer.
For large amounts: Dike spillage. Pump off product.
Dispose of absorbed material in accordance with regulations. Mop up spills with non-flammable adsorbents (e.g. vermiculite, spill mats). Soiled textiles / cleaning rags / adsorbents and Silica are capable of self ignition and should be wetted with water and must be disposed of in a safe manner.

**7. Handling and Storage**

**Precautions for safe handling**
Avoid aerosol formation. Wear suitable protective clothing and eye/face protection. Avoid contact with the skin, eyes and clothing. Keep container tightly sealed. Ensure that there is no crystallized product in the container before use. Processing machines must be fitted with local exhaust ventilation.

Protection against fire and explosion:
Risk of self-ignition when a large surface area is produced due to fine dispersion. Soiled textiles / cleaning rags / adsorbents and Silica are capable of self ignition and should be wetted with water and must be disposed of in a safe manner. Take precautionary measures against static discharges. Avoid all sources of ignition: heat, sparks, open flame. If exposed to fire, keep containers cool by spraying with water.

**Conditions for safe storage, including any incompatibilities**
Segregate from oxidants.

Suitable materials for containers: High density polyethylene (HDPE), Low density polyethylene (LDPE)

Further information on storage conditions: Keep container tightly closed and dry; store in a cool place. Protect from air. Protect from the effects of light. Keep under nitrogen.

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### 8. Exposure Controls/Personal Protection

**Components with occupational exposure limits**

| | | |
|---|---|---|
| Sunflower oil | OSHA PEL | PEL 15 mg/m3 Total dust ; PEL 5 mg/m3 Respirable fraction ; TWA value 5 mg/m3 Respirable fraction ; TWA value 15 mg/m3 Total dust ; |

**Personal protective equipment**

**Respiratory protection:**
Wear a NIOSH-certified (or equivalent) organic vapour/particulate respirator as needed.

**Hand protection:**
Wear chemical resistant protective gloves.

**Eye protection:**
Tightly fitting safety goggles (chemical goggles).

**Body protection:**
Body protection must be chosen depending on activity and possible exposure, e.g. head protection, apron, protective boots, chemical-protection suit.

**General safety and hygiene measures:**
Handle in accordance with good industrial hygiene and safety practice. Wearing of closed work clothing is required additionally to the stated personal protection equipment. Under no circumstances should the product come into contact with the skin of pregnant women or be inhaled by them. Avoid contact with skin. No eating, drinking, smoking or tobacco use at the place of work. Hands and/or face should be washed before breaks and at the end of the shift. Store work clothing separately.

### 9. Physical and Chemical Properties

| | | |
|---|---|---|
| Form: | oily | |
| Odour: | mild | |
| Odour threshold: | Not determined due to potential health hazard by inhalation. | |
| Colour: | yellow | |
| pH value: | insoluble | |
| Freezing point: | not determined | |
| Boiling point: | The substance / product decomposes therefore not determined. | |
| Flash point: | > 100 °C | (DIN 51758) |
| Flammability: | hardly combustible | (derived from flash point) |
| Lower explosion limit: | For liquids not relevant for classification and labelling. | |
| Upper explosion limit: | For liquids not relevant for classification and labelling. | |
| Autoignition: | approx. 265 °C | (DIN 51794) |
| Vapour pressure: | negligible | |
| Density: | 0.88 g/cm3 ( 20 °C) | |
| Vapour density: | negligible | |
| Partitioning coefficient n-octanol/water (log Pow): | not applicable for mixtures | |

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| | |
|---|---|
| Self-ignition temperature: | Risk of self-ignition when a large surface area is produced due to fine dispersion. |
| Thermal decomposition: | No decomposition if stored and handled as prescribed/indicated. |
| Viscosity, dynamic: | 27 mPa.s ( 60 °C) |
| Particle size: | The substance / product is marketed or used in a non solid or granular form. |
| Solubility in water: | insoluble |
| Solubility (qualitative): | soluble solvent(s): hydrocarbons, chlorinated hydrocarbons, ether, fats, oils, |
| Evaporation rate: | negligible |

### 10. Stability and Reactivity

**Reactivity**

Corrosion to metals:
Corrosive effects to metal are not anticipated.

Oxidizing properties:
Based on its structural properties the product is not classified as oxidizing.

**Chemical stability**
The product is stable if stored and handled as prescribed/indicated.

**Possibility of hazardous reactions**
When finely distributed, self-ignition is possible.

**Conditions to avoid**
Avoid light. Avoid all sources of ignition: heat, sparks, open flame. Avoid electro-static charge. See MSDS section 7 - Handling and storage.

**Incompatible materials**
atmospheric oxygen, atmospheric moisture

**Hazardous decomposition products**

Decomposition products:
Hazardous decomposition products: No hazardous decomposition products if stored and handled as prescribed/indicated.

Thermal decomposition:
No decomposition if stored and handled as prescribed/indicated.

### 11. Toxicological information

**Primary routes of exposure**

Routes of entry for solids and liquids are ingestion and inhalation, but may include eye or skin contact. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquefied gases.

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**Acute Toxicity/Effects**

Acute toxicity
Assessment of acute toxicity: Virtually nontoxic after a single ingestion.

Oral

*Information on: Vitamin A palmitate*
*Type of value: LD50*
*Species: rat (male/female)*
*Value: > 2,000 mg/kg (BASF-Test)*
*No mortality was observed. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.*
----------------------------------

Assessment other acute effects
Assessment of STOT single:
Based on available Data, the classification criteria are not met.

Irritation / corrosion
Assessment of irritating effects: Skin contact causes slight irritation. May cause slight irritation to the eyes.

*Information on: Vitamin A palmitate*
*Assessment of irritating effects: Not irritating to the eyes. May cause slight irritation to the skin.*

*Information on: Sunflower oil*
*Assessment of irritating effects: May cause slight irritation to the skin. May cause slight irritation to the eyes. May cause slight irritation to the respiratory tract. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.*

*Information on: D,L-alpha-Tocopherol*
*Assessment of irritating effects: Not irritating to the skin. Not irritating to the eyes.*
----------------------------------

Sensitization
Assessment of sensitization: May cause sensitization by skin contact.

*Information on: D,L-alpha-Tocopherol*
*Assessment of sensitization:*
*Caused skin sensitization in animal studies.*
----------------------------------

Aspiration Hazard
No data available.

**Chronic Toxicity/Effects**

Repeated dose toxicity
Assessment of repeated dose toxicity: Based on available Data, the classification criteria are not met.

*Information on: Vitamin A palmitate*
*Assessment of repeated dose toxicity: Repeated exposure to large quantities may affect certain organs.*

*Information on: D,L-alpha-Tocopherol*

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*Assessment of repeated dose toxicity: Repeated oral uptake of the substance did not cause substance-related effects.*
----------------------------------

Genetic toxicity
Assessment of mutagenicity: Based on available Data, the classification criteria are not met.

Carcinogenicity
Assessment of carcinogenicity: Based on available Data, the classification criteria are not met.

*Information on: Vitamin A palmitate*
*Assessment of carcinogenicity: Results from a number of long-term carcinogenity studies and short-term tests are available. Taking into account all of the information, there is no indication that the substance itself is carcinogenic. Literature data.*

*Information on: D,L-alpha-Tocopherol*
*Assessment of carcinogenicity: In long-term studies in rats in which the substance was given by feed, a carcinogenic effect was not observed. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.*
----------------------------------

Reproductive toxicity
Assessment of reproduction toxicity: Not classified, due to lack of data.

Teratogenicity
Assessment of teratogenicity: May cause harm to the unborn child.

*Information on: Vitamin A palmitate*
*Assessment of teratogenicity: May cause harm to the unborn child.*
----------------------------------

Other Information
The product has not been tested. The statements on toxicology have been derived from the properties of the individual components.

**Symptoms of Exposure**

The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11., (Further) symptoms and / or effects are not known so far

### 12. Ecological Information

**Toxicity**

Aquatic toxicity
Assessment of aquatic toxicity:
There is a high probability that the product is not acutely harmful to aquatic organisms. The inhibition of the degradation activity of activated sludge is not anticipated when introduced to biological treatment plants in appropriate low concentrations.

Toxicity to fish

*Information on: Vitamin A palmitate*
*LC50 (96 h) > 10,000 mg/l, Leuciscus idus (DIN 38412 Part 15, static)*

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*The details of the toxic effect relate to the nominal concentration. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.*

*Information on: Sunflower oil*
*LC50 (96 h) > 1,000 mg/l, Brachydanio rerio*
*The details of the toxic effect relate to the nominal concentration.*
----------------------------------

Aquatic invertebrates

*Information on: Vitamin A palmitate*
*EC50 (48 h) > 100 mg/l, Daphnia magna (Screening test, static)*
*The details of the toxic effect relate to the nominal concentration. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.*

*Information on: Sunflower oil*
*EC50 (48 h) > 100 mg/l, Daphnia magna*
*The details of the toxic effect relate to the nominal concentration.*
----------------------------------

Aquatic plants

*Information on: Vitamin A palmitate*
*EC50 (72 h) 152.94 mg/l (growth rate), Scenedesmus subspicatus (DIN 38412 Part 9, static)*
*The product has low solubility in the test medium. An aqueous solution prepared with solubilizers has been tested.*

*Information on: Sunflower oil*
*EC50 > 100 mg/l, algae*
*The details of the toxic effect relate to the nominal concentration.*
----------------------------------

**Microorganisms/Effect on activated sludge**

Toxicity to microorganisms

*Information on: Vitamin A palmitate*
*DIN EN ISO 8192-OECD 209-88/302/EEC,P. C aerobic activated sludge, domestic/EC20 (30 min): > 1,000 mg/l*
----------------------------------

**Persistence and degradability**

Assessment biodegradation and elimination (H2O)

*Information on: Vitamin A palmitate*

*Not readily biodegradable (by OECD criteria). Moderately/partially biodegradable.*

*Information on: D,L-alpha-Tocopherol*

*Not readily biodegradable (by OECD criteria). Biodegradable.*
----------------------------------

**Bioaccumulative potential**

Assessment bioaccumulation potential

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*Information on: Vitamin A palmitate*

*The product will not be readily bioavailable due to its consistency and insolubility in water. No significant accumulation in organisms is expected as a result of the distribution coefficient of n-octanol/water (log Pow).*
----------------------------------

Bioaccumulation potential

*Information on: Sunflower oil*

*Because of the n-octanol/water distribution coefficient (log Pow) accumulation in organisms is possible.*
----------------------------------

**Mobility in soil**

Assessment transport between environmental compartments

*Information on: Vitamin A palmitate*

*The substance will not evaporate into the atmosphere from the water surface.*
*Adsorption to solid soil phase is expected.*
----------------------------------

**Additional information**

Other ecotoxicological advice:
The product has not been tested. The statements on ecotoxicology have been derived from the properties of the individual components.

**13. Disposal considerations**

**Waste disposal of substance:**
Dispose of in accordance with national, state and local regulations.

**14. Transport Information**

**Land transport**
USDOT
Not classified as a dangerous good under transport regulations

**Sea transport**
IMDG
Not classified as a dangerous good under transport regulations

**Air transport**
IATA/ICAO
Not classified as a dangerous good under transport regulations

**15. Regulatory Information**

**Safety Data Sheet**
**Vitamin A-Palmitate 1.0 Mio IU/G stabilized with Tocopherol**
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**Federal Regulations**

**Registration status:**

| | | |
|---|---|---|
| Chemical | TSCA, US | released / listed |
| Cosmetic | TSCA, US | released / exempt |
| Food | TSCA, US | released / exempt |

**EPCRA 311/312 (Hazard categories):** Refer to SDS section 2 for GHS hazard classes applicable for this product.

**State regulations**

| State RTK | CAS Number | Chemical name |
|---|---|---|
| PA | 8001-21-6 | Sunflower oil |

**Safe Drinking Water & Toxic Enforcement Act, CA Prop. 65:**

**WARNING:** This product can expose you to chemicals including RETINOL PALMITATE, which is known to the State of California to cause birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

**NFPA Hazard codes:**
Health: 2 Fire: 1 Reactivity: 0 Special:

**HMIS III rating**
Health: 2¤ Flammability: 1 Physical hazard: 0

**Assessment of the hazard classes according to UN GHS criteria (most recent version):**

| | | |
|---|---|---|
| Skin Corr./Irrit. | 3 | Skin corrosion/irritation |
| Skin Sens. | 1B | Skin sensitization |
| Aquatic Chronic | 4 | Hazardous to the aquatic environment - chronic |
| Repr. | 1B (unborn child) | Reproductive toxicity |

**16. Other Information**

**SDS Prepared by:**
BASF NA Product Regulations
SDS Prepared on: 2018/10/10

We support worldwide Responsible Care® initiatives. We value the health and safety of our employees, customers, suppliers and neighbors, and the protection of the environment. Our commitment to Responsible Care is integral to conducting our business and operating our facilities in a safe and environmentally responsible fashion, supporting our customers and suppliers in ensuring the safe and environmentally sound handling of our products, and minimizing the impact of our operations on society and the environment during production, storage, transport, use and disposal of our products.

END OF DATA SHEET

0000049933

First issue : 2008/06/23
Revised : 2010/09/13

# SAFETY DATA SHEET

## 1. IDENTIFICATION

| | |
|---|---|
| Product Name | : YUKINOSHITA Liquid MB |
| Company / Supplier Name | : ICHIMARU PHARCOS CO., LTD. |
| Address | : 318-1 Asagi, Motosu-shi, Gifu 501-0475 JAPAN |
| Telephone number | : (81) 58-320-1032 |
| Fax number | : (81) 58-320-1039 |
| Emergency telephone number | : (81) 58-320-1032 |
| Emergency fax number | : (81) 58-320-1039 |
| E-mail address | : patent@ichimaru.co.jp |
| Recommended use of this product and restrictions on use | : Ingredient for cosmetic etc. |

## 2. HAZARD IDENTIFICATION

| | |
|---|---|
| Adverse Human Health Effects and symptoms | : There is no information. |
| Adverse Environmental Effects and symptoms | : There is no information. |
| GHS Classification | |
| Physical Hazards | |
| Explosives | : Not applicable |
| Flammable gases | : Not applicable |
| Flammable aerosols | : Not applicable |
| Oxidizing gases | : Not applicable |
| Gases under pressure | : Not applicable |
| Flammable Liquids | : Not classified |
| Flammable solids | : Not applicable |
| Self-reactive substances and mixtures | : Not applicable |
| Pyrophoric liquids | : No data available |
| Pyrophoric solids | : Not applicable |
| Self-heating substances and mixtures | : No data available |
| Substances and mixtures which, in contact with water, emit flammable gases | : Not applicable |
| Oxidizing liquids | : Not applicable |
| Oxidizing solids | : Not applicable |
| Organic peroxides | : Not applicable |
| Corrosive to metals | : No data available |
| Health Hazards | |
| Acute toxicity (Oral) | : No data available |
| Acute toxicity (Dermal) | : No data available |
| Acute toxicity (Gass) | : No data available |
| Acute toxicity (Vapour) | : No data available |
| Acute toxicity (Dust/Mist) | : No data available |
| Skin corrosion/irritation | : No data available |
| Serious eye damage/eye irritation | : No data available |
| Respiratory sensitization | : No data available |
| Skin sensitization | : No data available |
| Germ cell mutagenicity | : No data available |
| Carcinogenicity | : No data available |
| Reproductive toxicity | : No data available |
| Specific target organ systemic toxicity - Single exposure | : No data available |
| Specific target organ systemic toxicity - Repeated exposure | : No data available |
| Aspiration hazard | : No data available |
| Environmental Hazards | |

YUKINOSHITA Liquid MB 1/5

Hazardous to the aquatic environment (acute) : No data available
Hazardous to the aquatic environment (chronic) : No data available
Label Element
Pictogram or symbol : No pictogram
Signal word : No signal words
Hazard statement : No hazard statement
Precautionary statement : No precautionary statements
Other hazards : There is no information.

## 3. COMPOSITION / INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture
INCI Name[EU Trivial Name] : Water [Aqua], Butylene Glycol, Saxifraga Sarmentosa Extract
Latin Name of the Plant : Saxifraga sarmentosa L. f. (Saxifragaceae)
Substances presenting a health or environmental hazard within the meaning of directive 67/548/EEC : None

| Chemical Name | % | Chemical Formula | CAS No. | EC No. |
|---|---|---|---|---|
| Water | 68.25 | $H_2O$ | 7732-18-5 | 231-791-2 |
| 1,3-Butanediol | 29.25 | $C_4H_{10}O_2$ | 107-88-0 | 203-529-7 |
| Saxifraga stolonifera, ext. | 2.50 | NA | 164288-53-3 | None |

| Chemical Name | TSCA | UN Class | UN Number | Risk phrase(s) |
|---|---|---|---|---|
| Water | Listed | NA | NA | NA |
| 1,3-Butanediol | Listed | NA | NA | NA |
| Saxifraga stolonifera, ext. | Not listed | NA | NA | NA |

| Chemical Name | Hazard Symbol |
|---|---|
| Water | NA |
| 1,3-Butanediol | NA |
| Saxifraga stolonifera, ext. | NA |

## 4. FIRST-AID MEASURES

Effects and Symptoms
Inhalation : There is no information.
Skin Contact : There is no information.
Eye Contact : There is no information.
Ingestion : There is no information.
First aid measures
Inhalation : Remove the victim from the contamination area immediately to fresh air. Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible, if necessary.
Skin Contact : Wash the affected area under running water using a mild soap. If irritation persists, arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.
Eye Contact : Gently rinses the affected eyes, including under the eyelids, with clean water for at least 15 minutes. Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.

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Ingestion : Rinse mouth with water. If the victim is responsive, give the person one or two glasses of water, try to get the victim to vomit by having the victim touch the back of their throat with a finger. Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.
Most important symptoms/ effects, acute and delayed : There is no information.
Indication of immediate medical attention and special treatment needed, if necessary : There is no information.

## 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media : In case of fire, use water spray, foam, dry chemical powder, dry sand or carbon dioxide.
Unsuitable extinguishing media : There is no information.
Specific hazards arising from this product : There is no information.
Special protective equipment and precautions for fire fighters : Firefighters should wear proper protective equipment. Keep personnel removed from and upwind of fire. Move container from fire areas if it can be done without risk. Apply water from a safe distance to cool and protect surrounding area.

## 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : Wear proper protective equipment (see Section 8). Evacuate non essential personnel. Eliminate all sources of ignition and ventilate the area.
Environmental precautions : Treat using the best available techniques before discharging into drains or the aquatic environment.
Methods and materials for containment and cleaning up : Absorb spill with inert material (e.g., dry sand, sawdust or dustcloth), then place in a chemical waste container. Flush residual spill area with copious amounts of water. For large spills, dike for later disposal.

## 7. HANDLING AND STORAGE

Handling
Precautions for safe handling : Use in the well-ventilated areas. Shut off all pilot burner and electrical (spark or hot wire) igniters and other sources of ignition during use and until all odors are gone. Protect against physical damage, do not drop onto, or slide across sharp objects
Storage
Conditions for safe storage, including any incompatibilities : Store in a dry, ventilated location. Keep away from high temperature and sun light, store in the closed containers.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guideline : · ACGIH (TLV) : Not Established
· OSHA (PEL) : Not Established
Appropriate engineering controls : Good general ventilation should be sufficient for most conditions.
Personal protective equipment
Respiratory Protection : Wear chemical cartridge respirator with an ethanol vapor cartridge, if necessary.
Hand Protection : To prevent any contact, wear impervious clothing such as gloves, as appropriate.
Eye Protection : Wear safety glasses, safety goggle, face shield.
Skin Protection : To prevent any contact, wear impervious clothing such as gloves, apron, boots or wholebody suits, as appropriate.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance (physical state, color etc) : Brown, clear liquid
Odor : Slightly characteristic odor
pH : 4.0 to 6.0
Flash point : >93℃ / 200° F Tag Closed Cup (limit of detection)
Specific Gravity $d^{20}_{20}$ : 1.01 to 1.03
Solubility in Water : Very soluble
Auto-ignition temperature : Not performed

## 10. STABILITY AND REACTIVITY

Reactivity : There is no information.
Chemical stability : This product is considered a stable material under normal and anticipated storage and handling conditions.
Possibility of hazardous reactions : There is no information.
Conditions to avoid : There is no information.
Incompatible materials : There is no information.
Hazardous decomposition products : This product will not produce hazardous decomposition.

## 11. TOXICOLOGICAL INFORMATION

Acute toxicity : 【The information related to 1,3-Butanediol】
Oral: rat LD50 18.61 g/kg
mouse LD50 12.98 g/kg
dermal: rabbit LD50 >20 g/kg
Skin corrosion / irritation : 【The information related to 1,3-Butanediol】
skin rabbit 500mg (24 hr) Mild
Serious eye damage / irritation : 【The information related to 1,3-Butanediol】
eye rabbit 500mg (24 hr) Mild
Respiratory or skin sensitization : 【The information related to 1,3-Butanediol】
human: Not sensitized
Germ cell mutagenicity : There is no information.
Carcinogenicity : 【The information related to 1,3-Butanediol】
NTP No
IARC Monographs No
OSHA Regulated No (No information is available.)
Reproductive toxicity : 【The information related to1,3-Butanediol】
Oral: rat TDLO (6 - 15 D preg) 42.36g/kg
Specific target organ systemic toxicity - single exposure : There is no information.
Specific target organ systemic toxicity - repeated exposure : There is no information.
Aspiration hazard : There is no information.

【We show the toxicological information of this product as follows】
Acute Oral Toxicity : Oral Mice ALD : Not less than 15mL/kg
Primary Skin Irritation : No Irritation (Undiluted)
Cumulative Skin Irritation : Not Performed
Skin Sensitization (+Adjuvant) : No Sensitization (Undiluted)
Photo Toxicity : Not Performed
Photosensitization : Not Performed
Ocular Irritation : Almost no Irritaiton (Undiluted)
Mutagenicity (Reverse mutation) : Reverse mutation was negative.
Mutagenicity (Chromosal aberration) : Not Performed

## 12. ECOLOGICAL INFORMATION

*YUKINOSHITA Liquid MB* 4/5

Ecotoxicity : There is no information.
Persistence and degradability : 【The information related to 1,3-Butanediol】
Readily biodegradable. (79% after 28days, OECD TG 301C)
Bioaccumulative potential : There is no information.
Mobility in soil : There is no information.
Other adverse effects : There is no information.

## 13. DISPOSAL CONSIDERATIONS

Method of Disposal : Comply with all EU, national and local regulations.
Do not dump this product material into sewers, on the ground or into any body of water.
Treat using the best available techniques before discharging into drains or the aquatic environment.
Follow all regulations in your country.

## 14. TRANSPORT INFORMATION

UN Class : NA
UN Number : NA
Land-Road/Railway
Proper shipping name : NA
ADR/RID Class : NA
Packing Group : NA
Classification Code : NA
Sea
Proper shipping name : NA
IMDG Class : NA
Packing Group : NA
Air
Proper shipping name : NA
IATA DGR Class : NA
Packing Group : NA

## 15. REGULATORY INFORMATION

This product is classified as follows and labeled accordingly.
According to Directive 67/548/EEC
Classification : NA
Symbol : NA
Risk Phrases : NA
Safety Phrases : NA
Please refer to any other national measures that may be relevant.

## 16. OTHER INFORMATION

References
Supplier's Safety Data Sheet etc.

To the best of our knowledge, the information contained here in is accurate. However, neither ICHIMARU PHARCOS CO.,LTD. nor any of our distributors assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used in caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards which exist.

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