

CARBON REMOVER

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 571604 (25L steel drums)

Version No: 10.34

Safety Data Sheet

Issue Date: 02/08/2021

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L.GHS.SGP.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

| | |
|-------------------------------|--|
| Product name | CARBON REMOVER |
| Chemical Name | Not Applicable |
| Synonyms | Pr No: 2911 (Norwegian Product Register) |
| Proper shipping name | TOXIC LIQUID, ORGANIC, N.O.S. (Xylenol, Dichlorotoluene mixture) |
| Chemical formula | Not Applicable |
| Other means of identification | 571604 (25L steel drums), 571604 |

Relevant identified uses of the substance or mixture and uses advised against

| | |
|--------------------------|----------------------------|
| Relevant identified uses | Heavy duty solvent cleaner |
|--------------------------|----------------------------|

Details of the supplier of the safety data sheet

| | | | |
|-------------------------|---|---|---|
| Registered company name | Wilhelmsen Ships Service (S) Pte. Ltd. | Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | 186 Pandan Loop Singapore 128376 Singapore | -----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +65 6395 4545 | Not Available | +31 10 4877 777 |
| Fax | Not Available | Not Available | Not Available |
| Website | http://www.wilhelmsen.com/services/maritime/compan | http://www.wilhelmsen.com | http://www.wilhelmsen.com |
| Email | wss.singapore@wilhelmsen.com | wss.global.sdsinfo@wilhelmsen.com | wss.rotterdam@wilhelmsen.com |

| | |
|-------------------------|---|
| Registered company name | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +31 10 4877 777 |
| Fax | Not Available |
| Website | http://www.wilhelmsen.com |
| Email | wss.rotterdam@wilhelmsen.com |

Emergency telephone number

| | | | |
|-----------------------------------|------------------|------------------|--------------------------|
| Association / Organisation | 24hrs - Chemtrec | 24hrs - Chemtrec | Dutch nat. poison centre |
| Emergency telephone numbers | +31-10-4877700 | +31-10-4877700 | + 31 88 7558561 |
| Other emergency telephone numbers | +31-10-4877700 | +1 800 424 9300 | + 31 10 4877700 |

| | |
|-----------------------------------|--------------------------|
| Association / Organisation | Dutch nat. poison centre |
| Emergency telephone numbers | + 31 30 274 88 88 |
| Other emergency telephone numbers | + 31-10-4877700 |

SECTION 2 Hazards identification

Classification of the substance or mixture

| | |
|----------------|--|
| Classification | Skin Corrosion/Irritation Category 1, Acute Toxicity (Dermal) Category 3, Specific Target Organ Toxicity - Single Exposure (Narcotic Effects) Category 3, Hazardous to the Aquatic Environment Long-Term Hazard Category 2, Sensitisation (Skin) Category 1, Specific Target Organ Toxicity - Repeated Exposure Category 1, Acute Toxicity (Oral) Category 3, Aspiration Hazard Category 1 |
|----------------|--|

Label elements

| | |
|---------------------|--|
| Hazard pictogram(s) |  |
|---------------------|--|

| | |
|-------------|---------------|
| Signal word | Danger |
|-------------|---------------|

Hazard statement(s)

| | |
|------|---|
| H314 | Causes severe skin burns and eye damage. |
| H311 | Toxic in contact with skin. |
| H336 | May cause drowsiness or dizziness. |
| H411 | Toxic to aquatic life with long lasting effects. |
| H317 | May cause an allergic skin reaction. |
| H372 | Causes damage to organs through prolonged or repeated exposure. (Respiratory system) (Inhalation) |
| H301 | Toxic if swallowed. |
| H304 | May be fatal if swallowed and enters airways. |

Precautionary statement(s) Prevention

| | |
|------|---|
| P260 | Do not breathe mist/vapours/spray. |
| P264 | Wash all exposed external body areas thoroughly after handling. |
| P270 | Do not eat, drink or smoke when using this product. |

Precautionary statement(s) Response

| | |
|----------------|---|
| P301+P310 | IF SWALLOWED: Immediately call a POISON CENTER/doctor/physician/first aider. |
| P301+P330+P331 | IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. |
| P303+P361+P353 | IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. |

Precautionary statement(s) Storage

| | |
|-----------|--|
| P405 | Store locked up. |
| P403+P233 | Store in a well-ventilated place. Keep container tightly closed. |

Precautionary statement(s) Disposal

| | |
|------|--|
| P501 | Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation. |
|------|--|

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

| CAS No | %[weight] | Name |
|---------------|-----------|--|
| 29797-40-8* | 30-60 | <u>dichlorotoluene</u> |
| Not Available | 10-30 | <u>Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, aromatics (2-25%)-</u> |
| Not Available | 10-30 | <u>Hydrocarbones, C10, aromatics, <1% naphthalene</u> |
| 84989-06-0* | 10-30 | <u>tar acids, 3,5-xylenol fraction</u> |

SECTION 4 First aid measures

Description of first aid measures

| | |
|---------------------|---|
| Eye Contact | <p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. |
| Skin Contact | <p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation. |
| Inhalation | <ul style="list-style-type: none"> ▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor, without delay. |
| Ingestion | <ul style="list-style-type: none"> ▸ If swallowed do NOT induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully. ▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Seek medical advice. ▸ If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus. |

Indication of any immediate medical attention and special treatment needed

Any material aspirated during vomiting may produce lung injury. Therefore emesis should not be induced mechanically or pharmacologically. Mechanical means should be used if it is considered necessary to evacuate the stomach contents; these include gastric lavage after endotracheal intubation. If spontaneous vomiting has occurred after ingestion, the patient should be monitored for difficult breathing, as adverse effects of aspiration into the lungs may be delayed up to 48 hours. As in all cases of suspected poisoning, follow the ABCDEs of emergency medicine (airway, breathing, circulation, disability, exposure), then the ABCDEs of toxicology (antidotes, basics, change absorption, change distribution, change elimination).

For poisons (where specific treatment regime is absent):

BASIC TREATMENT

- Establish a patent airway with suction where necessary.
- Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- Administer oxygen by non-rebreather mask at 10 to 15 L/min.
- Monitor and treat, where necessary, for pulmonary oedema.
- Monitor and treat, where necessary, for shock.
- Anticipate seizures.
- **DO NOT** use emetics. Where ingestion is suspected rinse mouth and give up to 200 ml water (5 ml/kg recommended) for dilution where patient is able to swallow, has a strong gag reflex and does not drool.

ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

SECTION 5 Firefighting measures

Extinguishing media

- ▶ Water spray or fog.
- ▶ Foam.
- ▶ Dry chemical powder.

Special hazards arising from the substrate or mixture

| | |
|-----------------------------|--|
| Fire Incompatibility | ▶ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result |
|-----------------------------|--|

Advice for firefighters

| | |
|------------------------------|--|
| Fire Fighting | <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear full body protective clothing with breathing apparatus. ▶ Prevent, by any means available, spillage from entering drains or water course. |
| Fire/Explosion Hazard | carbon dioxide (CO ₂) , other pyrolysis products typical of burning organic material. May emit poisonous fumes. |

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

| | |
|---------------------|---|
| Minor Spills | <ul style="list-style-type: none"> ▶ Clean up all spills immediately. ▶ Avoid breathing vapours and contact with skin and eyes. ▶ Control personal contact with the substance, by using protective equipment. |
| Major Spills | <ul style="list-style-type: none"> ▶ Clear area of personnel and move upwind. ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear full body protective clothing with breathing apparatus. |

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

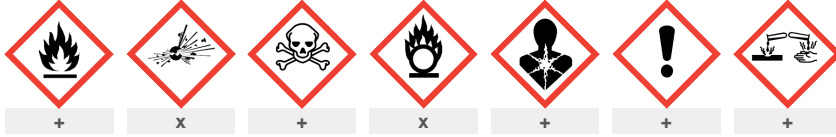
Precautions for safe handling

| | |
|--------------------------|---|
| Safe handling | <ul style="list-style-type: none"> ▶ Avoid all personal contact, including inhalation. ▶ Wear protective clothing when risk of exposure occurs. ▶ Use in a well-ventilated area. |
| Other information | <ul style="list-style-type: none"> ▶ Store in original containers. ▶ Keep containers securely sealed. ▶ Store in a cool, dry, well-ventilated area. |

Conditions for safe storage, including any incompatibilities

| | |
|---------------------------|---|
| Suitable container | ▶ Lined metal can, lined metal pail/ can. |
|---------------------------|---|

| | |
|--------------------------------|--|
| | <ul style="list-style-type: none"> ▸ Plastic pail. ▸ Polyliner drum. For low viscosity materials <ul style="list-style-type: none"> ▸ Drums and jerricans must be of the non-removable head type. ▸ Where a can is to be used as an inner package, the can must have a screwed enclosure. For materials with a viscosity of at least 2680 cSt. |
| Storage incompatibility | ▸ Avoid reaction with oxidising agents |



X — Must not be stored together

0 — May be stored together with specific preventions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Not Available

Emergency Limits

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|----------------|---------------|---------------|---------------|
| CARBON REMOVER | Not Available | Not Available | Not Available |

| Ingredient | Original IDLH | Revised IDLH |
|---|---------------|---------------|
| dichlorotoluene | Not Available | Not Available |
| Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, aromatics (2-25%)- | Not Available | Not Available |
| Hydrocarbones, C10, aromatics, <1% naphtalene | Not Available | Not Available |
| tar acids, 3,5-xyleneol fraction | Not Available | Not Available |

Occupational Exposure Banding

| Ingredient | Occupational Exposure Band Rating | Occupational Exposure Band Limit |
|----------------------------------|-----------------------------------|----------------------------------|
| dichlorotoluene | E | ≤ 0.1 ppm |
| tar acids, 3,5-xyleneol fraction | E | ≤ 0.01 mg/m ³ |

Notes:

Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.

MATERIAL DATA

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more.

NOTE J: The classification as a carcinogen need not apply if it can be shown that the substance contains less than 0.1%w/w benzene (EINECS No 200-753-7). - European Union (EU) List of harmonised classification and labelling hazardous substances, Table 3.1, Annex VI, Regulation (EC) No 1272/2008 (CLP) - up to the latest ATP

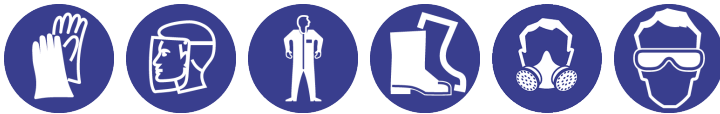
NOTE M: The classification as a carcinogen need not apply if it can be shown that the substance contains less than 0.005% w/w benzo[a]pyrene (EINECS No 200-028-5). This note applies only to certain complex oil-derived substances in Annex IV.

European Union (EU) List of harmonised classification and labelling hazardous substances, Table 3.1, Annex VI, Regulation (EC) No 1272/2008 (CLP) - up to the latest ATP

Exposure controls

| | |
|--------------------------------|--|
| Appropriate engineering | Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed |
|--------------------------------|--|

Continued...

| | |
|--------------------------------|---|
| controls | engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. |
| Personal protection |  |
| Eye and face protection | <ul style="list-style-type: none"> ▸ Safety glasses with side shields. ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. |
| Skin protection | See Hand protection below |
| Hands/feet protection | The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice. <ul style="list-style-type: none"> ▸ Wear chemical protective gloves, e.g. PVC. ▸ Wear safety footwear or safety gumboots, e.g. Rubber |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none"> ▸ Overalls. ▸ Eyewash unit. ▸ Barrier cream. |

Respiratory protection

Type A Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

| Required minimum protection factor | Maximum gas/vapour concentration present in air p.p.m. (by volume) | Half-face Respirator | Full-Face Respirator |
|------------------------------------|--|----------------------|----------------------|
| up to 10 | 1000 | A-AUS / Class1 | - |
| up to 50 | 1000 | - | A-AUS / Class 1 |
| up to 50 | 5000 | Airline * | - |
| up to 100 | 5000 | - | A-2 |
| up to 100 | 10000 | - | A-3 |
| 100+ | | | Airline** |

* - Continuous Flow ** - Continuous-flow or positive pressure demand

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO₂), G = Agricultural chemicals, K = Ammonia(NH₃), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content.
- The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.
- Cartridge performance is affected by humidity. Cartridges should be changed after 2 hr of continuous use unless it is determined that the humidity is less than 75%, in which case, cartridges can be used for 4 hr. Used cartridges should be discarded daily, regardless of the length of time used

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

| | | | |
|------------------------|---------------|--|---------------|
| Appearance | Brown | | |
| Physical state | Liquid | Relative density (Water = 1) | 0.990 - 1.005 |
| Odour | Not Available | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | >200 |

| | | | |
|---|------------------------|--|----------------|
| pH (as supplied) | Infinity | Decomposition temperature | Not Available |
| Melting point / freezing point (°C) | Not Available | Viscosity (cSt) | Not Applicable |
| Initial boiling point and boiling range (°C) | 150-230 | Molecular weight (g/mol) | Not Applicable |
| Flash point (°C) | Not Applicable | Taste | Not Available |
| Evaporation rate | Not Available BuAC = 1 | Explosive properties | Not Available |
| Flammability | Not Applicable | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | Not Available | Surface Tension (dyn/cm or mN/m) | Not Available |
| Lower Explosive Limit (%) | Not Applicable | Volatile Component (%vol) | Not Available |
| Vapour pressure (kPa) | Not Applicable | Gas group | Not Available |
| Solubility in water | Immiscible | pH as a solution (Not Available%) | 10-11 |
| Vapour density (Air = 1) | Not Applicable | VOC g/L | Not Applicable |

SECTION 10 Stability and reactivity

| | |
|---|--|
| Reactivity | See section 7 |
| Chemical stability | <ul style="list-style-type: none"> ▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur. |
| Possibility of hazardous reactions | See section 7 |
| Conditions to avoid | See section 7 |
| Incompatible materials | See section 7 |
| Hazardous decomposition products | See section 5 |

SECTION 11 Toxicological information

Information on toxicological effects

| | |
|---------------------|---|
| Inhaled | <p>Evidence shows, or practical experience predicts, that the material produces irritation of the respiratory system, in a substantial number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs.</p> <p>Inhalation of aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.</p> |
| Ingestion | <p>Swallowing of the liquid may cause aspiration of vomit into the lungs with the risk of haemorrhaging, pulmonary oedema, progressing to chemical pneumonitis; serious consequences may result.</p> <p>Signs and symptoms of chemical (aspiration) pneumonitis may include coughing, gasping, choking, burning of the mouth, difficult breathing, and bluish coloured skin (cyanosis).</p> <p>Accidental ingestion of the material may be damaging to the health of the individual.</p> |
| Skin Contact | <p>The liquid may be miscible with fats or oils and may degrease the skin, producing a skin reaction described as non-allergic contact dermatitis. The material is unlikely to produce an irritant dermatitis as described in EC Directives .</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p> |
| Eye | <p>Although the liquid is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).</p> |
| Chronic | <p>Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.</p> <p>Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.</p> <p>Prolonged or repeated skin contact may cause drying with cracking, irritation and possible dermatitis following.</p> |

| | | |
|---|---|-------------------------------|
| CARBON REMOVER | TOXICITY | IRRITATION |
| | Oral (Human)LC50: 150 mg/kg ^[2] | Not Available |
| dichlorotoluene | TOXICITY | IRRITATION |
| | Oral (Rat) LD50; 4600 mg/kg ^[2] | Eye : Mild Skin : Moderate |
| Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, aromatics (2-25%)- | TOXICITY | IRRITATION |
| | Dermal (Other) LD50: >3400 mg/kg ^[2] | Not Available |
| | Inhalation(Rat) LC50; 13,1 mg/kg ^[2] | |
| | Oral (Rat) LD50; >15000 mg/kg ^[2] | |
| Hydrocarbones, C10, aromatics, <1% naphtalene | TOXICITY | IRRITATION |
| | Not Available | Not Available |
| tar acids, 3,5-xylenol fraction | TOXICITY | IRRITATION |
| | Oral (Rat) LD50; 608 mg/kg ^[2] | Eye (rabbit): 726 ug - SEVERE |
| Legend: | 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances | |

| | |
|--|---|
| dichlorotoluene | <p>For dichlorotoluenes:</p> <p>2,6-Dichlorotoluene is moderately toxic in a repeated dose study (i.e. liver, kidney, thymus) and reproductive/ developmental toxicity study (maternal toxicity).</p> <p>Repeat dose toxicity: In a combined repeat dose and reproductive/developmental toxicity screening test, using 2,6-dichlorotoluene both male and female rats showed histopathological changes in liver, kidney and thymus, and maternal toxicity was observed. The no observed effect levels (NOEL) were obtained as 30 mg/kg/day for repeated dose toxicity and 100 mg/kg/day for reproductive toxicity.</p> <p>In a combined repeat dose and reproductive/developmental toxicity screening test, using 2,4-dichlorotoluene, dose dependent salivation was found in all treated groups. Toxicological significant changes in haematological and blood chemical examinations were found at the highest dose (e.g. decrease of platelet count). No sensitising effects in guinea pig (OECD 406) GPMT according to Magnusson-Kligman</p> |
| tar acids, 3,5-xylenol fraction | <p>The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.</p> <p>Tumorigenic by RTECS criteria</p> |
| CARBON REMOVER & dichlorotoluene & tar acids, 3,5-xylenol fraction | <p>Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant.</p> |

| | | | |
|-----------------------------------|---|--------------------------|---|
| Acute Toxicity | ✓ | Carcinogenicity | ✗ |
| Skin Irritation/Corrosion | ✗ | Reproductivity | ✗ |
| Serious Eye Damage/Irritation | ✗ | STOT - Single Exposure | ✓ |
| Respiratory or Skin sensitisation | ✓ | STOT - Repeated Exposure | ✓ |
| Mutagenicity | ✗ | Aspiration Hazard | ✓ |

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

| | Endpoint | Test Duration (hr) | Species | Value | Source |
|----------------|---------------|--------------------|---------------|---------------|---------------|
| CARBON REMOVER | Not Available | Not Available | Not Available | Not Available | Not Available |

CARBON REMOVER

| | Endpoint | Test Duration (hr) | Species | Value | Source |
|---|---|--------------------|--|---------------|---------------|
| | dichlorotoluene | LC50 | 96h | Fish | 2mg/l |
| EC50 | | 72h | Algae or other aquatic plants | 1.4mg/l | 2 |
| EC50 | | 48h | Crustacea | 1mg/l | 2 |
| NOEC(ECx) | | 792h | Fish | 0.078mg/l | 2 |
| Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, aromatics (2-25%)- | Endpoint | Test Duration (hr) | Species | Value | Source |
| | EC50 | 48 | Crustacea Daphnia magna | 100mg/L | 8 |
| Hydrocarbons, C10, aromatics, <1% naphthalene | LC50 | 96 | Fish Oncorhynchus mykiss (Rainbow trout) | 10-100mg/L | 8 |
| | Not Available | Not Available | Not Available | Not Available | Not Available |
| tar acids, 3,5-xyleneol fraction | Endpoint | Test Duration (hr) | Species | Value | Source |
| | NOEC(ECx) | 96h | Fish | 0.3mg/l | 2 |
| Legend: | LC50 | 96h | Fish | 4.4mg/l | 2 |
| | EC50 | 72h | Algae or other aquatic plants | 14mg/l | 2 |
| | EC50 | 48h | Crustacea | 2.37mg/l | 2 |
| | EC50 | 96h | Algae or other aquatic plants | 100mg/l | 2 |
| | <p>Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data</p> | | | | |

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

DO NOT discharge into sewer or waterways.

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|------------|---------------------------------------|---------------------------------------|
| | No Data available for all ingredients | No Data available for all ingredients |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|------------|---------------------------------------|
| | No Data available for all ingredients |

Mobility in soil

| Ingredient | Mobility |
|------------|---------------------------------------|
| | No Data available for all ingredients |



SECTION 13 Disposal considerations

Waste treatment methods

| | |
|------------------------------|---|
| Product / Packaging disposal | <p>Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.</p> <ul style="list-style-type: none"> ▶ DO NOT allow wash water from cleaning or process equipment to enter drains. ▶ It may be necessary to collect all wash water for treatment before disposal. ▶ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▶ Recycle wherever possible or consult manufacturer for recycling options. ▶ Consult State Land Waste Authority for disposal. ▶ Bury or incinerate residue at an approved site. |
|------------------------------|---|

SECTION 14 Transport information

Labels Required

| | |
|------------------|---|
| |  |
| Marine Pollutant |  |

Land transport (UN)

| | | |
|------------------------------|--|----------------|
| UN number | 2810 | |
| UN proper shipping name | TOXIC LIQUID, ORGANIC, N.O.S. (Xylenol, Dichlorotoluene mixture) | |
| Transport hazard class(es) | Class | 6.1 |
| | Subrisk | Not Applicable |
| Packing group | III | |
| Environmental hazard | Environmentally hazardous | |
| Special precautions for user | Special provisions | 223; 274 |
| | Limited quantity | 5 L |

Air transport (ICAO-IATA / DGR)

| | | |
|------------------------------|--|----------------|
| UN number | 2810 | |
| UN proper shipping name | Toxic liquid, organic, n.o.s. * (Xylenol, Dichlorotoluene mixture) | |
| Transport hazard class(es) | ICAO/IATA Class | 6.1 |
| | ICAO / IATA Subrisk | Not Applicable |
| | ERG Code | 6L |
| Packing group | III | |
| Environmental hazard | Environmentally hazardous | |
| Special precautions for user | Special provisions | A3 A4 A137 |
| | Cargo Only Packing Instructions | 663 |
| | Cargo Only Maximum Qty / Pack | 220 L |
| | Passenger and Cargo Packing Instructions | 655 |
| | Passenger and Cargo Maximum Qty / Pack | 60 L |
| | Passenger and Cargo Limited Quantity Packing Instructions | Y642 |
| | Passenger and Cargo Limited Maximum Qty / Pack | 2 L |

Sea transport (IMDG-Code / GGVSee)

| | | |
|------------------------------|--|----------------|
| UN number | 2810 | |
| UN proper shipping name | TOXIC LIQUID, ORGANIC, N.O.S. (Xylenol, Dichlorotoluene mixture) | |
| Transport hazard class(es) | IMDG Class | 6.1 |
| | IMDG Subrisk | Not Applicable |
| Packing group | III | |
| Environmental hazard | Marine Pollutant | |
| Special precautions for user | EMS Number | F-A, S-A |
| | Special provisions | 223 274 |
| | Limited Quantities | 5 L |

Transport in bulk according to Annex II of MARPOL and the IBC code

Continued...

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

| Product name | Group |
|---|---------------|
| dichlorotoluene | Not Available |
| Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, aromatics (2-25%)- | Not Available |
| Hydrocarbones, C10, aromatics, <1% naphtalene | Not Available |
| tar acids, 3,5-xylenol fraction | Not Available |

Transport in bulk in accordance with the ICG Code

| Product name | Ship Type |
|---|---------------|
| dichlorotoluene | Not Available |
| Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, aromatics (2-25%)- | Not Available |
| Hydrocarbones, C10, aromatics, <1% naphtalene | Not Available |
| tar acids, 3,5-xylenol fraction | Not Available |

SECTION 15 Regulatory information**Safety, health and environmental regulations / legislation specific for the substance or mixture****dichlorotoluene is found on the following regulatory lists**

Not Applicable

Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, aromatics (2-25%)- is found on the following regulatory lists

Not Applicable

Hydrocarbones, C10, aromatics, <1% naphtalene is found on the following regulatory lists

Not Applicable

tar acids, 3,5-xylenol fraction is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List

National Inventory Status

| National Inventory | Status |
|--|---|
| Australia - AIIIC / Australia Non-Industrial Use | No (tar acids, 3,5-xylenol fraction) |
| Canada - DSL | No (dichlorotoluene; tar acids, 3,5-xylenol fraction) |
| Canada - NDSL | No (tar acids, 3,5-xylenol fraction) |
| China - IECSC | Yes |
| Europe - EINEC / ELINCS / NLP | Yes |
| Japan - ENCS | No (tar acids, 3,5-xylenol fraction) |
| Korea - KECI | No (dichlorotoluene; tar acids, 3,5-xylenol fraction) |
| New Zealand - NZIoC | No (tar acids, 3,5-xylenol fraction) |
| Philippines - PICCS | No (tar acids, 3,5-xylenol fraction) |
| USA - TSCA | No (tar acids, 3,5-xylenol fraction) |
| Taiwan - TCSI | No (tar acids, 3,5-xylenol fraction) |
| Mexico - INSQ | No (tar acids, 3,5-xylenol fraction) |
| Vietnam - NCI | No (tar acids, 3,5-xylenol fraction) |
| Russia - FBEPH | Yes |

Legend:

Yes = All CAS declared ingredients are on the inventory

No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require

National Inventory**Status***registration.***SECTION 16 Other information**

| | |
|----------------------|------------|
| Revision Date | 02/08/2021 |
| Initial Date | 09/04/2018 |

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

SDS Version Summary

| Version | Date of Update | Sections Updated |
|---------|----------------|---|
| 9.34 | 02/08/2021 | Acute Health (eye), Acute Health (skin), Classification, Fire Fighter (fire/explosion hazard), First Aid (skin), Handling Procedure, Ingredients, Personal Protection (hands/feet), Physical Properties |

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

CARBONCLEAN LT

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 575696 (25 liter)

Version No: 12.20

Safety Data Sheet

Issue Date: 07/06/2021

Print Date: 24/03/2022

L.GHS.SGP.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

| | |
|-------------------------------|---------------------------|
| Product name | CARBONCLEAN LT |
| Chemical Name | Not Applicable |
| Synonyms | Not Available |
| Chemical formula | Not Applicable |
| Other means of identification | 575696 (25 liter), 575696 |

Relevant identified uses of the substance or mixture and uses advised against

| | |
|--------------------------|--|
| Relevant identified uses | Carbonclean LT includes a chemical, quaternary alkyl methyl amine ethoxylate methyl chloride (CAS No 1554325-20-0), that is subject to a Significant New Use Rule (SNUR) at 40 CFR \$721.10859. The SNUR for this substance requires that you report to the EPA any predictable or purposeful release of a process stream containing the substance as defined in 40 CFR \$721.90(a)(4), (b)(4) and (c)(4) with N=29, through a Significant New Use Notice (SNUN). The calculation for the surface water concentrations is found in 40 CFR \$721.91 |
|--------------------------|--|

Details of the supplier of the safety data sheet

| | | | |
|-------------------------|---|---|--|
| Registered company name | Wilhelmsen Ships Service (S) Pte. Ltd. | Wilhelmsen Ships Service AS* Central Warehouse | Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/login?login=wilhelmsen |
| Address | 186 Pandan Loop Singapore 128376 Singapore | Willem Barentszstraat 50 Rotterdam Netherlands | -----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway |
| Telephone | +65 6395 4545 | +31 10 4877 777 | Not Available |
| Fax | Not Available | Not Available | Not Available |
| Website | http://www.wilhelmsen.com/services/maritime/compan | http://www.wilhelmsen.com | http://www.wilhelmsen.com |
| Email | wss.singapore@wilhelmsen.com | wss.rotterdam@wilhelmsen.com | wss.global.sdsinfo@wilhelmsen.com |

| | |
|-------------------------|---|
| Registered company name | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +31 10 4877 777 |
| Fax | Not Available |
| Website | http://www.wilhelmsen.com |
| Email | wss.rotterdam@wilhelmsen.com |

Emergency telephone number


| Association / Organisation | 24hrs - Chemtrec | Dutch nat. poison centre | 24hrs - Chemtrec |
|-----------------------------------|------------------|--------------------------|------------------|
| Emergency telephone numbers | +31-10-4877700 | + 31 88 7558561 | +31-10-4877700 |
| Other emergency telephone numbers | +31-10-4877700 | + 31 10 4877700 | +1 800 424 9300 |

| Association / Organisation | Dutch nat. poison centre |
|-----------------------------------|--------------------------|
| Emergency telephone numbers | + 31 30 274 88 88 |
| Other emergency telephone numbers | + 31-10-4877700 |

SECTION 2 Hazards identification**Classification of the substance or mixture**

| Classification | Specific Target Organ Toxicity - Repeated Exposure Category 2, Flammable Liquids Category 4, Serious Eye Damage/Eye Irritation Category 1 |
|----------------|---|
| | |

Label elements

| Hazard pictogram(s) |  |
|---------------------|--|
| | |

| Signal word | Danger |
|-------------|--------|
| | |

Hazard statement(s)

| | |
|------|--|
| H373 | May cause damage to organs through prolonged or repeated exposure. (Respiratory system) (Inhalation) |
| H227 | Combustible liquid. |
| H318 | Causes serious eye damage. |

Precautionary statement(s) Prevention

| | |
|------|--|
| P210 | Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. |
| P260 | Do not breathe mist/vapours/spray. |
| P280 | Wear protective gloves, protective clothing, eye protection and face protection. |

Precautionary statement(s) 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/doctor/physician/first aider. |
| P370+P378 | In case of fire: Use water spray/fog to extinguish. |

Precautionary statement(s) Storage

| | |
|-----------|--|
| P403+P235 | Store in a well-ventilated place. Keep cool. |
|-----------|--|

Precautionary statement(s) Disposal

| | |
|------|--|
| P501 | Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation. |
|------|--|

SECTION 3 Composition / information on ingredients**Substances**

See section below for composition of Mixtures

Mixtures

| CAS No | %[weight] | Name |
|---------------|-----------|--|
| 112-34-5* | 5-10 | <u>2-(2-butoxyethoxy)ethanol</u> |
| 160875-66-1* | 5-10 | <u>fatty alcohol ethoxylates</u> |
| 68439-46-3* | 10-30 | <u>primary c9-c11 alcoholethoxylate</u> |
| Not Available | 5-10 | <u>Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, aromatics (2-25%)-</u> |
| 1554325-20-0* | 1-5 | <u>Quaternary C12-C14 Alkylaminetoxilate chloride</u> |

SECTION 4 First aid measures**Description of first aid measures**

| | |
|---------------------|--|
| Eye Contact | <p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▶ Immediately hold eyelids apart and flush the eye continuously with running water. ▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▶ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▶ Transport to hospital or doctor without delay. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. |
| Skin Contact | <p>If skin contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately remove all contaminated clothing, including footwear. ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation. |
| Inhalation | <ul style="list-style-type: none"> ▶ If fumes, aerosols or combustion products are inhaled remove from contaminated area. ▶ Other measures are usually unnecessary. |
| Ingestion | <ul style="list-style-type: none"> ▶ If swallowed do NOT induce vomiting. ▶ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▶ Observe the patient carefully. ▶ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▶ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▶ Seek medical advice. |

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 Firefighting measures**Extinguishing media**

- ▶ Water spray or fog.
- ▶ Foam.
- ▶ Dry chemical powder.

Special hazards arising from the substrate or mixture

| | |
|-----------------------------|-------------|
| Fire Incompatibility | None known. |
|-----------------------------|-------------|

Advice for firefighters

| | |
|------------------------------|--|
| Fire Fighting | <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear full body protective clothing with breathing apparatus. ▶ Prevent, by any means available, spillage from entering drains or water course. |
| Fire/Explosion Hazard | <ul style="list-style-type: none"> ▶ Combustible. ▶ Slight fire hazard when exposed to heat or flame. ▶ Heating may cause expansion or decomposition leading to violent rupture of containers. <p>May emit poisonous fumes. May emit corrosive fumes.</p> |

SECTION 6 Accidental release measures**Personal precautions, protective equipment and emergency procedures**

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

| | |
|---------------------|---|
| Minor Spills | <ul style="list-style-type: none"> Remove all ignition sources. Clean up all spills immediately. Avoid breathing vapours and contact with skin and eyes. |
| Major Spills | <p>Moderate hazard.</p> <ul style="list-style-type: none"> Clear area of personnel and move upwind. Alert Fire Brigade and tell them location and nature of hazard. |

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

| | |
|--------------------------|--|
| Safe handling | <ul style="list-style-type: none"> Avoid all personal contact, including inhalation. Wear protective clothing when risk of exposure occurs. Use in a well-ventilated area. DO NOT allow clothing wet with material to stay in contact with skin |
| Other information | <ul style="list-style-type: none"> Store in original containers. Keep containers securely sealed. No smoking, naked lights or ignition sources. |

Conditions for safe storage, including any incompatibilities

| | |
|--------------------------------|--|
| Suitable container | <ul style="list-style-type: none"> Metal can or drum Packaging as recommended by manufacturer. Check all containers are clearly labelled and free from leaks. |
| Storage incompatibility | None known |



X — Must not be stored together

0 — May be stored together with specific preventions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Not Available

Emergency Limits

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|---------------------------|--------|--------|---------|
| 2-(2-butoxyethoxy)ethanol | 30 ppm | 33 ppm | 200 ppm |

| Ingredient | Original IDLH | Revised IDLH |
|---|---------------|---------------|
| 2-(2-butoxyethoxy)ethanol | Not Available | Not Available |
| fatty alcohol ethoxylates | Not Available | Not Available |
| primary c9-c11 alcoholethoxylate | Not Available | Not Available |
| Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, aromatics (2-25%)- | Not Available | Not Available |

Continued...

| Ingredient | Original IDLH | Revised IDLH |
|--|---------------|---------------|
| Quaternary C12-C14 Alkylaminetoxilate chloride | Not Available | Not Available |

Occupational Exposure Banding

| Ingredient | Occupational Exposure Band Rating | Occupational Exposure Band Limit |
|--|-----------------------------------|----------------------------------|
| 2-(2-butoxyethoxy)ethanol | E | ≤ 0.1 ppm |
| fatty alcohol ethoxylates | E | ≤ 0.1 ppm |
| primary c9-c11 alcoholethoxylate | E | ≤ 0.1 ppm |
| Quaternary C12-C14 Alkylaminetoxilate chloride | E | ≤ 0.01 mg/m ³ |


Notes:

Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.

MATERIAL DATA

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more.

Exposure controls

| | |
|---|---|
| Appropriate engineering controls | Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. |
| Personal protection |  |
| Eye and face protection | <ul style="list-style-type: none"> ▶ Safety glasses with side shields. ▶ Chemical goggles. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. |
| Skin protection | See Hand protection below |
| Hands/feet protection | <ul style="list-style-type: none"> ▶ Wear chemical protective gloves, e.g. PVC. ▶ Wear safety footwear or safety gumboots, e.g. Rubber <p>The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.</p> |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none"> ▶ Overalls. ▶ P.V.C apron. ▶ Barrier cream. |

SECTION 9 Physical and chemical properties**Information on basic physical and chemical properties**

| | | | |
|-------------------------|---------------|--|---------------|
| Appearance | Yellow | | |
| Physical state | Liquid | Relative density (Water = 1) | 0.950 - 0.960 |
| Odour | Not Available | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | Not Available |
| pH (as supplied) | Not Available | Decomposition temperature | Not Available |

Continued...

CARBONCLEAN LT

| | | | |
|---|------------------------|--|----------------|
| Melting point / freezing point (°C) | Not Available | Viscosity (cSt) | Not Available |
| Initial boiling point and boiling range (°C) | >100 | Molecular weight (g/mol) | Not Available |
| Flash point (°C) | >61 | Taste | Not Available |
| Evaporation rate | Not Available BuAC = 1 | Explosive properties | Not Available |
| Flammability | Combustible. | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | Not Applicable | Surface Tension (dyn/cm or mN/m) | Not Available |
| Lower Explosive Limit (%) | Not Applicable | Volatile Component (%vol) | Not Available |
| Vapour pressure (kPa) | Not Available | Gas group | Not Available |
| Solubility in water | Miscible | pH as a solution (Not Available%) | Not Applicable |
| Vapour density (Air = 1) | Not Available | VOC g/L | Not Available |

SECTION 10 Stability and reactivity

| | |
|---|--|
| Reactivity | See section 7 |
| Chemical stability | <ul style="list-style-type: none"> ▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur. |
| Possibility of hazardous reactions | See section 7 |
| Conditions to avoid | See section 7 |
| Incompatible materials | See section 7 |
| Hazardous decomposition products | See section 5 |

SECTION 11 Toxicological information

Information on toxicological effects

| | |
|---------------------|--|
| Inhaled | The material is not thought to produce either adverse health effects or irritation of the respiratory tract following inhalation (as classified by EC Directives using animal models). Nevertheless, adverse systemic effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting. |
| Ingestion | Accidental ingestion of the material may be damaging to the health of the individual. |
| Skin Contact | <p>Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions. Repeated exposure may cause skin cracking, flaking or drying following normal handling and use.</p> <p>Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p> |
| Eye | When applied to the eye(s) of animals, the material produces severe ocular lesions which are present twenty-four hours or more after instillation. |
| Chronic | Long-term exposure to the product is not thought to produce chronic effects adverse to health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course. Prolonged or repeated skin contact may cause drying with cracking, irritation and possible dermatitis following. |

| | | |
|----------------------------------|---|----------------------------------|
| CARBONCLEAN LT | TOXICITY | IRRITATION |
| | Not Available | Not Available |
| 2-(2-butoxyethoxy)ethanol | TOXICITY | IRRITATION |
| | Dermal (rabbit) LD50: 4120 mg/kg ^[2] | Eye (rabbit): 20 mg/24h moderate |

Continued...

| | | |
|---|--|--|
| | Oral (Rat) LD50; 5660 mg/kg ^[2] | Eye (rabbit): 5 mg - SEVERE |
| fatty alcohol ethoxylates | TOXICITY | IRRITATION |
| | Not Available | Not Available |
| primary c9-c11 alcoholethoxylate | TOXICITY | IRRITATION |
| | Dermal (rabbit) LD50: >2000 mg/kg ^[2] | Eye (human): SEVERE |
| | Dermal (rabbit) LD50: >5000 mg/kg * ^[2] | Eye: adverse effect observed (irritating) ^[1] |
| | Oral (Rat) LD50; 1378 mg/kg ^[2] | Skin: no adverse effect observed (not irritating) ^[1] |
| | Oral (Rat) LD50; 1400 mg/kg * ^[2] | Skin: SEVERE |
| Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, aromatics (2-25%)- | TOXICITY | IRRITATION |
| | Dermal (Other) LD50: >3400 mg/kg ^[2] | Not Available |
| | Inhalation(Rat) LC50; 13,1 mg/kg ^[2] | |
| Quaternary C12-C14 Alkylaminetoxilate chloride | TOXICITY | IRRITATION |
| | Oral (Rat) LD50; >300 mg/kg ^[2] | Not Available |
| Legend: | 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances | |

| | |
|--|--|
| 2-(2-butoxyethoxy)ethanol | <p>For diethylene glycol monoalkyl ethers and their acetates: This category includes diethylene glycol ethyl ether (DGEE), diethylene glycol propyl ether (DGPE) diethylene glycol butyl ether (DGBE) and diethylene glycol hexyl ether (DGHE) and their acetates.</p> <p>Acute toxicity: There are adequate oral, inhalation and/or dermal toxicity studies on the category members. Oral LD50 values in rats for all category members are all > 3000 mg/kg bw, with values generally decreasing with increasing molecular weight. Four to eight hour acute inhalation toxicity studies were conducted for all category members except DGPE in rats at the highest vapour concentrations achievable.</p> |
| primary c9-c11 alcoholethoxylate | <p>Human beings have regular contact with alcohol ethoxylates through a variety of industrial and consumer products such as soaps, detergents, and other cleaning products . Exposure to these chemicals can occur through ingestion, inhalation, or contact with the skin or eyes. Studies of acute toxicity show that volumes well above a reasonable intake level would have to occur to produce any toxic response.</p> <p>Alcohol ethoxylates are according to CESIO (2000) classified as Irritant or Harmful depending on the number of EO-units: EO < 5 gives Irritant (Xi) with R38 (Irritating to skin) and R41 (Risk of serious damage to eyes) EO > 5-15 gives Harmful (Xn) with R22 (Harmful if swallowed) - R38/41 EO > 15-20 gives Harmful (Xn) with R22-41 >20 EO is not classified (CESIO 2000) Oxo-AE, C13 EO10 and C13 EO15, are Irritating (Xi) with R36/38 (Irritating to eyes and skin) . AE are not included in Annex 1 of the list of dangerous substances of the Council Directive 67/548/EEC</p> <p>In general, alcohol ethoxylates (AE) are readily absorbed through the skin of guinea pigs and rats and through the gastrointestinal mucosa of rats. AE are quickly eliminated from the body through the urine, faeces, and expired air (CO₂). Orally dosed AE was absorbed rapidly and extensively in rats, and more than 75% of the dose was absorbed. When applied to the skin of humans, the doses were absorbed slowly and incompletely (50% absorbed in 72 hours).</p> <p>The material may produce severe skin irritation after prolonged or repeated exposure, and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) thickening of the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis. Prolonged contact is unlikely, given the severity of response, but repeated exposures may produce severe ulceration.</p> <p>Dermal (rabbit): 4000 mg/kg * Somnolence, ataxia, diarrhoea recorded.</p> |
| 2-(2-butoxyethoxy)ethanol & primary c9-c11 alcoholethoxylate | The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. |

| | | | |
|--------------------------------------|---|--------------------------|---|
| Acute Toxicity | ✗ | Carcinogenicity | ✗ |
| Skin Irritation/Corrosion | ✗ | Reproductivity | ✗ |
| Serious Eye Damage/Irritation | ✓ | STOT - Single Exposure | ✗ |
| Respiratory or Skin sensitisation | ✗ | STOT - Repeated Exposure | ✓ |
| Mutagenicity | ✗ | Aspiration Hazard | ✗ |

Legend: ✘ – Data either not available or does not fill the criteria for classification
✔ – Data available to make classification

SECTION 12 Ecological information

Toxicity

| CARBONCLEAN LT | Endpoint | Test Duration (hr) | Species | Value | Source |
|--|--|--|-------------------------------|---------------|---------------|
| | Not Available | Not Available | Not Available | Not Available | Not Available |
| 2-(2-butoxyethoxy)ethanol | Endpoint | Test Duration (hr) | Species | Value | Source |
| | NOEC(ECx) | 96h | Algae or other aquatic plants | >=100mg/l | 1 |
| | EC50 | 72h | Algae or other aquatic plants | 1101mg/l | 2 |
| | LC50 | 96h | Fish | 1300mg/l | 2 |
| | EC50 | 48h | Crustacea | >100mg/l | 1 |
| EC50 | 96h | Algae or other aquatic plants | >100mg/l | 1 | |
| fatty alcohol ethoxylates | Endpoint | Test Duration (hr) | Species | Value | Source |
| | Not Available | Not Available | Not Available | Not Available | Not Available |
| primary c9-c11 alcoholethoxylate | Endpoint | Test Duration (hr) | Species | Value | Source |
| | NOEC(ECx) | 720h | Fish | 0.11-0.28mg/l | 2 |
| | LC50 | 96h | Fish | 5-7mg/l | 2 |
| | EC50 | 48h | Crustacea | 2.5mg/l | 2 |
| EC50 | 96h | Algae or other aquatic plants | 1.4mg/l | 2 | |
| Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, aromatics (2-25%) | Endpoint | Test Duration (hr) | Species | Value | Source |
| | EC50 | 48 | Crustacea Daphnia magna | 100mg/L | 8 |
| LC50 | 96 | Fish Oncorhynchus mykiss (Rainbow trout) | 10-100mg/L | 8 | |
| Quaternary C12-C14 Alkylaminetoxilate chloride | Endpoint | Test Duration (hr) | Species | Value | Source |
| | Not Available | Not Available | Not Available | Not Available | Not Available |
| Legend: | Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data | | | | |

Harmful to aquatic organisms.

DO NOT discharge into sewer or waterways.

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|---------------------------|-------------------------|------------------|
| 2-(2-butoxyethoxy)ethanol | LOW | LOW |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|---------------------------|------------------|
| 2-(2-butoxyethoxy)ethanol | LOW (BCF = 0.46) |

Mobility in soil

| Ingredient | Mobility |
|---------------------------|----------------|
| 2-(2-butoxyethoxy)ethanol | LOW (KOC = 10) |

SECTION 13 Disposal considerations

Waste treatment methods

| | |
|-------------------------------------|--|
| Product / Packaging disposal | <p>Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.</p> <ul style="list-style-type: none"> ▶ DO NOT allow wash water from cleaning or process equipment to enter drains. ▶ It may be necessary to collect all wash water for treatment before disposal. ▶ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▶ Recycle wherever possible or consult manufacturer for recycling options. ▶ Consult State Land Waste Management Authority for disposal. ▶ Bury residue in an authorised landfill. |
|-------------------------------------|--|

SECTION 14 Transport information

Labels Required

| | |
|-------------------------|----|
| Marine Pollutant | NO |
|-------------------------|----|

Land transport (UN): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

| Product name | Group |
|---|---------------|
| 2-(2-butoxyethoxy)ethanol | Not Available |
| fatty alcohol ethoxylates | Not Available |
| primary c9-c11 alcoholethoxylate | Not Available |
| Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, aromatics (2-25%)- | Not Available |
| Quaternary C12-C14 Alkylaminetoxilate chloride | Not Available |

Transport in bulk in accordance with the ICG Code

| Product name | Ship Type |
|---|---------------|
| 2-(2-butoxyethoxy)ethanol | Not Available |
| fatty alcohol ethoxylates | Not Available |
| primary c9-c11 alcoholethoxylate | Not Available |
| Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, aromatics (2-25%)- | Not Available |
| Quaternary C12-C14 Alkylaminetoxilate chloride | Not Available |

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

2-(2-butoxyethoxy)ethanol is found on the following regulatory lists

Not Applicable

fatty alcohol ethoxylates is found on the following regulatory lists

Not Applicable

primary c9-c11 alcoholethoxylate is found on the following regulatory lists

Not Applicable

Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, aromatics (2-25%)- is found on the following regulatory lists

Not Applicable

Quaternary C12-C14 Alkylaminetoxilate chloride is found on the following regulatory lists

Not Applicable

National Inventory Status

| National Inventory | Status |
|--|---|
| Australia - AIC / Australia Non-Industrial Use | No (Quaternary C12-C14 Alkylaminetoxilate chloride) |
| Canada - DSL | No (fatty alcohol ethoxylates; Quaternary C12-C14 Alkylaminetoxilate chloride) |
| Canada - NDSL | No (2-(2-butoxyethoxy)ethanol; fatty alcohol ethoxylates; primary c9-c11 alcoholethoxylate; Quaternary C12-C14 Alkylaminetoxilate chloride) |
| China - IECSC | No (Quaternary C12-C14 Alkylaminetoxilate chloride) |
| Europe - EINEC / ELINCS / NLP | No (fatty alcohol ethoxylates; primary c9-c11 alcoholethoxylate; Quaternary C12-C14 Alkylaminetoxilate chloride) |
| Japan - ENCS | No (Quaternary C12-C14 Alkylaminetoxilate chloride) |
| Korea - KECI | No (Quaternary C12-C14 Alkylaminetoxilate chloride) |
| New Zealand - NZIoC | No (Quaternary C12-C14 Alkylaminetoxilate chloride) |
| Philippines - PICCS | No (fatty alcohol ethoxylates; Quaternary C12-C14 Alkylaminetoxilate chloride) |
| USA - TSCA | No (Quaternary C12-C14 Alkylaminetoxilate chloride) |
| Taiwan - TCSI | No (Quaternary C12-C14 Alkylaminetoxilate chloride) |
| Mexico - INSQ | No (fatty alcohol ethoxylates; Quaternary C12-C14 Alkylaminetoxilate chloride) |
| Vietnam - NCI | No (Quaternary C12-C14 Alkylaminetoxilate chloride) |
| Russia - FBEPH | No (fatty alcohol ethoxylates; primary c9-c11 alcoholethoxylate; Quaternary C12-C14 Alkylaminetoxilate chloride) |
| Legend: | Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration. |

SECTION 16 Other information

| | |
|----------------------|------------|
| Revision Date | 07/06/2021 |
| Initial Date | 08/03/2018 |

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

SDS Version Summary

| Version | Date of Update | Sections Updated |
|---------|----------------|--|
| 11.20 | 07/06/2021 | Acute Health (skin), Chronic Health, Classification, Ingredients, Physical Properties, Use |

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Carbonclean LT includes a chemical, quaternary alkyl methyl amine ethoxylate methyl chloride (CAS No. 1554325-20-0), that is subject to a Significant New Use Rule (SNUR) at 40 CFR §721.10859. The SNUR for this substance requires that you report to the EPA any predictable or purposeful release of a process stream containing the substance as defined in 40 CFR §721.90 (a)(4), (b)(4), and (c)(4), with N = 29, through a Significant New Use Notice (SNUN). The calculation for the surface water concentrations is found in 40 CFR §721.91.

Powered by AuthorITe, from Chemwatch.

CargoBarrier HD

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 779092

Version No: 1.1

Safety Data Sheet

Issue Date: 01/10/2020

Print Date: 24/03/2022

L.GHS.SGP.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

| | |
|-------------------------------|-------------------------------------|
| Product name | CargoBarrier HD |
| Chemical Name | Not Applicable |
| Synonyms | Product Part Number 779092 (25 ltr) |
| Chemical formula | Not Applicable |
| Other means of identification | 779092 |

Relevant identified uses of the substance or mixture and uses advised against

| | |
|--------------------------|---|
| Relevant identified uses | Use according to manufacturer's directions. |
|--------------------------|---|

Details of the supplier of the safety data sheet

| | | | |
|-------------------------|---|--|---|
| Registered company name | Wilhelmsen Ships Service (S) Pte. Ltd. | Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | 186 Pandan Loop Singapore 128376 Singapore | -----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +65 6395 4545 | Not Available | +31 10 4877 777 |
| Fax | Not Available | Not Available | Not Available |
| Website | http://www.wilhelmsen.com/services/maritime/compan | http://www.wilhelmsen.com | http://www.wilhelmsen.com |
| Email | wss.singapore@wilhelmsen.com | wss.global.sdsinfo@wilhelmsen.com | wss.rotterdam@wilhelmsen.com |

| | |
|-------------------------|---|
| Registered company name | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +31 10 4877 777 |
| Fax | Not Available |
| Website | http://www.wilhelmsen.com |
| Email | wss.rotterdam@wilhelmsen.com |

Emergency telephone number

| | | | |
|----------------------------|------------------|------------------|--------------------------|
| Association / Organisation | 24hrs - Chemtrec | 24hrs - Chemtrec | Dutch nat. poison centre |
|----------------------------|------------------|------------------|--------------------------|

| | | | |
|-----------------------------------|--------------------------|-----------------|-----------------|
| Emergency telephone numbers | +31-10-4877700 | +31-10-4877700 | + 31 88 7558561 |
| Other emergency telephone numbers | +31-10-4877700 | +1 800 424 9300 | + 31 10 4877700 |
| Association / Organisation | Dutch nat. poison centre | | |
| Emergency telephone numbers | + 31 30 274 88 88 | | |
| Other emergency telephone numbers | + 31-10-4877700 | | |

SECTION 2 Hazards identification

Classification of the substance or mixture

| | |
|----------------|----------------|
| Classification | Not Applicable |
|----------------|----------------|

Label elements

| | |
|---------------------|----------------|
| Hazard pictogram(s) | Not Applicable |
|---------------------|----------------|

| | |
|-------------|-----------------------|
| Signal word | Not Applicable |
|-------------|-----------------------|

Hazard statement(s)

Not Applicable

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

| CAS No | %[weight] | Name |
|-----------|------------|--------------------------------------|
| 141-43-5* | 0.1-1 | <u>2-aminoethanol</u> |
| 2682-20-4 | 0.001-0.01 | <u>2-methyl-4-isothiazolin-3-one</u> |
| 2634-33-5 | 0.001-0.01 | <u>1,2-benzisothiazoline-3-one</u> |

SECTION 4 First aid measures

Description of first aid measures

| | |
|--------------|--|
| Eye Contact | <p>If this product comes in contact with eyes:</p> <ul style="list-style-type: none"> ▶ Wash out immediately with water. ▶ If irritation continues, seek medical attention. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. |
| Skin Contact | <p>If skin contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately remove all contaminated clothing, including footwear. ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation. |

| | |
|------------|---|
| Inhalation | <ul style="list-style-type: none"> ▶ If fumes, aerosols or combustion products are inhaled remove from contaminated area. ▶ Other measures are usually unnecessary. |
| Ingestion | <ul style="list-style-type: none"> ▶ Immediately give a glass of water. ▶ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor. |

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 Firefighting measures

Extinguishing media

- ▶ There is no restriction on the type of extinguisher which may be used.
- ▶ Use extinguishing media suitable for surrounding area.

Special hazards arising from the substrate or mixture

| | |
|----------------------|-------------|
| Fire Incompatibility | None known. |
|----------------------|-------------|

Advice for firefighters

| | |
|-----------------------|--|
| Fire Fighting | <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus plus protective gloves in the event of a fire. ▶ Prevent, by any means available, spillage from entering drains or water courses. |
| Fire/Explosion Hazard | <ul style="list-style-type: none"> ▶ Non combustible. ▶ Not considered a significant fire risk, however containers may burn. May emit corrosive fumes. |

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

| | |
|--------------|---|
| Minor Spills | <ul style="list-style-type: none"> ▶ Clean up all spills immediately. ▶ Avoid breathing vapours and contact with skin and eyes. ▶ Control personal contact with the substance, by using protective equipment. |
| Major Spills | <ul style="list-style-type: none"> ▶ Absorb or contain isothiazolinone liquid spills with sand, earth, inert material or vermiculite. ▶ The absorbent (and surface soil to a depth sufficient to remove all of the biocide) should be shovelled into a drum and treated with an 11% solution of sodium metabisulfite (Na₂S₂O₅) or sodium bisulfite (NaHSO₃), or 12% sodium sulfite (Na₂SO₃) and 8% hydrochloric acid (HCl). ▶ Glutathione has also been used to inactivate the isothiazolinones. |

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

| | |
|-------------------|--|
| Safe handling | <ul style="list-style-type: none"> ▶ Avoid all personal contact, including inhalation. ▶ Wear protective clothing when risk of exposure occurs. ▶ Use in a well-ventilated area. ▶ DO NOT allow clothing wet with material to stay in contact with skin |
| Other information | |

Conditions for safe storage, including any incompatibilities

| | |
|-------------------------|---|
| Suitable container | <ul style="list-style-type: none"> ▶ Polyethylene or polypropylene container. ▶ Packing as recommended by manufacturer. ▶ Check all containers are clearly labelled and free from leaks. |
| Storage incompatibility | None known |



X — Must not be stored together

0 — May be stored together with specific preventions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

| Source | Ingredient | Material name | TWA | STEL | Peak | Notes |
|---|----------------|---------------|-------------------------------|------------------------------|---------------|---------------|
| Singapore Permissible Exposure Limits of Toxic Substances | 2-aminoethanol | Ethanolamine | 3 ppm / 7.5 mg/m ³ | 15 mg/m ³ / 6 ppm | Not Available | Not Available |

Emergency Limits

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|----------------|--------|---------|-----------|
| 2-aminoethanol | 6 ppm | 170 ppm | 1,000 ppm |

| Ingredient | Original IDLH | Revised IDLH |
|-------------------------------|---------------|---------------|
| 2-aminoethanol | 30 ppm | Not Available |
| 2-methyl-4-isothiazolin-3-one | Not Available | Not Available |
| 1,2-benzisothiazoline-3-one | Not Available | Not Available |

Occupational Exposure Banding

| Ingredient | Occupational Exposure Band Rating | Occupational Exposure Band Limit |
|-------------------------------|-----------------------------------|-----------------------------------|
| 2-methyl-4-isothiazolin-3-one | D | > 0.01 to ≤ 0.1 mg/m ³ |
| 1,2-benzisothiazoline-3-one | E | ≤ 0.01 mg/m ³ |

Notes: Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.

MATERIAL DATA


Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more.

1,2-Benzisothiazoline-3-one (BIT) produces sensitising effects and causes skin irritation at concentrations of 0.05%. Solutions containing the substance should contain levels considerably lower than 0.05%.

CEL TWA: 0.1 mg/m³; STEL 0.3 mg/m³ total isothiazolinones (Rohm and Haas)

(CEL = Chemwatch Exposure Limit)

Exposure controls

| | |
|---|---|
| Appropriate engineering controls | Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. |
| Personal protection |  |
| Eye and face protection | <ul style="list-style-type: none"> ▶ Safety glasses with side shields. ▶ Chemical goggles. |

| | |
|------------------------------|---|
| | <ul style="list-style-type: none"> ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. |
| Skin protection | See Hand protection below |
| Hands/feet protection | <ul style="list-style-type: none"> ▸ Wear chemical protective gloves, e.g. PVC. ▸ Wear safety footwear or safety gumboots, e.g. Rubber <p>The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.</p> <p>The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.</p> <ul style="list-style-type: none"> ▸ Butyl rubber gloves · Nitrile rubber gloves (Note: Nitric acid penetrates nitrile gloves in a few minutes.) |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none"> ▸ Overalls. ▸ P.V.C apron. ▸ Barrier cream. |

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

CargoBarrier HD

| Material | CPI |
|------------------|-----|
| BUTYL | A |
| BUTYL/NEOPRENE | A |
| HYPALON | A |
| NATURAL+NEOPRENE | A |
| NEOPRENE | A |
| NEOPRENE/NATURAL | A |
| NITRILE | A |
| PVA | A |
| VITON | A |
| NATURAL RUBBER | B |
| NITRILE+PVC | B |
| PVC | B |

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

| | | | |
|--|--------------------------|--|----------------|
| Appearance | Low viscous, milky white | | |
| Physical state | Liquid | Relative density (Water = 1) | 1 |
| Odour | Not Available | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | Not Applicable |
| pH (as supplied) | 9 | Decomposition temperature | Not Applicable |
| Melting point / freezing point (°C) | Not Applicable | Viscosity (cSt) | Not Available |

| | | | |
|--|----------------|-----------------------------------|----------------|
| Initial boiling point and boiling range (°C) | Not Applicable | Molecular weight (g/mol) | Not Applicable |
| Flash point (°C) | Not Applicable | Taste | Not Available |
| Evaporation rate | Not Available | Explosive properties | Not Available |
| Flammability | Not Applicable | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | Not Applicable | Surface Tension (dyn/cm or mN/m) | Not Available |
| Lower Explosive Limit (%) | Not Applicable | Volatile Component (%vol) | Not Applicable |
| Vapour pressure (kPa) | Not Applicable | Gas group | Not Available |
| Solubility in water | Miscible | pH as a solution (Not Available%) | Not Available |
| Vapour density (Air = 1) | Not Applicable | VOC g/L | Not Applicable |

SECTION 10 Stability and reactivity

| | |
|------------------------------------|--|
| Reactivity | See section 7 |
| Chemical stability | <ul style="list-style-type: none"> ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur. |
| Possibility of hazardous reactions | See section 7 |
| Conditions to avoid | See section 7 |
| Incompatible materials | See section 7 |
| Hazardous decomposition products | See section 5 |

SECTION 11 Toxicological information

Information on toxicological effects

| | |
|--------------|--|
| Inhaled | The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting. |
| Ingestion | The material has NOT been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence. The material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g liver, kidney) damage is evident. Isothiazolinones are moderately to highly toxic by oral administration. The major signs of toxicity were severe gastric irritation, lethargy, and ataxia |
| Skin Contact | <p>Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.</p> <p>Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis.</p> <p>Solutions of 0.5% strength 1,2-benzisothiazoline-3-one (BIT) are irritating to the skin. Allergic effects also begin at 0.05% and have been confirmed in a series of case and patch test studies. When the substance was applied to human volunteers under an occlusive patch the maximum tolerated doses was 0.05%.</p> <p>Aqueous solutions of isothiazolinones may be irritating or even corrosive depending on concentration. Solutions containing more than 0.5% (5000 ppm active substance) may produce severe irritation of human skin whilst solutions containing more than 100 ppm may irritate the skin.</p> |
| Eye | <p>Although the liquid is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).</p> <p>Solutions containing isothiazolinones may produce corrosion of the mucous membranes and cornea. Instillation of 0.1 ml of an aqueous solution containing 560 ppm isothiazolinone into rabbit eye did not produce irritation whereas concentrations, typically around 3% and 5.5 %, were severely irritating or corrosive to the eye.. Symptoms included clouding of the cornea, chemosis and swelling of the eyelids.</p> |
| Chronic | <p>Long-term exposure to the product is not thought to produce chronic effects adverse to health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course.</p> <p>In a teratogenic study in rats concentrations of up to 40 mg/kg 1,2-benzisothiazoline-3-one (BIT) were neither embryotoxic nor teratogenic. The material is not mutagenic. In a 2-year carcinogenicity study with rats, BIT did not produce excess tumours.</p> |

| | | |
|-------------------------------|---|---|
| | The isothiazolinones are known contact sensitisers. Data are presented which demonstrate that, in comparison with the chlorinated and dichlorinated compounds which share immunological cross-reactivity, the non-chlorinated isothiazolinones have a lower potential for sensitization and no documented immunological cross-reaction with the chlorinated isothiazolinones. The risk of sensitization depends on how contact with the product occurs. | |
| CargoBarrier HD | TOXICITY | IRRITATION |
| | Not Available | Not Available |
| 2-aminoethanol | TOXICITY | IRRITATION |
| | Dermal (rabbit) LD50: 1000 mg/kg ^[2] | Eye (rabbit): 0.76 mg - SEVERE |
| | Oral (Rat) LD50; 1510 mg/kg * ^[2] | Skin (rabbit):505 mg open-moderate |
| | Oral (Rat) LD50; 2050 mg/kg ^[2] | |
| 2-methyl-4-isothiazolin-3-one | TOXICITY | IRRITATION |
| | dermal (rat) LD50: 242 mg/kg ^[1] | Eye: adverse effect observed (irreversible damage) ^[1] |
| | Inhalation(Rat) LC50; 0.1 mg/l4h ^[1] | Skin: adverse effect observed (corrosive) ^[1] |
| | Oral (Rat) LD50; 120 mg/kg ^[1] | |
| 1,2-benzisothiazoline-3-one | TOXICITY | IRRITATION |
| | dermal (rat) LD50: >2000 mg/kg ^[1] | Eye: adverse effect observed (irreversible damage) ^[1] |
| | Oral (Rat) LD50; 454 mg/kg ^[1] | Skin: no adverse effect observed (not irritating) ^[1] |
| Legend: | 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances | |

| | |
|----------------|--|
| 2-aminoethanol | <p>While it is difficult to generalise about the full range of potential health effects posed by exposure to the many different amine compounds, characterised by those used in the manufacture of polyurethane and polyisocyanurate foams, it is agreed that overexposure to the majority of these materials may cause adverse health effects.</p> <ul style="list-style-type: none"> ▶ Many amine-based compounds can induce histamine liberation, which, in turn, can trigger allergic and other physiological effects, including bronchoconstriction or bronchial asthma and rhinitis. ▶ Systemic symptoms include headache, nausea, faintness, anxiety, a decrease in blood pressure, tachycardia (rapid heartbeat), itching, erythema (reddening of the skin), urticaria (hives), and facial edema (swelling). Systemic effects (those affecting the body) that are related to the pharmacological action of amines are usually transient. <p>Typically, there are four routes of possible or potential exposure: inhalation, skin contact, eye contact, and ingestion.</p> <p>Inhalation:</p> <p>Inhalation of vapors may, depending upon the physical and chemical properties of the specific product and the degree and length of exposure, result in moderate to severe irritation of the tissues of the nose and throat and can irritate the lungs. Products with higher vapour pressures have a greater potential for higher airborne concentrations. This increases the probability of worker exposure.</p> <p>Higher concentrations of certain amines can produce severe respiratory irritation, characterised by nasal discharge, coughing, difficulty in breathing, and chest pains.</p> <p>Chronic exposure via inhalation may cause headache, nausea, vomiting, drowsiness, sore throat, bronchopneumonia, and possible lung damage.</p> <p>The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.</p> <p>The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.</p> <p>* Bayer</p> |
| | 2-METHYL-4-ISOTHIAZOLIN-3-ONE |

| | |
|--|--|
| 1,2-BENZISOTHIAZOLINE-3-ONE | <p>The predominant fate of the thiazole ring is oxidative ring scission catalysed by cytochrome P450 (CYP) and formation of the corresponding alpha-dicarbonyl metabolites and thioamide derivatives. The well-established toxicity associated with thioamides and thioureas has led to the speculation that thiazole toxicity is attributed to ring scission yielding the corresponding thioamide metabolite. Ring opening has also been observed in benzothiazoles.</p> <p>Acute toxicity data show that 1,2-benzisothiazoline-3-one (BIT) is moderately toxic by the oral and dermal routes but that this chemical is a severe eye irritant. Irritation to the skin from acute data show only mild skin irritation, but repeated dermal application indicated a more significant skin irritation response.</p> <p>The neurotoxicity observed in the rat acute oral toxicity study (piloerection and upward curvature of the spine at 300 mg/kg and above; decreased activity, prostration, decreased abdominal muscle tone, reduced righting reflex, and decreased rate and depth of breathing at 900 mg/kg) and the acute dermal toxicity study (upward curvature of the spine was observed in increased incidence, but this was absent after day 5 post-dose at a dose of 2000 mg/kg) were felt to be at exposures in excess of those expected from the use pattern of this pesticide and that such effects would not be observed at estimated exposure doses.</p> |
| 2-aminoethanol & 2-METHYL-4-ISOTHIAZOLIN-3-ONE | <p>Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant.</p> |
| 2-METHYL-4-ISOTHIAZOLIN-3-ONE & 1,2-BENZISOTHIAZOLINE-3-ONE | <p>The following information refers to contact allergens as a group and may not be specific to this product. Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. In light of potential adverse effects, and to ensure a harmonised risk assessment and management, the EU regulatory framework for biocides has been established with the objective of ensuring a high level of protection of human and animal health and the environment. To this aim, it is required that risk assessment of biocidal products is carried out before they can be placed on the market. A central element in the risk assessment of the biocidal products are the utilization instructions that defines the dosage, application method and amount of applications and thus the exposure of humans and the environment to the biocidal substance.</p> <p>Humans may be exposed to biocidal products in different ways in both occupational and domestic settings. No significant acute toxicological data identified in literature search.</p> |

| | | | |
|--|---|---------------------------------|---|
| Acute Toxicity | ✗ | Carcinogenicity | ✗ |
| Skin Irritation/Corrosion | ✗ | Reproductivity | ✗ |
| Serious Eye Damage/Irritation | ✗ | STOT - Single Exposure | ✗ |
| Respiratory or Skin sensitisation | ✗ | STOT - Repeated Exposure | ✗ |
| Mutagenicity | ✗ | Aspiration Hazard | ✗ |

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

| CargoBarrier HD | Endpoint | Test Duration (hr) | Species | Value | Source |
|-------------------------------|---------------|--------------------|-------------------------------|-----------------|---------------|
| | Not Available | Not Available | Not Available | Not Available | Not Available |
| 2-aminoethanol | Endpoint | Test Duration (hr) | Species | Value | Source |
| | NOEC(ECx) | 72h | Algae or other aquatic plants | 4mg/l | 1 |
| | LC50 | 96h | Fish | 75mg/l | 1 |
| | EC50 | 72h | Algae or other aquatic plants | 15mg/l | 1 |
| | EC50 | 48h | Crustacea | 65mg/l | 1 |
| | EC50 | 96h | Algae or other aquatic plants | 80mg/l | 2 |
| 2-methyl-4-isothiazolin-3-one | Endpoint | Test Duration (hr) | Species | Value | Source |
| | LC50 | 96h | Fish | 0.081-0.122mg/L | 4 |
| | EC50 | 48h | Crustacea | 0.189-0.257mg/L | 4 |
| | NOEC(ECx) | 96h | Algae or other aquatic plants | 0.01mg/l | 2 |
| | EC50 | 96h | Algae or other aquatic plants | 0.063mg/l | 2 |

| 1,2-benzisothiazoline-3-one | Endpoint | Test Duration (hr) | Species | Value | Source |
|-----------------------------|-----------|--------------------|-----------|----------------|--------|
| | LC50 | 96h | Fish | 0.067-0.29mg/L | 4 |
| | EC50 | 48h | Crustacea | 0.097mg/L | 4 |
| | EC50(ECx) | 48h | Crustacea | 0.097mg/L | 4 |

Legend: Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data

The isothiazolinones are very toxic to marine organisms (fish, *Daphnia magna* and algae)

The high water solubility and low log Kow values of several chlorinated and non-chlorinated indicate a low potential for bioaccumulation.

Studies of 5-chloro-2-methyl-4-isothiazolin-3-one (CMI) in bluegill sunfish (*Lepomis macrochirus*) show BCF values of 102, 114 and 67 at nominal concentrations of 0.02, 0.12 and 0.8 mg/l. The BCF for 2-methyl-4-isothiazolin-3-one (MI) was determined at 2.3 at a nominal concentration of 0.12 mg/l

Primary biodegradation of MI and CMI occurred with half-lives of less than 24 hours in aerobic and anoxic sediments, and within a period of less than one week the parent compounds were depleted to very low levels that could not be clearly distinguished from analytical artifacts.

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|-------------------------------|-------------------------|------------------|
| 2-aminoethanol | LOW | LOW |
| 2-methyl-4-isothiazolin-3-one | HIGH | HIGH |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|-------------------------------|------------------------|
| 2-aminoethanol | LOW (LogKOW = -1.31) |
| 2-methyl-4-isothiazolin-3-one | LOW (LogKOW = -0.8767) |

Mobility in soil

| Ingredient | Mobility |
|-------------------------------|-------------------|
| 2-aminoethanol | HIGH (KOC = 1) |
| 2-methyl-4-isothiazolin-3-one | LOW (KOC = 27.88) |

SECTION 13 Disposal considerations

Waste treatment methods

| | |
|-------------------------------------|--|
| Product / Packaging disposal | <p>Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.</p> <ul style="list-style-type: none"> ▶ DO NOT allow wash water from cleaning or process equipment to enter drains. ▶ It may be necessary to collect all wash water for treatment before disposal. ▶ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▶ Recycle wherever possible. ▶ Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. ▶ Dispose of by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or incineration in a licensed apparatus (after admixture with suitable combustible material). |
|-------------------------------------|--|

SECTION 14 Transport information

Labels Required

| | |
|-------------------------|----|
| Marine Pollutant | NO |
|-------------------------|----|

Land transport (UN): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

| Product name | Group |
|-------------------------------|---------------|
| 2-aminoethanol | Not Available |
| 2-methyl-4-isothiazolin-3-one | Not Available |
| 1,2-benzisothiazoline-3-one | Not Available |

Transport in bulk in accordance with the ICG Code

| Product name | Ship Type |
|-------------------------------|---------------|
| 2-aminoethanol | Not Available |
| 2-methyl-4-isothiazolin-3-one | Not Available |
| 1,2-benzisothiazoline-3-one | Not Available |

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

2-aminoethanol is found on the following regulatory lists

Singapore Permissible Exposure Limits of Toxic Substances

2-methyl-4-isothiazolin-3-one is found on the following regulatory lists

Not Applicable

1,2-benzisothiazoline-3-one is found on the following regulatory lists

Not Applicable

National Inventory Status

| National Inventory | Status |
|--|---|
| Australia - AIIIC / Australia Non-Industrial Use | Yes |
| Canada - DSL | Yes |
| Canada - NDSL | No (2-aminoethanol; 2-methyl-4-isothiazolin-3-one; 1,2-benzisothiazoline-3-one) |
| China - IECSC | Yes |
| Europe - EINEC / ELINCS / NLP | Yes |
| Japan - ENCS | Yes |
| Korea - KECI | Yes |
| New Zealand - NZIoC | Yes |
| Philippines - PICCS | Yes |
| USA - TSCA | Yes |
| Taiwan - TCSI | Yes |
| Mexico - INSQ | Yes |
| Vietnam - NCI | Yes |
| Russia - FBEPH | Yes |
| Legend: | <i>Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.</i> |

SECTION 16 Other information

| | |
|----------------------|------------|
| Revision Date | 01/10/2020 |
| Initial Date | 01/10/2020 |

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

CargoClean HD

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 779104 (25 liter)

Version No: 3.12

Safety Data Sheet

Issue Date: 21/06/2021

Print Date: 24/03/2022

L.GHS.SGP.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

| | |
|--------------------------------------|--|
| Product name | CargoClean HD |
| Chemical Name | Not Applicable |
| Synonyms | Not Available |
| Proper shipping name | CAUSTIC ALKALI LIQUID, N.O.S. (contains potassium hydroxide) |
| Chemical formula | Not Applicable |
| Other means of identification | 779104 (25 liter), 779104 |

Relevant identified uses of the substance or mixture and uses advised against

| | |
|---------------------------------|-----------------------------|
| Relevant identified uses | Heavy duty alkaline cleaner |
|---------------------------------|-----------------------------|

Details of the supplier of the safety data sheet

| | | | |
|--------------------------------|---|---|---|
| Registered company name | Wilhelmsen Ships Service (S) Pte. Ltd. | Wilhelmsen Ships Service AS* Central Warehouse | Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen |
| Address | 186 Pandan Loop Singapore 128376 Singapore | Willem Barentszstraat 50 Rotterdam Netherlands | -----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway |
| Telephone | +65 6395 4545 | +31 10 4877 777 | Not Available |
| Fax | Not Available | Not Available | Not Available |
| Website | http://www.wilhelmsen.com/services/maritime/compan | http://www.wilhelmsen.com | http://www.wilhelmsen.com |
| Email | wss.singapore@wilhelmsen.com | wss.rotterdam@wilhelmsen.com | wss.global.sdsinfo@wilhelmsen.com |

| | |
|--------------------------------|---|
| Registered company name | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +31 10 4877 777 |
| Fax | Not Available |
| Website | http://www.wilhelmsen.com |
| Email | wss.rotterdam@wilhelmsen.com |

Emergency telephone number

CargoClean HD

| Association / Organisation | 24hrs - Chemtrec | Dutch nat. poison centre | 24hrs - Chemtrec |
|-----------------------------------|------------------|--------------------------|------------------|
| Emergency telephone numbers | +31-10-4877700 | + 31 88 7558561 | +31-10-4877700 |
| Other emergency telephone numbers | +31-10-4877700 | + 31 10 4877700 | +1 800 424 9300 |


| Association / Organisation | Dutch nat. poison centre |
|-----------------------------------|--------------------------|
| Emergency telephone numbers | + 31 30 274 88 88 |
| Other emergency telephone numbers | + 31-10-4877700 |

SECTION 2 Hazards identification

Classification of the substance or mixture

| | |
|----------------|--|
| Classification | Corrosive to Metals Category 1, Acute Toxicity (Oral) Category 4, Skin Corrosion/Irritation Category 2, Serious Eye Damage/Eye Irritation Category 2 |
|----------------|--|

Label elements

| | |
|---------------------|--|
| Hazard pictogram(s) |  |
|---------------------|--|

| | |
|-------------|---------|
| Signal word | Warning |
|-------------|---------|

Hazard statement(s)

| | |
|------|--------------------------------|
| H290 | May be corrosive to metals. |
| H302 | Harmful if swallowed. |
| H315 | Causes skin irritation. |
| H319 | Causes serious eye irritation. |

Precautionary statement(s) Prevention

| | |
|------|---|
| P234 | Keep only in original container. |
| P264 | Wash all exposed external body areas thoroughly after handling. |
| P270 | Do not eat, drink or smoke when using this product. |

Precautionary statement(s) 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. |
| P390 | Absorb spillage to prevent material damage. |

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

| | |
|------|--|
| P501 | Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation. |
|------|--|

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

| CAS No | %[weight] | Name |
|--------|-----------|------|
| | | |

Continued...

| CAS No | %[weight] | Name |
|---------------|-----------|--|
| 1310-58-3 | 2.5-5 | <u>potassium hydroxide</u> |
| 6834-92-0* | 1-2 | <u>disodium metasilicate</u> |
| 7758-29-4* | 1-5 | <u>sodium tripolyphosphate</u> |
| 1356964-77-6* | 1-5 | <u>N,N-Dimethyl 9-decenamide</u> |
| 111-76-2 | 1-5 | <u>ethylene glycol monobutyl ether</u> |
| Not Available | 1-5 | <u>Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, <2% aromatics</u> |
| 160875-66-1* | 1-5 | <u>Fatty alcohol ethoxylate</u> |
| 1554325-20-0* | <1 | <u>Quaternary C12-C14 Alkylaminetoxilate chloride</u> |

SECTION 4 First aid measures

Description of first aid measures

| | |
|---------------------|--|
| Eye Contact | <p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▶ Immediately hold eyelids apart and flush the eye continuously with running water. ▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▶ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▶ Transport to hospital or doctor without delay. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. |
| Skin Contact | <p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately flush body and clothes with large amounts of water, using safety shower if available. ▶ Quickly remove all contaminated clothing, including footwear. ▶ Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre. ▶ Transport to hospital, or doctor. |
| Inhalation | <ul style="list-style-type: none"> ▶ If fumes or combustion products are inhaled remove from contaminated area. ▶ Lay patient down. Keep warm and rested. ▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▶ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▶ Transport to hospital, or doctor, without delay. |
| Ingestion | <ul style="list-style-type: none"> ▶ For advice, contact a Poisons Information Centre or a doctor at once. ▶ Urgent hospital treatment is likely to be needed. ▶ If swallowed do NOT induce vomiting. ▶ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▶ Observe the patient carefully. ▶ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▶ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▶ Transport to hospital or doctor without delay. ▶ Avoid giving milk or oils. ▶ Avoid giving alcohol. ▶ If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus. |

Indication of any immediate medical attention and special treatment needed

Any material aspirated during vomiting may produce lung injury. Therefore emesis should not be induced mechanically or pharmacologically. Mechanical means should be used if it is considered necessary to evacuate the stomach contents; these include gastric lavage after endotracheal intubation. If spontaneous vomiting has occurred after ingestion, the patient should be monitored for difficult breathing, as adverse effects of aspiration into the lungs may be delayed up to 48 hours.

For acute or short term repeated exposures to ethylene glycol:

- ▶ Early treatment of ingestion is important. Ensure emesis is satisfactory.
- ▶ Test and correct for metabolic acidosis and hypocalcaemia.
- ▶ Apply sustained diuresis when possible with hypertonic mannitol.
- ▶ Evaluate renal status and begin haemodialysis if indicated. [I.L.O]
- ▶ Rapid absorption is an indication that emesis or lavage is effective only in the first few hours. Cathartics and charcoal are generally not effective.
- ▶ Correct acidosis, fluid/electrolyte balance and respiratory depression in the usual manner. Systemic acidosis (below 7.2) can be treated with intravenous sodium bicarbonate solution.
- ▶ Ethanol therapy prolongs the half-life of ethylene glycol and reduces the formation of toxic metabolites.
- ▶ Pyridoxine and thiamine are cofactors for ethylene glycol metabolism and should be given (50 to 100 mg respectively) intramuscularly, four times per day for 2 days.
- ▶ Magnesium is also a cofactor and should be replenished. The status of 4-methylpyrazole, in the treatment regime, is still uncertain. For clearance of the material and its metabolites, haemodialysis is much superior to peritoneal dialysis.

[Ellenhorn and Barceloux: Medical Toxicology]

It has been suggested that there is a need for establishing a new biological exposure limit before a workshift that is clearly below 100 mmol ethoxy-acetic acids per mole creatinine in morning urine of people occupationally exposed to ethylene glycol ethers. This arises from the finding that an increase in urinary stones may be associated with such exposures.

Laitinen J., et al: *Occupational & Environmental Medicine* 1996; 53, 595-600

For acute or short-term repeated exposures to highly alkaline materials:

- Respiratory stress is uncommon but present occasionally because of soft tissue edema.
- Unless endotracheal intubation can be accomplished under direct vision, cricothyroidotomy or tracheotomy may be necessary.
- Oxygen is given as indicated.
- The presence of shock suggests perforation and mandates an intravenous line and fluid administration.
- Damage due to alkaline corrosives occurs by liquefaction necrosis whereby the saponification of fats and solubilisation of proteins allow deep penetration into the tissue.

Alkalis continue to cause damage after exposure.

INGESTION:

- Milk and water are the preferred diluents

No more than 2 glasses of water should be given to an adult.

- Neutralising agents should never be given since exothermic heat reaction may compound injury.

* Catharsis and emesis are absolutely contra-indicated.

* Activated charcoal does not absorb alkali.

* Gastric lavage should not be used.

Supportive care involves the following:

- Withhold oral feedings initially.
- If endoscopy confirms transmucosal injury start steroids only within the first 48 hours.
- Carefully evaluate the amount of tissue necrosis before assessing the need for surgical intervention.
- Patients should be instructed to seek medical attention whenever they develop difficulty in swallowing (dysphagia).

SKIN AND EYE:

- Injury should be irrigated for 20-30 minutes.

Eye injuries require saline. [Ellenhorn & Barceloux: Medical Toxicology]

SECTION 5 Firefighting measures

Extinguishing media

- Water spray or fog.
- Foam.
- Dry chemical powder.

Special hazards arising from the substrate or mixture

| | |
|-----------------------------|-------------|
| Fire Incompatibility | None known. |
|-----------------------------|-------------|

Advice for firefighters

| | |
|------------------------------|--|
| Fire Fighting | <ul style="list-style-type: none"> ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves in the event of a fire. ▸ Prevent, by any means available, spillage from entering drains or water courses. |
| Fire/Explosion Hazard | <ul style="list-style-type: none"> ▸ Non combustible. ▸ Not considered a significant fire risk, however containers may burn. <p>May emit poisonous fumes.</p> |

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

| | |
|---------------------|---|
| Minor Spills | <ul style="list-style-type: none"> ▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment. |
| Major Spills | <ul style="list-style-type: none"> ▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves. <p>Chemical Class: bases For release onto land: recommended sorbents listed in order of priority.</p> |

| SORBENT TYPE | RANK | APPLICATION | COLLECTION | LIMITATIONS |
|---|------|-------------|------------|-----------------|
| LAND SPILL - SMALL | | | | |
| cross-linked polymer - particulate | 1 | shovel | shovel | R,W,SS |
| cross-linked polymer - pillow | 1 | throw | pitchfork | R, DGC, RT |
| sorbent clay - particulate | 2 | shovel | shovel | R, I, P |
| foamed glass - pillow | 2 | throw | pitchfork | R, P, DGC, RT |
| expanded minerals - particulate | 3 | shovel | shovel | R, I, W, P, DGC |
| foamed glass - particulate | 4 | shovel | shovel | R, W, P, DGC, |
| LAND SPILL - MEDIUM | | | | |
| cross-linked polymer -particulate | 1 | blower | skidloader | R,W, SS |
| sorbent clay - particulate | 2 | blower | skidloader | R, I, P |
| expanded mineral - particulate | 3 | blower | skidloader | R, I,W, P, DGC |
| cross-linked polymer - pillow | 3 | throw | skidloader | R, DGC, RT |
| foamed glass - particulate | 4 | blower | skidloader | R, W, P, DGC |
| foamed glass - pillow | 4 | throw | skidloader | R, P, DGC., RT |
| Legend DGC: Not effective where ground cover is dense R: Not reusable I: Not incinerable P: Effectiveness reduced when rainy RT:Not effective where terrain is rugged SS: Not for use within environmentally sensitive sites W: Effectiveness reduced when windy Reference: Sorbents for Liquid Hazardous Substance Cleanup and Control; R.W Melvold et al: Pollution Technology Review No. 150: Noyes Data Corporation 1988 | | | | |

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

| | |
|--------------------------|---|
| Safe handling | <ul style="list-style-type: none"> ▶ Avoid all personal contact, including inhalation. ▶ Wear protective clothing when risk of exposure occurs. ▶ Use in a well-ventilated area. |
| Other information | <ul style="list-style-type: none"> ▶ Store in original containers. ▶ Keep containers securely sealed. ▶ Store in a cool, dry, well-ventilated area. |

Conditions for safe storage, including any incompatibilities

| | |
|--------------------------------|---|
| Suitable container | <ul style="list-style-type: none"> ▶ Lined metal can, lined metal pail/ can. ▶ Plastic pail. ▶ Polyliner drum. For low viscosity materials <ul style="list-style-type: none"> ▶ Drums and jerricans must be of the non-removable head type. ▶ Where a can is to be used as an inner package, the can must have a screwed enclosure. For materials with a viscosity of at least 2680 cSt. |
| Storage incompatibility | <ul style="list-style-type: none"> ▶ Avoid strong acids, acid chlorides, acid anhydrides and chloroformates. ▶ Avoid contact with copper, aluminium and their alloys. |



X — Must not be stored together
 0 — May be stored together with specific preventions
 + — May be stored together

CargoClean HD

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

| Source | Ingredient | Material name | TWA | STEL | Peak | Notes |
|---|---------------------------------|------------------------|--------------------|---------------|---------------|---------------|
| Singapore Permissible Exposure Limits of Toxic Substances | potassium hydroxide | Potassium hydroxide | Not Available | 2 mg/m3 | Not Available | Not Available |
| Singapore Permissible Exposure Limits of Toxic Substances | ethylene glycol monobutyl ether | 2-Butoxyethanol (EGBE) | 25 ppm / 121 mg/m3 | Not Available | Not Available | Not Available |

Emergency Limits

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|---------------------------------|------------|-----------|-----------|
| potassium hydroxide | 0.18 mg/m3 | 2 mg/m3 | 54 mg/m3 |
| disodium metasilicate | 3.8 mg/m3 | 42 mg/m3 | 250 mg/m3 |
| sodium tripolyphosphate | 0.61 mg/m3 | 6.8 mg/m3 | 620 mg/m3 |
| ethylene glycol monobutyl ether | 60 ppm | 120 ppm | 700 ppm |

| Ingredient | Original IDLH | Revised IDLH |
|--|---------------|---------------|
| potassium hydroxide | Not Available | Not Available |
| disodium metasilicate | Not Available | Not Available |
| sodium tripolyphosphate | Not Available | Not Available |
| N,N-Dimethyl 9-decenamide | Not Available | Not Available |
| ethylene glycol monobutyl ether | 700 ppm | Not Available |
| Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, <2% aromatics | Not Available | Not Available |
| Fatty alcohol ethoxylate | Not Available | Not Available |
| Quaternary C12-C14 Alkylaminetoxilate chloride | Not Available | Not Available |

Occupational Exposure Banding

| Ingredient | Occupational Exposure Band Rating | Occupational Exposure Band Limit |
|--|-----------------------------------|----------------------------------|
| disodium metasilicate | E | ≤ 0.01 mg/m ³ |
| N,N-Dimethyl 9-decenamide | E | ≤ 0.1 ppm |
| Fatty alcohol ethoxylate | E | ≤ 0.1 ppm |
| Quaternary C12-C14 Alkylaminetoxilate chloride | E | ≤ 0.1 ppm |

Notes: Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.

MATERIAL DATA

for potassium hydroxide:

The TLV-TWA is protective against respiratory tract irritation produced at higher concentrations


For ethylene glycol monobutyl ether (2-butoxyethanol)

Odour Threshold Value: 0.10 ppm (detection), 0.35 ppm (recognition)

Although rats appear to be more susceptible than other animals anaemia is not uncommon amongst humans following exposure. The TLV reflects the need to maintain exposures below levels found to cause blood changes in experimental animals. It is concluded that this limit will reduce the significant risk of irritation, haematologic effects and other systemic effects observed in humans and animals exposed to higher vapour concentrations.

CargoClean HD

Exposure controls

| | |
|---|---|
| Appropriate engineering controls | Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. |
| Personal protection |  |
| Eye and face protection | <ul style="list-style-type: none"> ▸ Safety glasses with unperforated side shields may be used where continuous eye protection is desirable, as in laboratories; spectacles are not sufficient where complete eye protection is needed such as when handling bulk-quantities, where there is a danger of splashing, or if the material may be under pressure. ▸ Chemical goggles whenever there is a danger of the material coming in contact with the eyes; goggles must be properly fitted. ▸ Full face shield (20 cm, 8 in minimum) may be required for supplementary but never for primary protection of eyes; these afford face protection. |
| Skin protection | See Hand protection below |
| Hands/feet protection | <ul style="list-style-type: none"> ▸ Elbow length PVC gloves ▸ When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots. |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none"> ▸ Overalls. ▸ Eyewash unit. ▸ Barrier cream. |

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:
CargoClean HD

| Material | CPI |
|-------------------|-----|
| BUTYL | A |
| NEOPRENE | B |
| NITRILE | B |
| PVC | B |
| NAT+NEOPR+NITRILE | C |
| NATURAL RUBBER | C |
| NATURAL+NEOPRENE | C |
| NITRILE+PVC | C |
| PE/EVAL/PE | C |
| PVA | C |
| SARANEX-23 | C |

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

| | | | |
|-----------------------|--------|-------------------------------------|-------------|
| Appearance | Yellow | | |
| Physical state | Liquid | Relative density (Water = 1) | 1.030-1.055 |

Continued...

| | | | |
|---|---------------|--|---------------|
| Odour | Not Available | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | Not Available |
| pH (as supplied) | >13 | Decomposition temperature | Not Available |
| Melting point / freezing point (°C) | Not Available | Viscosity (cSt) | Not Available |
| Initial boiling point and boiling range (°C) | 100 | Molecular weight (g/mol) | Not Available |
| Flash point (°C) | Not Available | Taste | Not Available |
| Evaporation rate | Not Available | Explosive properties | Not Available |
| Flammability | Not Available | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | Not Available | Surface Tension (dyn/cm or mN/m) | Not Available |
| Lower Explosive Limit (%) | Not Available | Volatile Component (%vol) | Not Available |
| Vapour pressure (kPa) | Not Available | Gas group | Not Available |
| Solubility in water | Miscible | pH as a solution (Not Available%) | Not Available |
| Vapour density (Air = 1) | Not Available | VOC g/L | Not Available |

SECTION 10 Stability and reactivity

| | |
|---|--|
| Reactivity | See section 7 |
| Chemical stability | <ul style="list-style-type: none"> ▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur. |
| Possibility of hazardous reactions | See section 7 |
| Conditions to avoid | See section 7 |
| Incompatible materials | See section 7 |
| Hazardous decomposition products | See section 5 |

SECTION 11 Toxicological information

Information on toxicological effects

| | |
|---------------------|--|
| Inhaled | <p>Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may produce toxic effects.</p> <p>Inhalation of alkaline corrosives may produce irritation of the respiratory tract with coughing, choking, pain and mucous membrane damage. Pulmonary oedema may develop in more severe cases; this may be immediate or in most cases following a latent period of 5-72 hours. Symptoms may include a tightness in the chest, dyspnoea, frothy sputum, cyanosis and dizziness.</p> |
| Ingestion | <p>Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.</p> <p>Ingestion of alkaline corrosives may produce immediate pain, and circumoral burns. Mucous membrane corrosive damage is characterised by a white appearance and soapy feel; this may then become brown, oedematous and ulcerated. Profuse salivation with an inability to swallow or speak may also result.</p> <p>Swallowing of the liquid may cause aspiration of vomit into the lungs with the risk of haemorrhaging, pulmonary oedema, progressing to chemical pneumonitis; serious consequences may result.</p> <p>Signs and symptoms of chemical (aspiration) pneumonitis may include coughing, gasping, choking, burning of the mouth, difficult breathing, and bluish coloured skin (cyanosis).</p> |
| Skin Contact | <p>Skin contact with the material may produce toxic effects; systemic effects may result following absorption.</p> <p>The material can produce severe chemical burns following direct contact with the skin.</p> <p>Skin contact with alkaline corrosives may produce severe pain and burns; brownish stains may develop. The corroded area may be soft, gelatinous and necrotic; tissue destruction may be deep.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p> |
| Eye | <p>Direct contact with alkaline corrosives may produce pain and burns. Oedema, destruction of the epithelium, corneal opacification and iritis may occur. In less severe cases these symptoms tend to resolve.</p> |

| | |
|----------------|---|
| Chronic | <p>Repeated or prolonged exposure to corrosives may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue. Gastrointestinal disturbances may also occur.</p> <p>Repeated or long-term occupational exposure is likely to produce cumulative health effects involving organs or biochemical systems.</p> <p>Exposure to the material may cause concerns for human fertility, generally on the basis that results in animal studies provide sufficient evidence to cause a strong suspicion of impaired fertility in the absence of toxic effects, or evidence of impaired fertility occurring at around the same dose levels as other toxic effects, but which are not a secondary non-specific consequence of other toxic effects.</p> <p>On the basis, primarily, of animal experiments, concern has been expressed that the material may produce carcinogenic or mutagenic effects; in respect of the available information, however, there presently exists inadequate data for making a satisfactory assessment.</p> |
|----------------|---|

| CargoClean HD | TOXICITY | IRRITATION |
|--|--|--|
| | Not Available | Not Available |
| potassium hydroxide | TOXICITY | IRRITATION |
| | Oral (Rat) LD50; 273 mg/kg ^[2] | Eye (rabbit): 1mg/24h rinse-moderate |
| | | Skin (human): 50 mg/24h SEVERE |
| | | Skin (rabbit): 50 mg/24h SEVERE |
| disodium metasilicate | TOXICITY | IRRITATION |
| | Oral (Rat) LD50; 1153 mg/kg ^[2] | Skin (human): 250 mg/24h SEVERE |
| | | Skin (rabbit): 250 mg/24h SEVERE |
| sodium tripolyphosphate | TOXICITY | IRRITATION |
| | Dermal (rabbit) LD50: >3160 mg/kg * ^[2] | Not Available |
| | Oral (Rat) LD50; 5190 mg/kg ^[2] | |
| N,N-Dimethyl 9-decenamide | TOXICITY | IRRITATION |
| | Dermal (rabbit) LD50: >2000 mg/kg ^[2] | Not Available |
| | Inhalation(Rat) LC50; >3.551 mg/L4h ^[1] | |
| | Oral (Rat) LD50; 550 mg/kg ^[1] | |
| ethylene glycol monobutyl ether | TOXICITY | IRRITATION |
| | dermal (guinea pig) LD50: 210 mg/kg ^[2] | Eye (rabbit): 100 mg SEVERE |
| | Inhalation(Rat) LC50; 2.21 mg/14h ^[2] | Eye (rabbit): 100 mg/24h-moderate |
| | Oral (Rat) LD50; 300 mg/kg ^[2] | Eye: adverse effect observed (irritating) ^[1] |
| | | Skin (rabbit): 500 mg, open; mild |
| | | Skin: adverse effect observed (irritating) ^[1] |
| | | Skin: no adverse effect observed (not irritating) ^[1] |
| Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, <2% aromatics | TOXICITY | IRRITATION |
| | Not Available | Not Available |
| Fatty alcohol ethoxylate | TOXICITY | IRRITATION |
| | Not Available | Not Available |
| Quaternary C12-C14 Alkylaminetoxilate chloride | TOXICITY | IRRITATION |
| | Oral (Rat) LD50; >300 mg/kg ^[2] | Not Available |

Legend:

1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances

| | |
|--|---|
| POTASSIUM HYDROXIDE | The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. |
| ETHYLENE GLYCOL MONOBUTYL ETHER | NOTE: Changes in kidney, liver, spleen and lungs are observed in animals exposed to high concentrations of this substance by all routes. ** ASCC (NZ) SDS |

| | |
|--|---|
| | <p>The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.</p> <p>The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.</p> <p>For ethylene glycol monoalkyl ethers and their acetates (EGMAEs):</p> <p>Typical members of this category are ethylene glycol propylene ether (EGPE), ethylene glycol butyl ether (EGBE) and ethylene glycol hexyl ether (EGHE) and their acetates.</p> <p>EGMAEs are substrates for alcohol dehydrogenase isozyme ADH-3, which catalyzes the conversion of their terminal alcohols to aldehydes (which are transient metabolites). Further, rapid conversion of the aldehydes by aldehyde dehydrogenase produces alkoxyacetic acids, which are the predominant urinary metabolites of mono substituted glycol ethers.</p> <p>Acute Toxicity: Oral LD50 values in rats for all category members range from 739 (EGHE) to 3089 mg/kg bw (EGPE), with values increasing with decreasing molecular weight. Four to six hour acute inhalation toxicity studies were conducted for these chemicals in rats at the highest vapour concentrations practically achievable.</p> <p>Exposure of pregnant rats to ethylene glycol monobutyl ether (2-butoxyethanol) at 100 ppm or rabbits at 200 ppm during organogenesis resulted in maternal toxicity and embryotoxicity including a decreased number of viable implantations per litter. Slight foetotoxicity in the form of poorly ossified or unossified skeletal elements was also apparent in rats. Teratogenic effects were not observed in other species.</p> <p>At least one researcher has stated that the reproductive effects were less than that of other monoalkyl ethers of ethylene glycol. Chronic exposure may cause anaemia, macrocytosis, abnormally large red cells and abnormal red cell fragility.</p> <p>Exposure of male and female rats and mice for 14 weeks to 2 years produced a regenerative haemolytic anaemia and subsequent effects on the haemopoietic system in rats and mice.</p> <p>For ethylene glycol:</p> <p>Ethylene glycol is quickly and extensively absorbed through the gastrointestinal tract. Limited information suggests that it is also absorbed through the respiratory tract; dermal absorption is apparently slow. Following absorption, ethylene glycol is distributed throughout the body according to total body water.</p> |
| Fatty alcohol ethoxylate | <p>Human beings have regular contact with alcohol ethoxylates through a variety of industrial and consumer products such as soaps, detergents, and other cleaning products. Exposure to these chemicals can occur through ingestion, inhalation, or contact with the skin or eyes. Studies of acute toxicity show that volumes well above a reasonable intake level would have to occur to produce any toxic response.</p> <p>Alcohol ethoxylates are according to CESIO (2000) classified as Irritant or Harmful depending on the number of EO-units: EO < 5 gives Irritant (Xi) with R38 (Irritating to skin) and R41 (Risk of serious damage to eyes) EO > 5-15 gives Harmful (Xn) with R22 (Harmful if swallowed) - R38/41 EO > 15-20 gives Harmful (Xn) with R22-41 >20 EO is not classified (CESIO 2000) Oxo-AE, C13 EO10 and C13 EO15, are Irritating (Xi) with R36/38 (Irritating to eyes and skin). AE are not included in Annex 1 of the list of dangerous substances of the Council Directive 67/548/EEC</p> <p>In general, alcohol ethoxylates (AE) are readily absorbed through the skin of guinea pigs and rats and through the gastrointestinal mucosa of rats. AE are quickly eliminated from the body through the urine, faeces, and expired air (CO₂). Orally dosed AE was absorbed rapidly and extensively in rats, and more than 75% of the dose was absorbed. When applied to the skin of humans, the doses were absorbed slowly and incompletely (50% absorbed in 72 hours). No significant acute toxicological data identified in literature search.</p> |
| CargoClean HD & POTASSIUM HYDROXIDE & disodium metasilicate & sodium tripolyphosphate | <p>Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant.</p> |
| POTASSIUM HYDROXIDE & disodium metasilicate | <p>The material may produce severe skin irritation after prolonged or repeated exposure, and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) thickening of the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis. Prolonged contact is unlikely, given the severity of response, but repeated exposures may produce severe ulceration.</p> |

| | | | |
|--|---|---------------------------------|---|
| Acute Toxicity | ✓ | Carcinogenicity | ✗ |
| Skin Irritation/Corrosion | ✓ | Reproductivity | ✗ |
| Serious Eye Damage/Irritation | ✓ | STOT - Single Exposure | ✗ |
| Respiratory or Skin sensitisation | ✗ | STOT - Repeated Exposure | ✗ |
| Mutagenicity | ✗ | Aspiration Hazard | ✗ |

Legend: ✗ – Data either not available or does not fill the criteria for classification
✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

CargoClean HD

| CargoClean HD | Endpoint | Test Duration (hr) | Species | Value | Source |
|--|--|--------------------|-------------------------------|-----------------|---------------|
| | Not Available | Not Available | Not Available | Not Available | Not Available |
| potassium hydroxide | Endpoint | Test Duration (hr) | Species | Value | Source |
| | NOEC(ECx) | 24h | Fish | 28mg/l | 2 |
| | LC50 | 96h | Fish | 80mg/l | 2 |
| disodium metasilicate | Endpoint | Test Duration (hr) | Species | Value | Source |
| | EC50(ECx) | 48h | Crustacea | 22.94-49.01mg/l | 4 |
| | LC50 | 96h | Fish | 180mg/l | 1 |
| | EC50 | 72h | Algae or other aquatic plants | 207mg/l | 2 |
| | EC50 | 48h | Crustacea | 22.94-49.01mg/l | 4 |
| sodium tripolyphosphate | Endpoint | Test Duration (hr) | Species | Value | Source |
| | EC50(ECx) | 96h | Algae or other aquatic plants | 69.2mg/l | 2 |
| | EC50 | 48h | Crustacea | >70.7<101.3mg/l | 2 |
| | EC50 | 96h | Algae or other aquatic plants | 69.2mg/l | 2 |
| N,N-Dimethyl 9-decenamide | Endpoint | Test Duration (hr) | Species | Value | Source |
| | NOEC(ECx) | 504h | Crustacea | 0.37mg/l | 2 |
| | LC50 | 96h | Fish | >7.5mg/l | 2 |
| | EC50 | 72h | Algae or other aquatic plants | 5.47mg/l | 2 |
| | EC50 | 48h | Crustacea | 2.8mg/l | 2 |
| | EC50 | 96h | Algae or other aquatic plants | 6.3mg/l | 2 |
| ethylene glycol monobutyl ether | Endpoint | Test Duration (hr) | Species | Value | Source |
| | EC10(ECx) | 48h | Crustacea | 7.2mg/l | 2 |
| | EC50 | 72h | Algae or other aquatic plants | 623mg/l | 2 |
| | LC50 | 96h | Fish | 1250mg/l | 2 |
| | EC50 | 48h | Crustacea | 164mg/l | 2 |
| | EC50 | 96h | Algae or other aquatic plants | 720mg/l | 2 |
| Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, <2% aromatics | Endpoint | Test Duration (hr) | Species | Value | Source |
| | Not Available | Not Available | Not Available | Not Available | Not Available |
| Fatty alcohol ethoxylate | Endpoint | Test Duration (hr) | Species | Value | Source |
| | Not Available | Not Available | Not Available | Not Available | Not Available |
| Quaternary C12-C14 Alkylaminetoxilate chloride | Endpoint | Test Duration (hr) | Species | Value | Source |
| | Not Available | Not Available | Not Available | Not Available | Not Available |
| Legend: | Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data | | | | |

Harmful to aquatic organisms.

DO NOT discharge into sewer or waterways.

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|---------------------------------|---------------------------|-----------------------------|
| ethylene glycol monobutyl ether | LOW (Half-life = 56 days) | LOW (Half-life = 1.37 days) |

Bioaccumulative potential

Continued...

| Ingredient | Bioaccumulation |
|---------------------------------|------------------|
| ethylene glycol monobutyl ether | LOW (BCF = 2.51) |

Mobility in soil

| Ingredient | Mobility |
|---------------------------------|----------------|
| ethylene glycol monobutyl ether | HIGH (KOC = 1) |


SECTION 13 Disposal considerations

Waste treatment methods

| | |
|-------------------------------------|---|
| Product / Packaging disposal | <ul style="list-style-type: none"> ▶ Containers may still present a chemical hazard/ danger when empty. ▶ Return to supplier for reuse/ recycling if possible. <p>Otherwise:</p> <ul style="list-style-type: none"> ▶ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. ▶ DO NOT allow wash water from cleaning or process equipment to enter drains. ▶ It may be necessary to collect all wash water for treatment before disposal. ▶ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▶ Recycle wherever possible. ▶ Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. ▶ Treat and neutralise at an approved treatment plant. |
|-------------------------------------|---|

SECTION 14 Transport information

Labels Required

| | |
|---|----|
|  | |
| Marine Pollutant | NO |

Land transport (UN)

| | | |
|-------------------------------------|--|----------------|
| UN number | 1719 | |
| UN proper shipping name | CAUSTIC ALKALI LIQUID, N.O.S. (contains potassium hydroxide) | |
| Transport hazard class(es) | Class | 8 |
| | Subrisk | Not Applicable |
| Packing group | III | |
| Environmental hazard | Not Applicable | |
| Special precautions for user | Special provisions | 223; 274 |
| | Limited quantity | 5 L |

Air transport (ICAO-IATA / DGR)

| | | |
|-----------------------------------|--|----------------|
| UN number | 1719 | |
| UN proper shipping name | Caustic alkali liquid, n.o.s. * (contains potassium hydroxide) | |
| Transport hazard class(es) | ICAO/IATA Class | 8 |
| | ICAO / IATA Subrisk | Not Applicable |
| | ERG Code | 8L |
| Packing group | III | |
| Environmental hazard | Not Applicable | |

| | | |
|-------------------------------------|---|---------|
| Special precautions for user | Special provisions | A3 A803 |
| | Cargo Only Packing Instructions | 856 |
| | Cargo Only Maximum Qty / Pack | 60 L |
| | Passenger and Cargo Packing Instructions | 852 |
| | Passenger and Cargo Maximum Qty / Pack | 5 L |
| | Passenger and Cargo Limited Quantity Packing Instructions | Y841 |
| | Passenger and Cargo Limited Maximum Qty / Pack | 1 L |

Sea transport (IMDG-Code / GGVSee)

| | | |
|-------------------------------------|--|----------------|
| UN number | 1719 | |
| UN proper shipping name | CAUSTIC ALKALI LIQUID, N.O.S. (contains potassium hydroxide) | |
| Transport hazard class(es) | IMDG Class | 8 |
| | IMDG Subrisk | Not Applicable |
| Packing group | III | |
| Environmental hazard | Not Applicable | |
| Special precautions for user | EMS Number | F-A, S-B |
| | Special provisions | 223 274 |
| | Limited Quantities | 5 L |

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

| Product name | Group |
|--|---------------|
| potassium hydroxide | Not Available |
| disodium metasilicate | Not Available |
| sodium tripolyphosphate | Not Available |
| N,N-Dimethyl 9-decenamide | Not Available |
| ethylene glycol monobutyl ether | Not Available |
| Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, <2% aromatics | Not Available |
| Fatty alcohol ethoxylate | Not Available |
| Quaternary C12-C14 Alkylaminetoxilate chloride | Not Available |

Transport in bulk in accordance with the ICG Code

| Product name | Ship Type |
|--|---------------|
| potassium hydroxide | Not Available |
| disodium metasilicate | Not Available |
| sodium tripolyphosphate | Not Available |
| N,N-Dimethyl 9-decenamide | Not Available |
| ethylene glycol monobutyl ether | Not Available |
| Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, <2% aromatics | Not Available |
| Fatty alcohol ethoxylate | Not Available |
| Quaternary C12-C14 Alkylaminetoxilate chloride | Not Available |

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

potassium hydroxide is found on the following regulatory lists

Singapore Permissible Exposure Limits of Toxic Substances

disodium metasilicate is found on the following regulatory lists

Not Applicable

sodium tripolyphosphate is found on the following regulatory lists

Not Applicable

N,N-Dimethyl 9-decenamide is found on the following regulatory lists

Not Applicable

ethylene glycol monobutyl ether is found on the following regulatory lists

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

Singapore Permissible Exposure Limits of Toxic Substances

Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, <2% aromatics is found on the following regulatory lists

Not Applicable

Fatty alcohol ethoxylate is found on the following regulatory lists

Not Applicable

Quaternary C12-C14 Alkylaminetoxilate chloride is found on the following regulatory lists

Not Applicable

National Inventory Status

| National Inventory | Status |
|---|--|
| Australia - AIIC / Australia Non-Industrial Use | No (Quaternary C12-C14 Alkylaminetoxilate chloride) |
| Canada - DSL | No (Fatty alcohol ethoxylate; Quaternary C12-C14 Alkylaminetoxilate chloride) |
| Canada - NDSL | No (potassium hydroxide; disodium metasilicate; sodium tripolyphosphate; N,N-Dimethyl 9-decenamide; ethylene glycol monobutyl ether; Fatty alcohol ethoxylate; Quaternary C12-C14 Alkylaminetoxilate chloride) |
| China - IECSC | No (N,N-Dimethyl 9-decenamide; Quaternary C12-C14 Alkylaminetoxilate chloride) |
| Europe - EINEC / ELINCS / NLP | No (N,N-Dimethyl 9-decenamide; Fatty alcohol ethoxylate; Quaternary C12-C14 Alkylaminetoxilate chloride) |
| Japan - ENCS | No (N,N-Dimethyl 9-decenamide; Quaternary C12-C14 Alkylaminetoxilate chloride) |
| Korea - KECI | No (N,N-Dimethyl 9-decenamide; Quaternary C12-C14 Alkylaminetoxilate chloride) |
| New Zealand - NZIoC | No (Quaternary C12-C14 Alkylaminetoxilate chloride) |
| Philippines - PICCS | No (N,N-Dimethyl 9-decenamide; Fatty alcohol ethoxylate; Quaternary C12-C14 Alkylaminetoxilate chloride) |
| USA - TSCA | No (Quaternary C12-C14 Alkylaminetoxilate chloride) |
| Taiwan - TCSI | No (Quaternary C12-C14 Alkylaminetoxilate chloride) |
| Mexico - INSQ | No (N,N-Dimethyl 9-decenamide; Fatty alcohol ethoxylate; Quaternary C12-C14 Alkylaminetoxilate chloride) |
| Vietnam - NCI | No (N,N-Dimethyl 9-decenamide; Quaternary C12-C14 Alkylaminetoxilate chloride) |
| Russia - FBEPH | No (N,N-Dimethyl 9-decenamide; Fatty alcohol ethoxylate; Quaternary C12-C14 Alkylaminetoxilate chloride) |
| Legend: | <i>Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.</i> |

SECTION 16 Other information

| | |
|----------------------|------------|
| Revision Date | 21/06/2021 |
| Initial Date | 03/05/2019 |

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

SDS Version Summary

| Version | Date of Update | Sections Updated |
|---------|----------------|---|
| 2.12 | 21/06/2021 | Acute Health (inhaled), Acute Health (skin), Acute Health (swallowed), Advice to Doctor, Appearance, Chronic Health, Classification, Environmental, Fire Fighter (fire/explosion hazard), Fire Fighter (fire fighting), First Aid (inhaled), First Aid (swallowed), Handling Procedure, Ingredients, Personal Protection (other), Physical Properties, Spills (major), Spills (minor), Storage (storage requirement), Storage (suitable container), Transport |

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Note:

"This composition meets the criteria for not being harmful to the marine environment according to MARPOL Annex V and may be discharged into the sea when used to clean cargo holds and external surfaces on ships."

Powered by AuthorITe, from Chemwatch.

CAT SULPHITE L (CSL)

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 575662

Version No: 3.3

Safety Data Sheet

Issue Date: 29/11/2016

Print Date: 24/03/2022

L.GHS.SGP.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

| | |
|-------------------------------|---|
| Product name | CAT SULPHITE L (CSL) |
| Chemical Name | Not Applicable |
| Synonyms | Product Part Number: 575662 (25 liter) - Boiler water treatment |
| Proper shipping name | BISULPHITES, AQUEOUS SOLUTION, N.O.S. (sodium bisulfite) |
| Chemical formula | Not Applicable |
| Other means of identification | 575662, 1053494 |

Relevant identified uses of the substance or mixture and uses advised against

| | |
|--------------------------|----------------|
| Relevant identified uses | Reducing agent |
|--------------------------|----------------|

Details of the supplier of the safety data sheet

| | | | |
|-------------------------|---|---|---|
| Registered company name | Wilhelmsen Ships Service (S) Pte. Ltd. | Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | 186 Pandan Loop Singapore 128376 Singapore | -----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +65 6395 4545 | Not Available | +31 10 4877 777 |
| Fax | Not Available | Not Available | Not Available |
| Website | http://www.wilhelmsen.com/services/maritime/compan | http://www.wilhelmsen.com | http://www.wilhelmsen.com |
| Email | wss.singapore@wilhelmsen.com | wss.global.sdsinfo@wilhelmsen.com | wss.rotterdam@wilhelmsen.com |

| | |
|-------------------------|---|
| Registered company name | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +31 10 4877 777 |
| Fax | Not Available |
| Website | http://www.wilhelmsen.com |
| Email | wss.rotterdam@wilhelmsen.com |

Emergency telephone number


| | | | |
|-----------------------------------|--------------------------|------------------|--------------------------|
| Association / Organisation | 24hrs - Chemtrec | 24hrs - Chemtrec | Dutch nat. poison centre |
| Emergency telephone numbers | +31-10-4877700 | +31-10-4877700 | + 31 88 7558561 |
| Other emergency telephone numbers | +31-10-4877700 | +1 800 424 9300 | + 31 10 4877700 |
| Association / Organisation | Dutch nat. poison centre | | |
| Emergency telephone numbers | + 31 30 274 88 88 | | |
| Other emergency telephone numbers | + 31-10-4877700 | | |

SECTION 2 Hazards identification

Classification of the substance or mixture

| | |
|----------------|---|
| Classification | Acute Toxicity (Oral) Category 4, Carcinogenicity Category 1B |
|----------------|---|

Label elements

| | |
|---------------------|---|
| Hazard pictogram(s) |  |
|---------------------|---|

| | |
|-------------|--------|
| Signal word | Danger |
|-------------|--------|

Hazard statement(s)

| | |
|------|-----------------------|
| H302 | Harmful if swallowed. |
| H350 | May cause cancer. |

Precautionary statement(s) Prevention

| | |
|------|---|
| P201 | Obtain special instructions before use. |
| P280 | Wear protective gloves and protective clothing. |
| P264 | Wash all exposed external body areas thoroughly after handling. |

Precautionary statement(s) Response

| | |
|-----------|---|
| P308+P313 | IF exposed or concerned: Get medical advice/ attention. |
| P301+P312 | IF SWALLOWED: Call a POISON CENTER/doctor/physician/first aider/if you feel unwell. |
| P330 | Rinse mouth. |

Precautionary statement(s) Storage

| | |
|------|------------------|
| P405 | Store locked up. |
|------|------------------|

Precautionary statement(s) Disposal

| | |
|------|--|
| P501 | Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation. |
|------|--|

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

| CAS No | %[weight] | Name |
|-----------|-----------|-------------------------|
| 7631-90-5 | 30-60 | <u>sodium bisulfite</u> |

| CAS No | %[weight] | Name |
|------------|-----------|---------------------------|
| 10124-43-3 | 0.01-0.25 | <u>cobalt(II) sulfate</u> |

SECTION 4 First aid measures

Description of first aid measures

| | |
|---------------------|---|
| Eye Contact | <p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▶ Immediately hold eyelids apart and flush the eye continuously with running water. ▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▶ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▶ Transport to hospital or doctor without delay. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. |
| Skin Contact | <p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately flush body and clothes with large amounts of water, using safety shower if available. ▶ Quickly remove all contaminated clothing, including footwear. ▶ Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre. ▶ Transport to hospital, or doctor. |
| Inhalation | <ul style="list-style-type: none"> ▶ If fumes or combustion products are inhaled remove from contaminated area. ▶ Lay patient down. Keep warm and rested. ▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▶ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▶ Transport to hospital, or doctor, without delay. ▶ Inhalation of vapours or aerosols (mists, fumes) may cause lung oedema. ▶ Corrosive substances may cause lung damage (e.g. lung oedema, fluid in the lungs). ▶ As this reaction may be delayed up to 24 hours after exposure, affected individuals need complete rest (preferably in semi-recumbent posture) and must be kept under medical observation even if no symptoms are (yet) manifested. ▶ Before any such manifestation, the administration of a spray containing a dexamethasone derivative or beclomethasone derivative may be considered. <p>This must definitely be left to a doctor or person authorised by him/her. (ICSC13719)</p> |
| Ingestion | <ul style="list-style-type: none"> ▶ For advice, contact a Poisons Information Centre or a doctor at once. ▶ Urgent hospital treatment is likely to be needed. ▶ If swallowed do NOT induce vomiting. ▶ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▶ Observe the patient carefully. ▶ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▶ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▶ Transport to hospital or doctor without delay. |

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

Depending on the degree of exposure, periodic medical examination is indicated. The symptoms of lung oedema often do not manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation is therefore essential. Immediate administration of an appropriate spray, by a doctor or a person authorised by him/her should be considered.

(ICSC24419/24421

for corrosives:

BASIC TREATMENT

- ▶ Establish a patent airway with suction where necessary.
- ▶ Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- ▶ Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- ▶ Monitor and treat, where necessary, for pulmonary oedema .
- ▶ Monitor and treat, where necessary, for shock.
- ▶ Anticipate seizures.
- ▶ Where eyes have been exposed, flush immediately with water and continue to irrigate with normal saline during transport to hospital.
- ▶ **DO NOT use emetics.** Where ingestion is suspected rinse mouth and give up to 200 ml water (5 ml/kg recommended) for dilution where patient is able to swallow, has a strong gag reflex and does not drool.
- ▶ Skin burns should be covered with dry, sterile bandages, following decontamination.
- ▶ **DO NOT attempt neutralisation as exothermic reaction may occur.**

ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

EMERGENCY DEPARTMENT

- ▶ Laboratory analysis of complete blood count, serum electrolytes, BUN, creatinine, glucose, urinalysis, baseline for serum aminotransferases (ALT and AST), calcium, phosphorus and magnesium, may assist in establishing a treatment regime.
- ▶ Positive end-expiratory pressure (PEEP)-assisted ventilation may be required for acute parenchymal injury or adult respiratory distress syndrome.
- ▶ Consider endoscopy to evaluate oral injury.
- ▶ Consult a toxicologist as necessary.

BRONSTEIN, A.C. and CURRANCE, P.L. *EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994*

SECTION 5 Firefighting measures

Extinguishing media

- ▶ Water spray or fog.
- ▶ Foam.
- ▶ Dry chemical powder.

Special hazards arising from the substrate or mixture

| | |
|-----------------------------|-------------|
| Fire Incompatibility | None known. |
|-----------------------------|-------------|

Advice for firefighters

| | |
|------------------------------|--|
| Fire Fighting | <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear full body protective clothing with breathing apparatus. ▶ Prevent, by any means available, spillage from entering drains or water course. |
| Fire/Explosion Hazard | <ul style="list-style-type: none"> ▶ Non combustible. ▶ Not considered a significant fire risk, however containers may burn. Decomposition may produce toxic fumes of: , sulfur oxides (SOx) May emit corrosive fumes. |

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

| | |
|---------------------|---|
| Minor Spills | <ul style="list-style-type: none"> ▶ Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material. ▶ Check regularly for spills and leaks. ▶ Clean up all spills immediately. ▶ Avoid breathing vapours and contact with skin and eyes. ▶ Control personal contact with the substance, by using protective equipment. |
| Major Spills | <ul style="list-style-type: none"> ▶ Clear area of personnel and move upwind. ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear full body protective clothing with breathing apparatus. |

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Continued...

| | |
|--------------------------|--|
| Safe handling | <ul style="list-style-type: none"> ▶ Avoid all personal contact, including inhalation. ▶ Wear protective clothing when risk of exposure occurs. ▶ Use in a well-ventilated area. ▶ DO NOT allow clothing wet with material to stay in contact with skin |
| Other information | <ul style="list-style-type: none"> ▶ Store in original containers. ▶ Keep containers securely sealed. ▶ Store in a cool, dry, well-ventilated area. |

Conditions for safe storage, including any incompatibilities

| | |
|--------------------------------|--|
| Suitable container | <ul style="list-style-type: none"> ▶ DO NOT use aluminium or galvanised containers ▶ Lined metal can, lined metal pail/ can. ▶ Plastic pail. ▶ Polyliner drum. <p>For low viscosity materials</p> <ul style="list-style-type: none"> ▶ Drums and jerricans must be of the non-removable head type. ▶ Where a can is to be used as an inner package, the can must have a screwed enclosure. <p>For materials with a viscosity of at least 2680 cSt.</p> |
| Storage incompatibility | <ul style="list-style-type: none"> ▶ Contact with acids produces toxic fumes ▶ Inorganic reducing agents react with oxidizing agents to generate heat and products that may be flammable, combustible, or otherwise reactive. Their reactions with oxidizing agents may be violent. ▶ Incidents involving interaction of active oxidants and reducing agents, either by design or accident, are usually very energetic and examples of so-called redox reactions. ▶ Segregate from alcohol, water. <p>Sulfites and hydrosulfites (dithionites) :</p> <ul style="list-style-type: none"> ▶ may react explosively with strong oxidising agents. ▶ react with water or steam to produce corrosive acid solutions and sulfur oxide fumes - aqueous solutions are incompatible with oxidisers, strong acids, alkalis, ammonia, aliphatic amines, alkanolamines, alkylene oxides, amides, epichlorohydrin, organic anhydrides, isocyanates, nitromethane, vinyl acetate ▶ aqueous solutions attack metals in presence of moisture ▶ generate gaseous sulfur dioxide in contact with oxidising and nonoxidising acids <p>Sulfur dioxide:</p> <ul style="list-style-type: none"> ▶ reacts with water or steam forming sulfurous acid; reaction may be violent ▶ reacts with acrolein, alcohols, aluminium powder, alkali metals, amines, bromine, pentafluoride, caustics, caesium, acetylene carbide, chlorates, chlorine trifluoride, chromium powder, copper or its alloy powders, diethylzinc, fluorine, lead dioxide, lithium acetylene carbide, metal powders, monolithium acetylide-ammonia, nitril chloride, potassium acetylene carbide, potassium acetylide, potassium chlorate, rubidium carbide, silver azide, sodium, sodium acetylide, stannous oxide; reaction may be violent ▶ decomposes above 60 deg. C releasing oxides of sulfur ▶ Incompatible with alkalis, alkylene oxides, ammonia, aliphatic amines, alkanolamines, amides, organic anhydrides, caesium monoxide, epichlorohydrin, ferrous oxide, halogens, interhalogens, isocyanates, lithium nitrate, manganese, metal acetylides, metal oxides, perbromyl fluoride, red phosphorus, potassium azide, rubidium acetylide, sodium hydride, sulfuric acid ▶ attacks some plastics, coatings and rubber ▶ attacks metals, especially chemically active metals, in the presence of moisture. |



X — Must not be stored together

O — May be stored together with specific preventions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

| Source | Ingredient | Material name | TWA | STEL | Peak | Notes |
|---|------------------|------------------|---------|---------------|---------------|---------------|
| Singapore Permissible Exposure Limits of Toxic Substances | sodium bisulfite | Sodium bisulfite | 5 mg/m3 | Not Available | Not Available | Not Available |

Continued...

CAT SULPHITE L (CSL)

| Source | Ingredient | Material name | TWA | STEL | Peak | Notes |
|---|--------------------|--|------------|---------------|---------------|---------------|
| Singapore Permissible Exposure Limits of Toxic Substances | cobalt(II) sulfate | Cobalt, elemental and inorganic compounds, as Co | 0.02 mg/m3 | Not Available | Not Available | Not Available |

Emergency Limits


| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|--------------------|------------|-----------|-----------|
| sodium bisulfite | 15 mg/m3 | 66 mg/m3 | 400 mg/m3 |
| cobalt(II) sulfate | 0.29 mg/m3 | 19 mg/m3 | 120 mg/m3 |
| cobalt(II) sulfate | 0.16 mg/m3 | 14 mg/m3 | 84 mg/m3 |
| cobalt(II) sulfate | 0.18 mg/m3 | 1.9 mg/m3 | 12 mg/m3 |

| Ingredient | Original IDLH | Revised IDLH |
|--------------------|---------------|---------------|
| sodium bisulfite | Not Available | Not Available |
| cobalt(II) sulfate | Not Available | Not Available |

MATERIAL DATA

Inorganic sulfites, bisulfites and metabisulfites (sodium, potassium and ammonium salts) liberate sulfur dioxide under certain conditions. Therefore the officially tabled exposure limits for these chemicals normally correspond to the yield of liberated sulfur dioxide. Dithionites may also produce sulfur dioxide. Sulfites have been placed on the U.S. Food and Drug Administration generally recognised as safe (GRAS) list.

Exposure controls

| | |
|---|--|
| Appropriate engineering controls | <p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.</p> <p>The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> |
| Personal protection |  |
| Eye and face protection | <ul style="list-style-type: none"> ▶ Chemical goggles. ▶ Full face shield may be required for supplementary but never for primary protection of eyes. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. |
| Skin protection | See Hand protection below |
| Hands/feet protection | <ul style="list-style-type: none"> ▶ Wear chemical protective gloves, e.g. PVC. ▶ Wear safety footwear or safety gumboots, e.g. Rubber ▶ When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots. <p>The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.</p> <p>The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.</p> |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none"> ▶ Employees working with confirmed human carcinogens should be provided with, and be required to wear, clean, full body protective clothing (smocks, coveralls, or long-sleeved shirt and pants), shoe covers and gloves prior to entering the regulated area. [AS/NZS ISO 6529:2006 or national equivalent] ▶ Employees engaged in handling operations involving carcinogens should be provided with, and required to wear and use half-face filter-type respirators with filters for dusts, mists and fumes, or air purifying canisters or cartridges. A respirator affording higher levels of protection may be substituted. ▶ Prior to each exit from an area containing confirmed human carcinogens, employees should be required to remove and leave protective clothing and equipment at the point of exit and at the last exit of the day, to place used clothing and equipment in impervious containers at the point of exit for purposes of decontamination or disposal. The contents of such impervious containers must be identified with suitable labels. For maintenance and decontamination activities, authorized employees entering the area should be provided with and required to wear clean, impervious garments, including gloves, boots and continuous-air supplied hood. ▶ Overalls. ▶ PVC Apron. ▶ PVC protective suit may be required if exposure severe. |

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

| | | | |
|---|--------------------------------|--|---------------|
| Appearance | Liquid, pink, soluble in water | | |
| Physical state | Liquid | Relative density (Water = 1) | 1.31 |
| Odour | Not Available | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | Not Available |
| pH (as supplied) | 3.5-5 | Decomposition temperature | Not Available |
| Melting point / freezing point (°C) | Not Available | Viscosity (cSt) | Not Available |
| Initial boiling point and boiling range (°C) | 100 | Molecular weight (g/mol) | Not Available |
| Flash point (°C) | Not Available | Taste | Not Available |
| Evaporation rate | Not Available BuAC = 1 | Explosive properties | Not Available |
| Flammability | Not Available | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | Not Available | Surface Tension (dyn/cm or mN/m) | Not Available |
| Lower Explosive Limit (%) | Not Available | Volatile Component (%vol) | Not Available |
| Vapour pressure (kPa) | Not Available | Gas group | Not Available |
| Solubility in water | Miscible | pH as a solution (Not Available%) | Not Available |
| Vapour density (Air = 1) | Not Available | VOC g/L | Not Available |

SECTION 10 Stability and reactivity

| | |
|---|--|
| Reactivity | See section 7 |
| Chemical stability | <ul style="list-style-type: none"> ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur. |
| Possibility of hazardous reactions | See section 7 |
| Conditions to avoid | See section 7 |
| Incompatible materials | See section 7 |
| Hazardous decomposition products | See section 5 |

SECTION 11 Toxicological information

Information on toxicological effects

| | |
|---------------------|---|
| Inhaled | Evidence shows, or practical experience predicts, that the material produces irritation of the respiratory system, in a substantial number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs. |
| Ingestion | Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual. The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion. Ingestion of sulfite salts may cause gastric irritation as a result of the liberation of sulfurous acid. Rapid oxidation to sulfate (at least in rats) means that sulfites are well tolerated. Large doses however may produce violent colic, diarrhoea, circulatory disturbances, central nervous system depression and, sometimes, death. |
| Skin Contact | The material can produce chemical burns following direct contact with the skin. Skin contact is not thought to produce harmful health effects (as classified under EC Directives using animal models). Systemic harm, however, has been identified following exposure of animals by at least one other route and the material may still produce health damage following entry through wounds, lesions or abrasions. Good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting. Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with |

CAT SULPHITE L (CSL)

| | |
|----------------|---|
| | harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected. |
| Eye | The material can produce chemical burns to the eye following direct contact. Vapours or mists may be extremely irritating. |
| Chronic | <p>On the basis of epidemiological data, it has been concluded that prolonged inhalation of the material, in an occupational setting, may produce cancer in humans.</p> <p>Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.</p> <p>On the basis, primarily, of animal experiments, the material may be regarded as carcinogenic to humans. There is sufficient evidence to provide a strong presumption that human exposure to the material may result in cancer on the basis of:</p> <ul style="list-style-type: none"> - appropriate long-term animal studies - other relevant information <p>Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.</p> <p>Repeated exposure of animals to airborne sulfur dioxide (SO₂) can produce a thickening of the mucous layer in the trachea and an increase in goblet cells and mucous glands similar to pathological changes found in chronic human bronchitis.</p> <p>Chronic exposure to sulfur dioxide (SO₂) particulate complexes, present in polluted air, have been associated with the aggravation of chronic cardiovascular diseases such as asthma, chronic pulmonary disease, and coronary artery disease (this may occur at levels of 6-10 ug/m³ for 24 hours), An association exists between persistent cough and sputum production, particularly in women and non-smokers. A 10-year follow study on workers exposed to a mean sulfur dioxide concentration of up to 33 ppm did not reveal an increased prevalence of chronic respiratory disease or decreased pulmonary function.</p> |

| CAT SULPHITE L (CSL) | TOXICITY | IRRITATION |
|----------------------|--|---|
| | Not Available | Not Available |
| sodium bisulfite | TOXICITY | IRRITATION |
| | dermal (rat) LD50: >2000 mg/kg ^[1] Oral (Rat) LD50; 1420 mg/kg ^[2] | Eye: no adverse effect observed (not irritating) ^[1] Skin: no adverse effect observed (not irritating) ^[1] |
| cobalt(II) sulfate | TOXICITY | IRRITATION |
| | dermal (rat) LD50: >2000 mg/kg ^[1] Oral (Rat) LD50; 424 mg/kg ^[2] | Eye: adverse effect observed (irritating) ^[1] Skin: no adverse effect observed (not irritating) ^[1] |
| Legend: | 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances | |

| | |
|--|--|
| SODIUM BISULFITE | Human lymphocyte mutagen |
| COBALT(II) SULFATE | <p>The following information refers to contact allergens as a group and may not be specific to this product.</p> <p>Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type.</p> <p>Allergic reactions which develop in the respiratory passages as bronchial asthma or rhinoconjunctivitis, are mostly the result of reactions of the allergen with specific antibodies of the IgE class and belong in their reaction rates to the manifestation of the immediate type. In addition to the allergen-specific potential for causing respiratory sensitisation, the amount of the allergen, the exposure period and the genetically determined disposition of the exposed person are likely to be decisive. Factors which increase the sensitivity of the mucosa may play a role in predisposing a person to allergy.</p> <p>Particular attention is drawn to so-called atopic diathesis which is characterised by an increased susceptibility to allergic rhinitis, allergic bronchial asthma and atopic eczema (neurodermatitis) which is associated with increased IgE synthesis.</p> <p>Exogenous allergic alveolitis is induced essentially by allergen specific immune-complexes of the IgG type; cell-mediated reactions (T lymphocytes) may be involved. Such allergy is of the delayed type with onset up to four hours following exposure.</p> <p>WARNING: This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.</p> |
| CAT SULPHITE L (CSL) & SODIUM BISULFITE | Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. |

| | | | |
|--|---|---------------------------------|---|
| Acute Toxicity | ✓ | Carcinogenicity | ✓ |
| Skin Irritation/Corrosion | ✗ | Reproductivity | ✗ |
| Serious Eye Damage/Irritation | ✗ | STOT - Single Exposure | ✗ |
| Respiratory or Skin sensitisation | ✗ | STOT - Repeated Exposure | ✗ |
| Mutagenicity | ✗ | Aspiration Hazard | ✗ |

CAT SULPHITE L (CSL)

Legend: ✘ – Data either not available or does not fill the criteria for classification
✔ – Data available to make classification

SECTION 12 Ecological information

Toxicity

| CAT SULPHITE L (CSL) | Endpoint | Test Duration (hr) | Species | Value | Source |
|----------------------|---------------|--------------------|---------------|---------------|---------------|
| | Not Available | Not Available | Not Available | Not Available | Not Available |

| sodium bisulfite | Endpoint | Test Duration (hr) | Species | Value | Source |
|------------------|-----------|--------------------|-------------------------------|------------|--------|
| | EC15(ECx) | 0.5h | Algae or other aquatic plants | 8.2mg/l | 1 |
| | LC50 | 96h | Fish | 38.776mg/L | 4 |
| | EC50 | 72h | Algae or other aquatic plants | 43.8mg/l | 2 |
| | EC50 | 48h | Crustacea | 89mg/l | 2 |
| | EC50 | 96h | Algae or other aquatic plants | 63-126mg/l | 2 |

| cobalt(II) sulfate | Endpoint | Test Duration (hr) | Species | Value | Source |
|--------------------|-----------|-------------------------------|-------------------------------|--------------|--------|
| | NOEC(ECx) | 72h | Algae or other aquatic plants | <=0.2-72mg/l | 1 |
| | LC50 | 96h | Fish | 1.512mg/l | 2 |
| | BCF | 1008h | Fish | <3.7 | 7 |
| | EC50 | 72h | Algae or other aquatic plants | 0.4-72mg/l | 1 |
| | EC50 | 48h | Crustacea | 5.89mg/l | 2 |
| EC50 | 96h | Algae or other aquatic plants | 10.2mg/l | 2 | |

| | | | | | |
|----------------|---|--|--|--|--|
| Legend: | <i>Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data</i> | | | | |
|----------------|---|--|--|--|--|

Toxic to aquatic organisms.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

Sulfur dioxide is oxidised rapidly by both homogeneous and heterogeneous reactions and is removed from the atmosphere by precipitation and by dry deposition on surfaces, mainly as sulfuric acid. Because of its high vapor pressure (3,000 mm Hg at 20°C), sulfur dioxide is typically present in a gaseous phase. Some of the sulfur dioxide emitted into the air moves unchanged to various surfaces including soil, water, grass, and vegetation in general.

In the atmosphere, sulfur dioxide can be transformed into sulfuric acid or sulfates by a variety of processes.

Prevent, by any means available, spillage from entering drains or water courses.

DO NOT discharge into sewer or waterways.

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|------------------|-------------------------|------------------|
| sodium bisulfite | HIGH | HIGH |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|--------------------|------------------------|
| sodium bisulfite | LOW (LogKOW = -2.3169) |
| cobalt(II) sulfate | LOW (BCF = 37) |

Mobility in soil

| Ingredient | Mobility |
|------------------|-------------------|
| sodium bisulfite | LOW (KOC = 4.411) |

SECTION 13 Disposal considerations

Waste treatment methods

| | |
|-------------------------------------|---|
| Product / Packaging disposal | <ul style="list-style-type: none"> ▸ Containers may still present a chemical hazard/ danger when empty. ▸ Return to supplier for reuse/ recycling if possible. <p>Otherwise:</p> <ul style="list-style-type: none"> ▸ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. <p>For small quantities:</p> <ul style="list-style-type: none"> ▸ Cautiously add the material to dry butanol in an appropriate solvent. ▸ Reaction may be vigorous and exothermic. ▸ Large volumes of flammable hydrogen may be generated and venting procedures should be conducted in a flame-proof environment. <p>Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.</p> <ul style="list-style-type: none"> ▸ DO NOT allow wash water from cleaning or process equipment to enter drains. ▸ It may be necessary to collect all wash water for treatment before disposal. ▸ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▸ Recycle wherever possible. ▸ Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. ▸ Treat and neutralise at an approved treatment plant. |
|-------------------------------------|---|

SECTION 14 Transport information

Labels Required

| | |
|-------------------------|--|
| Labels Required |  |
| Marine Pollutant | NO |

Land transport (UN)

| | | |
|-------------------------------------|--|----------------|
| UN number | 2693 | |
| UN proper shipping name | BISULPHITES, AQUEOUS SOLUTION, N.O.S. (sodium bisulfite) | |
| Transport hazard class(es) | Class | 8 |
| | Subrisk | Not Applicable |
| Packing group | III | |
| Environmental hazard | Not Applicable | |
| Special precautions for user | Special provisions | 274 |
| | Limited quantity | 5 L |

Air transport (ICAO-IATA / DGR)

| | | |
|-------------------------------------|--|----------------|
| UN number | 2693 | |
| UN proper shipping name | Bisulphites, aqueous solution, n.o.s. * (sodium bisulfite) | |
| Transport hazard class(es) | ICAO/IATA Class | 8 |
| | ICAO / IATA Subrisk | Not Applicable |
| | ERG Code | 8L |
| Packing group | III | |
| Environmental hazard | Not Applicable | |
| Special precautions for user | Special provisions | A803 |
| | Cargo Only Packing Instructions | 856 |
| | Cargo Only Maximum Qty / Pack | 60 L |
| | Passenger and Cargo Packing Instructions | 852 |
| | Passenger and Cargo Maximum Qty / Pack | 5 L |
| | Passenger and Cargo Limited Quantity Packing Instructions | Y841 |
| | Passenger and Cargo Limited Maximum Qty / Pack | 1 L |

Sea transport (IMDG-Code / GGVSee)

| | | |
|-------------------------------------|--|----------------|
| UN number | 2693 | |
| UN proper shipping name | BISULPHITES, AQUEOUS SOLUTION, N.O.S. (sodium bisulfite) | |
| Transport hazard class(es) | IMDG Class | 8 |
| | IMDG Subrisk | Not Applicable |
| Packing group | III | |
| Environmental hazard | Not Applicable | |
| Special precautions for user | EMS Number | F-A, S-B |
| | Special provisions | 274 |
| | Limited Quantities | 5 L |

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

| Product name | Group |
|--------------------|---------------|
| sodium bisulfite | Not Available |
| cobalt(II) sulfate | Not Available |

Transport in bulk in accordance with the ICG Code

| Product name | Ship Type |
|--------------------|---------------|
| sodium bisulfite | Not Available |
| cobalt(II) sulfate | Not Available |

SECTION 15 Regulatory information**Safety, health and environmental regulations / legislation specific for the substance or mixture****sodium bisulfite is found on the following regulatory lists**

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

Singapore Permissible Exposure Limits of Toxic Substances

cobalt(II) sulfate is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B: Possibly carcinogenic to humans

Singapore Permissible Exposure Limits of Toxic Substances

National Inventory Status

| National Inventory | Status |
|---|---|
| Australia - AIIC / Australia Non-Industrial Use | Yes |
| Canada - DSL | Yes |
| Canada - NDSL | No (sodium bisulfite; cobalt(II) sulfate) |
| China - IECSC | Yes |
| Europe - EINEC / ELINCS / NLP | Yes |
| Japan - ENCS | Yes |
| Korea - KECI | Yes |
| New Zealand - NZIoC | Yes |
| Philippines - PICCS | Yes |
| USA - TSCA | Yes |
| Taiwan - TCSI | Yes |
| Mexico - INSQ | Yes |
| Vietnam - NCI | Yes |

Continued...

| National Inventory | Status |
|--------------------|--------|
| Russia - FBEPH | Yes |

Legend:

Yes = All CAS declared ingredients are on the inventory

No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.

SECTION 16 Other information

| | |
|---------------|------------|
| Revision Date | 29/11/2016 |
| Initial Date | 29/11/2016 |

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

Catalytic Fines Reagent Alpha

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 735748 / 735750

Version No: 1.2

Safety Data Sheet

Issue Date: 10/05/2017

Print Date: 24/03/2022

L.GHS.SGP.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

| | |
|--------------------------------------|-------------------------------|
| Product name | Catalytic Fines Reagent Alpha |
| Chemical Name | Not Applicable |
| Synonyms | Not Available |
| Chemical formula | Not Applicable |
| Other means of identification | 735748 / 735750 |

Relevant identified uses of the substance or mixture and uses advised against

| | |
|---------------------------------|---|
| Relevant identified uses | Use according to manufacturer's directions. |
|---------------------------------|---|

Details of the supplier of the safety data sheet

| | | | |
|--------------------------------|---|--|---|
| Registered company name | Wilhelmsen Ships Service (S) Pte. Ltd. | Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | 186 Pandan Loop Singapore 128376 Singapore | -----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +65 6395 4545 | Not Available | +31 10 4877 777 |
| Fax | Not Available | Not Available | Not Available |
| Website | http://www.wilhelmsen.com/services/maritime/compan | http://www.wilhelmsen.com | http://www.wilhelmsen.com |
| Email | wss.singapore@wilhelmsen.com | wss.global.sdsinfo@wilhelmsen.com | wss.rotterdam@wilhelmsen.com |

| | |
|--------------------------------|---|
| Registered company name | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +31 10 4877 777 |
| Fax | Not Available |
| Website | http://www.wilhelmsen.com |
| Email | wss.rotterdam@wilhelmsen.com |

Emergency telephone number

| | | | |
|-----------------------------------|------------------|------------------|--------------------------|
| Association / Organisation | 24hrs - Chemtrec | 24hrs - Chemtrec | Dutch nat. poison centre |
|-----------------------------------|------------------|------------------|--------------------------|

Catalytic Fines Reagent Alpha

| | | | |
|-----------------------------------|--------------------------|-----------------|-----------------|
| Emergency telephone numbers | +31-10-4877700 | +31-10-4877700 | + 31 88 7558561 |
| Other emergency telephone numbers | +31-10-4877700 | +1 800 424 9300 | + 31 10 4877700 |
| Association / Organisation | Dutch nat. poison centre | | |
| Emergency telephone numbers | + 31 30 274 88 88 | | |
| Other emergency telephone numbers | + 31-10-4877700 | | |

SECTION 2 Hazards identification

Classification of the substance or mixture

| | |
|----------------|----------------|
| Classification | Not Applicable |
|----------------|----------------|

Label elements

| | |
|---------------------|----------------|
| Hazard pictogram(s) | Not Applicable |
|---------------------|----------------|

| | |
|-------------|-----------------------|
| Signal word | Not Applicable |
|-------------|-----------------------|

Hazard statement(s)

Not Applicable

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

| CAS No | %[weight] | Name |
|------------|-----------|-------------------------|
| 7647-14-5 | 10-20 | <u>sodium chloride</u> |
| 1310-73-2* | <1 | <u>sodium hydroxide</u> |
| 7732-18-5 | 80-90 | <u>water</u> |

SECTION 4 First aid measures

Description of first aid measures

| | |
|--------------|--|
| Eye Contact | <p>If this product comes in contact with eyes:</p> <ul style="list-style-type: none"> ▶ Wash out immediately with water. ▶ If irritation continues, seek medical attention. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. |
| Skin Contact | <p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation. |

Catalytic Fines Reagent Alpha

| | |
|-------------------|---|
| Inhalation | <ul style="list-style-type: none"> ▸ If fumes, aerosols or combustion products are inhaled remove from contaminated area. ▸ Other measures are usually unnecessary. |
| Ingestion | <ul style="list-style-type: none"> ▸ Immediately give a glass of water. ▸ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor. |

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 Firefighting measures

Extinguishing media

- There is no restriction on the type of extinguisher which may be used.
- Use extinguishing media suitable for surrounding area.

Special hazards arising from the substrate or mixture

| | |
|-----------------------------|-------------|
| Fire Incompatibility | None known. |
|-----------------------------|-------------|

Advice for firefighters

| | |
|------------------------------|--|
| Fire Fighting | <ul style="list-style-type: none"> ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves in the event of a fire. ▸ Prevent, by any means available, spillage from entering drains or water courses. |
| Fire/Explosion Hazard | <ul style="list-style-type: none"> ▸ Non combustible. ▸ Not considered a significant fire risk, however containers may burn. <p>Decomposition may produce toxic fumes of:</p> <p>hydrogen chloride</p> <p>May emit poisonous fumes.</p> |

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

| | |
|---------------------|--|
| Minor Spills | <ul style="list-style-type: none"> ▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment. |
| Major Spills | <p>Moderate hazard.</p> <ul style="list-style-type: none"> ▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. |

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

| | |
|--------------------------|---|
| Safe handling | <ul style="list-style-type: none"> ▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area. |
| Other information | |

Conditions for safe storage, including any incompatibilities

| | |
|--------------------------------|---|
| Suitable container | <ul style="list-style-type: none"> ▸ Polyethylene or polypropylene container. ▸ Packing as recommended by manufacturer. ▸ Check all containers are clearly labelled and free from leaks. |
| Storage incompatibility | None known |



X — Must not be stored together

0 — May be stored together with specific preventions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

| Source | Ingredient | Material name | TWA | STEL | Peak | Notes |
|---|------------------|------------------|---------------|---------|---------------|---------------|
| Singapore Permissible Exposure Limits of Toxic Substances | sodium hydroxide | Sodium hydroxide | Not Available | 2 mg/m3 | Not Available | Not Available |

Emergency Limits

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|------------------|---------------|---------------|---------------|
| sodium chloride | 0.5 ppm | 2 ppm | 20 ppm |
| sodium hydroxide | Not Available | Not Available | Not Available |

| Ingredient | Original IDLH | Revised IDLH |
|------------------|---------------|---------------|
| sodium chloride | Not Available | Not Available |
| sodium hydroxide | 10 mg/m3 | Not Available |
| water | Not Available | Not Available |

Occupational Exposure Banding

| Ingredient | Occupational Exposure Band Rating | Occupational Exposure Band Limit |
|-----------------|---|----------------------------------|
| sodium chloride | E | ≤ 0.01 mg/m ³ |
| Notes: | <i>Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.</i> | |

MATERIAL DATA

Exposure controls

| | |
|---|---|
| Appropriate engineering controls | Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. |
| Personal protection | |
| Eye and face protection | <ul style="list-style-type: none"> ▸ Safety glasses with side shields ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. |
| Skin protection | See Hand protection below |
| Hands/feet protection | The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice. <ul style="list-style-type: none"> ▸ Wear chemical protective gloves, e.g. PVC. |

| | |
|-------------------------|---|
| | ▸ Wear safety footwear or safety gumboots, e.g. Rubber |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none"> ▸ Overalls. ▸ P.V.C apron. ▸ Barrier cream. |

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

Catalytic Fines Reagent Alpha

| Material | CPI |
|-------------------|-----|
| BUTYL | C |
| NAT+NEOPR+NITRILE | C |
| NATURAL RUBBER | C |
| NATURAL+NEOPRENE | C |
| NEOPRENE | C |
| NEOPRENE/NATURAL | C |
| NITRILE | C |
| NITRILE+PVC | C |
| PE | C |
| PE/EVAL/PE | C |
| PVA | C |
| PVC | C |
| SARANEX-23 | C |
| SARANEX-23 2-PLY | C |
| TEFLON | C |
| VITON | C |
| VITON/CHLOROBUTYL | C |

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

| Appearance | Colourless | | |
|---|----------------|--|----------------|
| Physical state | Liquid | Relative density (Water = 1) | 1.1 |
| Odour | Odourless | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | Not Applicable |
| pH (as supplied) | 7 | Decomposition temperature | Not Applicable |
| Melting point / freezing point (°C) | <0 | Viscosity (cSt) | Not Available |
| Initial boiling point and boiling range (°C) | >100 | Molecular weight (g/mol) | Not Available |
| Flash point (°C) | Not Applicable | Taste | Not Available |

Continued...

Catalytic Fines Reagent Alpha

| | | | |
|---------------------------|------------------------|-----------------------------------|---------------|
| Evaporation rate | Not Available BuAC = 1 | Explosive properties | Not Available |
| Flammability | Not Applicable | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | Not Applicable | Surface Tension (dyn/cm or mN/m) | Not Available |
| Lower Explosive Limit (%) | Not Applicable | Volatile Component (%vol) | Not Available |
| Vapour pressure (kPa) | Not Available | Gas group | Not Available |
| Solubility in water | Miscible | pH as a solution (Not Available%) | Not Available |
| Vapour density (Air = 1) | Not Available | VOC g/L | Not Available |

SECTION 10 Stability and reactivity

| | |
|------------------------------------|--|
| Reactivity | See section 7 |
| Chemical stability | <ul style="list-style-type: none"> ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur. |
| Possibility of hazardous reactions | See section 7 |
| Conditions to avoid | See section 7 |
| Incompatible materials | See section 7 |
| Hazardous decomposition products | See section 5 |

SECTION 11 Toxicological information

Information on toxicological effects

| | |
|--------------|---|
| Inhaled | The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting. Not normally a hazard due to non-volatile nature of product |
| Ingestion | The material has NOT been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence. The material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g liver, kidney) damage is evident. |
| Skin Contact | The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting. Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected. |
| Eye | Although the liquid is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn). |
| Chronic | Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems. |

| Catalytic Fines Reagent Alpha | TOXICITY | IRRITATION |
|--|--|-------------------------------------|
| | Not Available | Not Available |
| sodium chloride | TOXICITY | IRRITATION |
| | Dermal (rabbit) LD50: >10000 mg/kg ^[1] | Eye (rabbit): 10 mg - moderate |
| | Inhalation(Rat) LC50; >10.5 mg/l4h ^[1] | Eye (rabbit):100 mg/24h - moderate |
| Oral (Rat) LD50; 3000 mg/kg ^[2] | Skin (rabbit): 500 mg/24h - mild | |
| sodium hydroxide | TOXICITY | IRRITATION |
| | Dermal (rabbit) LD50: 1350 mg/kg ^[2] | Eye (rabbit): 0.05 mg/24h SEVERE |
| | Oral (Rabbit) LD50; 325 mg/kg ^[1] | Eye (rabbit):1 mg/24h SEVERE |
| | | Eye (rabbit):1 mg/30s rinsed-SEVERE |
| | Eye: adverse effect observed (irritating) ^[1] | |

| | | |
|----------------|---|--|
| | | Skin (rabbit): 500 mg/24h SEVERE |
| | | Skin: adverse effect observed (corrosive) ^[1] |
| water | TOXICITY | IRRITATION |
| | Oral (Rat) LD50; >90000 mg/kg ^[2] | Not Available |
| Legend: | 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances | |

| | |
|---|--|
| SODIUM CHLORIDE | The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis. |
| sodium hydroxide | The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. The material may produce severe skin irritation after prolonged or repeated exposure, and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) thickening of the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis. Prolonged contact is unlikely, given the severity of response, but repeated exposures may produce severe ulceration. |
| WATER | No significant acute toxicological data identified in literature search. |
| SODIUM CHLORIDE & sodium hydroxide | Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. |

| | | | |
|--|---|---------------------------------|---|
| Acute Toxicity | ✗ | Carcinogenicity | ✗ |
| Skin Irritation/Corrosion | ✗ | Reproductivity | ✗ |
| Serious Eye Damage/Irritation | ✗ | STOT - Single Exposure | ✗ |
| Respiratory or Skin sensitisation | ✗ | STOT - Repeated Exposure | ✗ |
| Mutagenicity | ✗ | Aspiration Hazard | ✗ |

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✔ – Data available to make classification

SECTION 12 Ecological information

Toxicity

| Catalytic Fines Reagent Alpha | Endpoint | Test Duration (hr) | Species | Value | Source |
|-------------------------------|---------------|--------------------|-------------------------------|-----------------|---------------|
| | Not Available | Not Available | Not Available | Not Available | Not Available |
| sodium chloride | Endpoint | Test Duration (hr) | Species | Value | Source |
| | NOEC(ECx) | 168h | Crustacea | 0.63mg/l | 4 |
| | LC50 | 96h | Fish | 3644-4565mg/l | 4 |
| | EC50 | 72h | Algae or other aquatic plants | 20.76-36.17mg/L | 4 |
| | EC50 | 48h | Crustacea | 340.7-469.2mg/l | 4 |
| sodium hydroxide | Endpoint | Test Duration (hr) | Species | Value | Source |
| | EC50(ECx) | 48h | Crustacea | 34.59-47.13mg/l | 4 |
| | LC50 | 96h | Fish | 144-267mg/l | 4 |
| | EC50 | 48h | Crustacea | 34.59-47.13mg/l | 4 |

Catalytic Fines Reagent Alpha

| | Endpoint | Test Duration (hr) | Species | Value | Source |
|----------------|--|--------------------|---------------|---------------|---------------|
| water | Not Available | Not Available | Not Available | Not Available | Not Available |
| Legend: | Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data | | | | |

Although inorganic chloride ions are not normally considered toxic they can exist in effluents at acutely toxic levels (chloride >3000 mg/l). The resulting salinity can exceed the tolerances of most freshwater organisms.

Inorganic chlorine eventually finds its way into the aqueous compartment and as such is bioavailable.

DO NOT discharge into sewer or waterways.

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|------------------|-------------------------|------------------|
| sodium chloride | LOW | LOW |
| sodium hydroxide | LOW | LOW |
| water | LOW | LOW |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|------------------|------------------------|
| sodium chloride | LOW (LogKOW = 0.5392) |
| sodium hydroxide | LOW (LogKOW = -3.8796) |

Mobility in soil

| Ingredient | Mobility |
|------------------|------------------|
| sodium chloride | LOW (KOC = 14.3) |
| sodium hydroxide | LOW (KOC = 14.3) |

SECTION 13 Disposal considerations

Waste treatment methods

| | |
|------------------------------|--|
| Product / Packaging disposal | <p>Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.</p> <ul style="list-style-type: none"> ▶ DO NOT allow wash water from cleaning or process equipment to enter drains. ▶ It may be necessary to collect all wash water for treatment before disposal. ▶ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▶ Recycle wherever possible. ▶ Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. ▶ Dispose of by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or incineration in a licensed apparatus (after admixture with suitable combustible material). |
|------------------------------|--|

SECTION 14 Transport information

Labels Required

| | |
|------------------|----|
| Marine Pollutant | NO |
|------------------|----|

Land transport (UN): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

| | |
|--------------|-------|
| Product name | Group |
|--------------|-------|

Continued...

| Product name | Group |
|------------------|---------------|
| sodium chloride | Not Available |
| sodium hydroxide | Not Available |
| water | Not Available |

Transport in bulk in accordance with the ICG Code

| Product name | Ship Type |
|------------------|---------------|
| sodium chloride | Not Available |
| sodium hydroxide | Not Available |
| water | Not Available |

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

sodium chloride is found on the following regulatory lists

Not Applicable

sodium hydroxide is found on the following regulatory lists

Singapore Permissible Exposure Limits of Toxic Substances

water is found on the following regulatory lists

Not Applicable

National Inventory Status

| National Inventory | Status |
|--|---|
| Australia - AIIIC / Australia Non-Industrial Use | Yes |
| Canada - DSL | Yes |
| Canada - NDSL | No (sodium chloride; sodium hydroxide; water) |
| China - IECSC | Yes |
| Europe - EINEC / ELINCS / NLP | Yes |
| Japan - ENCS | Yes |
| Korea - KECI | Yes |
| New Zealand - NZIoC | Yes |
| Philippines - PICCS | Yes |
| USA - TSCA | Yes |
| Taiwan - TCSI | Yes |
| Mexico - INSQ | Yes |
| Vietnam - NCI | Yes |
| Russia - FBEPH | Yes |
| Legend: | Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration. |

SECTION 16 Other information

| | |
|---------------|------------|
| Revision Date | 10/05/2017 |
| Initial Date | 10/05/2017 |

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

Other information

Catalytic Fines Reagent Alpha

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

Catalytic Fines Test Fluid

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 735748 / 735750

Version No: 1.3

Safety Data Sheet

Issue Date: 11/05/2017

Print Date: 24/03/2022

L.GHS.SGP.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

| | |
|--------------------------------------|----------------------------|
| Product name | Catalytic Fines Test Fluid |
| Chemical Name | Not Applicable |
| Synonyms | Not Available |
| Chemical formula | Not Applicable |
| Other means of identification | 735748 / 735750 |

Relevant identified uses of the substance or mixture and uses advised against

| | |
|---------------------------------|--|
| Relevant identified uses | The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation. |
|---------------------------------|--|

Details of the supplier of the safety data sheet

| | | | |
|--------------------------------|---|---|---|
| Registered company name | Wilhelmsen Ships Service (S) Pte. Ltd. | Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | 186 Pandan Loop Singapore 128376 Singapore | -----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +65 6395 4545 | Not Available | +31 10 4877 777 |
| Fax | Not Available | Not Available | Not Available |
| Website | http://www.wilhelmsen.com/services/maritime/compan | http://www.wilhelmsen.com | http://www.wilhelmsen.com |
| Email | wss.singapore@wilhelmsen.com | wss.global.sdsinfo@wilhelmsen.com | wss.rotterdam@wilhelmsen.com |

| | |
|--------------------------------|---|
| Registered company name | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +31 10 4877 777 |
| Fax | Not Available |
| Website | http://www.wilhelmsen.com |
| Email | wss.rotterdam@wilhelmsen.com |

Emergency telephone number

| | | | |
|-----------------------------------|------------------|------------------|--------------------------|
| Association / Organisation | 24hrs - Chemtrec | 24hrs - Chemtrec | Dutch nat. poison centre |
|-----------------------------------|------------------|------------------|--------------------------|

Catalytic Fines Test Fluid

| | | | |
|-----------------------------------|--------------------------|-----------------|-----------------|
| Emergency telephone numbers | +31-10-4877700 | +31-10-4877700 | + 31 88 7558561 |
| Other emergency telephone numbers | +31-10-4877700 | +1 800 424 9300 | + 31 10 4877700 |
| Association / Organisation | Dutch nat. poison centre | | |
| Emergency telephone numbers | + 31 30 274 88 88 | | |
| Other emergency telephone numbers | + 31-10-4877700 | | |

SECTION 2 Hazards identification

Classification of the substance or mixture

| | |
|----------------|----------------|
| Classification | Not Applicable |
|----------------|----------------|

Label elements

| | |
|---------------------|-----------------------|
| Hazard pictogram(s) | Not Applicable |
| Signal word | Not Applicable |

Hazard statement(s)

Not Applicable

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

| CAS No | %[weight] | Name |
|-------------|-----------|---|
| 64741-65-7. | 45-55 | <u>naphtha petroleum, heavy alkylate</u> |
| 20324-33-8 | 45-55 | <u>tripropylene glycol monomethyl ether</u> |

SECTION 4 First aid measures

Description of first aid measures

| | |
|--------------|---|
| Eye Contact | <p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▶ Wash out immediately with fresh running water. ▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▶ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. |
| Skin Contact | <p>If skin contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately remove all contaminated clothing, including footwear. ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation. |

| | |
|-------------------|--|
| Inhalation | <ul style="list-style-type: none"> ▶ If fumes or combustion products are inhaled remove from contaminated area. ▶ Lay patient down. Keep warm and rested. ▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▶ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▶ Transport to hospital, or doctor. |
| Ingestion | <ul style="list-style-type: none"> ▶ If swallowed do NOT induce vomiting. ▶ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▶ Observe the patient carefully. ▶ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▶ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▶ Seek medical advice. ▶ Avoid giving milk or oils. ▶ Avoid giving alcohol. ▶ If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus. |

Indication of any immediate medical attention and special treatment needed

For acute or short term repeated exposures to petroleum distillates or related hydrocarbons:

- ▶ Primary threat to life, from pure petroleum distillate ingestion and/or inhalation, is respiratory failure.
- ▶ Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnoea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO₂ 50 mm Hg) should be intubated.
- ▶ Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.
- ▶ A chest x-ray should be taken immediately after stabilisation of breathing and circulation to document aspiration and detect the presence of pneumothorax.
- ▶ Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitisation to catecholamines. Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.
- ▶ Lavage is indicated in patients who require decontamination; ensure use of cuffed endotracheal tube in adult patients. [Ellenhorn and Barceloux: Medical Toxicology]

Treat symptomatically.

SECTION 5 Firefighting measures

Extinguishing media

- ▶ Foam.
- ▶ Dry chemical powder.
- ▶ BCF (where regulations permit).

Special hazards arising from the substrate or mixture

| | |
|-----------------------------|--|
| Fire Incompatibility | ▶ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result |
|-----------------------------|--|

Advice for firefighters

| | |
|------------------------------|---|
| Fire Fighting | <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear full body protective clothing with breathing apparatus. ▶ Prevent, by any means available, spillage from entering drains or water course. |
| Fire/Explosion Hazard | <p>WARNING: In use may form flammable/ explosive vapour-air mixtures.</p> <ul style="list-style-type: none"> ▶ Combustible. ▶ Slight fire hazard when exposed to heat or flame. ▶ Heating may cause expansion or decomposition leading to violent rupture of containers. <p>Combustion products include:</p> <ul style="list-style-type: none"> , carbon dioxide (CO₂) , , other pyrolysis products typical of burning organic material. <p>Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions.</p> <p>May emit poisonous fumes.</p> <p>May emit corrosive fumes.</p> |

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

Catalytic Fines Test Fluid

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

| Minor Spills | <ul style="list-style-type: none"> ▶ Remove all ignition sources. ▶ Clean up all spills immediately. ▶ Avoid breathing vapours and contact with skin and eyes. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------------------|---|-------------|------------|-----------------|--|--|--------------|------|-------------|------------|-------------|--|--------------------|--|--|--|--|--|------------------------------------|---|--------|--------|----------|--|-------------------------------|---|-------|-----------|------------|--|---------------------|---|-------|-----------|---------------|--|----------------------------|---|-------|-----------|---------|--|----------------------------|---|--------|--------|---------|--|-----------------------|---|-------|-----------|---------------|--|---------------------|--|--|--|--|--|------------------------------------|---|--------|------------|---------|--|-------------------------------|---|-------|------------|------------|--|----------------------------|---|--------|------------|---------|--|-----------------------------|---|--------|------------|------------|--|--------------------------------|---|--------|------------|-----------------|--|---------------------|---|-------|------------|---------|--|
| Major Spills | <p>Chemical Class: aliphatic hydrocarbons For release onto land: recommended sorbents listed in order of priority.</p> <table border="1"> <thead> <tr> <th>SORBENT TYPE</th> <th>RANK</th> <th>APPLICATION</th> <th>COLLECTION</th> <th colspan="2">LIMITATIONS</th> </tr> </thead> <tbody> <tr> <td colspan="6">LAND SPILL - SMALL</td> </tr> <tr> <td>cross-linked polymer - particulate</td> <td>1</td> <td>shovel</td> <td>shovel</td> <td colspan="2">R, W, SS</td> </tr> <tr> <td>cross-linked polymer - pillow</td> <td>1</td> <td>throw</td> <td>pitchfork</td> <td colspan="2">R, DGC, RT</td> </tr> <tr> <td>wood fiber - pillow</td> <td>2</td> <td>throw</td> <td>pitchfork</td> <td colspan="2">R, P, DGC, RT</td> </tr> <tr> <td>treated wood fibre- pillow</td> <td>2</td> <td>throw</td> <td>pitchfork</td> <td colspan="2">DGC, RT</td> </tr> <tr> <td>sorbent clay - particulate</td> <td>3</td> <td>shovel</td> <td>shovel</td> <td colspan="2">R, I, P</td> </tr> <tr> <td>foamed glass - pillow</td> <td>3</td> <td>throw</td> <td>pitchfork</td> <td colspan="2">R, P, DGC, RT</td> </tr> <tr> <td colspan="6">LAND SPILL - MEDIUM</td> </tr> <tr> <td>cross-linked polymer - particulate</td> <td>1</td> <td>blower</td> <td>skiploader</td> <td colspan="2">R,W, SS</td> </tr> <tr> <td>cross-linked polymer - pillow</td> <td>2</td> <td>throw</td> <td>skiploader</td> <td colspan="2">R, DGC, RT</td> </tr> <tr> <td>sorbent clay - particulate</td> <td>3</td> <td>blower</td> <td>skiploader</td> <td colspan="2">R, I, P</td> </tr> <tr> <td>polypropylene - particulate</td> <td>3</td> <td>blower</td> <td>skiploader</td> <td colspan="2">W, SS, DGC</td> </tr> <tr> <td>expanded mineral - particulate</td> <td>4</td> <td>blower</td> <td>skiploader</td> <td colspan="2">R, I, W, P, DGC</td> </tr> <tr> <td>polypropylene - mat</td> <td>4</td> <td>throw</td> <td>skiploader</td> <td colspan="2">DGC, RT</td> </tr> </tbody> </table> <p>Legend DGC: Not effective where ground cover is dense R: Not reusable I: Not incinerable P: Effectiveness reduced when rainy RT:Not effective where terrain is rugged SS: Not for use within environmentally sensitive sites W: Effectiveness reduced when windy Reference: Sorbents for Liquid Hazardous Substance Cleanup and Control; R.W Melvold et al: Pollution Technology Review No. 150: Noyes Data Corporation 1988 Moderate hazard.</p> <ul style="list-style-type: none"> ▶ Clear area of personnel and move upwind. ▶ Alert Fire Brigade and tell them location and nature of hazard. | | | | | | SORBENT TYPE | RANK | APPLICATION | COLLECTION | LIMITATIONS | | LAND SPILL - SMALL | | | | | | cross-linked polymer - particulate | 1 | shovel | shovel | R, W, SS | | cross-linked polymer - pillow | 1 | throw | pitchfork | R, DGC, RT | | wood fiber - pillow | 2 | throw | pitchfork | R, P, DGC, RT | | treated wood fibre- pillow | 2 | throw | pitchfork | DGC, RT | | sorbent clay - particulate | 3 | shovel | shovel | R, I, P | | foamed glass - pillow | 3 | throw | pitchfork | R, P, DGC, RT | | LAND SPILL - MEDIUM | | | | | | cross-linked polymer - particulate | 1 | blower | skiploader | R,W, SS | | cross-linked polymer - pillow | 2 | throw | skiploader | R, DGC, RT | | sorbent clay - particulate | 3 | blower | skiploader | R, I, P | | polypropylene - particulate | 3 | blower | skiploader | W, SS, DGC | | expanded mineral - particulate | 4 | blower | skiploader | R, I, W, P, DGC | | polypropylene - mat | 4 | throw | skiploader | DGC, RT | |
| SORBENT TYPE | RANK | APPLICATION | COLLECTION | LIMITATIONS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LAND SPILL - SMALL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| cross-linked polymer - particulate | 1 | shovel | shovel | R, W, SS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| cross-linked polymer - pillow | 1 | throw | pitchfork | R, DGC, RT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| wood fiber - pillow | 2 | throw | pitchfork | R, P, DGC, RT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| treated wood fibre- pillow | 2 | throw | pitchfork | DGC, RT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| sorbent clay - particulate | 3 | shovel | shovel | R, I, P | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| foamed glass - pillow | 3 | throw | pitchfork | R, P, DGC, RT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LAND SPILL - MEDIUM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| cross-linked polymer - particulate | 1 | blower | skiploader | R,W, SS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| cross-linked polymer - pillow | 2 | throw | skiploader | R, DGC, RT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| sorbent clay - particulate | 3 | blower | skiploader | R, I, P | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| polypropylene - particulate | 3 | blower | skiploader | W, SS, DGC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| expanded mineral - particulate | 4 | blower | skiploader | R, I, W, P, DGC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| polypropylene - mat | 4 | throw | skiploader | DGC, RT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

| | |
|----------------------|---|
| Safe handling | <p>The conductivity of this material may make it a static accumulator., A liquid is typically considered nonconductive if its conductivity is below 100 pS/m and is considered semi-conductive if its conductivity is below 10 000 pS/m., Whether a liquid is nonconductive or semi-conductive, the precautions are the same., A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid.</p> <ul style="list-style-type: none"> ▶ Containers, even those that have been emptied, may contain explosive vapours. ▶ Do NOT cut, drill, grind, weld or perform similar operations on or near containers. <p>Contains low boiling substance: Storage in sealed containers may result in pressure buildup causing violent rupture of containers not rated appropriately.</p> <ul style="list-style-type: none"> ▶ Check for bulging containers. ▶ Vent periodically ▶ Always release caps or seals slowly to ensure slow dissipation of vapours <p>The tendency of many ethers to form explosive peroxides is well documented. Ethers lacking non-methyl hydrogen atoms adjacent to the ether link are thought to be relatively safe</p> <ul style="list-style-type: none"> ▶ DO NOT concentrate by evaporation, or evaporate extracts to dryness, as residues may contain explosive peroxides with DETONATION potential. |
|----------------------|---|

Continued...

Catalytic Fines Test Fluid

| | |
|--------------------------|---|
| | <ul style="list-style-type: none"> ▸ Any static discharge is also a source of hazard. <p>The substance accumulates peroxides which may become hazardous only if it evaporates or is distilled or otherwise treated to concentrate the peroxides. The substance may concentrate around the container opening for example.</p> <p>Purchases of peroxidisable chemicals should be restricted to ensure that the chemical is used completely before it can become peroxidised.</p> <ul style="list-style-type: none"> ▸ Electrostatic discharge may be generated during pumping - this may result in fire. ▸ Ensure electrical continuity by bonding and grounding (earthing) all equipment. ▸ Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (≤ 1 m/sec until fill pipe submerged to twice its diameter, then ≤ 7 m/sec). ▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area. ▸ DO NOT allow clothing wet with material to stay in contact with skin |
| Other information | <ul style="list-style-type: none"> ▸ Store in original containers. ▸ Keep containers securely sealed. ▸ No smoking, naked lights or ignition sources. |

Conditions for safe storage, including any incompatibilities

| | |
|--------------------------------|--|
| Suitable container | <ul style="list-style-type: none"> ▸ Metal can or drum ▸ Packaging as recommended by manufacturer. ▸ Check all containers are clearly labelled and free from leaks. |
| Storage incompatibility | <ul style="list-style-type: none"> ▸ Glycol ethers may form peroxides under certain conditions; the potential for peroxide formation is enhanced when these substances are used in processes such as distillation where they are concentrated or even evaporated to near-dryness or dryness; storage under a nitrogen atmosphere is recommended to minimise the possible formation of highly reactive peroxides ▸ Nitrogen blanketing is recommended if transported in containers at temperatures within 15 deg C of the flash-point and at or above the flash-point - large containers may first need to be purged and inerted with nitrogen prior to loading ▸ In the presence of strong bases or the salts of strong bases, at elevated temperatures, the potential exists for runaway reactions. ▸ Contact with aluminium should be avoided; release of hydrogen gas may result- glycol ethers will corrode scratched aluminium surfaces. ▸ May discolour in mild steel/ copper; lined containers, glass or stainless steel is preferred ▸ Glycols and their ethers undergo violent decomposition in contact with 70% perchloric acid. ▸ Avoid reaction with oxidising agents |



X — Must not be stored together

0 — May be stored together with specific preventions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Not Available

Emergency Limits

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|--------------------------------------|-----------------------|-----------------------|-----------------------|
| tripropylene glycol monomethyl ether | 2 ppm | 22 ppm | 75 ppm |
| tripropylene glycol monomethyl ether | 9.6 mg/m ³ | 110 mg/m ³ | 630 mg/m ³ |

| Ingredient | Original IDLH | Revised IDLH |
|-----------------------------------|---------------|---------------|
| naphtha petroleum, heavy alkylate | Not Available | Not Available |

Continued...

Catalytic Fines Test Fluid

| Ingredient | Original IDLH | Revised IDLH |
|--------------------------------------|---------------|---------------|
| tripropylene glycol monomethyl ether | Not Available | Not Available |

Occupational Exposure Banding


| Ingredient | Occupational Exposure Band Rating | Occupational Exposure Band Limit |
|--------------------------------------|---|----------------------------------|
| tripropylene glycol monomethyl ether | E | ≤ 0.1 ppm |
| Notes: | <i>Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.</i> | |

MATERIAL DATA

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more.

NOTE P: The classification as a carcinogen need not apply if it can be shown that the substance contains less than 0.01% w/w benzene (EINECS No 200-753-7). Note E shall also apply when the substance is classified as a carcinogen. This note applies only to certain complex oil-derived substances in Annex VI.

Exposure controls

| | |
|---|---|
| Appropriate engineering controls | Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. |
| Personal protection |  |
| Eye and face protection | <ul style="list-style-type: none"> ▶ Safety glasses with side shields. ▶ Chemical goggles. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. |
| Skin protection | See Hand protection below |
| Hands/feet protection | <ul style="list-style-type: none"> ▶ Wear chemical protective gloves, e.g. PVC. ▶ Wear safety footwear or safety gumboots, e.g. Rubber <p>The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.</p> |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none"> ▶ Overalls. ▶ P.V.C apron. ▶ Barrier cream. |

Respiratory protection

- ▶ Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content.
- ▶ The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.
- ▶ Cartridge performance is affected by humidity. Cartridges should be changed after 2 hr of continuous use unless it is determined that the humidity is less than 75%, in which case, cartridges can be used for 4 hr. Used cartridges should be discarded daily, regardless of the length of time used

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

| | | | |
|-----------------------|------------|-------------------------------------|---------------|
| Appearance | Colourless | | |
| Physical state | Liquid | Relative density (Water = 1) | Not Available |

| | | | |
|---|------------------------|--|----------------|
| Odour | Odourless | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | Not Applicable |
| pH (as supplied) | Not Applicable | Decomposition temperature | Not Available |
| Melting point / freezing point (°C) | Not Available | Viscosity (cSt) | Not Available |
| Initial boiling point and boiling range (°C) | >70 | Molecular weight (g/mol) | Not Available |
| Flash point (°C) | >93 | Taste | Not Available |
| Evaporation rate | Not Available BuAC = 1 | Explosive properties | Not Available |
| Flammability | Not Applicable | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | Not Applicable | Surface Tension (dyn/cm or mN/m) | Not Available |
| Lower Explosive Limit (%) | Not Applicable | Volatile Component (%vol) | Not Available |
| Vapour pressure (kPa) | Not Available | Gas group | Not Available |
| Solubility in water | Immiscible | pH as a solution (Not Available%) | Not Available |
| Vapour density (Air = 1) | Not Available | VOC g/L | Not Available |

SECTION 10 Stability and reactivity

| | |
|---|--|
| Reactivity | See section 7 |
| Chemical stability | <ul style="list-style-type: none"> ▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur. |
| Possibility of hazardous reactions | See section 7 |
| Conditions to avoid | See section 7 |
| Incompatible materials | See section 7 |
| Hazardous decomposition products | See section 5 |

SECTION 11 Toxicological information

Information on toxicological effects

| | |
|---------------------|--|
| Inhaled | <p>Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.</p> <p>Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs.</p> <p>Acute effects from inhalation of high concentrations of vapour are pulmonary irritation, including coughing, with nausea; central nervous system depression - characterised by headache and dizziness, increased reaction time, fatigue and loss of co-ordination. Central nervous system (CNS) depression may include nonspecific discomfort, symptoms of giddiness, headache, dizziness, nausea, anaesthetic effects, slowed reaction time, slurred speech and may progress to unconsciousness. Serious poisonings may result in respiratory depression and may be fatal.</p> <p>The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.</p> |
| Ingestion | <p>Accidental ingestion of the material may be damaging to the health of the individual.</p> <p>Central nervous system (CNS) depression may include nonspecific discomfort, symptoms of giddiness, headache, dizziness, nausea, anaesthetic effects, slowed reaction time, slurred speech and may progress to unconsciousness. Serious poisonings may result in respiratory depression and may be fatal.</p> |
| Skin Contact | <p>Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis.</p> |

| | | |
|---|---|------------------------------------|
| | <p>The liquid may be miscible with fats or oils and may degrease the skin, producing a skin reaction described as non-allergic contact dermatitis. The material is unlikely to produce an irritant dermatitis as described in EC Directives .</p> <p>The material may accentuate any pre-existing dermatitis condition</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p> | |
| Eye | <p>Limited evidence exists, or practical experience suggests, that the material may cause eye irritation in a substantial number of individuals and/or is expected to produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.</p> | |
| Chronic | <p>Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.</p> <p>Repeated or prolonged exposure to mixed hydrocarbons may produce narcosis with dizziness, weakness, irritability, concentration and/or memory loss, tremor in the fingers and tongue, vertigo, olfactory disorders, constriction of visual field, paraesthesias of the extremities, weight loss and anaemia and degenerative changes in the liver and kidney. Chronic exposure by petroleum workers, to the lighter hydrocarbons, has been associated with visual disturbances, damage to the central nervous system, peripheral neuropathies (including numbness and paraesthesias), psychological and neurophysiological deficits, bone marrow toxicities (including hypoplasia possibly due to benzene) and hepatic and renal involvement. Chronic dermal exposure to petroleum hydrocarbons may result in defatting which produces localised dermatoses.</p> <p>Studies with some glycol ethers (principally the monoethylene glycols) and their esters indicate reproductive changes, testicular atrophy, infertility and kidney function changes. The metabolic acetic acid derivatives of glycol ethers (alkoxyacetic acids), not the ether itself, have been found to be the proximal reproductive toxin in animals. The potency of these metabolites decreases significantly as the chain length of the ether increases.</p> | |
| Catalytic Fines Test Fluid | TOXICITY Not Available | IRRITATION Not Available |
| naphtha petroleum, heavy alkylate | TOXICITY Dermal (rabbit) LD50: >2000 mg/kg ^[2] Inhalation(Rat) LC50; >5.04 mg/l4h ^[2] Oral (Rat) LD50; >7000 mg/kg ^[2] | IRRITATION Not Available |
| tripropylene glycol monomethyl ether | TOXICITY Dermal (rabbit) LD50: 15440 mg/kg ^[2] Oral (Rat) LD50; 3200 mg/kg ^[2] | IRRITATION Not Available |
| Legend: | 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances | |

| | |
|--|--|
| NAPHTHA PETROLEUM, HEAVY ALKYLATE | <p>For Low Boiling Point Naphthas (LBPNs):</p> <p>Acute toxicity: LBPNs generally have low acute toxicity by the oral (median lethal dose [LD50] in rats > 2000 mg/kg-bw), inhalation (LD50 in rats > 5000 mg/m³) and dermal (LD50 in rabbits > 2000 mg/kg-bw) routes of exposure</p> <p>Most LBPNs are mild to moderate eye and skin irritants in rabbits, with the exception of heavy catalytic cracked and heavy catalytic reformed naphthas, which have higher primary skin irritation indices.</p> <p>Sensitisation: LBPNs do not appear to be skin sensitizers, but a poor response in the positive control was also noted in these studies</p> <p>Repeat dose toxicity: The lowest-observed-adverse-effect concentration (LOAEC) and lowest-observed-adverse-effect level (LOAEL) values identified following short-term (2-89 days) and subchronic (greater than 90 days) exposure to the LBPN substances. These values were determined for a variety of endpoints after considering the toxicity data for all LBPNs in the group. Most of the studies were carried out by the inhalation route of exposure.</p> <p>Studies indicate that normal, branched and cyclic paraffins are absorbed from the mammalian gastrointestinal tract and that the absorption of n-paraffins is inversely proportional to the carbon chain length, with little absorption above C30. With respect to the carbon chain lengths likely to be present in mineral oil, n-paraffins may be absorbed to a greater extent than iso- or cyclo-paraffins.</p> <p>The major classes of hydrocarbons have been shown to be well absorbed by the gastrointestinal tract in various species. In many cases, the hydrophobic hydrocarbons are ingested in association with dietary lipids.</p> <p>for petroleum: Altered mental state, drowsiness, peripheral motor neuropathy, irreversible brain damage (so-called Petrol Sniffer's Encephalopathy), delirium, seizures, and sudden death have been reported from repeated overexposure to some hydrocarbon solvents, naphthas, and gasoline</p> <p>This product may contain benzene which is known to cause acute myeloid leukaemia and n-hexane which has been shown to metabolize to compounds which are neuropathic.</p> |
|--|--|

| | |
|--|---|
| | <p>This product contains toluene. There are indications from animal studies that prolonged exposure to high concentrations of toluene may lead to hearing loss.</p> <p>This product contains ethyl benzene and naphthalene from which there is evidence of tumours in rodents</p> <p>Carcinogenicity: Inhalation exposure to mice causes liver tumours, which are not considered relevant to humans. Inhalation exposure to rats causes kidney tumours which are not considered relevant to humans.</p> <p>Mutagenicity: There is a large database of mutagenicity studies on gasoline and gasoline blending streams, which use a wide variety of endpoints and give predominantly negative results.</p> |
| Catalytic Fines Test Fluid & TRIPROPYLENE GLYCOL MONOMETHYL ETHER | <p>for propylene glycol ethers (PGEs):</p> <p>Typical propylene glycol ethers include propylene glycol n-butyl ether (PnB); dipropylene glycol n-butyl ether (DPnB); dipropylene glycol methyl ether acetate (DPMA); tripropylene glycol methyl ether (TPM).</p> <p>Testing of a wide variety of propylene glycol ethers Testing of a wide variety of propylene glycol ethers has shown that propylene glycol-based ethers are less toxic than some ethers of the ethylene series. The common toxicities associated with the lower molecular weight homologues of the ethylene series, such as adverse effects on reproductive organs, the developing embryo and fetus, blood (haemolytic effects), or thymus, are not seen with the commercial-grade propylene glycol ethers. In the ethylene series, metabolism of the terminal hydroxyl group produces an alkoxyacetic acid.</p> |

| | | | |
|--|---|---------------------------------|---|
| Acute Toxicity | ✗ | Carcinogenicity | ✗ |
| Skin Irritation/Corrosion | ✗ | Reproductivity | ✗ |
| Serious Eye Damage/Irritation | ✗ | STOT - Single Exposure | ✗ |
| Respiratory or Skin sensitisation | ✗ | STOT - Repeated Exposure | ✗ |
| Mutagenicity | ✗ | Aspiration Hazard | ✗ |

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

| Catalytic Fines Test Fluid | Endpoint | Test Duration (hr) | Species | Value | Source |
|----------------------------|---------------|--------------------|---------------|---------------|---------------|
| | Not Available | Not Available | Not Available | Not Available | Not Available |

| naphtha petroleum, heavy alkylate | Endpoint | Test Duration (hr) | Species | Value | Source |
|-----------------------------------|-----------|--------------------|-------------------------------|---------|--------|
| | NOEC(ECx) | 72h | Algae or other aquatic plants | 0.1mg/l | 1 |
| | EC50 | 72h | Algae or other aquatic plants | 13mg/l | 1 |

| tripropylene glycol monomethyl ether | Endpoint | Test Duration (hr) | Species | Value | Source |
|--------------------------------------|-----------|--------------------|-------------------------------|-----------|--------|
| | LC50 | 96h | Fish | 11619mg/l | 2 |
| | EC50 | 48h | Crustacea | >10mg/l | 1 |
| | EC50(ECx) | 48h | Crustacea | >10mg/l | 1 |
| | EC50 | 96h | Algae or other aquatic plants | 9069mg/l | 2 |

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

When spilled this product may act as a typical oil, causing a film, sheen, emulsion or sludge at or beneath the surface of the body of water. The oil film on water surface may physically affect the aquatic organisms, due to the interruption of the oxygen transfer between the air and the water

Oils of any kind can cause:

- ▶ drowning of water-fowl due to lack of buoyancy, loss of insulating capacity of feathers, starvation and vulnerability to predators due to lack of mobility
- ▶ lethal effects on fish by coating gill surfaces, preventing respiration
- ▶ asphyxiation of benthic life forms when floating masses become engaged with surface debris and settle on the bottom and
- ▶ adverse aesthetic effects of fouled shoreline and beaches

In case of accidental releases on the soil, a fine film is formed on the soil, which prevents the plant respiration process and the soil particle saturation. It may cause deep water infestation.

for propylene glycol ethers:

Environmental fate:

Most are liquids at room temperature and all are water-soluble.

Typical propylene glycol ethers include propylene glycol n-butyl ether (PnB); dipropylene glycol n-butyl ether (DPnB); dipropylene glycol methyl ether acetate (DPMA); tripropylene glycol methyl ether (TPM)

Environmental fate: Log octanol-water partition coefficients (log Kow's) range from 0.309 for TPM to 1.523 for DPnB. Calculated BCFs range from 1.47 for DPnB

to 3.16 for DPMA and TPM, indicating low bioaccumulation.

For glycol ethers:

Environmental fate:

Ether groups are generally stable to hydrolysis in water under neutral conditions and ambient temperatures. OECD guideline studies indicate ready biodegradability for several glycol ethers although higher molecular weight species seem to biodegrade at a slower rate. No glycol ethers that have been tested demonstrate marked resistance to biodegradative processes.

Drinking Water Standards: hydrocarbon total: 10 ug/l (UK max.).

For hydrocarbons:

Environmental fate:

The lower molecular weight hydrocarbons are expected to form a "slick" on the surface of waters after release in calm sea conditions. This is expected to evaporate and enter the atmosphere where it will be degraded through reaction with hydroxy radicals.

Some hydrocarbon will become associated with benthic sediments, and it is likely to be spread over a fairly wide area of sea floor.

DO NOT discharge into sewer or waterways.

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|--------------------------------------|-------------------------|------------------|
| tripropylene glycol monomethyl ether | HIGH | HIGH |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|--------------------------------------|------------------------|
| tripropylene glycol monomethyl ether | LOW (LogKOW = -0.2027) |

Mobility in soil

| Ingredient | Mobility |
|--------------------------------------|----------------|
| tripropylene glycol monomethyl ether | LOW (KOC = 10) |

SECTION 13 Disposal considerations

Waste treatment methods

| | |
|-------------------------------------|---|
| Product / Packaging disposal | <p>Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.</p> <ul style="list-style-type: none"> ▶ DO NOT allow wash water from cleaning or process equipment to enter drains. ▶ It may be necessary to collect all wash water for treatment before disposal. ▶ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▶ Recycle wherever possible or consult manufacturer for recycling options. ▶ Consult State Land Waste Authority for disposal. ▶ Bury or incinerate residue at an approved site. |
|-------------------------------------|---|

SECTION 14 Transport information

Labels Required

| | |
|-------------------------|----|
| Marine Pollutant | NO |
|-------------------------|----|

Land transport (UN): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

| Product name | Group |
|-----------------------------------|---------------|
| naphtha petroleum, heavy alkylate | Not Available |

| Product name | Group |
|--------------------------------------|---------------|
| tripropylene glycol monomethyl ether | Not Available |

Transport in bulk in accordance with the ICG Code

| Product name | Ship Type |
|--------------------------------------|---------------|
| naphtha petroleum, heavy alkylate | Not Available |
| tripropylene glycol monomethyl ether | Not Available |

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

naphtha petroleum, heavy alkylate is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List

tripropylene glycol monomethyl ether is found on the following regulatory lists

Not Applicable

National Inventory Status

| National Inventory | Status |
|--|---|
| Australia - AIIIC / Australia Non-Industrial Use | Yes |
| Canada - DSL | Yes |
| Canada - NDSL | No (naphtha petroleum, heavy alkylate) |
| China - IECSC | Yes |
| Europe - EINEC / ELINCS / NLP | Yes |
| Japan - ENCS | No (naphtha petroleum, heavy alkylate) |
| Korea - KECI | Yes |
| New Zealand - NZIoC | Yes |
| Philippines - PICCS | Yes |
| USA - TSCA | Yes |
| Taiwan - TCSI | Yes |
| Mexico - INSQ | Yes |
| Vietnam - NCI | Yes |
| Russia - FBEPH | No (naphtha petroleum, heavy alkylate) |
| Legend: | Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration. |

SECTION 16 Other information

| | |
|---------------|------------|
| Revision Date | 11/05/2017 |
| Initial Date | 11/05/2017 |

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

CERAMIGRADE LINER ACTIVATOR

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 659276 (activator)

Version No: 8.15

Safety Data Sheet

Issue Date: 04/10/2017

Print Date: 24/03/2022

L.GHS.SGP.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

| | |
|--------------------------------------|--|
| Product name | CERAMIGRADE LINER ACTIVATOR |
| Chemical Name | Not Applicable |
| Synonyms | 659300 , POLYMER KIT-ALFA,Product Part Number: 659276 Ceramigrade liner base and activator 0.5L |
| Proper shipping name | CORROSIVE LIQUID, N.O.S. (contains Polyoxypropylenediamine, 4,4'-isopropylidenediphenol and nonylphenol) |
| Chemical formula | Not Applicable |
| Other means of identification | 659276 (activator), 1056599, 659276, 659300 |

Relevant identified uses of the substance or mixture and uses advised against

| | |
|---------------------------------|--|
| Relevant identified uses | The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation. |
|---------------------------------|--|

Details of the supplier of the safety data sheet

| | | | |
|--------------------------------|---|---|--|
| Registered company name | Wilhelmsen Ships Service (S) Pte. Ltd. | Wilhelmsen Ships Service AS* Central Warehouse | Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen |
| Address | 186 Pandan Loop Singapore 128376 Singapore | Willem Barentszstraat 50 Rotterdam Netherlands | -----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway |
| Telephone | +65 6395 4545 | +31 10 4877 777 | Not Available |
| Fax | Not Available | Not Available | Not Available |
| Website | http://www.wilhelmsen.com/services/maritime/compan | http://www.wilhelmsen.com | http://www.wilhelmsen.com |
| Email | wss.singapore@wilhelmsen.com | wss.rotterdam@wilhelmsen.com | wss.global.sdsinfo@wilhelmsen.com |

| | |
|--------------------------------|---|
| Registered company name | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +31 10 4877 777 |
| Fax | Not Available |
| Website | http://www.wilhelmsen.com |
| Email | wss.rotterdam@wilhelmsen.com |

Emergency telephone number

CERAMIGRADE LINER ACTIVATOR

| Association / Organisation | 24hrs - Chemtrec | Dutch nat. poison centre | 24hrs - Chemtrec |
|-----------------------------------|------------------|--------------------------|------------------|
| Emergency telephone numbers | +31-10-4877700 | + 31 88 7558561 | +31-10-4877700 |
| Other emergency telephone numbers | +31-10-4877700 | + 31 10 4877700 | +1 800 424 9300 |

| Association / Organisation | Dutch nat. poison centre |
|-----------------------------------|--------------------------|
| Emergency telephone numbers | + 31 30 274 88 88 |
| Other emergency telephone numbers | + 31-10-4877700 |

SECTION 2 Hazards identification

Classification of the substance or mixture

| | |
|----------------|---|
| Classification | Corrosive to Metals Category 1, Acute Toxicity (Oral) Category 4, Skin Corrosion/Irritation Category 1, Sensitisation (Skin) Category 1, Reproductive Toxicity Category 2, Hazardous to the Aquatic Environment Long-Term Hazard Category 2 |
|----------------|---|

Label elements

| | |
|---------------------|--|
| Hazard pictogram(s) |  |
|---------------------|--|

| | |
|-------------|---------------|
| Signal word | Danger |
|-------------|---------------|

Hazard statement(s)

| | |
|------|--|
| H290 | May be corrosive to metals. |
| H302 | Harmful if swallowed. |
| H314 | Causes severe skin burns and eye damage. |
| H317 | May cause an allergic skin reaction. |
| H361 | Suspected of damaging fertility or the unborn child. |
| H411 | Toxic to aquatic life with long lasting effects. |

Precautionary statement(s) Prevention

| | |
|------|---|
| P201 | Obtain special instructions before use. |
| P260 | Do not breathe mist/vapours/spray. |
| P264 | Wash all exposed external body areas thoroughly after handling. |

Precautionary statement(s) Response

| | |
|----------------|--|
| P301+P330+P331 | IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. |
| P303+P361+P353 | IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. |
| P305+P351+P338 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. |

Precautionary statement(s) Storage

| | |
|------|------------------|
| P405 | Store locked up. |
|------|------------------|

Precautionary statement(s) Disposal

| | |
|------|--|
| P501 | Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation. |
|------|--|

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

| CAS No | %[weight] | Name |
|------------|-----------|------------------------------------|
| 9046-10-0* | >45 | <u>Polyoxypropylenediamine</u> |
| 25154-52-3 | <20 | <u>nonylphenol</u> |
| 80-05-7* | >15 | <u>4,4'-isopropylidenediphenol</u> |
| 100-51-6 | <15 | <u>benzyl alcohol</u> |

SECTION 4 First aid measures

Description of first aid measures

| | |
|---------------------|---|
| Eye Contact | <p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▶ Immediately hold eyelids apart and flush the eye continuously with running water. ▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▶ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▶ Transport to hospital or doctor without delay. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. |
| Skin Contact | <p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately flush body and clothes with large amounts of water, using safety shower if available. ▶ Quickly remove all contaminated clothing, including footwear. ▶ Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre. ▶ Transport to hospital, or doctor. |
| Inhalation | <ul style="list-style-type: none"> ▶ If fumes or combustion products are inhaled remove from contaminated area. ▶ Lay patient down. Keep warm and rested. ▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▶ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▶ Transport to hospital, or doctor, without delay. ▶ Inhalation of vapours or aerosols (mists, fumes) may cause lung oedema. ▶ Corrosive substances may cause lung damage (e.g. lung oedema, fluid in the lungs). ▶ As this reaction may be delayed up to 24 hours after exposure, affected individuals need complete rest (preferably in semi-recumbent posture) and must be kept under medical observation even if no symptoms are (yet) manifested. ▶ Before any such manifestation, the administration of a spray containing a dexamethasone derivative or beclomethasone derivative may be considered. <p>This must definitely be left to a doctor or person authorised by him/her. (ICSC13719)</p> |
| Ingestion | <ul style="list-style-type: none"> ▶ For advice, contact a Poisons Information Centre or a doctor at once. ▶ Urgent hospital treatment is likely to be needed. ▶ If swallowed do NOT induce vomiting. ▶ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▶ Observe the patient carefully. ▶ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▶ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▶ Transport to hospital or doctor without delay. |

Indication of any immediate medical attention and special treatment needed

Clinical experience of benzyl alcohol poisoning is generally confined to premature neonates in receipt of preserved intravenous salines.

- ▶ Metabolic acidosis, bradycardia, skin breakdown, hypotonia, hepatorenal failure, hypotension and cardiovascular collapse are characteristic.
- ▶ High urine benzoate and hippuric acid as well as elevated serum benzoic acid levels are found.
- ▶ The so-called "gasping syndrome" describes the progressive neurological deterioration of poisoned neonates.
- ▶ Management is essentially supportive.

for corrosives:

BASIC TREATMENT

- ▶ Establish a patent airway with suction where necessary.
- ▶ Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- ▶ Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- ▶ Monitor and treat, where necessary, for pulmonary oedema .
- ▶ Monitor and treat, where necessary, for shock.
- ▶ Anticipate seizures.
- ▶ Where eyes have been exposed, flush immediately with water and continue to irrigate with normal saline during transport to hospital.

Continued...

CERAMIGRADE LINER ACTIVATOR

- ▶ **DO NOT use emetics.** Where ingestion is suspected rinse mouth and give up to 200 ml water (5 ml/kg recommended) for dilution where patient is able to swallow, has a strong gag reflex and does not drool.
- ▶ Skin burns should be covered with dry, sterile bandages, following decontamination.
- ▶ **DO NOT attempt neutralisation as exothermic reaction may occur.**

ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

EMERGENCY DEPARTMENT

- ▶ Laboratory analysis of complete blood count, serum electrolytes, BUN, creatinine, glucose, urinalysis, baseline for serum aminotransferases (ALT and AST), calcium, phosphorus and magnesium, may assist in establishing a treatment regime.
- ▶ Positive end-expiratory pressure (PEEP)-assisted ventilation may be required for acute parenchymal injury or adult respiratory distress syndrome.
- ▶ Consider endoscopy to evaluate oral injury.
- ▶ Consult a toxicologist as necessary.

BRONSTEIN, A.C. and CURRANCE, P.L. *EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994*

For acute or short term repeated exposures to phenols/ cresols:

- ▶ Phenol is absorbed rapidly through lungs and skin. [Massive skin contact may result in collapse and death]*
- ▶ [Ingestion may result in ulceration of upper respiratory tract; perforation of oesophagus and/or stomach, with attendant complications, may occur. Oesophageal stricture may occur.]*
- ▶ An initial excitatory phase may present. Convulsions may appear as long as 18 hours after ingestion. Hypotension and ventricular tachycardia that require vasopressor and antiarrhythmic therapy, respectively, can occur.
- ▶ Respiratory arrest, ventricular dysrhythmias, seizures and metabolic acidosis may complicate severe phenol exposures so the initial attention should be directed towards stabilisation of breathing and circulation with ventilation, intubation, intravenous lines, fluids and cardiac monitoring as indicated.
- ▶ [Vegetable oils retard absorption; do NOT use paraffin oils or alcohols. Gastric lavage, with endotracheal intubation, should be repeated until phenol odour is no longer detectable; follow with vegetable oil. A saline cathartic should then be given.]* ALTERNATIVELY: Activated charcoal (1g/kg) may be given. A cathartic should be given after oral activated charcoal.
- ▶ Severe poisoning may require slow intravenous injection of methylene blue to treat methaemoglobinaemia.
- ▶ [Renal failure may require haemodialysis.]*
- ▶ Most absorbed phenol is biotransformed by the liver to ethereal and glucuronide sulfates and is eliminated almost completely after 24 hours. [Ellenhorn and Barceloux: *Medical Toxicology*] *[Union Carbide]

BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker who has been exposed to the Exposure Standard (ES or TLV):

| Determinant | Index | Sampling Time | Comments |
|--------------------------|----------------------|---------------|----------|
| 1. Total phenol in blood | 250 mg/gm creatinine | End of shift | B, NS |

B: Background levels occur in specimens collected from subjects **NOT** exposed

NS: Non-specific determinant; also seen in exposure to other materials

SECTION 5 Firefighting measures

Extinguishing media

- ▶ Foam.
- ▶ Dry chemical powder.
- ▶ BCF (where regulations permit).

Special hazards arising from the substrate or mixture

| | |
|-----------------------------|--|
| Fire Incompatibility | ▶ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result |
|-----------------------------|--|

Advice for firefighters

| | |
|----------------------|--|
| Fire Fighting | |
|----------------------|--|

CERAMIGRADE LINER ACTIVATOR

| | |
|------------------------------|--|
| Fire/Explosion Hazard | <ul style="list-style-type: none"> ▶ Combustible. ▶ Slight fire hazard when exposed to heat or flame. ▶ Heating may cause expansion or decomposition leading to violent rupture of containers. <p>Combustion products include:</p> <ul style="list-style-type: none"> , carbon dioxide (CO2) , aldehydes , other pyrolysis products typical of burning organic material. <p>Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions. May emit corrosive fumes.</p> <p>WARNING: Long standing in contact with air and light may result in the formation of potentially explosive peroxides.</p> |
|------------------------------|--|

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

| Minor Spills | <ul style="list-style-type: none"> ▶ Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material. ▶ Check regularly for spills and leaks. ▶ Clean up all spills immediately. ▶ Avoid breathing vapours and contact with skin and eyes. ▶ Control personal contact with the substance, by using protective equipment. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------------------|--|--------------|------------|-----------------|------------|-------------|---------------------------|--|--|--|--|------------------------------------|---|--------|--------|----------|-------------------------------|---|-------|-----------|------------|---------------------|---|-------|-----------|---------------|-----------------------|---|--------|--------|--------------|----------------------------|---|--------|--------|---------|--------------------------|---|--------|--------|--------------|----------------------------|--|--|--|--|------------------------------------|---|--------|------------|---------|-------------------------------|---|-------|------------|------------|----------------------------|---|--------|------------|---------|-----------------------------|---|--------|------------|------------|--------------------------|---|--------|------------|--------------|--------------------------------|---|--------|------------|-----------------|
| Major Spills | <ul style="list-style-type: none"> ▶ Clear area of personnel and move upwind. ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus plus protective gloves. <p>Chemical Class: phenols and cresols For release onto land: recommended sorbents listed in order of priority.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">SORBENT TYPE</th> <th style="text-align: left;">RANK</th> <th style="text-align: left;">APPLICATION</th> <th style="text-align: left;">COLLECTION</th> <th style="text-align: left;">LIMITATIONS</th> </tr> </thead> <tbody> <tr> <td colspan="5">LAND SPILL - SMALL</td> </tr> <tr> <td>cross-linked polymer - particulate</td> <td>1</td> <td>shovel</td> <td>shovel</td> <td>R, W, SS</td> </tr> <tr> <td>cross-linked polymer - pillow</td> <td>1</td> <td>throw</td> <td>pitchfork</td> <td>R, DGC, RT</td> </tr> <tr> <td>wood fiber - pillow</td> <td>1</td> <td>throw</td> <td>pitchfork</td> <td>R, P, DGC, RT</td> </tr> <tr> <td>foamed glass - pillow</td> <td>2</td> <td>shovel</td> <td>shovel</td> <td>R, W, P, DGC</td> </tr> <tr> <td>sorbent clay - particulate</td> <td>2</td> <td>shovel</td> <td>shovel</td> <td>R, I, P</td> </tr> <tr> <td>wood fibre - particulate</td> <td>3</td> <td>shovel</td> <td>shovel</td> <td>R, W, P, DGC</td> </tr> <tr> <td colspan="5">LAND SPILL - MEDIUM</td> </tr> <tr> <td>cross-linked polymer - particulate</td> <td>1</td> <td>blower</td> <td>skiploader</td> <td>R,W, SS</td> </tr> <tr> <td>cross-linked polymer - pillow</td> <td>2</td> <td>throw</td> <td>skiploader</td> <td>R, DGC, RT</td> </tr> <tr> <td>sorbent clay - particulate</td> <td>3</td> <td>blower</td> <td>skiploader</td> <td>R, I, P</td> </tr> <tr> <td>polypropylene - particulate</td> <td>3</td> <td>blower</td> <td>skiploader</td> <td>R, SS, DGC</td> </tr> <tr> <td>wood fiber - particulate</td> <td>4</td> <td>blower</td> <td>skiploader</td> <td>R, W, P, DGC</td> </tr> <tr> <td>expanded moneral - particulate</td> <td>4</td> <td>blower</td> <td>skiploader</td> <td>R, I, W, P, DGC</td> </tr> </tbody> </table> <p>Legend DGC: Not effective where ground cover is dense R: Not reusable I: Not incinerable P: Effectiveness reduced when rainy RT:Not effective where terrain is rugged SS: Not for use within environmentally sensitive sites W: Effectiveness reduced when windy Reference: Sorbents for Liquid Hazardous Substance Cleanup and Control; R.W Melvold et al: Pollution Technology Review No. 150: Noyes Data Corporation 1988</p> | SORBENT TYPE | RANK | APPLICATION | COLLECTION | LIMITATIONS | LAND SPILL - SMALL | | | | | cross-linked polymer - particulate | 1 | shovel | shovel | R, W, SS | cross-linked polymer - pillow | 1 | throw | pitchfork | R, DGC, RT | wood fiber - pillow | 1 | throw | pitchfork | R, P, DGC, RT | foamed glass - pillow | 2 | shovel | shovel | R, W, P, DGC | sorbent clay - particulate | 2 | shovel | shovel | R, I, P | wood fibre - particulate | 3 | shovel | shovel | R, W, P, DGC | LAND SPILL - MEDIUM | | | | | cross-linked polymer - particulate | 1 | blower | skiploader | R,W, SS | cross-linked polymer - pillow | 2 | throw | skiploader | R, DGC, RT | sorbent clay - particulate | 3 | blower | skiploader | R, I, P | polypropylene - particulate | 3 | blower | skiploader | R, SS, DGC | wood fiber - particulate | 4 | blower | skiploader | R, W, P, DGC | expanded moneral - particulate | 4 | blower | skiploader | R, I, W, P, DGC |
| SORBENT TYPE | RANK | APPLICATION | COLLECTION | LIMITATIONS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LAND SPILL - SMALL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| cross-linked polymer - particulate | 1 | shovel | shovel | R, W, SS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| cross-linked polymer - pillow | 1 | throw | pitchfork | R, DGC, RT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| wood fiber - pillow | 1 | throw | pitchfork | R, P, DGC, RT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| foamed glass - pillow | 2 | shovel | shovel | R, W, P, DGC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| sorbent clay - particulate | 2 | shovel | shovel | R, I, P | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| wood fibre - particulate | 3 | shovel | shovel | R, W, P, DGC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LAND SPILL - MEDIUM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| cross-linked polymer - particulate | 1 | blower | skiploader | R,W, SS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| cross-linked polymer - pillow | 2 | throw | skiploader | R, DGC, RT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| sorbent clay - particulate | 3 | blower | skiploader | R, I, P | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| polypropylene - particulate | 3 | blower | skiploader | R, SS, DGC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| wood fiber - particulate | 4 | blower | skiploader | R, W, P, DGC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| expanded moneral - particulate | 4 | blower | skiploader | R, I, W, P, DGC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

CERAMIGRADE LINER ACTIVATOR

Personal Protective Equipment advice is contained in Section 8 of the SDS.

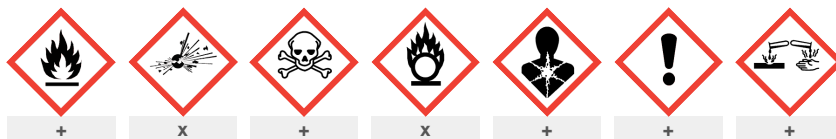
SECTION 7 Handling and storage

Precautions for safe handling

| | |
|--------------------------|---|
| Safe handling | <p>Contains low boiling substance: Storage in sealed containers may result in pressure buildup causing violent rupture of containers not rated appropriately.</p> <ul style="list-style-type: none"> ▸ Check for bulging containers. ▸ Vent periodically ▸ Always release caps or seals slowly to ensure slow dissipation of vapours ▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area. |
| Other information | <ul style="list-style-type: none"> ▸ Store in original containers. ▸ Keep containers securely sealed. ▸ Store in a cool, dry, well-ventilated area. |

Conditions for safe storage, including any incompatibilities

| | |
|--------------------------------|---|
| Suitable container | <ul style="list-style-type: none"> ▸ Lined metal can, lined metal pail/ can. ▸ Plastic pail. ▸ Polyliner drum. <p>For low viscosity materials</p> <ul style="list-style-type: none"> ▸ Drums and jerricans must be of the non-removable head type. ▸ Where a can is to be used as an inner package, the can must have a screwed enclosure. <p>For materials with a viscosity of at least 2680 cSt.</p> |
| Storage incompatibility | <p>Benzyl alcohol:</p> <ul style="list-style-type: none"> ▸ may froth in contact with water ▸ slowly oxidises in air, oxygen forming benzaldehyde ▸ is incompatible with mineral acids, caustics, aliphatic amines, isocyanates ▸ reacts violently with strong oxidisers, and explosively with sulfuric acid at elevated temperatures ▸ corrodes aluminium at high temperatures ▸ is incompatible with aluminum, iron, steel ▸ attacks some nonfluorinated plastics; may attack, extract and dissolve polypropylene <p>Benzyl alcohol contaminated with 1.4% hydrogen bromide and 1.2% of dissolved iron(II) polymerises exothermically above 100 deg. C.</p> <ul style="list-style-type: none"> ▸ Phenols are incompatible with strong reducing substances such as hydrides, nitrides, alkali metals, and sulfides. ▸ Avoid use of aluminium, copper and brass alloys in storage and process equipment. ▸ Heat is generated by the acid-base reaction between phenols and bases. ▸ Avoid reaction with oxidising agents |



X — Must not be stored together
 O — May be stored together with specific preventions
 + — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

| Source | Ingredient | Material name | TWA | STEL | Peak | Notes |
|---|-----------------------------|-----------------------|----------|---------------|---------------|---------------|
| Singapore Permissible Exposure Limits of Toxic Substances | 4,4'-isopropylidenediphenol | Nuisance particulates | 10 mg/m3 | Not Available | Not Available | Not Available |

Emergency Limits

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|-----------------------------|-----------|-----------|-----------|
| Polyoxypropylenediamine | 4.8 mg/m3 | 53 mg/m3 | 320 mg/m3 |
| nonylphenol | 3.9 mg/m3 | 43 mg/m3 | 260 mg/m3 |
| 4,4'-isopropylidenediphenol | 15 mg/m3 | 110 mg/m3 | 650 mg/m3 |
| benzyl alcohol | 30 ppm | 52 ppm | 740 ppm |

| Ingredient | Original IDLH | Revised IDLH |
|-----------------------------|---------------|---------------|
| Polyoxypropylenediamine | Not Available | Not Available |
| nonylphenol | Not Available | Not Available |
| 4,4'-isopropylidenediphenol | Not Available | Not Available |
| benzyl alcohol | Not Available | Not Available |

Occupational Exposure Banding

| Ingredient | Occupational Exposure Band Rating | Occupational Exposure Band Limit |
|-------------------------|-----------------------------------|----------------------------------|
| Polyoxypropylenediamine | E | ≤ 0.1 ppm |
| nonylphenol | E | ≤ 0.1 ppm |
| benzyl alcohol | E | ≤ 0.1 ppm |

Notes:

Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.

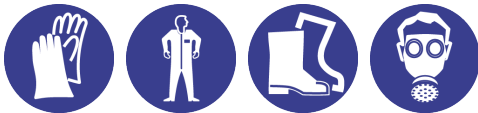
MATERIAL DATA

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more.

Fragrance substance with is an established contact allergen in humans.

Scientific Committee on Consumer Safety SCCS OPINION on Fragrance allergens in cosmetic products 2012

Exposure controls

| | |
|---|--|
| Appropriate engineering controls | Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. |
| Personal protection |  |
| Eye and face protection | <ul style="list-style-type: none"> ▶ Chemical goggles. ▶ Full face shield may be required for supplementary but never for primary protection of eyes. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. |
| Skin protection | See Hand protection below |
| Hands/feet protection | <ul style="list-style-type: none"> ▶ Wear chemical protective gloves, e.g. PVC. ▶ Wear safety footwear or safety gumboots, e.g. Rubber ▶ When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots. <p>NOTE:</p> <ul style="list-style-type: none"> ▶ The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact. ▶ Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed. |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none"> ▶ Overalls. ▶ PVC Apron. ▶ PVC protective suit may be required if exposure severe. |

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the

Respiratory protection

Type A Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required.

CERAMIGRADE LINER ACTIVATOR

computer-generated selection:
CERAMIGRADE LINER ACTIVATOR

| Material | CPI |
|----------|-----|
| BUTYL | C |
| NEOPRENE | C |
| NITRILE | C |
| VITON | C |

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

| Required Minimum Protection Factor | Half-Face Respirator | Full-Face Respirator | Powered Air Respirator |
|------------------------------------|----------------------|----------------------|------------------------|
| up to 10 x ES | A-AUS | - | A-PAPR-AUS / Class 1 |
| up to 50 x ES | - | A-AUS / Class 1 | - |
| up to 100 x ES | - | A-2 | A-PAPR-2 ^ |

^ - Full-face

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

| | | | |
|---|--|--|---------------|
| Appearance | Amber colour clear liquid with no odour. | | |
| Physical state | Liquid | Relative density (Water = 1) | 1.04 |
| Odour | Ammonia-Like | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | Not Available |
| pH (as supplied) | Not Available | Decomposition temperature | Not Available |
| Melting point / freezing point (°C) | Not Available | Viscosity (cSt) | Not Available |
| Initial boiling point and boiling range (°C) | Not Available | Molecular weight (g/mol) | Not Available |
| Flash point (°C) | 120 | Taste | Not Available |
| Evaporation rate | Not Available BuAC = 1 | Explosive properties | Not Available |
| Flammability | Not Applicable | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | Not Available | Surface Tension (dyn/cm or mN/m) | Not Available |
| Lower Explosive Limit (%) | Not Available | Volatile Component (%vol) | Not Available |
| Vapour pressure (kPa) | Not Available | Gas group | Not Available |
| Solubility in water | Not Available | pH as a solution (Not Available%) | Not Available |
| Vapour density (Air = 1) | Not Available | VOC g/L | Not Available |

SECTION 10 Stability and reactivity

| | |
|---|--|
| Reactivity | See section 7 |
| Chemical stability | <ul style="list-style-type: none"> ▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur. |
| Possibility of hazardous reactions | See section 7 |
| Conditions to avoid | See section 7 |
| Incompatible materials | See section 7 |
| Hazardous decomposition products | See section 5 |

SECTION 11 Toxicological information

Information on toxicological effects

| | |
|---------------------|--|
| Inhaled | <p>Evidence shows, or practical experience predicts, that the material produces irritation of the respiratory system, in a substantial number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs.</p> <p>Inhalation of benzyl alcohol may affect respiration (paralysis of the respiratory center, respiratory depression, gasping respirations), cardiovascular system (hypotension)</p> <p>The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.</p> |
| Ingestion | <p>Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.</p> <p>The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.</p> <p>Ingestion of large doses of benzyl alcohol may cause abdominal pain, nausea, vomiting, diarrhea. It may affect behavior/central nervous system and cause headache, somnolence, excitement, dizziness, ataxia, coma, convulsions, and other symptoms of central nervous system depression.</p> <p>Exposure to excessive amounts of benzyl alcohol has been associated with toxicity (hypotension, metabolic acidosis), particularly in neonates, and an increased incidence of kernicterus (a neurological condition that occurs in severe jaundice), particularly in small preterm infants.</p> |
| Skin Contact | <p>Skin contact with the material may be harmful; systemic effects may result following absorption.</p> <p>The material can produce chemical burns following direct contact with the skin.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p> |
| Eye | <p>The material can produce chemical burns to the eye following direct contact. Vapours or mists may be extremely irritating.</p> <p>When applied to the eye(s) of animals, the material produces severe ocular lesions which are present twenty-four hours or more after instillation.</p> |
| Chronic | <p>Repeated or prolonged exposure to corrosives may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue. Gastrointestinal disturbances may also occur.</p> <p>Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.</p> <p>Practical experience shows that skin contact with the material is capable either of inducing a sensitisation reaction in a substantial number of individuals, and/or of producing a positive response in experimental animals.</p> <p>Substances that can cause occupational asthma (also known as asthmagens and respiratory sensitisers) can induce a state of specific airway hyper-responsiveness via an immunological, irritant or other mechanism. Once the airways have become hyper-responsive, further exposure to the substance, sometimes even to tiny quantities, may cause respiratory symptoms.</p> <p>Exposure to the material may cause concerns for human fertility, generally on the basis that results in animal studies provide sufficient evidence to cause a strong suspicion of impaired fertility in the absence of toxic effects, or evidence of impaired fertility occurring at around the same dose levels as other toxic effects, but which are not a secondary non-specific consequence of other toxic effects.</p> <p>Exposure to the material may cause concerns for humans owing to possible developmental toxic effects, generally on the basis that results in appropriate animal studies provide strong suspicion of developmental toxicity in the absence of signs of marked maternal toxicity, or at around the same dose levels as other toxic effects but which are not a secondary non-specific consequence of other toxic effects.</p> <p>Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.</p> <p>Prolonged or repeated exposure to benzyl alcohol may cause allergic contact dermatitis.</p> <p>Prolonged or repeated ingestion may affect behavior/central nervous system with symptoms similar to acute ingestion. It may also affect the liver, kidneys, cardiovascular system, and metabolism (weight loss).</p> <p>Prolonged exposure to some derivatives of phenol may produce dermatitis, anorexia, weight loss, weakness, muscle aches and pain, liver damage, dark urine, ochronosis, skin eruptions, diarrhoea, nervous disorders with headache, salivation, fainting, increased skin and scleral pigmentation, vertigo and mental disorders. Liver and kidney damage may also ensue. Chronic phenol toxicity was first noted in medical personnel in the late 1800s when 5 and 10% phenol was used as a skin disinfectant.</p> |

| CERAMIGRADE LINER ACTIVATOR | TOXICITY | IRRITATION |
|--------------------------------|--|---|
| | Not Available | Not Available |
| Polyoxypropylenediamine | TOXICITY | IRRITATION |
| | Dermal (rabbit) LD50: 250 mg/kg *** ^[2] | Eye (rabbit): 100 mg - SEVERE |
| | Dermal (rabbit) LD50: 360 mg/kg ^[2] | Eye (rabbit): SEVERE *** |
| | Dermal (rabbit) LD50: 670 mg/kg ** ^[2] | Eye: adverse effect observed (irreversible damage) ^[1] |
| | Dermal (rabbit) LD50: 760 mg/kg * ^[2] | Skin (rabbit): SEVERE *** |

CERAMIGRADE LINER ACTIVATOR

| | | |
|--|---|--|
| | Dermal (rabbit) LD50: 760 mg/kg **** ^[2] | Skin: adverse effect observed (corrosive) ^[1] |
| | Inhalation(Rat) LC50; >2 mg/l * ^[2] | |
| | Oral (None) rat: LD450 500 mg/kg *** ^[2] | |
| | Oral (Rat) LD50; 1600 mg/kg **** ^[2] | |
| | Oral (Rat) LD50; 1660 mg/kg * ^[2] | |
| | Oral (Rat) LD50; 242 mg/kg ^[2] | |
| | Oral (Rat) LD50; 670 mg/kg ** ^[2] | |
| nonylphenol | TOXICITY | IRRITATION |
| | Dermal (rabbit) LD50: >2000 mg/kg ^[2] | Eye (rabbit): 0.5 mg (open)-SEVERE |
| | Oral (Rat) LD50; 1000-2500 mg/kg ^[2] | Eye: adverse effect observed (irritating) ^[1] |
| | | Skin (rabbit): 500 mg(open)-mod |
| | | Skin(rabbit):10mg/24h(open)-SEVERE |
| | | Skin: adverse effect observed (corrosive) ^[1] |
| 4,4'-isopropylidenediphenol | TOXICITY | IRRITATION |
| | Dermal (rabbit) LD50: 3000 mg/kg ^[2] | Eye (rabbit): 0.25 mg/24h-SEVERE |
| | Inhalation(Rat) LC50; 200 ppm ^[2] | Eye: adverse effect observed (irritating) ^[1] |
| | Intraperitoneal (Mouse) LD50: 150 mg/kg ^[2] | Skin (rabbit): 250 mg open - mild |
| | Oral (Mouse) LD50; 2400 mg/kg ^[2] | Skin (rabbit): 500 mg/24h - mild |
| | Oral (Rabbit) LD50: 2230 mg/kg ^[2] | Skin: adverse effect observed (irritating) ^[1] |
| | Oral (Rat)LD50; 1200 mg/kg ^[2] | Skin: no adverse effect observed (not irritating) ^[1] |
| | Oral (Rat)LD50; 3250 mg/kg ^[2] | |
| | Oral (Rat)TDLo: 1000 mg/kg ^[2] | |
| Subcutaneous (Mouse) LD: 2500 mg/kg ^[2] | | |
| Subcutaneous (Rat) TDLo: 5.9 mg/kg ^[2] | | |
| benzyl alcohol | TOXICITY | IRRITATION |
| | Dermal (rabbit) LD50: 2000 mg/kg ^[2] | Eye (rabbit): 0.75 mg open SEVERE |
| | Inhalation(Rat) LC50; >4.178 mg/L4h ^[1] | Eye: adverse effect observed (irritating) ^[1] |
| | Oral (Rat) LD50; 1230 mg/kg ^[2] | Skin (man): 16 mg/48h-mild |
| | | Skin (rabbit):10 mg/24h open-mild |
| | | Skin: no adverse effect observed (not irritating) ^[1] |
| Legend: | 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances | |

| | |
|--------------------------------|--|
| Polyoxypropylenediamine | Convulsions, stomach ulceration, haemorrhage, respiratory tract changes, dermatitis after systemic administration recorded. * Reichard ** Bayer Inc. Canada *** Texaco ****EpoxyLite |
| NONYLPHENOL | <p>For nonylphenol and its compounds: Alkylphenols like nonylphenol and bisphenol A have estrogenic effects in the body. They are known as xenoestrogens. Estrogenic substances and other endocrine disruptors are compounds that have hormone-like effects in both wildlife and humans.</p> <p>for alkylphenolics category: The alkylphenolics may be divided into three groups. Group I: ortho-substituted mono-alkylphenols: Group II para-substituted mono-alkylphenols Group III: di- and tri-substituted mixed alkyl phenols</p> <p>The subdivision of the category alkylphenols into <i>ortho</i>, <i>para</i> and the di/tri-substituted mixed members is supported by several published investigations. In assessing antimicrobial and antifouling activity of twenty-three alkylphenols, a significant difference was noted between <i>para</i> and <i>ortho</i>-substituted materials. In particular, biological activity was found to vary parabolically with increasing hydrophobicity of the <i>para</i>-substituent while introduction of a bulky substituent at the <i>ortho</i>-position resulted in a very significant decrease in antimicrobial, antifouling, and membrane-perturbation potency.</p> <p>for nonylphenol: Nonylphenol was studied for oral toxicity in rats in a 28-day repeat dose toxicity test at doses of 0, 4, 15, 60 and 250 mg/kg/day. Changes suggesting renal dysfunction were mainly noted in both sexes given 250 mg/kg. Liver weights were increased in males given 60 mg/kg and in both sexes given 250 mg/kg group. The material may produce severe skin irritation after prolonged or repeated exposure, and may produce a contact dermatitis</p> |

| | |
|--|--|
| | <p>(nonallergic). This form of dermatitis is often characterised by skin redness (erythema) thickening of the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis. Prolonged contact is unlikely, given the severity of response, but repeated exposures may produce severe ulceration.</p> |
| 4,4'-isopropylidenediphenol | <p>The chemical structure of hydroxylated diphenylalkanes or bisphenols consists of two phenolic rings joined together through a bridging carbon. This class of endocrine disruptors that mimic oestrogens is widely used in industry, particularly in plastics. Bisphenol A (BPA) and some related compounds exhibit oestrogenic activity in human breast cancer cell line MCF-7, but there were remarkable differences in activity. Several derivatives of BPA exhibited significant thyroid hormonal activity towards rat pituitary cell line GH3, which releases growth hormone in a thyroid hormone-dependent manner.</p> <p>For bisphenol A (BPA) Following oral administration absorption of BPA is rapid and extensive while dermal absorption is limited. Extensive first pass metabolism occurs following absorption from the gastrointestinal tract with glucuronide conjugation being the major metabolic pathway. Bisphenol A is of low acute toxicity (rodent oral LD50 values from 3300-4100 mg/kg, a rabbit oral LD50 value 2230 mg/kg and a rat acute inhalation 6-hour LC50 value >170 mg/m3).</p> <p>The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.</p> |
| BENZYL ALCOHOL | <p>For benzyl alkyl alcohols: Unlike benzylic alcohols, the beta-hydroxyl group of the members of this cluster is unlikely to undergo phase II metabolic activation. Instead, the beta-hydroxyl group is expected to contribute to detoxification via oxidation to hydrophilic acid. Despite structural similarity to carcinogenic ethyl benzene, only a marginal concern has been assigned to phenethyl alcohol due to limited mechanistic analogy.</p> <p>For benzoates: Acute toxicity: Benzyl alcohol, benzoic acid and its sodium and potassium salt can be considered as a single category regarding human health, as they are all rapidly metabolised and excreted via a common pathway within 24 hrs. Systemic toxic effects of similar nature (e.g. liver, kidney) were observed. However with benzoic acid and its salts toxic effects are seen at higher doses than with benzyl alcohol.</p> <p>The compounds exhibit low acute toxicity as for the oral and dermal route. The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.</p> <p>A member or analogue of a group of benzyl derivatives generally regarded as safe (GRAS) based in part on their self-limiting properties as flavouring substances in food; their rapid absorption, metabolic detoxification, and excretion in humans and other animals, their low level of flavour use, the wide margin of safety between the conservative estimates of intake and the no-observed-adverse effect levels determined from chronic and subchronic studies and the lack of significant genotoxic and mutagenic potential. This evidence of safety is supported by the fact that the intake of benzyl derivatives as natural components of traditional foods is greater than the intake as intentionally added flavouring substances.</p> <p>All members of this group are aromatic primary alcohols, aldehydes, carboxylic acids or their corresponding esters or acetals. The aryl alkyl alcohol (AAA) fragrance ingredients are a diverse group of chemical structures with similar metabolic and toxicity profiles.</p> <p>The AAA fragrances demonstrate low acute and subchronic dermal and oral toxicity. At concentrations likely to be encountered by consumers, AAA fragrance ingredients are non-irritating to the skin. The potential for eye irritation is minimal.</p> <p>With the exception of benzyl alcohol and to a lesser extent phenethyl and 2-phenoxyethyl AAA alcohols, human sensitization studies, diagnostic patch tests and human induction studies, indicate that AAA fragrance ingredients generally have no or low sensitization potential. Available data indicate that the potential for photosensitization is low.</p> <p>NOAELs for maternal and developmental toxicity are far in excess of current human exposure levels. No carcinogenicity in rats or mice was observed in 2-year chronic testing of benzyl alcohol or a-methylbenzyl alcohol; the latter did induce species and gender-specific renal adenomas in male rats at the high dose. There was no to little genotoxicity, mutagenicity, or clastogenicity in the mutagenicity in vitro bacterial assays, and in vitro mammalian cell assays.</p> |
| CERAMIGRADE LINER ACTIVATOR & Polyoxypropylenediamine & NONYLPHENOL & 4,4'-isopropylidenediphenol | <p>Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant.</p> |
| CERAMIGRADE LINER ACTIVATOR & 4,4'-isopropylidenediphenol & BENZYL ALCOHOL | <p>The following information refers to contact allergens as a group and may not be specific to this product. Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type.</p> |
| CERAMIGRADE LINER ACTIVATOR & BENZYL ALCOHOL | <p>Adverse reactions to fragrances in perfumes and in fragranced cosmetic products include allergic contact dermatitis, irritant contact dermatitis, photosensitivity, immediate contact reactions (contact urticaria), and pigmented contact dermatitis. Airborne and conubial contact dermatitis occur.</p> <p>Intolerance to perfumes, by inhalation, may occur if the perfume contains a sensitising principal. Symptoms may vary from general illness, coughing, phlegm, wheezing, chest-tightness, headache, exertional dyspnoea, acute respiratory illness, hayfever, and other respiratory diseases (including asthma).</p> <p>Fragrance allergens act as haptens, i.e. low molecular weight chemicals that are immunogenic only when attached to a carrier protein. However, not all sensitising fragrance chemicals are directly reactive, but require previous activation. A prehapten is a chemical that itself is non- or low-sensitising, but that is transformed into a hapten outside the skin by simple chemical transformation (air oxidation, photoactivation) and without the requirement of specific enzymatic systems.</p> |

| | | | | |
|--|--|---------------------------------|---|--|
| Polyoxypropylenediamine & NONYLPHENOL | The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. | | | |
| Acute Toxicity | ✓ | Carcinogenicity | ✗ | |
| Skin Irritation/Corrosion | ✗ | Reproductivity | ✓ | |
| Serious Eye Damage/Irritation | ✗ | STOT - Single Exposure | ✗ | |
| Respiratory or Skin sensitisation | ✓ | STOT - Repeated Exposure | ✗ | |
| Mutagenicity | ✗ | Aspiration Hazard | ✗ | |

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

| CERAMIGRADE LINER ACTIVATOR | Endpoint | Test Duration (hr) | Species | Value | Source |
|-----------------------------|---------------|--------------------|-------------------------------|----------------|---------------|
| | Not Available | Not Available | Not Available | Not Available | Not Available |
| Polyoxypropylenediamine | Endpoint | Test Duration (hr) | Species | Value | Source |
| | NOEC(ECx) | 72h | Algae or other aquatic plants | 0.32mg/l | 2 |
| | LC50 | 96h | Fish | 772.14mg/l | 2 |
| | EC50 | 72h | Algae or other aquatic plants | 2.1mg/l | 2 |
| | EC50 | 48h | Crustacea | 80mg/l | 2 |
| nonylphenol | Endpoint | Test Duration (hr) | Species | Value | Source |
| | BCF | 1344h | Fish | 90-220 | 7 |
| | LC50 | 96h | Fish | 0.166-0.23mg/L | 4 |
| | EC50 | 72h | Algae or other aquatic plants | 0.056mg/l | 4 |
| | EC50 | 48h | Crustacea | 0.17mg/l | 4 |
| | NOEC(ECx) | 96h | Crustacea | 0.018mg/l | 1 |
| | EC50 | 96h | Algae or other aquatic plants | 0.027mg/l | 1 |
| 4,4'-isopropylidenediphenol | Endpoint | Test Duration (hr) | Species | Value | Source |
| | BCF | 1008h | Fish | 5.1-13.3 | 7 |
| | ErC50 | 72h | Algae or other aquatic plants | 2.7-3.1mg/l | 1 |
| | NOEC(ECx) | 96h | Crustacea | 0.51mg/l | 1 |
| | LC50 | 96h | Fish | 3-5mg/l | 2 |
| | EC50 | 72h | Algae or other aquatic plants | 1.25-1.89mg/l | 4 |
| | EC50 | 48h | Crustacea | 10.2mg/l | 1 |
| | EC50 | 96h | Algae or other aquatic plants | 1mg/l | 1 |
| benzyl alcohol | Endpoint | Test Duration (hr) | Species | Value | Source |
| | NOEC(ECx) | 336h | Fish | 5.1mg/l | 2 |
| | LC50 | 96h | Fish | 10mg/l | 2 |
| | EC50 | 72h | Algae or other aquatic plants | 500mg/l | 2 |
| | EC50 | 48h | Crustacea | 230mg/l | 2 |
| | EC50 | 96h | Algae or other aquatic plants | 76.828mg/l | 2 |

Legend: Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data

Harmful to aquatic organisms.

Environmental toxicity is a function of the n-octanol/ water partition coefficient (log Pow, log Kow). Phenols with log Pow >7.4 are expected to exhibit low toxicity to

Continued...

aquatic organisms. However the toxicity of phenols with a lower log Pow is variable, ranging from low toxicity (LC50 values >100 mg/l) to highly toxic (LC50 values <1 mg/l) dependent on log Pow, molecular weight and substitutions on the aromatic ring.

for alkylphenols and their ethoxylates, or propoxylates:

Environmental fate: Alkylphenols are ubiquitous in the environment after the introduction, generally as wastes, of their alkoxyated forms (ethoxylates and propoxylates, for example); these are extensively used throughout industry and in the home.

Alkylphenol ethoxylates are widely used surfactants in domestic and industrial products, which are commonly found in wastewater discharges and in sewage treatment plant (STP) effluent's. Degradation of APEs in wastewater treatment plants or in the environment generates more persistent shorter-chain APEs and alkylphenols (APs) such as nonylphenol (NP), octylphenol (OP) and AP mono- to triethoxylates (NPE1, NPE2 and NPE3).

For benzyl alcohol:

log Kow : 1.1

Koc : <5

Henry's atm m3 /mol: 3.91E-07

BOD 5: 1.55-1.6,33-62%

COD : 96%

ThOD : 2.519

BCF : 4

Bioaccumulation : not significant

Anaerobic effects : significant degradation

Effects on algae and plankton: inhibits degradation of glucose

Degradation Biological: significant

processes Abiotic: RxnOH*,no photochem

Ecotoxicity

Fish LC50 (48 h): fathead minnow 770 mg/l; (72 h): 480 mg/l; (96 h) 460 mg/l

Fish LC50 (96 h) fathead minnow 10 ppm, bluegill sunfish 15 ppm; tidewater silverside fish 15 ppm

Products of Biodegradation: Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Prevent, by any means available, spillage from entering drains or water courses.

DO NOT discharge into sewer or waterways.

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|-----------------------------|-----------------------------|-----------------------------|
| nonylphenol | HIGH | HIGH |
| 4,4'-isopropylidenediphenol | HIGH (Half-life = 360 days) | LOW (Half-life = 0.31 days) |
| benzyl alcohol | LOW | LOW |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|-----------------------------|--------------------|
| nonylphenol | LOW (BCF = 271) |
| 4,4'-isopropylidenediphenol | LOW (BCF = 100) |
| benzyl alcohol | LOW (LogKOW = 1.1) |

Mobility in soil

| Ingredient | Mobility |
|-----------------------------|-------------------|
| nonylphenol | LOW (KOC = 56010) |
| 4,4'-isopropylidenediphenol | LOW (KOC = 75190) |
| benzyl alcohol | LOW (KOC = 15.66) |

SECTION 13 Disposal considerations

Waste treatment methods



| | |
|-------------------------------------|---|
| Product / Packaging disposal | <ul style="list-style-type: none"> ▸ Containers may still present a chemical hazard/ danger when empty. ▸ Return to supplier for reuse/ recycling if possible. <p>Otherwise:</p> <ul style="list-style-type: none"> ▸ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. ▸ DO NOT allow wash water from cleaning or process equipment to enter drains. ▸ It may be necessary to collect all wash water for treatment before disposal. ▸ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▸ Recycle wherever possible. ▸ Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. |
|-------------------------------------|---|

CERAMIGRADE LINER ACTIVATOR

▸ Treat and neutralise at an approved treatment plant.

SECTION 14 Transport information

Labels Required

| | |
|------------------|---|
| |  |
| Marine Pollutant |  |

Land transport (UN)

| | | |
|------------------------------|--|----------------|
| UN number | 1760 | |
| UN proper shipping name | CORROSIVE LIQUID, N.O.S. (contains Polyoxypropylenediamine, 4,4'-isopropylidenediphenol and nonylphenol) | |
| Transport hazard class(es) | Class | 8 |
| | Subrisk | Not Applicable |
| Packing group | III | |
| Environmental hazard | Environmentally hazardous | |
| Special precautions for user | Special provisions | 223; 274 |
| | Limited quantity | 5 L |

Air transport (ICAO-IATA / DGR)

| | | |
|------------------------------|--|----------------|
| UN number | 1760 | |
| UN proper shipping name | Corrosive liquid, n.o.s. * (contains Polyoxypropylenediamine, 4,4'-isopropylidenediphenol and nonylphenol) | |
| Transport hazard class(es) | ICAO/IATA Class | 8 |
| | ICAO / IATA Subrisk | Not Applicable |
| | ERG Code | 8L |
| Packing group | III | |
| Environmental hazard | Environmentally hazardous | |
| Special precautions for user | Special provisions | A3 A803 |
| | Cargo Only Packing Instructions | 856 |
| | Cargo Only Maximum Qty / Pack | 60 L |
| | Passenger and Cargo Packing Instructions | 852 |
| | Passenger and Cargo Maximum Qty / Pack | 5 L |
| | Passenger and Cargo Limited Quantity Packing Instructions | Y841 |
| | Passenger and Cargo Limited Maximum Qty / Pack | 1 L |

Sea transport (IMDG-Code / GGVSee)

| | | |
|------------------------------|--|----------------|
| UN number | 1760 | |
| UN proper shipping name | CORROSIVE LIQUID, N.O.S. (contains Polyoxypropylenediamine, 4,4'-isopropylidenediphenol and nonylphenol) | |
| Transport hazard class(es) | IMDG Class | 8 |
| | IMDG Subrisk | Not Applicable |
| Packing group | III | |
| Environmental hazard | Marine Pollutant | |
| Special precautions for user | EMS Number | F-A, S-B |
| | Special provisions | 223 274 |

CERAMIGRADE LINER ACTIVATOR

Limited Quantities | 5 L

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

| Product name | Group |
|-----------------------------|---------------|
| Polyoxypropylenediamine | Not Available |
| nonylphenol | Not Available |
| 4,4'-isopropylidenediphenol | Not Available |
| benzyl alcohol | Not Available |

Transport in bulk in accordance with the ICG Code

| Product name | Ship Type |
|-----------------------------|---------------|
| Polyoxypropylenediamine | Not Available |
| nonylphenol | Not Available |
| 4,4'-isopropylidenediphenol | Not Available |
| benzyl alcohol | Not Available |

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

Polyoxypropylenediamine is found on the following regulatory lists

Not Applicable

nonylphenol is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List

4,4'-isopropylidenediphenol is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List

Singapore Permissible Exposure Limits of Toxic Substances

International WHO List of Proposed Occupational Exposure Limit (OEL)

Values for Manufactured Nanomaterials (MNMS)

benzyl alcohol is found on the following regulatory lists

Not Applicable

National Inventory Status

| National Inventory | Status |
|--|---|
| Australia - AIIIC / Australia Non-Industrial Use | Yes |
| Canada - DSL | Yes |
| Canada - NDSL | No (Polyoxypropylenediamine; 4,4'-isopropylidenediphenol; benzyl alcohol) |
| China - IECSC | Yes |
| Europe - EINEC / ELINCS / NLP | No (Polyoxypropylenediamine) |
| Japan - ENCS | Yes |
| Korea - KECI | Yes |
| New Zealand - NZIoC | Yes |
| Philippines - PICCS | Yes |
| USA - TSCA | Yes |
| Taiwan - TCSI | Yes |
| Mexico - INSQ | Yes |
| Vietnam - NCI | Yes |
| Russia - FBEPH | Yes |

CERAMIGRADE LINER ACTIVATOR

| National Inventory | Status |
|--------------------|---|
| Legend: | <i>Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.</i> |

SECTION 16 Other information

| | |
|----------------------|------------|
| Revision Date | 04/10/2017 |
| Initial Date | 03/10/2017 |

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

CERAMIGRADE LINER BASE

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 659276 - base

Version No: 5.6

Safety Data Sheet

Issue Date: 12/05/2017

Print Date: 24/03/2022

L.GHS.SGP.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

| | |
|--------------------------------------|--|
| Product name | CERAMIGRADE LINER BASE |
| Chemical Name | Not Applicable |
| Synonyms | Product Part Number: 659276 Ceramigraade liner base and activator 0.5L, 659300, POLYMER KIT-ALFA |
| Chemical formula | Not Applicable |
| Other means of identification | 659276 - base, 659276, 659300 |

Relevant identified uses of the substance or mixture and uses advised against

| | |
|---------------------------------|-----------------------|
| Relevant identified uses | Polymer repair system |
|---------------------------------|-----------------------|

Details of the supplier of the safety data sheet

| | | | |
|--------------------------------|---|--|---|
| Registered company name | Wilhelmsen Ships Service (S) Pte. Ltd. | Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | 186 Pandan Loop Singapore 128376 Singapore | -----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +65 6395 4545 | Not Available | +31 10 4877 777 |
| Fax | Not Available | Not Available | Not Available |
| Website | http://www.wilhelmsen.com/services/maritime/compan | http://www.wilhelmsen.com | http://www.wilhelmsen.com |
| Email | wss.singapore@wilhelmsen.com | wss.global.sdsinfo@wilhelmsen.com | wss.rotterdam@wilhelmsen.com |

| | |
|--------------------------------|---|
| Registered company name | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +31 10 4877 777 |
| Fax | Not Available |
| Website | http://www.wilhelmsen.com |
| Email | wss.rotterdam@wilhelmsen.com |

Emergency telephone number

| | | | |
|-----------------------------------|------------------|------------------|--------------------------|
| Association / Organisation | 24hrs - Chemtrec | 24hrs - Chemtrec | Dutch nat. poison centre |
|-----------------------------------|------------------|------------------|--------------------------|

CERAMIGRADE LINER BASE


| | | | |
|-----------------------------------|--------------------------|-----------------|-----------------|
| Emergency telephone numbers | +31-10-4877700 | +31-10-4877700 | + 31 88 7558561 |
| Other emergency telephone numbers | +31-10-4877700 | +1 800 424 9300 | + 31 10 4877700 |
| Association / Organisation | Dutch nat. poison centre | | |
| Emergency telephone numbers | + 31 30 274 88 88 | | |
| Other emergency telephone numbers | + 31-10-4877700 | | |

SECTION 2 Hazards identification

Classification of the substance or mixture

| | |
|----------------|---|
| Classification | Skin Corrosion/Irritation Category 2, Serious Eye Damage/Eye Irritation Category 2, Sensitisation (Skin) Category 1, Hazardous to the Aquatic Environment Long-Term Hazard Category 2 |
|----------------|---|

Label elements

| | |
|---------------------|---|
| Hazard pictogram(s) |  |
|---------------------|---|

| | |
|-------------|---------|
| Signal word | Warning |
|-------------|---------|

Hazard statement(s)

| | |
|------|--|
| H315 | Causes skin irritation. |
| H319 | Causes serious eye irritation. |
| H317 | May cause an allergic skin reaction. |
| H411 | Toxic to aquatic life with long lasting effects. |

Precautionary statement(s) Prevention

| | |
|------|--|
| P280 | Wear protective gloves, protective clothing, eye protection and face protection. |
| P261 | Avoid breathing dust/fumes. |
| P273 | Avoid release to the environment. |

Precautionary statement(s) Response

| | |
|----------------|--|
| P302+P352 | IF ON SKIN: Wash with plenty of 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. |
| P333+P313 | If skin irritation or rash occurs: Get medical advice/attention. |

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

| | |
|------|--|
| P501 | Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation. |
|------|--|

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

| CAS No | %[weight] | Name |
|-------------|-----------|---|
| 25068-38-6* | 40-50 | <u>BISPHENOL A- (EPICHLORHYDRIN) (REACTION PRODUCT)</u> |

Continued...

CERAMIGRADE LINER BASE

| CAS No | %[weight] | Name |
|---------------|-----------|------------------------------------|
| 68609-97-2 | <10 | <u>(C12-14)alkylglycidyl ether</u> |
| Not Available | >40 | <u>Non-hazardous ingredient</u> |

SECTION 4 First aid measures

Description of first aid measures

| | |
|---------------------|---|
| Eye Contact | <p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▶ Wash out immediately with fresh running water. ▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▶ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. |
| Skin Contact | <p>If skin contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately remove all contaminated clothing, including footwear. ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation. |
| Inhalation | <ul style="list-style-type: none"> ▶ If fumes, aerosols or combustion products are inhaled remove from contaminated area. ▶ Other measures are usually unnecessary. |
| Ingestion | <ul style="list-style-type: none"> ▶ Immediately give a glass of water. ▶ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor. |

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 Firefighting measures

Extinguishing media

- ▶ Foam.
- ▶ Dry chemical powder.
- ▶ BCF (where regulations permit).

Special hazards arising from the substrate or mixture

| | |
|-----------------------------|-------------|
| Fire Incompatibility | None known. |
|-----------------------------|-------------|

Advice for firefighters

| | |
|------------------------------|---|
| Fire Fighting | <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus plus protective gloves. ▶ Prevent, by any means available, spillage from entering drains or water courses. |
| Fire/Explosion Hazard | <p>Combustible. Will burn if ignited. May emit corrosive fumes.</p> |

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

| | |
|---------------------|---|
| Minor Spills | <p>Environmental hazard - contain spillage.</p> <ul style="list-style-type: none"> ▶ Clean up all spills immediately. ▶ Avoid breathing dust and contact with skin and eyes. ▶ Wear protective clothing, gloves, safety glasses and dust respirator. |
| Major Spills | <p>Environmental hazard - contain spillage. Moderate hazard.</p> <ul style="list-style-type: none"> ▶ CAUTION: Advise personnel in area. ▶ Alert Emergency Services and tell them location and nature of hazard. |

CERAMIGRADE LINER BASE

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

| | |
|--------------------------|---|
| Safe handling | <ul style="list-style-type: none"> ▶ Avoid all personal contact, including inhalation. ▶ Wear protective clothing when risk of exposure occurs. ▶ Use in a well-ventilated area. |
| Other information | <ul style="list-style-type: none"> ▶ Store in original containers. ▶ Keep containers securely sealed. ▶ Store in a cool, dry area protected from environmental extremes. |

Conditions for safe storage, including any incompatibilities

| | |
|--------------------------------|--|
| Suitable container | <ul style="list-style-type: none"> ▶ Lined metal can, lined metal pail/ can. ▶ Plastic pail. ▶ Polyliner drum. |
| Storage incompatibility | <p>Glycidyl ethers:</p> <ul style="list-style-type: none"> ▶ may form unstable peroxides on storage in air, light, sunlight, UV light or other ionising radiation, trace metals - inhibitor should be maintained at adequate levels ▶ may polymerise in contact with heat, organic and inorganic free radical producing initiators ▶ may polymerise with evolution of heat in contact with oxidisers, strong acids, bases and amines ▶ react violently with strong oxidisers, permanganates, peroxides, acyl halides, alkalis, ammonium persulfate, bromine dioxide ▶ attack some forms of plastics, coatings, and rubber <p>None known</p> |



X — Must not be stored together
O — May be stored together with specific preventions
+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

| Source | Ingredient | Material name | TWA | STEL | Peak | Notes |
|---|--|-----------------------|----------|---------------|---------------|---------------|
| Singapore Permissible Exposure Limits of Toxic Substances | BISPHENOL A- (EPICHLORHYDRIN) {REACTION PRODUCT} | Nuisance particulates | 10 mg/m3 | Not Available | Not Available | Not Available |

Emergency Limits

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|--|----------|-----------|-------------|
| BISPHENOL A- (EPICHLORHYDRIN) {REACTION PRODUCT} | 90 mg/m3 | 990 mg/m3 | 5,900 mg/m3 |

| Ingredient | Original IDLH | Revised IDLH |
|--|---------------|---------------|
| BISPHENOL A- (EPICHLORHYDRIN) {REACTION PRODUCT} | Not Available | Not Available |
| (C12-14)alkylglycidyl ether | Not Available | Not Available |
| Non-hazardous ingredient | Not Available | Not Available |

Occupational Exposure Banding

| Ingredient | Occupational Exposure Band Rating | Occupational Exposure Band Limit |
|------------|-----------------------------------|----------------------------------|
|------------|-----------------------------------|----------------------------------|

CERAMIGRADE LINER BASE

| Ingredient | Occupational Exposure Band Rating | Occupational Exposure Band Limit |
|-----------------------------|---|----------------------------------|
| (C12-14)alkylglycidyl ether | E | ≤ 0.1 ppm |
| Notes: | <i>Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.</i> | |


MATERIAL DATA

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more.

It is the goal of the ACGIH (and other Agencies) to recommend TLVs (or their equivalent) for all substances for which there is evidence of health effects at airborne concentrations encountered in the workplace.

At this time no TLV has been established, even though this material may produce adverse health effects (as evidenced in animal experiments or clinical experience). Airborne concentrations must be maintained as low as is practically possible and occupational exposure must be kept to a minimum.

Exposure controls

| | |
|---|---|
| Appropriate engineering controls | Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. |
| Personal protection |  |
| Eye and face protection | <ul style="list-style-type: none"> ▶ Safety glasses with side shields. ▶ Chemical goggles. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. |
| Skin protection | See Hand protection below |
| Hands/feet protection | <p>NOTE:</p> <ul style="list-style-type: none"> ▶ The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact. ▶ Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed. <p>The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice. When handling liquid-grade epoxy resins wear chemically protective gloves, boots and aprons. The performance, based on breakthrough times, of:</p> <ul style="list-style-type: none"> · Ethyl Vinyl Alcohol (EVAL laminate) is generally excellent · Butyl Rubber ranges from excellent to good · Nitrile Butyl Rubber (NBR) from excellent to fair. · Neoprene from excellent to fair · Polyvinyl (PVC) from excellent to poor <p>As defined in ASTM F-739-96</p> <ul style="list-style-type: none"> · Excellent breakthrough time > 480 min · Good breakthrough time > 20 min · Fair breakthrough time < 20 min · Poor glove material degradation <p>Gloves should be tested against each resin system prior to making a selection of the most suitable type. Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present.</p> <ul style="list-style-type: none"> ▶ polychloroprene. ▶ nitrile rubber. |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none"> ▶ Overalls. ▶ P.V.C apron. ▶ Barrier cream. |

Respiratory protection

Type A-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

| Required Minimum Protection Factor | Half-Face Respirator | Full-Face Respirator | Powered Air Respirator |
|------------------------------------|----------------------|----------------------|------------------------|
|------------------------------------|----------------------|----------------------|------------------------|

CERAMIGRADE LINER BASE

| | | | |
|----------------|-------------------|------------|----------------|
| up to 10 x ES | A P1 Air-line* | - - | A PAPR-P1 - |
| up to 50 x ES | Air-line** | A P2 | A PAPR-P2 |
| up to 100 x ES | - | A P3 | - |
| | | Air-line* | - |
| 100+ x ES | - | Air-line** | A PAPR-P3 |

* - Negative pressure demand ** - Continuous flow

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO₂), G = Agricultural chemicals, K = Ammonia(NH₃), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
- Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory protection. These may be government mandated or vendor recommended.
- Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
- Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU)
- Use approved positive flow mask if significant quantities of dust becomes airborne.
- Try to avoid creating dust conditions.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

| | | | |
|---|------------------------|--|----------------|
| Appearance | blue paste | | |
| Physical state | Solid | Relative density (Water = 1) | 1.67 |
| Odour | Odourless | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | Not Available |
| pH (as supplied) | Not Available | Decomposition temperature | Not Available |
| Melting point / freezing point (°C) | Not Available | Viscosity (cSt) | Not Available |
| Initial boiling point and boiling range (°C) | >200 | Molecular weight (g/mol) | Not Available |
| Flash point (°C) | 245 | Taste | Not Available |
| Evaporation rate | Not Available BuAC = 1 | Explosive properties | Not Available |
| Flammability | Not Applicable | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | Not Available | Surface Tension (dyn/cm or mN/m) | Not Applicable |
| Lower Explosive Limit (%) | Not Available | Volatile Component (%vol) | Not Available |
| Vapour pressure (kPa) | Not Available | Gas group | Not Available |
| Solubility in water | Not Available | pH as a solution (Not Available%) | Not Available |
| Vapour density (Air = 1) | Not Available | VOC g/L | Not Available |

SECTION 10 Stability and reactivity

| | |
|---|---|
| Reactivity | See section 7 |
| Chemical stability | Product is considered stable and hazardous polymerisation will not occur. |
| Possibility of hazardous reactions | See section 7 |
| Conditions to avoid | See section 7 |

CERAMIGRADE LINER BASE

| | |
|---|---------------|
| Incompatible materials | See section 7 |
| Hazardous decomposition products | See section 5 |

SECTION 11 Toxicological information

Information on toxicological effects

| | |
|---------------------|--|
| Inhaled | The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting. |
| Ingestion | The material has NOT been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence. The material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g liver, kidney) damage is evident. |
| Skin Contact | Evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis. The material may accentuate any pre-existing dermatitis condition Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions. |
| Eye | Evidence exists, or practical experience predicts, that the material may cause eye irritation in a substantial number of individuals and/or may produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur. |
| Chronic | Practical experience shows that skin contact with the material is capable either of inducing a sensitisation reaction in a substantial number of individuals, and/or of producing a positive response in experimental animals. Substances that can cause occupational asthma (also known as asthmagens and respiratory sensitisers) can induce a state of specific airway hyper-responsiveness via an immunological, irritant or other mechanism. Once the airways have become hyper-responsive, further exposure to the substance, sometimes even to tiny quantities, may cause respiratory symptoms. All glycidyl ethers show genotoxic potential due their alkylating properties. Those glycidyl ethers that have been investigated in long term studies exhibit more or less marked carcinogenic potential. Alkylating agents may damage the stem cell which acts as the precursor to components of the blood. On the basis, primarily, of animal experiments, concern has been expressed by at least one classification body that the material may produce carcinogenic or mutagenic effects; in respect of the available information, however, there presently exists inadequate data for making a satisfactory assessment. |

| | | |
|---|---|--|
| CERAMIGRADE LINER BASE | TOXICITY | IRRITATION |
| | Not Available | Not Available |
| BISPHENOL A- (EPICHLORHYDRIN) {REACTION PRODUCT} | TOXICITY | IRRITATION |
| | dermal (rat) LD50: >1200 mg/kg ^[2] | Not Available |
| | Oral (Mouse) LD50; >500 mg/kg ^[2] | |
| (C12-14)alkylglycidyl ether | TOXICITY | IRRITATION |
| | Oral (Rat) LD50; >10000 mg/kg ^[2] | Eye (rabbit): mild [Ciba] |
| | | Eye: adverse effect observed (irritating) ^[1] |
| | | Skin (guinea pig): sensitiser |
| | | Skin (human): Irritant |
| | | Skin (human): non- sensitiser |
| | | Skin (rabbit): moderate |
| | | Skin : Moderate Skin: adverse effect observed (irritating) ^[1] |
| Non-hazardous ingredient | TOXICITY | IRRITATION |
| | Not Available | Not Available |

Legend: 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances

| | |
|--|---|
| BISPHENOL A- (EPICHLORHYDRIN) {REACTION PRODUCT} | <p>The chemical structure of hydroxylated diphenylalkanes or bisphenols consists of two phenolic rings joined together through a bridging carbon. This class of endocrine disruptors that mimic oestrogens is widely used in industry, particularly in plastics. Bisphenol A (BPA) and some related compounds exhibit oestrogenic activity in human breast cancer cell line MCF-7, but there were remarkable differences in activity. Several derivatives of BPA exhibited significant thyroid hormonal activity towards rat pituitary cell line GH3, which releases growth hormone in a thyroid hormone-dependent manner.</p> <p>The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.</p> <p>No significant acute toxicological data identified in literature search. CAUTION: Epoxy resin products may contain sensitising glycidyl ethers, even when these are not mentioned in the information given for the product. The likely occurrence of these is greatly reduced in solid grades of the resin.</p> |
| CERAMIGRADE LINER BASE & BISPHENOL A- (EPICHLORHYDRIN) {REACTION PRODUCT} & (C12-14)ALKYLGLYCIDYL ETHER | <p>The following information refers to contact allergens as a group and may not be specific to this product. Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type.</p> |
| CERAMIGRADE LINER BASE & (C12-14)ALKYLGLYCIDYL ETHER | <p>Oxiranes (including glycidyl ethers and alkyl oxides, and epoxides) exhibit many common characteristics with respect to animal toxicology. One such oxirane is ethyloxirane; data presented here may be taken as representative.</p> <p>for 1,2-butylene oxide (ethyloxirane):</p> <p>Ethyloxirane increased the incidence of tumours of the respiratory system in male and female rats exposed via inhalation. Significant increases in nasal papillary adenomas and combined alveolar/bronchiolar adenomas and carcinomas were observed in male rats exposed to 1200 mg/m³ ethyloxirane via inhalation for 103 weeks. There was also a significant positive trend in the incidence of combined alveolar/bronchiolar adenomas and carcinomas.</p> |

| | | | |
|--|---|---------------------------------|---|
| Acute Toxicity | ✗ | Carcinogenicity | ✗ |
| Skin Irritation/Corrosion | ✓ | Reproductivity | ✗ |
| Serious Eye Damage/Irritation | ✓ | STOT - Single Exposure | ✗ |
| Respiratory or Skin sensitisation | ✓ | STOT - Repeated Exposure | ✗ |
| Mutagenicity | ✗ | Aspiration Hazard | ✗ |

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

| CERAMIGRADE LINER BASE | Endpoint | Test Duration (hr) | Species | Value | Source |
|--|---------------|--------------------|---------------|---------------|---------------|
| | Not Available | Not Available | Not Available | Not Available | Not Available |
| BISPHENOL A- (EPICHLORHYDRIN) {REACTION PRODUCT} | Endpoint | Test Duration (hr) | Species | Value | Source |
| | EC50 | 48h | Crustacea | ~2mg/l | 2 |
| EC50(ECx) | 48h | Crustacea | ~2mg/l | 2 | |
| (C12-14)alkylglycidyl ether | Endpoint | Test Duration (hr) | Species | Value | Source |
| | EC50(ECx) | 48h | Crustacea | 6.07mg/l | 2 |
| | LC50 | 96h | Fish | >5000mg/l | 2 |
| EC50 | 48h | Crustacea | 6.07mg/l | 2 | |
| Non-hazardous ingredient | Endpoint | Test Duration (hr) | Species | Value | Source |
| | Not Available | Not Available | Not Available | Not Available | Not Available |

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

CERAMIGRADE LINER BASE

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

Significant environmental findings are limited. Oxiranes (including glycidyl ethers and alkyl oxides, and epoxides) exhibit common characteristics with respect to environmental fate and ecotoxicology. One such oxirane is ethyloxirane and data presented here may be taken as representative for 1,2-butylene oxide (ethyloxirane):

Environmental fate: Ethyloxirane is highly soluble in water and has a very low soil-adsorption coefficient, which suggests that if released to water, adsorption of ethyloxirane to sediment and suspended solids is not expected. Volatilisation of ethyloxirane from water surfaces would be expected based on the moderate estimated Henry's Law constant. If ethyloxirane is released to soil, it is expected to have low adsorption and thus very high mobility.

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|------------|---------------------------------------|---------------------------------------|
| | No Data available for all ingredients | No Data available for all ingredients |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|------------|---------------------------------------|
| | No Data available for all ingredients |

Mobility in soil

| Ingredient | Mobility |
|------------|---------------------------------------|
| | No Data available for all ingredients |


SECTION 13 Disposal considerations

Waste treatment methods

| | |
|-------------------------------------|---|
| Product / Packaging disposal | <ul style="list-style-type: none"> ▶ Containers may still present a chemical hazard/ danger when empty. ▶ Return to supplier for reuse/ recycling if possible. <p>Otherwise:</p> <ul style="list-style-type: none"> ▶ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. ▶ DO NOT allow wash water from cleaning or process equipment to enter drains. ▶ It may be necessary to collect all wash water for treatment before disposal. ▶ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▶ Recycle wherever possible. ▶ Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. ▶ Dispose of by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or Incineration in a licensed apparatus (after admixture with suitable combustible material) ▶ Decontaminate empty containers. |
|-------------------------------------|---|

SECTION 14 Transport information

Labels Required

| | |
|-------------------------|---|
| Marine Pollutant |  |
|-------------------------|---|

Land transport (UN): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

| Product name | Group |
|--|---------------|
| BISPHENOL A- (EPICHLORHYDRIN) {REACTION PRODUCT} | Not Available |

CERAMIGRADE LINER BASE

| Product name | Group |
|-----------------------------|---------------|
| (C12-14)alkylglycidyl ether | Not Available |
| Non-hazardous ingredient | Not Available |

Transport in bulk in accordance with the ICG Code

| Product name | Ship Type |
|--|---------------|
| BISPHENOL A- (EPICHLORHYDRIN) {REACTION PRODUCT} | Not Available |
| (C12-14)alkylglycidyl ether | Not Available |
| Non-hazardous ingredient | Not Available |

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

BISPHENOL A- (EPICHLORHYDRIN) {REACTION PRODUCT} is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List

Singapore Permissible Exposure Limits of Toxic Substances

International WHO List of Proposed Occupational Exposure Limit (OEL)
Values for Manufactured Nanomaterials (MNMS)

(C12-14)alkylglycidyl ether is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List

Non-hazardous ingredient is found on the following regulatory lists

Not Applicable

National Inventory Status

| National Inventory | Status |
|---|---|
| Australia - AIIC / Australia Non-Industrial Use | Yes |
| Canada - DSL | Yes |
| Canada - NDSL | No (BISPHENOL A- (EPICHLORHYDRIN) {REACTION PRODUCT}); (C12-14)alkylglycidyl ether) |
| China - IECSC | Yes |
| Europe - EINEC / ELINCS / NLP | Yes |
| Japan - ENCS | No ((C12-14)alkylglycidyl ether) |
| Korea - KECI | Yes |
| New Zealand - NZIoC | Yes |
| Philippines - PICCS | Yes |
| USA - TSCA | Yes |
| Taiwan - TCSI | Yes |
| Mexico - INSC | No (BISPHENOL A- (EPICHLORHYDRIN) {REACTION PRODUCT}); (C12-14)alkylglycidyl ether) |
| Vietnam - NCI | Yes |
| Russia - FBEPH | Yes |
| Legend: | Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration. |

SECTION 16 Other information

| | |
|---------------|------------|
| Revision Date | 12/05/2017 |
| Initial Date | 12/05/2017 |

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

Continued...

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

CERAMIGRADE REBUILD ACTIVATOR

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 659268 activator

Version No: 4.5

Safety Data Sheet

Issue Date: 19/10/2021

Print Date: 24/03/2022

L.GHS.SGP.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

| | |
|--------------------------------------|---|
| Product name | CERAMIGRADE REBUILD ACTIVATOR |
| Chemical Name | Not Applicable |
| Synonyms | 659300 , POLYMER KIT-ALFA,Product Part Number: 659268 - Ceramigrade rebuild base and activator 0.5L |
| Proper shipping name | CORROSIVE SOLID, BASIC, ORGANIC, N.O.S. (contains phenol) |
| Chemical formula | Not Applicable |
| Other means of identification | 659268 activator, 1056601, 659268, 659300 |

Relevant identified uses of the substance or mixture and uses advised against

| | |
|---------------------------------|-----------------------|
| Relevant identified uses | Polymer repair system |
|---------------------------------|-----------------------|

Details of the supplier of the safety data sheet

| | | | |
|--------------------------------|---|---|---|
| Registered company name | Wilhelmsen Ships Service (S) Pte. Ltd. | Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | 186 Pandan Loop Singapore 128376 Singapore | -----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +65 6395 4545 | Not Available | +31 10 4877 777 |
| Fax | Not Available | Not Available | Not Available |
| Website | http://www.wilhelmsen.com/services/maritime/compan | http://www.wilhelmsen.com | http://www.wilhelmsen.com |
| Email | wss.singapore@wilhelmsen.com | wss.global.sdsinfo@wilhelmsen.com | wss.rotterdam@wilhelmsen.com |

| | |
|--------------------------------|---|
| Registered company name | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +31 10 4877 777 |
| Fax | Not Available |
| Website | http://www.wilhelmsen.com |
| Email | wss.rotterdam@wilhelmsen.com |

Emergency telephone number

CERAMIGRADE REBUILD ACTIVATOR

| | | | |
|-----------------------------------|------------------|------------------|--------------------------|
| Association / Organisation | 24hrs - Chemtrec | 24hrs - Chemtrec | Dutch nat. poison centre |
| Emergency telephone numbers | +31-10-4877700 | +31-10-4877700 | + 31 88 7558561 |
| Other emergency telephone numbers | +31-10-4877700 | +1 800 424 9300 | + 31 10 4877700 |

| | |
|-----------------------------------|--------------------------|
| Association / Organisation | Dutch nat. poison centre |
| Emergency telephone numbers | + 31 30 274 88 88 |
| Other emergency telephone numbers | + 31-10-4877700 |

SECTION 2 Hazards identification

Classification of the substance or mixture

| | |
|----------------|---|
| Classification | Skin Corrosion/Irritation Category 1, Sensitisation (Respiratory) Category 1, Specific Target Organ Toxicity - Repeated Exposure Category 2, Acute Toxicity (Oral) Category 4, Reproductive Toxicity Category 2, Sensitisation (Skin) Category 1, Germ Cell Mutagenicity Category 2 |
|----------------|---|

Label elements

| | |
|---------------------|--|
| Hazard pictogram(s) |  |
|---------------------|--|

| | |
|-------------|---------------|
| Signal word | Danger |
|-------------|---------------|

Hazard statement(s)

| | |
|------|--|
| H314 | Causes severe skin burns and eye damage. |
| H334 | May cause allergy or asthma symptoms or breathing difficulties if inhaled. |
| H373 | May cause damage to organs through prolonged or repeated exposure. |
| H302 | Harmful if swallowed. |
| H361 | Suspected of damaging fertility or the unborn child. |
| H317 | May cause an allergic skin reaction. |
| H341 | Suspected of causing genetic defects. |

Precautionary statement(s) Prevention

| | |
|------|---|
| P201 | Obtain special instructions before use. |
| P260 | Do not breathe mist/vapours/spray. |
| P264 | Wash all exposed external body areas thoroughly after handling. |

Precautionary statement(s) Response

| | |
|----------------|---|
| P301+P330+P331 | IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. |
| P303+P361+P353 | IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. |
| P304+P340 | IF INHALED: Remove person to fresh air and keep comfortable for breathing. |

Precautionary statement(s) Storage

| | |
|------|------------------|
| P405 | Store locked up. |
|------|------------------|

Precautionary statement(s) Disposal

| | |
|------|--|
| P501 | Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation. |
|------|--|

SECTION 3 Composition / information on ingredients

CERAMIGRADE REBUILD ACTIVATOR

Substances

See section below for composition of Mixtures

Mixtures

| CAS No | %[weight] | Name |
|---------------|-----------|----------------------------|
| Not Available | >40 | Non-classified ingredients |
| 111-40-0 | 15-30 | <u>diethylenetriamine</u> |
| 108-95-2 | 15-30 | <u>phenol</u> |

SECTION 4 First aid measures

Description of first aid measures

| | |
|---------------------|--|
| Eye Contact | <p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▶ Immediately hold eyelids apart and flush the eye continuously with running water. ▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▶ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▶ Transport to hospital or doctor without delay. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. |
| Skin Contact | <p>If spilt on skin:</p> <ul style="list-style-type: none"> ▶ Remove contaminated clothing, swab repeatedly with glycerin, PEG (polyethylene glycol), or PEG/ methylated spirit mixture or if necessary with methylated spirit alone* ▶ Contamination of skin with phenol and some of its derivatives may produce rapid collapse and death. ▶ After skin contamination, keep patient under observation for at least 24-48 hours. ▶ Phenol-decontaminating fluid is more effective than water in removing phenol from the skin and retarding absorption; olive oil or vegetable oil may also be used; do not use mineral oil. ▶ Alcohols* (methylated spirit, for example) may enhance absorption and their use alone may be ill-advised; some authorities however continue to advise the use of such treatment. ▶ Rapid water dilution of phenol burns may increase systemic absorption by decreasing the extent of the coagulum and thus allowing greater absorption (1). <p>(1) Ellenhorn and Barceloux: Medical Toxicology: Diagnosis and Treatment of Human Poisoning.</p> |
| Inhalation | <ul style="list-style-type: none"> ▶ If fumes or combustion products are inhaled remove from contaminated area. ▶ Lay patient down. Keep warm and rested. ▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▶ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▶ Transport to hospital, or doctor, without delay. |
| Ingestion | <ul style="list-style-type: none"> ▶ Immediately give a glass of water. ▶ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor. |

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

For acute or short-term repeated exposures to highly alkaline materials:

- ▶ Respiratory stress is uncommon but present occasionally because of soft tissue edema.
- ▶ Unless endotracheal intubation can be accomplished under direct vision, cricothyroidotomy or tracheotomy may be necessary.
- ▶ Oxygen is given as indicated.
- ▶ The presence of shock suggests perforation and mandates an intravenous line and fluid administration.
- ▶ Damage due to alkaline corrosives occurs by liquefaction necrosis whereby the saponification of fats and solubilisation of proteins allow deep penetration into the tissue.

Alkalis continue to cause damage after exposure.

INGESTION:

- ▶ Milk and water are the preferred diluents

No more than 2 glasses of water should be given to an adult.

- ▶ Neutralising agents should never be given since exothermic heat reaction may compound injury.

* Catharsis and emesis are absolutely contra-indicated.

* Activated charcoal does not absorb alkali.

* Gastric lavage should not be used.

Supportive care involves the following:

- ▶ Withhold oral feedings initially.
- ▶ If endoscopy confirms transmucosal injury start steroids only within the first 48 hours.
- ▶ Carefully evaluate the amount of tissue necrosis before assessing the need for surgical intervention.
- ▶ Patients should be instructed to seek medical attention whenever they develop difficulty in swallowing (dysphagia).

SKIN AND EYE:

- ▶ Injury should be irrigated for 20-30 minutes.

CERAMIGRADE REBUILD ACTIVATOR

Eye injuries require saline. [Ellenhorn & Barceloux: Medical Toxicology]

If exposure has been severe and/or symptoms marked, observation in hospital for 48 hours should be considered due to possibility of delayed pulmonary oedema.

For acute or short term repeated exposures to phenols/ cresols:

- Phenol is absorbed rapidly through lungs and skin. [Massive skin contact may result in collapse and death]*
- [Ingestion may result in ulceration of upper respiratory tract; perforation of oesophagus and/or stomach, with attendant complications, may occur. Oesophageal stricture may occur.]*
- An initial excitatory phase may present. Convulsions may appear as long as 18 hours after ingestion. Hypotension and ventricular tachycardia that require vasopressor and antiarrhythmic therapy, respectively, can occur.
- Respiratory arrest, ventricular dysrhythmias, seizures and metabolic acidosis may complicate severe phenol exposures so the initial attention should be directed towards stabilisation of breathing and circulation with ventilation, intubation, intravenous lines, fluids and cardiac monitoring as indicated.
- [Vegetable oils retard absorption; do NOT use paraffin oils or alcohols. Gastric lavage, with endotracheal intubation, should be repeated until phenol odour is no longer detectable; follow with vegetable oil. A saline cathartic should then be given.]* ALTERNATIVELY: Activated charcoal (1g/kg) may be given. A cathartic should be given after oral activated charcoal.
- Severe poisoning may require slow intravenous injection of methylene blue to treat methaemoglobinaemia.
- [Renal failure may require haemodialysis.]*
- Most absorbed phenol is biotransformed by the liver to ethereal and glucuronide sulfates and is eliminated almost completely after 24 hours. [Ellenhorn and Barceloux: Medical Toxicology] *[Union Carbide]

BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker who has been exposed to the Exposure Standard (ES or TLV):

| Determinant | Index | Sampling Time | Comments |
|--------------------------|----------------------|---------------|----------|
| 1. Total phenol in blood | 250 mg/gm creatinine | End of shift | B, NS |

B: Background levels occur in specimens collected from subjects **NOT** exposed

NS: Non-specific determinant; also seen in exposure to other materials

SECTION 5 Firefighting measures

Extinguishing media

- Foam.
- Dry chemical powder.
- BCF (where regulations permit).

Special hazards arising from the substrate or mixture

| | |
|-----------------------------|--|
| Fire Incompatibility | ▸ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result |
|-----------------------------|--|

Advice for firefighters

| | |
|------------------------------|---|
| Fire Fighting | <ul style="list-style-type: none"> ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear full body protective clothing with breathing apparatus. ▸ Prevent, by any means available, spillage from entering drains or water course. |
| Fire/Explosion Hazard | Combustible. Will burn if ignited. Combustion products include: <ul style="list-style-type: none"> , carbon monoxide (CO) , carbon dioxide (CO₂) , nitrogen oxides (NO_x) , other pyrolysis products typical of burning organic material. May emit poisonous fumes. |

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

CERAMIGRADE REBUILD ACTIVATOR

See section 12

Methods and material for containment and cleaning up

| | |
|---------------------|--|
| Minor Spills | <p>Environmental hazard - contain spillage.</p> <ul style="list-style-type: none"> ▸ Clean up waste regularly and abnormal spills immediately. ▸ Avoid breathing dust and contact with skin and eyes. ▸ Wear protective clothing, gloves, safety glasses and dust respirator. |
| Major Spills | <p>Environmental hazard - contain spillage.</p> <ul style="list-style-type: none"> ▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear full body protective clothing with breathing apparatus. |

Personal Protective Equipment advice is contained in Section 8 of the SDS.

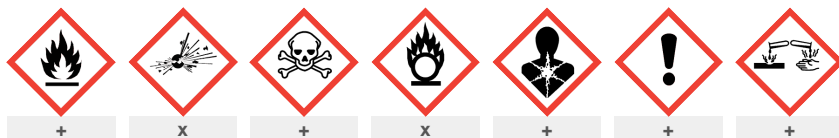
SECTION 7 Handling and storage

Precautions for safe handling

| | |
|--------------------------|---|
| Safe handling | <ul style="list-style-type: none"> ▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area. |
| Other information | <ul style="list-style-type: none"> ▸ Store in original containers. ▸ Keep containers securely sealed. ▸ Store in a cool, dry, well-ventilated area. |

Conditions for safe storage, including any incompatibilities

| | |
|--------------------------------|--|
| Suitable container | <ul style="list-style-type: none"> ▸ Lined metal can, lined metal pail/ can. ▸ Plastic pail. ▸ Polyliner drum. <p>For low viscosity materials</p> <ul style="list-style-type: none"> ▸ Drums and jerricans must be of the non-removable head type. ▸ Where a can is to be used as an inner package, the can must have a screwed enclosure. <p>For materials with a viscosity of at least 2680 cSt.</p> <p>All inner and sole packagings for substances that have been assigned to Packaging Groups I or II on the basis of inhalation toxicity criteria, must be hermetically sealed.</p> |
| Storage incompatibility | <p>Secondary amines form salts with strong acids and can be oxidized to the corresponding nitrene using hydrogen peroxide, catalyzed by selenium dioxide</p> <ul style="list-style-type: none"> ▸ Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous ▸ Phenols are incompatible with strong reducing substances such as hydrides, nitrides, alkali metals, and sulfides. ▸ Avoid use of aluminium, copper and brass alloys in storage and process equipment. ▸ Heat is generated by the acid-base reaction between phenols and bases. ▸ Avoid strong acids, acid chlorides, acid anhydrides and chloroformates. ▸ Avoid contact with copper, aluminium and their alloys. ▸ Segregate phenol from halogens, calcium hypochlorite, and metals such as aluminium, lead, zinc, magnesium. ▸ Reaction of phenol with calcium hypochlorite is exothermic and produces toxic fumes which may ignite ▸ Hot phenol is corrosive to many metals, including aluminium, lead, magnesium and zinc. ▸ Do not heat phenol above 60 deg.C. ▸ Avoid reaction with oxidising agents |



X — Must not be stored together
 O — May be stored together with specific preventions
 + — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

CERAMIGRADE REBUILD ACTIVATOR

INGREDIENT DATA

| Source | Ingredient | Material name | TWA | STEL | Peak | Notes |
|---|--------------------|---------------------|-------------------|---------------|---------------|---------------|
| Singapore Permissible Exposure Limits of Toxic Substances | diethylenetriamine | Diethylene triamine | 1 ppm / 4.2 mg/m3 | Not Available | Not Available | Not Available |
| Singapore Permissible Exposure Limits of Toxic Substances | phenol | Phenol | 5 ppm / 19 mg/m3 | Not Available | Not Available | Not Available |

Emergency Limits

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|--------------------|---------------|---------------|---------------|
| diethylenetriamine | 3 ppm | 8.5 ppm | 51 ppm |
| phenol | Not Available | Not Available | Not Available |

| Ingredient | Original IDLH | Revised IDLH |
|--------------------|---------------|---------------|
| diethylenetriamine | Not Available | Not Available |
| phenol | 250 ppm | Not Available |

MATERIAL DATA

Amine adducts have much reduced volatility and are less irritating to the skin and eyes than amine hardeners. However commercial amine adducts may contain a percentage of unreacted amine and all unnecessary contact should be avoided.

Amine adducts are prepared by reacting excess primary amines with epoxy resin.


Odour Threshold Value for phenol: 0.060 ppm (detection)

NOTE: Detector tubes for phenol, measuring in excess of 1 ppm, are commercially available.

Systemic absorption by all routes may induce convulsions with damage to the lungs and central nervous system.

Exposure at or below the recommended TLV-TWA is thought to protect the worker from respiratory, cardiovascular, hepatic, renal and neurological toxicity.

Exposure controls

| | |
|---|---|
| Appropriate engineering controls | Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. |
| Personal protection |  |
| Eye and face protection | <ul style="list-style-type: none"> ▶ Safety glasses with unperforated side shields may be used where continuous eye protection is desirable, as in laboratories; spectacles are not sufficient where complete eye protection is needed such as when handling bulk-quantities, where there is a danger of splashing, or if the material may be under pressure. ▶ Chemical goggles whenever there is a danger of the material coming in contact with the eyes; goggles must be properly fitted. ▶ Full face shield (20 cm, 8 in minimum) may be required for supplementary but never for primary protection of eyes; these afford face protection. |
| Skin protection | See Hand protection below |
| Hands/feet protection | <ul style="list-style-type: none"> ▶ Elbow length PVC gloves <p>NOTE:</p> <ul style="list-style-type: none"> ▶ The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact. ▶ Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed. |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none"> ▶ Overalls. ▶ Eyewash unit. ▶ Barrier cream. |

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

CERAMIGRADE REBUILD ACTIVATOR

Respiratory protection

Particulate. (AS/NZS 1716 & 1715, EN 143:2000 & 149:001, ANSI Z88 or national equivalent)

| Required Minimum Protection Factor | Half-Face Respirator | Full-Face Respirator | Powered Air Respirator |
|------------------------------------|----------------------|----------------------|------------------------|
|------------------------------------|----------------------|----------------------|------------------------|

CERAMIGRADE REBUILD ACTIVATOR

| Material | CPI |
|-------------------|-----|
| BUTYL | A |
| NEOPRENE | A |
| VITON | A |
| BUTYL/NEOPRENE | C |
| NAT+NEOPR+NITRILE | C |
| NATURAL RUBBER | C |
| NATURAL+NEOPRENE | C |
| NEOPRENE/NATURAL | C |
| NITRILE | C |
| PE/EVAL/PE | C |
| PVA | C |
| PVC | C |
| TEFLON | C |
| VITON/NEOPRENE | C |

| | | | |
|----------------|-----------------|------------|--------------|
| up to 10 x ES | P1 Air-line* | - | PAPR-P1 - |
| up to 50 x ES | Air-line** | P2 | PAPR-P2 |
| up to 100 x ES | - | P3 | - |
| | | Air-line* | - |
| 100+ x ES | - | Air-line** | PAPR-P3 |

* - Negative pressure demand ** - Continuous flow

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

| | | | |
|---|------------------------|--|---------------|
| Appearance | paste, white | | |
| Physical state | Non Slump Paste | Relative density (Water = 1) | Not Available |
| Odour | Not Available | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | Not Available |
| pH (as supplied) | Not Available | Decomposition temperature | Not Available |
| Melting point / freezing point (°C) | Not Available | Viscosity (cSt) | Not Available |
| Initial boiling point and boiling range (°C) | Not Available | Molecular weight (g/mol) | Not Available |
| Flash point (°C) | Not Available | Taste | Not Available |
| Evaporation rate | Not Available BuAC = 1 | Explosive properties | Not Available |
| Flammability | Not Available | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | Not Available | Surface Tension (dyn/cm or mN/m) | Not Available |
| Lower Explosive Limit (%) | Not Available | Volatile Component (%vol) | Not Available |
| Vapour pressure (kPa) | Not Available | Gas group | Not Available |
| Solubility in water | Not Available | pH as a solution (Not Available%) | Not Available |
| Vapour density (Air = 1) | Not Available | VOC g/L | Not Available |

SECTION 10 Stability and reactivity

| | |
|-------------------|---------------|
| Reactivity | See section 7 |
|-------------------|---------------|

Continued...

| | |
|---|---|
| Chemical stability | <ul style="list-style-type: none"> ▶ Presence of heat source and ignition source ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur. |
| Possibility of hazardous reactions | See section 7 |
| Conditions to avoid | See section 7 |
| Incompatible materials | See section 7 |
| Hazardous decomposition products | See section 5 |

SECTION 11 Toxicological information

Information on toxicological effects

| | |
|---------------------|---|
| Inhaled | <p>Evidence shows, or practical experience predicts, that the material produces irritation of the respiratory system, in a substantial number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs.</p> <p>Inhalation of dusts, generated by the material during the course of normal handling, may produce severe damage to the health of the individual. Relatively small amounts absorbed from the lungs may prove fatal.</p> <p>Inhalation of amine vapours may cause irritation of the mucous membranes of the nose and throat and lung irritation with respiratory distress and cough. Single exposures to near lethal concentrations and repeated exposures to sublethal concentrations produces tracheitis, bronchitis, pneumonitis and pulmonary oedema. Aliphatic and alicyclic amines are generally well absorbed from the respiratory tract.</p> <p>Inhalation of epoxy resin amine hardener vapours (including polyamines and amine adducts) may produce bronchospasm and coughing episodes lasting days after cessation of the exposure. Even faint traces of these vapours may trigger an intense reaction in individuals showing "amine asthma". The literature records several instances of systemic intoxications following the use of amines in epoxy resin systems.</p> <p>Pulmonary absorption may lead to systemic toxicity affecting the cardiovascular and central nervous system. Inhalation of phenol and some of its derivatives may produce profuse perspiration, intense thirst, nausea, vomiting, diarrhoea, cyanosis, hyperactivity, stupor, falling blood pressure, hyperpnoea, abdominal pain, haemolysis, convulsions, coma and pulmonary oedema with pneumonia. Respiratory failure and kidney damage may follow.</p> <p>Inhalation of the phenol vapour causes a sore throat, coughing, shortness of breath and laboured breathing.</p> <p>Systemic effects, following such inhalation, include paleness, weakness, headache, sweating, ringing of the ears, shock, cyanosis, excitement, dark coloured urine, frothing of the nose and mouth.</p> <p>Pulmonary inflammation and pneumonia, inflammation and necrosis of the myocardium, hepatic centro-lobular necrosis, renal proximal tube swelling and oedema and globular degeneration and hind-limb paralysis was observed in guinea-pigs exposed 29 times for 7 hours/day, five days/week to concentrations ranging from 26 to 52 ppm.</p> <p>Inhalation of vapours, aerosols (mists, fumes) or dusts, generated by the material during the course of normal handling, may produce toxic effects.</p> |
| Ingestion | <p>Aliphatic and alicyclic amines are generally well absorbed from the gut. Corrosive action may cause tissue damage throughout the gastrointestinal tract. Detoxification is thought to occur in the liver, kidney and intestinal mucosa with the enzymes, monoamine oxidase and diamine oxidase (histaminase) having a significant role.</p> <p>Ingestion of amine epoxy-curing agents (hardeners) may cause severe abdominal pain, nausea, vomiting or diarrhoea. The vomitus may contain blood and mucous. If death does not occur within 24 hours there may be an improvement in the patients condition for 2-4 days only to be followed by the sudden onset of abdominal pain, board-like abdominal rigidity or hypo-tension; this indicates that delayed gastric or oesophageal corrosive damage has occurred.</p> <p>Ingestion of alkaline corrosives may produce immediate pain, and circumoral burns. Mucous membrane corrosive damage is characterised by a white appearance and soapy feel; this may then become brown, oedematous and ulcerated. Profuse salivation with an inability to swallow or speak may also result.</p> <p>The material has NOT been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence. The material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g liver, kidney) damage is evident.</p> <p>For phenol, solid: Ingestion causes blotches on the lips and in the mouth.</p> <p>Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.</p> |
| Skin Contact | <p>The material may accentuate any pre-existing dermatitis condition</p> <p>Amine epoxy-curing agents (hardeners) may produce primary skin irritation and sensitisation dermatitis in predisposed individuals. Cutaneous reactions include erythema, intolerable itching and severe facial swelling. Blistering, with weeping of serious fluid, and crusting and scaling may also occur.</p> <p>Skin contact with alkaline corrosives may produce severe pain and burns; brownish stains may develop. The corroded area may be soft, gelatinous and necrotic; tissue destruction may be deep.</p> <p>Volatile amine vapours produce primary skin irritation and dermatitis. Direct local contact, with the lower molecular weight liquids, may produce skin burns. Percutaneous absorption of simple aliphatic amines is known to produce lethal effects often the same as that for oral administration.</p> |

| | |
|---|--|
| | <p>Phenol and some of its derivatives may produce mild to severe skin irritation on repeated or prolonged contact, producing second and third degree chemical burns. Rapid cutaneous absorption may lead to systemic toxicity affecting the cardiovascular and central nervous system. Absorption through the skin may result in profuse perspiration, intense thirst, nausea, vomiting, diarrhoea, cyanosis (following the formation of methaemoglobin), hyperactivity, stupor, falling blood pressure, hyperpnoea, abdominal pain, haemolysis, convulsions, coma and pulmonary oedema followed by pneumonia.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p> <p>For phenol, solid:</p> <p>Contact with the skin causes a white, wrinkled discolouration followed by a severe burn or systemic poisoning if not promptly and properly removed.</p> <p>Intense burning and pain from skin contact may be delayed. Extreme dangers are posed by percutaneous absorption.</p> <p>Skin contact with the material may produce severely toxic effects; systemic effects may result following absorption and these may be fatal.</p> |
| <p style="text-align: center;">Eye</p> | <p>Evidence exists, or practical experience predicts, that the material may cause eye irritation in a substantial number of individuals and/or may produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals.</p> <p>Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.</p> <p>Vapours of volatile amines cause eye irritation with lachrymation, conjunctivitis and minor transient corneal oedema which results in "halos" around lights (glauropsia, "blue haze", or "blue-grey haze"). Vision may become misty and halos may appear several hours after workers are exposed to the substance</p> <p>This effect generally disappears spontaneously within a few hours of the end of exposure, and does not produce physiological after-effects. However oedema of the corneal epithelium, which is primarily responsible for vision disturbances, may take more than one or more days to clear, depending on the severity of exposure.</p> <p>Direct contact with alkaline corrosives may produce pain and burns. Oedema, destruction of the epithelium, corneal opacification and iritis may occur. In less severe cases these symptoms tend to resolve.</p> <p>Some phenol derivatives may produce mild to severe eye irritation with redness, pain and blurred vision. Permanent eye injury may occur; recovery may also be complete or partial.</p> |
| <p style="text-align: center;">Chronic</p> | <p>Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.</p> <p>Practical evidence shows that inhalation of the material is capable of inducing a sensitisation reaction in a substantial number of individuals at a greater frequency than would be expected from the response of a normal population.</p> <p>Pulmonary sensitisation, resulting in hyperactive airway dysfunction and pulmonary allergy may be accompanied by fatigue, malaise and aching. Significant symptoms of exposure may persist for extended periods, even after exposure ceases.</p> <p>Practical experience shows that skin contact with the material is capable either of inducing a sensitisation reaction in a substantial number of individuals, and/or of producing a positive response in experimental animals.</p> <p>Substances that can cause occupational asthma (also known as asthmagens and respiratory sensitisers) can induce a state of specific airway hyper-responsiveness via an immunological, irritant or other mechanism. Once the airways have become hyper-responsive, further exposure to the substance, sometimes even to tiny quantities, may cause respiratory symptoms.</p> <p>There is sufficient evidence to provide a strong presumption that human exposure to the material may result in the development of heritable genetic damage, generally on the basis of</p> <ul style="list-style-type: none"> - appropriate animal studies, - other relevant information <p>Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.</p> <p>Serious damage (clear functional disturbance or morphological change which may have toxicological significance) is likely to be caused by repeated or prolonged exposure. As a rule the material produces, or contains a substance which produces severe lesions. Such damage may become apparent following direct application in subchronic (90 day) toxicity studies or following sub-acute (28 day) or chronic (two-year) toxicity tests.</p> <p>There is sufficient evidence to provide a strong presumption that human exposure to the material may result in impaired fertility on the basis of: - clear evidence in animal studies of impaired fertility in the absence of toxic effects, or evidence of impaired fertility occurring at around the same dose levels as other toxic effects but which is not a secondary non-specific consequence of other toxic effects.</p> <p>Secondary amines may react in the acid conditions of the stomach with oxidants or preservatives) to form potentially carcinogenic N-nitrosamines. The formation of nitrosamines from such amines has not only been observed in animals models but, at least for certain compounds, in the workplace. The amine-containing substances and end products handled at work can themselves be contaminated to a degree with corresponding nitrosamines.</p> <p>Prolonged exposure to some derivatives of phenol may produce dermatitis, anorexia, weight loss, weakness, muscle aches and pain, liver damage, dark urine, ochronosis, skin eruptions, diarrhoea, nervous disorders with headache, salivation, fainting, increased skin and scleral pigmentation, vertigo and mental disorders. Liver and kidney damage may also ensue. Chronic phenol toxicity was first noted in medical personnel in the late 1800s when 5 and 10% phenol was used as a skin disinfectant.</p> <p>On the basis, primarily, of animal experiments, concern has been expressed by at least one classification body that the material may produce carcinogenic or mutagenic effects; in respect of the available information, however, there presently exists inadequate data for making a satisfactory assessment.</p> <p>Solid phenol is highly toxic via ingestion, inhalation and skin contact.</p> <p>Chronic phenol poisoning is very rarely reported, but symptoms include vomiting, difficulty in swallowing, diarrhoea, lack of appetite, headache, fainting, dizziness, dark urine, mental disturbances, and possibly skin rash. Death due to liver and kidney damage may occur.</p> <p>Inhalation of epoxy resin amine hardener vapours (including polyamines and amine adducts) may produce bronchospasm and</p> |

| | | |
|-------------------------------|---|--|
| | coughing episodes lasting days after cessation of the exposure. Even faint traces of these vapours may trigger an intense reaction in individuals showing "amine asthma". The literature records several instances of systemic intoxications following the use of amines in epoxy resin systems. Repeated or long-term occupational exposure is likely to produce cumulative health effects involving organs or biochemical systems. | |
| CERAMIGRADE REBUILD ACTIVATOR | TOXICITY | IRRITATION |
| | Not Available | Not Available |
| diethylenetriamine | TOXICITY | IRRITATION |
| | Dermal (rabbit) LD50: 1090 mg/kg ^[2] | Eye: adverse effect observed (irritating) ^[1] |
| | Oral (Rat) LD50; 1080 mg/kg ^[2] | Skin (rabbit): 10 mg/24h - SEVERE |
| | | Skin (rabbit):500 mg open moderate |
| | | Skin: adverse effect observed (corrosive) ^[1] |
| phenol | TOXICITY | IRRITATION |
| | Dermal (rabbit) LD50: 850 mg/kg ^[2] | Eye(rabbit): 100 mg rinse - mild |
| | Inhalation(Mouse) LC50; 0.177 mg/L4h ^[2] | Eye(rabbit): 5 mg - SEVERE |
| | Oral (Rat) LD50; 317 mg/kg ^[2] | Skin(rabbit): 500 mg open -SEVERE |
| | | Skin(rabbit): 500 mg/24hr - SEVERE |
| Legend: | 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances | |

| | |
|--|---|
| DIETHYLENETRIAMINE | For alkyl polyamines: The alkyl polyamines cluster consists of organic compounds containing two terminal primary amine groups and at least one secondary amine group. Typically these substances are derivatives of ethylenediamine, propylenediamine or hexanediamine. The molecular weight range for the entire cluster is relatively narrow, ranging from 103 to 232 Acute toxicity of the alkyl polyamines cluster is low to moderate via oral exposure and a moderate to high via dermal exposure. Cluster members have been shown to be eye irritants, skin irritants, and skin sensitizers in experimental animals. |
| PHENOL | The substance is classified by IARC as Group 3: NOT classifiable as to its carcinogenicity to humans. Evidence of carcinogenicity may be inadequate or limited in animal testing. |
| CERAMIGRADE REBUILD ACTIVATOR & DIETHYLENETRIAMINE & PHENOL | Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. |
| CERAMIGRADE REBUILD ACTIVATOR & DIETHYLENETRIAMINE | Allergic reactions which develop in the respiratory passages as bronchial asthma or rhinoconjunctivitis, are mostly the result of reactions of the allergen with specific antibodies of the IgE class and belong in their reaction rates to the manifestation of the immediate type. In addition to the allergen-specific potential for causing respiratory sensitisation, the amount of the allergen, the exposure period and the genetically determined disposition of the exposed person are likely to be decisive. Factors which increase the sensitivity of the mucosa may play a role in predisposing a person to allergy. Particular attention is drawn to so-called atopic diathesis which is characterised by an increased susceptibility to allergic rhinitis, allergic bronchial asthma and atopic eczema (neurodermatitis) which is associated with increased IgE synthesis. Exogenous allergic alveolitis is induced essentially by allergen specific immune-complexes of the IgG type; cell-mediated reactions (T lymphocytes) may be involved. Such allergy is of the delayed type with onset up to four hours following exposure. The following information refers to contact allergens as a group and may not be specific to this product. Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Handling ethyleneamine products is complicated by their tendency to react with other chemicals, such as carbon dioxide in the air, which results in the formation of solid carbamates. Because of their ability to produce chemical burns, skin rashes, and asthma-like symptoms, ethyleneamines also require substantial care in handling. Higher molecular weight ethyleneamines are often handled at elevated temperatures further increasing the possibility of vapor exposure to these compounds. Because of the fragility of eye tissue, almost any eye contact with any ethyleneamine may cause irreparable damage, even blindness. |
| DIETHYLENETRIAMINE & PHENOL | The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. The material may produce severe skin irritation after prolonged or repeated exposure, and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) thickening of the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis. Prolonged contact is unlikely, given the severity of response, but repeated exposures may produce severe ulceration. |

| | | | |
|-----------------------------------|---|--------------------------|---|
| Acute Toxicity | ✓ | Carcinogenicity | ✗ |
| Skin Irritation/Corrosion | ✗ | Reproductivity | ✓ |
| Serious Eye Damage/Irritation | ✗ | STOT - Single Exposure | ✗ |
| Respiratory or Skin sensitisation | ✓ | STOT - Repeated Exposure | ✓ |
| Mutagenicity | ✓ | Aspiration Hazard | ✗ |

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

| CERAMIGRADE REBUILD ACTIVATOR | Endpoint | Test Duration (hr) | Species | Value | Source |
|-------------------------------|---------------|--------------------|---------------|---------------|---------------|
| | Not Available | Not Available | Not Available | Not Available | Not Available |

| diethylenetriamine | Endpoint | Test Duration (hr) | Species | Value | Source |
|--------------------|-----------|--------------------|-------------------------------|-----------|--------|
| | NOEC(ECx) | 504h | Crustacea | 5.6mg/l | 1 |
| | BCF | 1008h | Fish | <0.3-1.7 | 7 |
| | EC50 | 72h | Algae or other aquatic plants | 1164mg/l | 1 |
| | ErC50 | 72h | Algae or other aquatic plants | 1164mg/l | 1 |
| | LC50 | 96h | Fish | 175mg/l | 2 |
| | EC50 | 48h | Crustacea | 16mg/l | 1 |
| | EC50 | 96h | Algae or other aquatic plants | 345.6mg/l | 1 |

| phenol | Endpoint | Test Duration (hr) | Species | Value | Source |
|--------|-----------|--------------------|-------------------------------|-------------------|--------|
| | EC50(ECx) | 36h | Fish | 0.008mg/L | 4 |
| | EC50 | 72h | Algae or other aquatic plants | 48.937-57.407mg/L | 4 |
| | LC50 | 96h | Fish | 2.809-5.554mg/L | 4 |
| | EC50 | 48h | Crustacea | 3.1mg/l | 1 |
| | EC50 | 96h | Algae or other aquatic plants | 10.6mg/L | 4 |

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

Toxic to flora.

Toxic to soil organisms.

Environmental toxicity is a function of the n-octanol/ water partition coefficient (log Pow, log Kow). Phenols with log Pow >7.4 are expected to exhibit low toxicity to aquatic organisms. However the toxicity of phenols with a lower log Pow is variable, ranging from low toxicity (LC50 values >100 mg/l) to highly toxic (LC50 values <1 mg/l) dependent on log Pow, molecular weight and substitutions on the aromatic ring.

For ethyleneamines:

Adsorption of the ethyleneamines correlates closely with both the cation exchange capacity (CEC) and organic content of the soil. Soils with increased CEC and organic content exhibited higher affinities for these amines. This dependence of adsorption on CEC and organic content is most likely due to the strong electrostatic interaction between the positively charged amine and the negatively charged soil surface.

for diethylenetriamine (DETA)

Environmental fate:

DETA is miscible with water and inherently biodegradable.

log Kow : -2.27

The material will leach into ground water and is not expected to be biodegradable. No significant degree of bioaccumulation is anticipated.

Phenol is released into the air and discharged into water from both manufacturing and use. Based on its high water solubility and the fact that it has been detected in rainwater, some phenol may wash out of the atmosphere; however, it is probable that only limited amounts wash out because of the short atmospheric half-life of phenol. During the day, when photochemically produced hydroxyl radical concentrations are highest in the atmosphere, very little atmospheric transport of phenol is likely to occur.

DO NOT discharge into sewer or waterways.

CERAMIGRADE REBUILD ACTIVATOR

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|--------------------|---------------------------|-----------------------------|
| diethylenetriamine | LOW | LOW |
| phenol | LOW (Half-life = 10 days) | LOW (Half-life = 0.95 days) |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|--------------------|------------------|
| diethylenetriamine | LOW (BCF = 1.7) |
| phenol | LOW (BCF = 17.5) |

Mobility in soil

| Ingredient | Mobility |
|--------------------|-------------------|
| diethylenetriamine | LOW (KOC = 87.53) |
| phenol | LOW (KOC = 268) |


SECTION 13 Disposal considerations

Waste treatment methods

| | |
|-------------------------------------|---|
| Product / Packaging disposal | <ul style="list-style-type: none"> ▸ Containers may still present a chemical hazard/ danger when empty. ▸ Return to supplier for reuse/ recycling if possible. <p>Otherwise:</p> <ul style="list-style-type: none"> ▸ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. ▸ DO NOT allow wash water from cleaning or process equipment to enter drains. ▸ It may be necessary to collect all wash water for treatment before disposal. ▸ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▸ Recycle wherever possible. ▸ Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. ▸ Treat and neutralise at an approved treatment plant. |
|-------------------------------------|---|

SECTION 14 Transport information

Labels Required

| | |
|---|----|
|  | |
| Marine Pollutant | NO |

Land transport (UN)

| | | |
|-------------------------------------|---|----------------|
| UN number | 3263 | |
| UN proper shipping name | CORROSIVE SOLID, BASIC, ORGANIC, N.O.S. (contains phenol) | |
| Transport hazard class(es) | Class | 8 |
| | Subrisk | Not Applicable |
| Packing group | II | |
| Environmental hazard | Not Applicable | |
| Special precautions for user | Special provisions | 274 |
| | Limited quantity | 1 kg |

Air transport (ICAO-IATA / DGR)

| | |
|------------------|------|
| UN number | 3263 |
|------------------|------|

CERAMIGRADE REBUILD ACTIVATOR

| | | |
|-------------------------------------|---|----------------|
| UN proper shipping name | Corrosive solid, basic, organic, n.o.s. * (contains phenol) | |
| Transport hazard class(es) | ICAO/IATA Class | 8 |
| | ICAO / IATA Subrisk | Not Applicable |
| | ERG Code | 8L |
| Packing group | II | |
| Environmental hazard | Not Applicable | |
| Special precautions for user | Special provisions | A3 A803 |
| | Cargo Only Packing Instructions | 863 |
| | Cargo Only Maximum Qty / Pack | 50 kg |
| | Passenger and Cargo Packing Instructions | 859 |
| | Passenger and Cargo Maximum Qty / Pack | 15 kg |
| | Passenger and Cargo Limited Quantity Packing Instructions | Y844 |
| | Passenger and Cargo Limited Maximum Qty / Pack | 5 kg |

Sea transport (IMDG-Code / GGVSee)

| | | |
|-------------------------------------|---|----------------|
| UN number | 3263 | |
| UN proper shipping name | CORROSIVE SOLID, BASIC, ORGANIC, N.O.S. (contains phenol) | |
| Transport hazard class(es) | IMDG Class | 8 |
| | IMDG Subrisk | Not Applicable |
| Packing group | II | |
| Environmental hazard | Not Applicable | |
| Special precautions for user | EMS Number | F-A, S-B |
| | Special provisions | 274 |
| | Limited Quantities | 1 kg |

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

| Product name | Group |
|--------------------|---------------|
| diethylenetriamine | Not Available |
| phenol | Not Available |

Transport in bulk in accordance with the ICG Code

| Product name | Ship Type |
|--------------------|---------------|
| diethylenetriamine | Not Available |
| phenol | Not Available |

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

diethylenetriamine is found on the following regulatory lists

Singapore Permissible Exposure Limits of Toxic Substances

phenol is found on the following regulatory lists

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

Singapore Permissible Exposure Limits of Toxic Substances

National Inventory Status

| National Inventory | Status |
|-------------------------------|--------|
| Australia - AIIIC / Australia | Yes |

Continued...

CERAMIGRADE REBUILD ACTIVATOR

| National Inventory | Status |
|-------------------------------|---|
| Non-Industrial Use | |
| Canada - DSL | Yes |
| Canada - NDSL | No (diethylenetriamine; phenol) |
| China - IECSC | Yes |
| Europe - EINEC / ELINCS / NLP | Yes |
| Japan - ENCS | Yes |
| Korea - KECI | Yes |
| New Zealand - NZIoC | Yes |
| Philippines - PICCS | Yes |
| USA - TSCA | Yes |
| Taiwan - TCSI | Yes |
| Mexico - INSQ | Yes |
| Vietnam - NCI | Yes |
| Russia - FBEPH | Yes |
| Legend: | <i>Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.</i> |

SECTION 16 Other information

| | |
|----------------------|------------|
| Revision Date | 19/10/2021 |
| Initial Date | 29/11/2016 |

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

SDS Version Summary

| Version | Date of Update | Sections Updated |
|----------------|-----------------------|---|
| 3.5 | 19/10/2021 | Acute Health (eye), Acute Health (inhaled), Acute Health (skin), Acute Health (swallowed), Chronic Health, Classification, Environmental, Exposure Standard, First Aid (swallowed), Ingredients, Personal Protection (eye), Personal Protection (hands/feet), Spills (major), Spills (minor), Storage (storage incompatibility), Storage (suitable container) |

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorTe, from Chemwatch.

CERAMIGRADE REBUILD BASE

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 659268 base

Version No: 5.12

Safety Data Sheet

Issue Date: 19/10/2021

Print Date: 24/03/2022

L.GHS.SGP.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

| | |
|-------------------------------|--|
| Product name | CERAMIGRADE REBUILD BASE |
| Chemical Name | Not Applicable |
| Synonyms | Product Part Number: 659268 - Ceramigra rebuild base and activator 0.5L, 659300, POLYMER KIT-A, FA |
| Chemical formula | Not Applicable |
| Other means of identification | 659268 base, 659268, 659300, 659300. |

Relevant identified uses of the substance or mixture and uses advised against

| | |
|--------------------------|-----------------------|
| Relevant identified uses | Polymer repair system |
|--------------------------|-----------------------|

Details of the supplier of the safety data sheet

| | | | |
|-------------------------|---|--|---|
| Registered company name | Wilhelmsen Ships Service (S) Pte. Ltd. | Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | 186 Pandan Loop Singapore 128376 Singapore | -----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +65 6395 4545 | Not Available | +31 10 4877 777 |
| Fax | Not Available | Not Available | Not Available |
| Website | http://www.wilhelmsen.com/services/maritime/compan | http://www.wilhelmsen.com | http://www.wilhelmsen.com |
| Email | wss.singapore@wilhelmsen.com | wss.global.sdsinfo@wilhelmsen.com | wss.rotterdam@wilhelmsen.com |

| | |
|-------------------------|---|
| Registered company name | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +31 10 4877 777 |
| Fax | Not Available |
| Website | http://www.wilhelmsen.com |
| Email | wss.rotterdam@wilhelmsen.com |

Emergency telephone number

| | | | |
|----------------------------|------------------|------------------|--------------------------|
| Association / Organisation | 24hrs - Chemtrec | 24hrs - Chemtrec | Dutch nat. poison centre |
|----------------------------|------------------|------------------|--------------------------|

CERAMIGRADE REBUILD BASE


| | | | |
|-----------------------------------|--------------------------|-----------------|-----------------|
| Emergency telephone numbers | +31-10-4877700 | +31-10-4877700 | + 31 88 7558561 |
| Other emergency telephone numbers | +31-10-4877700 | +1 800 424 9300 | + 31 10 4877700 |
| Association / Organisation | Dutch nat. poison centre | | |
| Emergency telephone numbers | + 31 30 274 88 88 | | |
| Other emergency telephone numbers | + 31-10-4877700 | | |

SECTION 2 Hazards identification

Classification of the substance or mixture

| | |
|----------------|---|
| Classification | Hazardous to the Aquatic Environment Long-Term Hazard Category 2, Skin Corrosion/Irritation Category 2, Serious Eye Damage/Eye Irritation Category 2, Sensitisation (Skin) Category 1 |
|----------------|---|

Label elements

| | |
|---------------------|---|
| Hazard pictogram(s) |  |
|---------------------|---|

| | |
|-------------|---------|
| Signal word | Warning |
|-------------|---------|

Hazard statement(s)

| | |
|------|--|
| H411 | Toxic to aquatic life with long lasting effects. |
| H315 | Causes skin irritation. |
| H319 | Causes serious eye irritation. |
| H317 | May cause an allergic skin reaction. |

Precautionary statement(s) Prevention

| | |
|------|--|
| P280 | Wear protective gloves, protective clothing, eye protection and face protection. |
| P261 | Avoid breathing dust/fumes. |
| P273 | Avoid release to the environment. |

Precautionary statement(s) Response

| | |
|----------------|--|
| P302+P352 | IF ON SKIN: Wash with plenty of 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. |
| P333+P313 | If skin irritation or rash occurs: Get medical advice/attention. |

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

| | |
|------|--|
| P501 | Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation. |
|------|--|

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

| CAS No | %[weight] | Name |
|-------------|-----------|---|
| 25068-38-6* | >90 | <u>BISPHENOL A- (EPICHLORHYDRIN) (REACTION PRODUCT)</u> |

Continued...

CERAMIGRADE REBUILD BASE

| CAS No | %[weight] | Name |
|---------------|-----------|---------------------------------|
| Not Available | <9 | <u>Non-hazardous ingredient</u> |

SECTION 4 First aid measures

Description of first aid measures

| | |
|---------------------|---|
| Eye Contact | <p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▶ Wash out immediately with fresh running water. ▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▶ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. |
| Skin Contact | <p>If skin contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately remove all contaminated clothing, including footwear. ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation. |
| Inhalation | <ul style="list-style-type: none"> ▶ If fumes, aerosols or combustion products are inhaled remove from contaminated area. ▶ Other measures are usually unnecessary. |
| Ingestion | <ul style="list-style-type: none"> ▶ Immediately give a glass of water. ▶ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor. |

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 Firefighting measures

Extinguishing media

- ▶ Foam.
- ▶ Dry chemical powder.
- ▶ BCF (where regulations permit).

Special hazards arising from the substrate or mixture

| | |
|-----------------------------|-------------|
| Fire Incompatibility | None known. |
|-----------------------------|-------------|

Advice for firefighters

| | |
|------------------------------|---|
| Fire Fighting | <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus plus protective gloves. ▶ Prevent, by any means available, spillage from entering drains or water courses. |
| Fire/Explosion Hazard | <p>Combustible. Will burn if ignited. May emit corrosive fumes.</p> |

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

| | |
|---------------------|---|
| Minor Spills | <p>Environmental hazard - contain spillage.</p> <ul style="list-style-type: none"> ▶ Clean up all spills immediately. ▶ Avoid breathing dust and contact with skin and eyes. ▶ Wear protective clothing, gloves, safety glasses and dust respirator. |
| Major Spills | <p>Environmental hazard - contain spillage. Moderate hazard.</p> <ul style="list-style-type: none"> ▶ CAUTION: Advise personnel in area. ▶ Alert Emergency Services and tell them location and nature of hazard. |

Personal Protective Equipment advice is contained in Section 8 of the SDS.

CERAMIGRADE REBUILD BASE

SECTION 7 Handling and storage

Precautions for safe handling

| | |
|--------------------------|---|
| Safe handling | <ul style="list-style-type: none"> ▶ Avoid all personal contact, including inhalation. ▶ Wear protective clothing when risk of exposure occurs. ▶ Use in a well-ventilated area. |
| Other information | <ul style="list-style-type: none"> ▶ Store in original containers. ▶ Keep containers securely sealed. ▶ Store in a cool, dry area protected from environmental extremes. |

Conditions for safe storage, including any incompatibilities

| | |
|--------------------------------|---|
| Suitable container | <ul style="list-style-type: none"> ▶ Lined metal can, lined metal pail/ can. ▶ Plastic pail. ▶ Polyliner drum. |
| Storage incompatibility | None known |



X — Must not be stored together
O — May be stored together with specific precautions
+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

| Source | Ingredient | Material name | TWA | STEL | Peak | Notes |
|---|--|-----------------------|----------|---------------|---------------|---------------|
| Singapore Permissible Exposure Limits of Toxic Substances | BISPHENOL A- (EPICHLORHYDRIN) {REACTION PRODUCT} | Nuisance particulates | 10 mg/m3 | Not Available | Not Available | Not Available |

Emergency Limits

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|--|----------|-----------|-------------|
| BISPHENOL A- (EPICHLORHYDRIN) {REACTION PRODUCT} | 90 mg/m3 | 990 mg/m3 | 5,900 mg/m3 |

| Ingredient | Original IDLH | Revised IDLH |
|--|---------------|---------------|
| BISPHENOL A- (EPICHLORHYDRIN) {REACTION PRODUCT} | Not Available | Not Available |
| Non-hazardous ingredient | Not Available | Not Available |

MATERIAL DATA

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more.


It is the goal of the ACGIH (and other Agencies) to recommend TLVs (or their equivalent) for all substances for which there is evidence of health effects at airborne concentrations encountered in the workplace.

At this time no TLV has been established, even though this material may produce adverse health effects (as evidenced in animal experiments or clinical experience). Airborne concentrations must be maintained as low as is practically possible and occupational exposure must be kept to a minimum.

Exposure controls

| | |
|--------------------------------|--|
| Appropriate engineering | Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed |
|--------------------------------|--|

CERAMIGRADE REBUILD BASE

| | |
|--------------------------------|---|
| controls | <p>engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.</p> <p>The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> |
| Personal protection |  |
| Eye and face protection | <ul style="list-style-type: none"> ▶ Safety glasses with side shields. ▶ Chemical goggles. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. |
| Skin protection | See Hand protection below |
| Hands/feet protection | <p>NOTE:</p> <ul style="list-style-type: none"> ▶ The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact. ▶ Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed. <p>The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.</p> <p>The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.</p> <p>Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present.</p> <ul style="list-style-type: none"> ▶ polychloroprene. ▶ nitrile rubber. |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none"> ▶ Overalls. ▶ P.V.C apron. ▶ Barrier cream. |

Respiratory protection

Particulate. (AS/NZS 1716 & 1715, EN 143:2000 & 149:001, ANSI Z88 or national equivalent)

| Required Minimum Protection Factor | Half-Face Respirator | Full-Face Respirator | Powered Air Respirator |
|------------------------------------|----------------------|----------------------|------------------------|
| up to 10 x ES | P1 Air-line* | - - | PAPR-P1 - |
| up to 50 x ES | Air-line** | P2 | PAPR-P2 |
| up to 100 x ES | - | P3 | - |
| | | Air-line* | - |
| 100+ x ES | - | Air-line** | PAPR-P3 |

* - Negative pressure demand ** - Continuous flow

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO₂), G = Agricultural chemicals, K = Ammonia(NH₃), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
- Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory protection. These may be government mandated or vendor recommended.
- Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
- Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU)
- Use approved positive flow mask if significant quantities of dust becomes airborne.
- Try to avoid creating dust conditions.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

| | |
|-------------------|------------|
| Appearance | Blue paste |
|-------------------|------------|

CERAMIGRADE REBUILD BASE

| | | | |
|--|------------------------|---|----------------|
| Physical state | Solid | Relative density (Water = 1) | 1.8 |
| Odour | Not Available | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | Not Available |
| pH (as supplied) | Not Available | Decomposition temperature | Not Available |
| Melting point / freezing point (°C) | Not Available | Viscosity (cSt) | Not Available |
| Initial boiling point and boiling range (°C) | >200 | Molecular weight (g/mol) | Not Available |
| Flash point (°C) | 245 | Taste | Not Available |
| Evaporation rate | Not Available BuAC = 1 | Explosive properties | Not Available |
| Flammability | Not Applicable | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | Not Available | Surface Tension (dyn/cm or mN/m) | Not Applicable |
| Lower Explosive Limit (%) | Not Available | Volatile Component (%vol) | Not Available |
| Vapour pressure (kPa) | Not Available | Gas group | Not Available |
| Solubility in water | Not Available | pH as a solution (Not Available%) | Not Available |
| Vapour density (Air = 1) | Not Available | VOC g/L | Not Available |

SECTION 10 Stability and reactivity

| | |
|------------------------------------|---|
| Reactivity | See section 7 |
| Chemical stability | Product is considered stable and hazardous polymerisation will not occur. |
| Possibility of hazardous reactions | See section 7 |
| Conditions to avoid | See section 7 |
| Incompatible materials | See section 7 |
| Hazardous decomposition products | See section 5 |

SECTION 11 Toxicological information

Information on toxicological effects

| | |
|--------------|--|
| Inhaled | The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting. |
| Ingestion | The material has NOT been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence. The material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g liver, kidney) damage is evident. |
| Skin Contact | Evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis. The material may accentuate any pre-existing dermatitis condition Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions. |
| Eye | Evidence exists, or practical experience predicts, that the material may cause eye irritation in a substantial number of individuals and/or may produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur. |
| Chronic | Practical experience shows that skin contact with the material is capable either of inducing a sensitisation reaction in a substantial number of individuals, and/or of producing a positive response in experimental animals. Substances that can cause occupational asthma (also known as asthmagens and respiratory sensitisers) can induce a state of |

| | | |
|--|--|-------------------|
| | specific airway hyper-responsiveness via an immunological, irritant or other mechanism. Once the airways have become hyper-responsive, further exposure to the substance, sometimes even to tiny quantities, may cause respiratory symptoms. | |
| CERAMIGRADE REBUILD BASE | TOXICITY | IRRITATION |
| | Not Available | Not Available |
| BISPHENOL A-(EPICHLORHYDRIN) {REACTION PRODUCT} | TOXICITY | IRRITATION |
| | dermal (rat) LD50: >1200 mg/kg ^[2] Oral (Mouse) LD50; >500 mg/kg ^[2] | Not Available |
| Non-hazardous ingredient | TOXICITY | IRRITATION |
| | Not Available | Not Available |
| Legend: | 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances | |

| | |
|---|---|
| BISPHENOL A-(EPICHLORHYDRIN) {REACTION PRODUCT} | <p>The chemical structure of hydroxylated diphenylalkanes or bisphenols consists of two phenolic rings joined together through a bridging carbon. This class of endocrine disruptors that mimic oestrogens is widely used in industry, particularly in plastics. Bisphenol A (BPA) and some related compounds exhibit oestrogenic activity in human breast cancer cell line MCF-7, but there were remarkable differences in activity. Several derivatives of BPA exhibited significant thyroid hormonal activity towards rat pituitary cell line GH3, which releases growth hormone in a thyroid hormone-dependent manner.</p> <p>The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.</p> <p>No significant acute toxicological data identified in literature search. CAUTION: Epoxy resin products may contain sensitising glycidyl ethers, even when these are not mentioned in the information given for the product. The likely occurrence of these is greatly reduced in solid grades of the resin.</p> |
| CERAMIGRADE REBUILD BASE & BISPHENOL A-(EPICHLORHYDRIN) {REACTION PRODUCT} | <p>The following information refers to contact allergens as a group and may not be specific to this product. Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type.</p> |

| | | | |
|-----------------------------------|---|--------------------------|---|
| Acute Toxicity | ✗ | Carcinogenicity | ✗ |
| Skin Irritation/Corrosion | ✓ | Reproductivity | ✗ |
| Serious Eye Damage/Irritation | ✓ | STOT - Single Exposure | ✗ |
| Respiratory or Skin sensitisation | ✓ | STOT - Repeated Exposure | ✗ |
| Mutagenicity | ✗ | Aspiration Hazard | ✗ |

Legend: ✗ – Data either not available or does not fill the criteria for classification
✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

| CERAMIGRADE REBUILD BASE | Endpoint | Test Duration (hr) | Species | Value | Source |
|--|--|--------------------|---------------|---------------|---------------|
| | Not Available | Not Available | Not Available | Not Available | Not Available |
| BISPHENOL A-(EPICHLORHYDRIN) {REACTION PRODUCT} | Endpoint | Test Duration (hr) | Species | Value | Source |
| | EC50 | 48h | Crustacea | ~2mg/l | 2 |
| | EC50(ECx) | 48h | Crustacea | ~2mg/l | 2 |
| Non-hazardous ingredient | Endpoint | Test Duration (hr) | Species | Value | Source |
| | Not Available | Not Available | Not Available | Not Available | Not Available |
| Legend: | Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data | | | | |

CERAMIGRADE REBUILD BASE

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.
Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|------------|---------------------------------------|---------------------------------------|
| | No Data available for all ingredients | No Data available for all ingredients |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|------------|---------------------------------------|
| | No Data available for all ingredients |

Mobility in soil

| Ingredient | Mobility |
|------------|---------------------------------------|
| | No Data available for all ingredients |


SECTION 13 Disposal considerations

Waste treatment methods

| | |
|-------------------------------------|--|
| Product / Packaging disposal | <ul style="list-style-type: none"> ▶ Containers may still present a chemical hazard/ danger when empty. ▶ Return to supplier for reuse/ recycling if possible. <p>Otherwise:</p> <ul style="list-style-type: none"> ▶ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. ▶ Recycle wherever possible. ▶ Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. ▶ Dispose of by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or Incineration in a licensed apparatus (after admixture with suitable combustible material) ▶ Decontaminate empty containers. |
|-------------------------------------|--|

SECTION 14 Transport information

Labels Required

| | |
|-------------------------|---|
| Marine Pollutant |  |
|-------------------------|---|

Land transport (UN): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

| Product name | Group |
|--|---------------|
| BISPHENOL A- (EPICHLORHYDRIN) {REACTION PRODUCT} | Not Available |
| Non-hazardous ingredient | Not Available |

Transport in bulk in accordance with the ICG Code

| Product name | Ship Type |
|--------------|-----------|
|--------------|-----------|

CERAMIGRADE REBUILD BASE

| Product name | Ship Type |
|--|---------------|
| BISPHENOL A- (EPICHLORHYDRIN) {REACTION PRODUCT} | Not Available |
| Non-hazardous ingredient | Not Available |

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

BISPHENOL A- (EPICHLORHYDRIN) {REACTION PRODUCT} is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List

Singapore Permissible Exposure Limits of Toxic Substances

International WHO List of Proposed Occupational Exposure Limit (OEL)
Values for Manufactured Nanomaterials (MNMS)

Non-hazardous ingredient is found on the following regulatory lists

Not Applicable

National Inventory Status

| National Inventory | Status |
|---|---|
| Australia - AIIC / Australia Non-Industrial Use | Yes |
| Canada - DSL | Yes |
| Canada - NDSL | No (BISPHENOL A- (EPICHLORHYDRIN) {REACTION PRODUCT}) |
| China - IECSC | Yes |
| Europe - EINEC / ELINCS / NLP | Yes |
| Japan - ENCS | Yes |
| Korea - KECI | Yes |
| New Zealand - NZIoC | Yes |
| Philippines - PICCS | Yes |
| USA - TSCA | Yes |
| Taiwan - TCSI | Yes |
| Mexico - INSQ | No (BISPHENOL A- (EPICHLORHYDRIN) {REACTION PRODUCT}) |
| Vietnam - NCI | Yes |
| Russia - FBEPH | Yes |
| Legend: | <i>Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.</i> |

SECTION 16 Other information

| | |
|----------------------|------------|
| Revision Date | 19/10/2021 |
| Initial Date | 12/05/2017 |

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

SDS Version Summary

| Version | Date of Update | Sections Updated |
|---------|----------------|----------------------------------|
| 4.12 | 19/10/2021 | Ingredients, Physical Properties |

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks

Continued...

in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

CHLORIDE INDICATOR MBC1

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 777050

Version No: 6.10

Safety Data Sheet

Issue Date: 23/04/2021

Print Date: 24/03/2022

L.GHS.SGP.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

| | |
|-------------------------------|---|
| Product name | CHLORIDE INDICATOR MBC1 |
| Chemical Name | Not Applicable |
| Synonyms | KS140 - BC1 - Potassium Chromate Indicator, mBC1, Part of: BOILER PLUS TEST KIT MO380, MOTOR SHIP TEST KIT MO246A, CHLORIDE TITRATION PACK M251 |
| Proper shipping name | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains potassium chromate) |
| Chemical formula | Not Applicable |
| Other means of identification | 777050, 1346536, 777056, 777066, 777100 |

Relevant identified uses of the substance or mixture and uses advised against

| | |
|--------------------------|---|
| Relevant identified uses | Use according to manufacturer's directions. |
|--------------------------|---|

Details of the supplier of the safety data sheet

| | | | |
|-------------------------|---|---|--|
| Registered company name | Wilhelmsen Ships Service (S) Pte. Ltd. | Wilhelmsen Ships Service AS* Central Warehouse | Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen |
| Address | 186 Pandan Loop Singapore 128376 Singapore | Willem Barentszstraat 50 Rotterdam Netherlands | -----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway |
| Telephone | +65 6395 4545 | +31 10 4877 777 | Not Available |
| Fax | Not Available | Not Available | Not Available |
| Website | http://www.wilhelmsen.com/services/maritime/compan | http://www.wilhelmsen.com | http://www.wilhelmsen.com |
| Email | wss.singapore@wilhelmsen.com | wss.rotterdam@wilhelmsen.com | wss.global.sdsinfo@wilhelmsen.com |

| | |
|-------------------------|---|
| Registered company name | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +31 10 4877 777 |
| Fax | Not Available |
| Website | http://www.wilhelmsen.com |
| Email | wss.rotterdam@wilhelmsen.com |

Emergency telephone number

CHLORIDE INDICATOR MBC1

| Association / Organisation | 24hrs - Chemtrec | Dutch nat. poison centre | 24hrs - Chemtrec |
|-----------------------------------|------------------|--------------------------|------------------|
| Emergency telephone numbers | +31-10-4877700 | + 31 88 7558561 | +31-10-4877700 |
| Other emergency telephone numbers | +31-10-4877700 | + 31 10 4877700 | +1 800 424 9300 |

| Association / Organisation | Dutch nat. poison centre |
|-----------------------------------|--------------------------|
| Emergency telephone numbers | + 31 30 274 88 88 |
| Other emergency telephone numbers | + 31-10-4877700 |

SECTION 2 Hazards identification

Classification of the substance or mixture

| | |
|----------------|--|
| Classification | Carcinogenicity Category 1B, Hazardous to the Aquatic Environment Long-Term Hazard Category 2, Germ Cell Mutagenicity Category 1B, Sensitisation (Skin) Category 1 |
|----------------|--|

Label elements

| | |
|---------------------|--|
| Hazard pictogram(s) |  |
|---------------------|--|

| | |
|-------------|--------|
| Signal word | Danger |
|-------------|--------|

Hazard statement(s)

| | |
|------|--|
| H350 | May cause cancer. |
| H411 | Toxic to aquatic life with long lasting effects. |
| H340 | May cause genetic defects. |
| H317 | May cause an allergic skin reaction. |

Precautionary statement(s) Prevention

| | |
|------|---|
| P201 | Obtain special instructions before use. |
| P280 | Wear protective gloves and protective clothing. |
| P261 | Avoid breathing mist/vapours/spray. |

Precautionary statement(s) Response

| | |
|-----------|--|
| P308+P313 | IF exposed or concerned: Get medical advice/ attention. |
| P302+P352 | IF ON SKIN: Wash with plenty of water. |
| P333+P313 | If skin irritation or rash occurs: Get medical advice/attention. |

Precautionary statement(s) Storage

| | |
|------|------------------|
| P405 | Store locked up. |
|------|------------------|

Precautionary statement(s) Disposal

| | |
|------|--|
| P501 | Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation. |
|------|--|

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

| CAS No | %[weight] | Name |
|---------------|-----------|---------------------------------|
| 7789-00-6 | <5 | <u>potassium chromate</u> |
| Not Available | >94 | <u>Non-hazardous ingredient</u> |

SECTION 4 First aid measures

Description of first aid measures

| | |
|---------------------|--|
| Eye Contact | <p>If this product comes in contact with eyes:</p> <ul style="list-style-type: none"> ▶ Wash out immediately with water. ▶ If irritation continues, seek medical attention. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. |
| Skin Contact | <p>If skin contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately remove all contaminated clothing, including footwear. ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation. |
| Inhalation | <ul style="list-style-type: none"> ▶ If fumes, aerosols or combustion products are inhaled remove from contaminated area. ▶ Other measures are usually unnecessary. |
| Ingestion | <ul style="list-style-type: none"> ▶ Immediately give a glass of water. ▶ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor. |

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 Firefighting measures

Extinguishing media

- ▶ Jets of water.
- ▶ Water spray or fog.
- ▶ Foam.

Special hazards arising from the substrate or mixture

| | |
|-----------------------------|-------------|
| Fire Incompatibility | None known. |
|-----------------------------|-------------|

Advice for firefighters

| | |
|------------------------------|--|
| Fire Fighting | <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus plus protective gloves in the event of a fire. ▶ Prevent, by any means available, spillage from entering drains or water courses. |
| Fire/Explosion Hazard | <ul style="list-style-type: none"> ▶ Non combustible. ▶ Not considered a significant fire risk, however containers may burn. <p>Decomposition may produce toxic fumes of:</p> <p>metal oxides</p> <p>Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions.</p> |

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

| | |
|---------------------|--|
| Minor Spills | <p>Environmental hazard - contain spillage.</p> <ul style="list-style-type: none"> ▶ Clean up all spills immediately. ▶ Avoid breathing vapours and contact with skin and eyes. ▶ Control personal contact with the substance, by using protective equipment. |
| Major Spills | <p>Environmental hazard - contain spillage.</p> <p>Minor hazard.</p> <ul style="list-style-type: none"> ▶ Clear area of personnel. |

CHLORIDE INDICATOR MBC1

▶ Alert Fire Brigade and tell them location and nature of hazard.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

| | |
|--------------------------|--|
| Safe handling | <p>Contains low boiling substance: Storage in sealed containers may result in pressure buildup causing violent rupture of containers not rated appropriately.</p> <ul style="list-style-type: none"> ▶ Check for bulging containers. ▶ Vent periodically ▶ Always release caps or seals slowly to ensure slow dissipation of vapours ▶ Avoid all personal contact, including inhalation. ▶ Wear protective clothing when risk of exposure occurs. ▶ Use in a well-ventilated area. ▶ DO NOT allow clothing wet with material to stay in contact with skin |
| Other information | <ul style="list-style-type: none"> ▶ Store in original containers. ▶ Keep containers securely sealed. ▶ Store in a cool, dry, well-ventilated area. |

Conditions for safe storage, including any incompatibilities

| | |
|--------------------------------|---|
| Suitable container | <ul style="list-style-type: none"> ▶ Polyethylene or polypropylene container. ▶ Packing as recommended by manufacturer. ▶ Check all containers are clearly labelled and free from leaks. |
| Storage incompatibility | None known |



X — Must not be stored together
O — May be stored together with specific preventions
+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

| Source | Ingredient | Material name | TWA | STEL | Peak | Notes |
|---|--------------------|---|------------|---------------|---------------|---------------|
| Singapore Permissible Exposure Limits of Toxic Substances | potassium chromate | Chromium, metal and inorganic compounds, as Cr: Water-soluble Cr VI compounds | 0.05 mg/m3 | Not Available | Not Available | Not Available |

Emergency Limits


| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|--------------------|------------|-----------|----------|
| potassium chromate | 0.56 mg/m3 | 9.7 mg/m3 | 58 mg/m3 |

| Ingredient | Original IDLH | Revised IDLH |
|--------------------------|---------------|---------------|
| potassium chromate | Not Available | Not Available |
| Non-hazardous ingredient | Not Available | Not Available |

MATERIAL DATA

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more.

Exposure controls

| | |
|---|--|
| Appropriate engineering controls | Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. |
| Personal protection |  |
| Eye and face protection | <ul style="list-style-type: none"> ▸ Safety glasses with side shields. ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. |
| Skin protection | See Hand protection below |
| Hands/feet protection | <ul style="list-style-type: none"> ▸ Wear chemical protective gloves, e.g. PVC. ▸ Wear safety footwear or safety gumboots, e.g. Rubber <p>The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.</p> <p>The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.</p> |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none"> ▸ Overalls. ▸ P.V.C apron. ▸ Barrier cream. |

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

| | | | |
|---|-------------------------------------|--|---------------|
| Appearance | Liquid, yellow, miscible with water | | |
| Physical state | Liquid | Relative density (Water = 1) | Not Available |
| Odour | Not Available | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | Not Available |
| pH (as supplied) | Not Available | Decomposition temperature | 33.89 |
| Melting point / freezing point (°C) | Not Available | Viscosity (cSt) | Not Available |
| Initial boiling point and boiling range (°C) | 1.67 - 3.89 | Molecular weight (g/mol) | Not Available |
| Flash point (°C) | Not Available | Taste | Not Available |
| Evaporation rate | Not Available BuAC = 1 | Explosive properties | Not Available |
| Flammability | Not Available | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | Not Available | Surface Tension (dyn/cm or mN/m) | Not Available |
| Lower Explosive Limit (%) | Not Available | Volatile Component (%vol) | Not Available |
| Vapour pressure (kPa) | Not Available | Gas group | Not Available |
| Solubility in water | Miscible | pH as a solution (Not Available%) | Not Available |
| Vapour density (Air = 1) | Not Available | VOC g/L | Not Available |

SECTION 10 Stability and reactivity

| | |
|-------------------|---------------|
| Reactivity | See section 7 |
|-------------------|---------------|

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| | |
|---|--|
| Chemical stability | <ul style="list-style-type: none"> ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur. |
| Possibility of hazardous reactions | See section 7 |
| Conditions to avoid | See section 7 |
| Incompatible materials | See section 7 |
| Hazardous decomposition products | See section 5 |

SECTION 11 Toxicological information

Information on toxicological effects

| | |
|---------------------|--|
| Inhaled | <p>The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.</p> <p>Material is highly volatile and may quickly form a concentrated atmosphere in confined or unventilated areas. The vapour may displace and replace air in breathing zone, acting as a simple asphyxiant. This may happen with little warning of overexposure. The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.</p> |
| Ingestion | The material has NOT been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence. The material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g liver, kidney) damage is evident. |
| Skin Contact | <p>Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.</p> <p>Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p> |
| Eye | Although the liquid is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn). |
| Chronic | On the basis of epidemiological data, it has been concluded that prolonged inhalation of the material, in an occupational setting, may produce cancer in humans. |

| | | |
|---------------------------------|---|-----------------------------------|
| CHLORIDE INDICATOR MBC1 | TOXICITY | IRRITATION |
| | Not Available | Not Available |
| potassium chromate | TOXICITY | IRRITATION |
| | Dermal (rabbit) LD50: 960 mg/kg ^[1] | Skin (human): Highly irritating & |
| | Inhalation(Rat) LC50; 0.083 mg/L4h ^[1] | |
| | Oral (Rat) LD50; 52 mg/kg ^[1] | |
| Non-hazardous ingredient | TOXICITY | IRRITATION |
| | Not Available | Not Available |

Legend: 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances

| | |
|---------------------------|--|
| POTASSIUM CHROMATE | <p>Oral (rat) LD50: 50-500 mg/kg corrosive [CCINFO-Baker]</p> <p>The following information refers to contact allergens as a group and may not be specific to this product. Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type.</p> <p>Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high</p> |
|---------------------------|--|

CHLORIDE INDICATOR MBC1

levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant.

| | | | |
|--|---|---------------------------------|---|
| Acute Toxicity | ✗ | Carcinogenicity | ✓ |
| Skin Irritation/Corrosion | ✗ | Reproductivity | ✗ |
| Serious Eye Damage/Irritation | ✗ | STOT - Single Exposure | ✗ |
| Respiratory or Skin sensitisation | ✓ | STOT - Repeated Exposure | ✗ |
| Mutagenicity | ✓ | Aspiration Hazard | ✗ |

Legend: ✗ – Data either not available or does not fill the criteria for classification
✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

| CHLORIDE INDICATOR MBC1 | Endpoint | Test Duration (hr) | Species | Value | Source |
|----------------------------|---------------|--------------------|---------------|---------------|---------------|
| | Not Available | Not Available | Not Available | Not Available | Not Available |

| potassium chromate | Endpoint | Test Duration (hr) | Species | Value | Source |
|--------------------|-----------|--------------------|-------------------------------|---------------|--------|
| | NOEC(ECx) | 336h | Algae or other aquatic plants | <0.002mg/L | 4 |
| | LC50 | 96h | Fish | 16.16mg/l | 4 |
| | EC50 | 48h | Crustacea | 7.16-11.3mg/l | 4 |
| | EC50 | 96h | Algae or other aquatic plants | 0.332mg/l | 4 |

| Non-hazardous ingredient | Endpoint | Test Duration (hr) | Species | Value | Source |
|--------------------------|---------------|--------------------|---------------|---------------|---------------|
| | Not Available | Not Available | Not Available | Not Available | Not Available |

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

Toxic to aquatic organisms.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

Metal-containing inorganic substances generally have negligible vapour pressure and are not expected to partition to air. Once released to surface waters and moist soils their fate depends on solubility and dissociation in water. Environmental processes (such as oxidation and the presence of acids or bases) may transform insoluble metals to more soluble ionic forms.

Chromium in the oxidation state +3 (the trivalent form) is poorly absorbed by cells found in microorganisms, plants and animals. Chromate anions (CrO4-, oxidation state +6, the hexavalent form) are readily transported into cells and toxicity is closely linked to the higher oxidation state.

Chromium Ecotoxicology:

Toxicity in Aquatic Organisms:

Chromium is harmful to aquatic organisms in very low concentrations.

Since chromium compounds cannot volatilize from water, transport of chromium from water to the atmosphere is not likely, except by transport in windblown sea sprays. Most of the chromium released into water will ultimately be deposited in the sediment. A very small percentage of chromium can be present in water in both soluble and insoluble forms.

DO NOT discharge into sewer or waterways.

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|------------|---------------------------------------|---------------------------------------|
| | No Data available for all ingredients | No Data available for all ingredients |

Bioaccumulative potential

CHLORIDE INDICATOR MBC1

| Ingredient | Bioaccumulation |
|------------|---------------------------------------|
| | No Data available for all ingredients |

Mobility in soil

| Ingredient | Mobility |
|------------|---------------------------------------|
| | No Data available for all ingredients |



SECTION 13 Disposal considerations

Waste treatment methods

| | |
|-------------------------------------|--|
| Product / Packaging disposal | <p>Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.</p> <ul style="list-style-type: none"> ▶ DO NOT allow wash water from cleaning or process equipment to enter drains. ▶ It may be necessary to collect all wash water for treatment before disposal. ▶ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▶ Recycle wherever possible or consult manufacturer for recycling options. ▶ Consult State Land Waste Management Authority for disposal. ▶ Bury residue in an authorised landfill. |
|-------------------------------------|--|

SECTION 14 Transport information

Labels Required

| | |
|-------------------------|---|
| |  |
| Marine Pollutant |  |

Land transport (UN)

| | | |
|-------------------------------------|---|--------------------|
| UN number | 3082 | |
| UN proper shipping name | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains potassium chromate) | |
| Transport hazard class(es) | Class | 9 |
| | Subrisk | Not Applicable |
| Packing group | III | |
| Environmental hazard | Environmentally hazardous | |
| Special precautions for user | Special provisions | 274; 331; 335; 375 |
| | Limited quantity | 5 L |

Air transport (ICAO-IATA / DGR)

| | | |
|-------------------------------------|---|--------------------|
| UN number | 3082 | |
| UN proper shipping name | Environmentally hazardous substance, liquid, n.o.s. * (contains potassium chromate) | |
| Transport hazard class(es) | ICAO/IATA Class | 9 |
| | ICAO / IATA Subrisk | Not Applicable |
| | ERG Code | 9L |
| Packing group | III | |
| Environmental hazard | Environmentally hazardous | |
| Special precautions for user | Special provisions | A97 A158 A197 A215 |
| | Cargo Only Packing Instructions | 964 |

| | |
|---|---------|
| Cargo Only Maximum Qty / Pack | 450 L |
| Passenger and Cargo Packing Instructions | 964 |
| Passenger and Cargo Maximum Qty / Pack | 450 L |
| Passenger and Cargo Limited Quantity Packing Instructions | Y964 |
| Passenger and Cargo Limited Maximum Qty / Pack | 30 kg G |

Sea transport (IMDG-Code / GGVSee)

| | | |
|-------------------------------------|---|----------------|
| UN number | 3082 | |
| UN proper shipping name | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains potassium chromate) | |
| Transport hazard class(es) | IMDG Class | 9 |
| | IMDG Subrisk | Not Applicable |
| Packing group | III | |
| Environmental hazard | Marine Pollutant | |
| Special precautions for user | EMS Number | F-A, S-F |
| | Special provisions | 274 335 969 |
| | Limited Quantities | 5 L |

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

| Product name | Group |
|--------------------------|---------------|
| potassium chromate | Not Available |
| Non-hazardous ingredient | Not Available |

Transport in bulk in accordance with the ICG Code

| Product name | Ship Type |
|--------------------------|---------------|
| potassium chromate | Not Available |
| Non-hazardous ingredient | Not Available |

SECTION 15 Regulatory information**Safety, health and environmental regulations / legislation specific for the substance or mixture****potassium chromate is found on the following regulatory lists**

Chemical Footprint Project - Chemicals of High Concern List
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 1: Carcinogenic to humans
Singapore Permissible Exposure Limits of Toxic Substances

Non-hazardous ingredient is found on the following regulatory lists

Not Applicable

National Inventory Status

| National Inventory | Status |
|---|-------------------------|
| Australia - AIIC / Australia Non-Industrial Use | Yes |
| Canada - DSL | Yes |
| Canada - NDSL | No (potassium chromate) |
| China - IECSC | Yes |
| Europe - EINEC / ELINCS / NLP | Yes |
| Japan - ENCS | Yes |
| Korea - KECI | Yes |

| National Inventory | Status |
|---------------------|--------|
| New Zealand - NZIoC | Yes |
| Philippines - PICCS | Yes |
| USA - TSCA | Yes |
| Taiwan - TCSI | Yes |
| Mexico - INSQ | Yes |
| Vietnam - NCI | Yes |
| Russia - FBEPH | Yes |

Legend:
Yes = All CAS declared ingredients are on the inventory
No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.

SECTION 16 Other information

| | |
|----------------------|------------|
| Revision Date | 23/04/2021 |
| Initial Date | 19/04/2017 |

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

SDS Version Summary

| Version | Date of Update | Sections Updated |
|---------|----------------|------------------|
| 5.10 | 23/04/2021 | Ingredients |

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

CHLORIDE PHOTOMETER MO401 Reagent A

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 777179

Version No: 3.4

Safety Data Sheet

Issue Date: 21/08/2019

Print Date: 24/03/2022

L.GHS.SGP.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

| | |
|--------------------------------------|--|
| Product name | CHLORIDE PHOTOMETER MO401 Reagent A |
| Chemical Name | Not Applicable |
| Synonyms | Part A of Product Number: 777179 |
| Proper shipping name | FLAMMABLE LIQUID, TOXIC, N.O.S. (METHANOL; MERCURY (II) THIOCYANATE) |
| Chemical formula | Not Applicable |
| Other means of identification | 777179, 1346537 |

Relevant identified uses of the substance or mixture and uses advised against

| | |
|---------------------------------|---|
| Relevant identified uses | Use according to manufacturer's directions. |
|---------------------------------|---|

Details of the supplier of the safety data sheet

| | | | |
|--------------------------------|---|---|---|
| Registered company name | Wilhelmsen Ships Service (S) Pte. Ltd. | Wilhelmsen Ships Service AS* Central Warehouse | Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen |
| Address | 186 Pandan Loop Singapore 128376 Singapore | Willem Barentszstraat 50 Rotterdam Netherlands | -----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway |
| Telephone | +65 6395 4545 | +31 10 4877 777 | Not Available |
| Fax | Not Available | Not Available | Not Available |
| Website | http://www.wilhelmsen.com/services/maritime/compan | http://www.wilhelmsen.com | http://www.wilhelmsen.com |
| Email | wss.singapore@wilhelmsen.com | wss.rotterdam@wilhelmsen.com | wss.global.sdsinfo@wilhelmsen.com |

| | |
|--------------------------------|---|
| Registered company name | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +31 10 4877 777 |
| Fax | Not Available |
| Website | http://www.wilhelmsen.com |
| Email | wss.rotterdam@wilhelmsen.com |

Emergency telephone number

CHLORIDE PHOTOMETER MO401 Reagent A

| Association / Organisation | 24hrs - Chemtrec | Dutch nat. poison centre | 24hrs - Chemtrec |
|-----------------------------------|------------------|--------------------------|------------------|
| Emergency telephone numbers | +31-10-4877700 | + 31 88 7558561 | +31-10-4877700 |
| Other emergency telephone numbers | +31-10-4877700 | + 31 10 4877700 | +1 800 424 9300 |

| Association / Organisation | Dutch nat. poison centre |
|-----------------------------------|--------------------------|
| Emergency telephone numbers | + 31 30 274 88 88 |
| Other emergency telephone numbers | + 31-10-4877700 |

SECTION 2 Hazards identification

Classification of the substance or mixture

| | |
|----------------|---|
| Classification | Acute Toxicity (Dermal) Category 3, Specific Target Organ Toxicity - Single Exposure Category 1, Flammable Liquids Category 2, Acute Toxicity (Inhalation) Category 3, Acute Toxicity (Oral) Category 3 |
|----------------|---|

Label elements

| | |
|---------------------|--|
| Hazard pictogram(s) |  |
|---------------------|--|

| | |
|-------------|---------------|
| Signal word | Danger |
|-------------|---------------|

Hazard statement(s)

| | |
|------|---|
| H311 | Toxic in contact with skin. |
| H370 | Causes damage to organs. (Dermal, Inhalation) |
| H225 | Highly flammable liquid and vapour. |
| H331 | Toxic if inhaled. |
| H301 | Toxic if swallowed. |

Precautionary statement(s) Prevention

| | |
|------|--|
| P210 | Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. |
| P260 | Do not breathe mist/vapours/spray. |
| P264 | Wash all exposed external body areas thoroughly after handling. |

Precautionary statement(s) Response

| | |
|-----------|--|
| P301+P310 | IF SWALLOWED: Immediately call a POISON CENTER/doctor/physician/first aider. |
| P308+P311 | IF exposed or concerned: Call a POISON CENTER/doctor/physician/first aider. |
| P330 | Rinse mouth. |

Precautionary statement(s) Storage

| | |
|-----------|--|
| P403+P235 | Store in a well-ventilated place. Keep cool. |
| P405 | Store locked up. |

Precautionary statement(s) Disposal

| | |
|------|--|
| P501 | Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation. |
|------|--|

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

| CAS No | %[weight] | Name |
|----------|-----------|----------------------------|
| 67-56-1 | >80 | <u>methanol</u> |
| 592-85-8 | <1 | <u>mercury thiocyanate</u> |

SECTION 4 First aid measures

Description of first aid measures

| | |
|---------------------|--|
| Eye Contact | <p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▶ Immediately hold eyelids apart and flush the eye continuously with running water. ▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▶ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▶ Transport to hospital or doctor without delay. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. |
| Skin Contact | <p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately flush body and clothes with large amounts of water, using safety shower if available. ▶ Quickly remove all contaminated clothing, including footwear. ▶ Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre. ▶ Transport to hospital, or doctor. |
| Inhalation | <ul style="list-style-type: none"> ▶ If fumes or combustion products are inhaled remove from contaminated area. ▶ Lay patient down. Keep warm and rested. ▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▶ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▶ Transport to hospital, or doctor, without delay. |
| Ingestion | <ul style="list-style-type: none"> ▶ Immediately give a glass of water. ▶ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor. ▶ If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus. |

Indication of any immediate medical attention and special treatment needed

For acute and short term repeated exposures to methanol:

- Toxicity results from accumulation of formaldehyde/formic acid.
- Clinical signs are usually limited to CNS, eyes and GI tract. Severe metabolic acidosis may produce dyspnea and profound systemic effects which may become intractable. All symptomatic patients should have arterial pH measured. Evaluate airway, breathing and circulation.
- Stabilise obtunded patients by giving naloxone, glucose and thiamine.
- Decontaminate with Ipecac or lavage for patients presenting 2 hours post-ingestion. Charcoal does not absorb well; the usefulness of cathartic is not established.
- Forced diuresis is not effective; haemodialysis is recommended where peak methanol levels exceed 50 mg/dL (this correlates with serum bicarbonate levels below 18 mEq/L).
- Ethanol, maintained at levels between 100 and 150 mg/dL, inhibits formation of toxic metabolites and may be indicated when peak methanol levels exceed 20 mg/dL. An intravenous solution of ethanol in D5W is optimal.
- Folate, as leucovorin, may increase the oxidative removal of formic acid. 4-methylpyrazole may be an effective adjunct in the treatment. 8-Phenytoin may be preferable to diazepam for controlling seizure.

[Ellenhorn Barceloux: Medical Toxicology]

Methanol poisoning can be treated with fomepizole, or if unavailable, ethanol. Both drugs act to reduce the action of alcohol dehydrogenase on methanol by means of competitive inhibition. Ethanol, the active ingredient in alcoholic beverages, acts as a competitive inhibitor by more effectively binding and saturating the alcohol dehydrogenase enzyme in the liver, thus blocking the binding of methanol. Methanol is excreted by the kidneys without being converted into the very toxic metabolites formaldehyde and formic acid. Alcohol dehydrogenase instead enzymatically converts ethanol to acetaldehyde, a much less toxic organic molecule.

Additional treatment may include sodium bicarbonate for metabolic acidosis, and hemodialysis or hemodiafiltration to remove methanol and formate from the blood. Folinic acid or folic acid is also administered to enhance the metabolism of formate.

BIOLOGICAL EXPOSURE INDEX - BEI

| Determinant | Index | Sampling Time | Comment |
|-------------------------|---------------------|-------------------------------------|---------|
| 1. Methanol in urine | 15 mg/l | End of shift | B, NS |
| 2. Formic acid in urine | 80 mg/gm creatinine | Before the shift at end of workweek | B, NS |

B: Background levels occur in specimens collected from subjects **NOT** exposed.

NS: Non-specific determinant - observed following exposure to other materials.

SECTION 5 Firefighting measures

Extinguishing media

Water may be an ineffective extinguishing media for methanol fires; static explosions are reported for aqueous solutions as dilute as 30%. Water may be used to cool containers.

- ▶ Alcohol stable foam.
- ▶ Dry chemical powder.
- ▶ BCF (where regulations permit).

Special hazards arising from the substrate or mixture

| | |
|-----------------------------|--|
| Fire Incompatibility | ▶ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result |
|-----------------------------|--|

Advice for firefighters

| | |
|------------------------------|--|
| Fire Fighting | <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ May be violently or explosively reactive. ▶ Wear full body protective clothing with breathing apparatus. |
| Fire/Explosion Hazard | <ul style="list-style-type: none"> ▶ Liquid and vapour are highly flammable. ▶ Severe fire hazard when exposed to heat, flame and/or oxidisers. ▶ Vapour may travel a considerable distance to source of ignition. <p>Combustion products include:</p> <ul style="list-style-type: none"> , carbon dioxide (CO₂) , formaldehyde , metal oxides , other pyrolysis products typical of burning organic material. |

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

| Minor Spills | <ul style="list-style-type: none"> ▶ Remove all ignition sources. ▶ Clean up all spills immediately. ▶ Avoid breathing vapours and contact with skin and eyes. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------------------|--|-------------|------------|-----------------|--|--|--------------|------|-------------|------------|-------------|---------------------------|--|--|--|--|------------------------------------|---|--------|--------|----------|-------------------------------|---|-------|-----------|------------|----------------------------|---|--------|--------|---------|---------------------|---|-------|-----------|---------------|-----------------------------|---|-------|-----------|---------|-----------------------|---|-------|----------|---------------|----------------------------|--|--|--|--|------------------------------------|---|--------|------------|----------|-----------------------------|---|--------|------------|------------|----------------------------|---|--------|------------|-----------------|---------------------|---|-------|------------|---------|--------------------------------|---|--------|------------|-----------------|--------------------|---|-------|------------|---------|
| Major Spills | <p>Chemical Class: alcohols and glycols For release onto land: recommended sorbents listed in order of priority.</p> <table border="1"> <thead> <tr> <th>SORBENT TYPE</th> <th>RANK</th> <th>APPLICATION</th> <th>COLLECTION</th> <th>LIMITATIONS</th> </tr> </thead> <tbody> <tr> <td colspan="5">LAND SPILL - SMALL</td> </tr> <tr> <td>cross-linked polymer - particulate</td> <td>1</td> <td>shovel</td> <td>shovel</td> <td>R, W, SS</td> </tr> <tr> <td>cross-linked polymer - pillow</td> <td>1</td> <td>throw</td> <td>pitchfork</td> <td>R, DGC, RT</td> </tr> <tr> <td>sorbent clay - particulate</td> <td>2</td> <td>shovel</td> <td>shovel</td> <td>R, I, P</td> </tr> <tr> <td>wood fiber - pillow</td> <td>3</td> <td>throw</td> <td>pitchfork</td> <td>R, P, DGC, RT</td> </tr> <tr> <td>treated wood fiber - pillow</td> <td>3</td> <td>throw</td> <td>pitchfork</td> <td>DGC, RT</td> </tr> <tr> <td>foamed glass - pillow</td> <td>4</td> <td>throw</td> <td>pichfork</td> <td>R, P, DGC, RT</td> </tr> <tr> <td colspan="5">LAND SPILL - MEDIUM</td> </tr> <tr> <td>cross-linked polymer - particulate</td> <td>1</td> <td>blower</td> <td>skiploader</td> <td>R, W, SS</td> </tr> <tr> <td>polypropylene - particulate</td> <td>2</td> <td>blower</td> <td>skiploader</td> <td>W, SS, DGC</td> </tr> <tr> <td>sorbent clay - particulate</td> <td>2</td> <td>blower</td> <td>skiploader</td> <td>R, I, W, P, DGC</td> </tr> <tr> <td>polypropylene - mat</td> <td>3</td> <td>throw</td> <td>skiploader</td> <td>DGC, RT</td> </tr> <tr> <td>expanded mineral - particulate</td> <td>3</td> <td>blower</td> <td>skiploader</td> <td>R, I, W, P, DGC</td> </tr> <tr> <td>polyurethane - mat</td> <td>4</td> <td>throw</td> <td>skiploader</td> <td>DGC, RT</td> </tr> </tbody> </table> <p>Legend DGC: Not effective where ground cover is dense R; Not reusable</p> | | | | | | SORBENT TYPE | RANK | APPLICATION | COLLECTION | LIMITATIONS | LAND SPILL - SMALL | | | | | cross-linked polymer - particulate | 1 | shovel | shovel | R, W, SS | cross-linked polymer - pillow | 1 | throw | pitchfork | R, DGC, RT | sorbent clay - particulate | 2 | shovel | shovel | R, I, P | wood fiber - pillow | 3 | throw | pitchfork | R, P, DGC, RT | treated wood fiber - pillow | 3 | throw | pitchfork | DGC, RT | foamed glass - pillow | 4 | throw | pichfork | R, P, DGC, RT | LAND SPILL - MEDIUM | | | | | cross-linked polymer - particulate | 1 | blower | skiploader | R, W, SS | polypropylene - particulate | 2 | blower | skiploader | W, SS, DGC | sorbent clay - particulate | 2 | blower | skiploader | R, I, W, P, DGC | polypropylene - mat | 3 | throw | skiploader | DGC, RT | expanded mineral - particulate | 3 | blower | skiploader | R, I, W, P, DGC | polyurethane - mat | 4 | throw | skiploader | DGC, RT |
| SORBENT TYPE | RANK | APPLICATION | COLLECTION | LIMITATIONS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LAND SPILL - SMALL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| cross-linked polymer - particulate | 1 | shovel | shovel | R, W, SS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| cross-linked polymer - pillow | 1 | throw | pitchfork | R, DGC, RT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| sorbent clay - particulate | 2 | shovel | shovel | R, I, P | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| wood fiber - pillow | 3 | throw | pitchfork | R, P, DGC, RT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| treated wood fiber - pillow | 3 | throw | pitchfork | DGC, RT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| foamed glass - pillow | 4 | throw | pichfork | R, P, DGC, RT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LAND SPILL - MEDIUM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| cross-linked polymer - particulate | 1 | blower | skiploader | R, W, SS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| polypropylene - particulate | 2 | blower | skiploader | W, SS, DGC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| sorbent clay - particulate | 2 | blower | skiploader | R, I, W, P, DGC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| polypropylene - mat | 3 | throw | skiploader | DGC, RT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| expanded mineral - particulate | 3 | blower | skiploader | R, I, W, P, DGC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| polyurethane - mat | 4 | throw | skiploader | DGC, RT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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I: Not incinerable
 P: Effectiveness reduced when rainy
 RT: Not effective where terrain is rugged
 SS: Not for use within environmentally sensitive sites
 W: Effectiveness reduced when windy
 Reference: Sorbents for Liquid Hazardous Substance Cleanup and Control;
 R.W Melvold et al: Pollution Technology Review No. 150: Noyes Data Corporation 1988

- ▶ Clear area of personnel and move upwind.
- ▶ Alert Fire Brigade and tell them location and nature of hazard.
- ▶ May be violently or explosively reactive.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

| | |
|--------------------------|---|
| Safe handling | <ul style="list-style-type: none"> ▶ Containers, even those that have been emptied, may contain explosive vapours. ▶ Do NOT cut, drill, grind, weld or perform similar operations on or near containers. ▶ Avoid all personal contact, including inhalation. ▶ Wear protective clothing when risk of exposure occurs. ▶ Use in a well-ventilated area. |
| Other information | <ul style="list-style-type: none"> ▶ Store in original containers in approved flame-proof area. ▶ No smoking, naked lights, heat or ignition sources. ▶ DO NOT store in pits, depressions, basements or areas where vapours may be trapped. |

Conditions for safe storage, including any incompatibilities

| | |
|--------------------------------|--|
| Suitable container | <ul style="list-style-type: none"> ▶ Glass container is suitable for laboratory quantities ▶ Packing as supplied by manufacturer. ▶ Plastic containers may only be used if approved for flammable liquid. ▶ Check that containers are clearly labelled and free from leaks. ▶ For low viscosity materials (i) : Drums and jerry cans must be of the non-removable head type. (ii) : Where a can is to be used as an inner package, the can must have a screwed enclosure. ▶ For materials with a viscosity of at least 2680 cSt. |
| Storage incompatibility | <p>Methanol:</p> <ul style="list-style-type: none"> ▶ reacts violently with strong oxidisers, acetyl bromide, alkyl aluminium salts, beryllium dihydride, bromine, chromic acid, 1-chloro-3,3-difluoro-2-methoxycyclopropene, cyanuric chloride, diethylzinc, isophthaloyl chloride, nitric acid, perchloric acid, potassium-tert-butoxide, potassium sulfur diimide, Raney nickel catalysts, 2,4,6-trichlorotriazine, triethylaluminium, 1,3,3-trifluoro-2-methoxycyclopropene ▶ is incompatible with strong acids, strong caustics, alkaline earth and alkali metals, aliphatic amines, acetaldehyde, benzoyl peroxide, 1,3-bis(di-n-cyclopentadienyl iron)-2-propen-1-one, calcium carbide, chloroform, chromic anhydride, chromium trioxide, dialkylzinc, dichlorine oxide, dichloromethane, ethylene oxide, hypochlorous acid, isocyanates, isopropyl chlorocarbonate, lithium tetrahydroaluminate, magnesium, methyl azide, nitrogen dioxide, palladium, pentafluoroguanidine, perchloryl fluoride, phosphorus pentasulfide, phosphorus trioxide, potassium, tangerine oil, triisobutylaluminium ▶ mixtures with lead perchlorate, sodium hypochlorite are explosive ▶ may react with metallic aluminium at high temperatures ▶ slowly corrodes lead and aluminium ▶ may generate electrostatic charges, due to low conductivity, on flow or agitation ▶ attacks some plastics, rubber and coatings. <p>Static induced flash fires have happened when filling plastic containers with methanol / water solutions with as low as 30% methanol content</p> <p>Alcohols</p> <ul style="list-style-type: none"> ▶ are incompatible with strong acids, acid chlorides, acid anhydrides, oxidising and reducing agents. ▶ reacts, possibly violently, with alkaline metals and alkaline earth metals to produce hydrogen ▶ react with strong acids, strong caustics, aliphatic amines, isocyanates, acetaldehyde, benzoyl peroxide, chromic acid, chromium oxide, dialkylzinc, dichlorine oxide, ethylene oxide, hypochlorous acid, isopropyl chlorocarbonate, lithium tetrahydroaluminate, nitrogen dioxide, pentafluoroguanidine, phosphorus halides, phosphorus pentasulfide, tangerine oil, triethylaluminium, triisobutylaluminium ▶ should not be heated above 49 deg. C. when in contact with aluminium equipment ▶ Avoid storage with reducing agents. |



X — Must not be stored together

O — May be stored together with specific preventions

+ — May be stored together

Continued...

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

| Source | Ingredient | Material name | TWA | STEL | Peak | Notes |
|---|---------------------|---|---------------------------------|---------------------------------|---------------|---------------|
| Singapore Permissible Exposure Limits of Toxic Substances | methanol | Methanol (Methyl alcohol) | 200 ppm / 262 mg/m ³ | 328 mg/m ³ / 250 ppm | Not Available | Not Available |
| Singapore Permissible Exposure Limits of Toxic Substances | mercury thiocyanate | Mercury: Inorganic forms including metallic mercury | 0.025 mg/m ³ | Not Available | Not Available | Not Available |

Emergency Limits

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|---------------------|------------------------|------------------------|----------------------|
| methanol | Not Available | Not Available | Not Available |
| mercury thiocyanate | 0.12 mg/m ³ | 0.16 mg/m ³ | 44 mg/m ³ |

| Ingredient | Original IDLH | Revised IDLH |
|---------------------|----------------------|---------------|
| methanol | 6,000 ppm | Not Available |
| mercury thiocyanate | 10 mg/m ³ | Not Available |

MATERIAL DATA

For methanol:

Odour Threshold Value: 4.2-5960 ppm (detection), 53.0-8940 ppm (recognition)

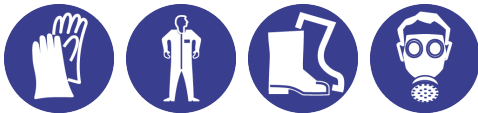
NOTE: Detector tubes for methanol, measuring in excess of 50 ppm, are commercially available.

Exposure at or below the recommended TLV-TWA is thought to substantially reduce the significant risk of headache, blurred vision and other ocular and systemic effects.

Odour Safety Factor (OSF)

OSF=2 (METHANOL)

Exposure controls

| | |
|---|--|
| Appropriate engineering controls | Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. |
| Personal protection |  |
| Eye and face protection | <ul style="list-style-type: none"> ▸ Safety glasses with side shields ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. |
| Skin protection | See Hand protection below |
| Hands/feet protection | <ul style="list-style-type: none"> ▸ Wear chemical protective gloves, e.g. PVC. ▸ Wear safety footwear or safety gumboots, e.g. Rubber |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none"> ▸ Overalls. ▸ PVC Apron. ▸ PVC protective suit may be required if exposure severe. ▸ Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity. ▸ For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets). ▸ Non sparking safety or conductive footwear should be considered. |

Recommended material(s)**GLOVE SELECTION INDEX**

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

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| Material | CPI |
|-------------------|-----|
| BUTYL | A |
| BUTYL/NEOPRENE | A |
| PE/EVAL/PE | A |
| PVDC/PE/PVDC | A |
| SARANEX-23 | A |
| SARANEX-23 2-PLY | A |
| TEFLON | A |
| VITON/NEOPRENE | A |
| NEOPRENE | B |
| NAT+NEOPR+NITRILE | C |
| NATURAL RUBBER | C |
| NATURAL+NEOPRENE | C |
| NEOPRENE/NATURAL | C |
| NITRILE | C |
| PVA | C |
| PVC | C |

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

Type AX Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required. Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

| Required Minimum Protection Factor | Half-Face Respirator | Full-Face Respirator | Powered Air Respirator |
|------------------------------------|----------------------|----------------------|------------------------|
| up to 10 x ES | AX-AUS | - | AX-PAPR-AUS / Class 1 |
| up to 50 x ES | - | AX-AUS / Class 1 | - |
| up to 100 x ES | - | AX-2 | AX-PAPR-2 ^ |

^ - Full-face

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO₂), G = Agricultural chemicals, K = Ammonia(NH₃), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

SECTION 9 Physical and chemical properties**Information on basic physical and chemical properties**

| Appearance | Liquid, colourless, miscible with water | | |
|--|---|---|---------------|
| Physical state | Liquid | Relative density (Water = 1) | Not Available |
| Odour | Not Available | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | Not Available |
| pH (as supplied) | Not Available | Decomposition temperature | Not Available |
| Melting point / freezing point (°C) | Not Available | Viscosity (cSt) | Not Available |
| Initial boiling point and boiling range (°C) | 64.7 | Molecular weight (g/mol) | Not Available |
| Flash point (°C) | 11 | Taste | Not Available |
| Evaporation rate | Not Available BuAC = 1 | Explosive properties | Not Available |
| Flammability | HIGHLY FLAMMABLE. | Oxidising properties | Not Available |

| | | | |
|---------------------------|---------------|-----------------------------------|---------------|
| Upper Explosive Limit (%) | Not Available | Surface Tension (dyn/cm or mN/m) | Not Available |
| Lower Explosive Limit (%) | Not Available | Volatile Component (%vol) | Not Available |
| Vapour pressure (kPa) | Not Available | Gas group | Not Available |
| Solubility in water | Miscible | pH as a solution (Not Available%) | Not Available |
| Vapour density (Air = 1) | Not Available | VOC g/L | Not Available |

SECTION 10 Stability and reactivity

| | |
|------------------------------------|---|
| Reactivity | See section 7 |
| Chemical stability | <ul style="list-style-type: none"> ▶ Static induced flash fires have happened when filling plastic containers with methanol / water solutions with as low as 30% methanol content. ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur. |
| Possibility of hazardous reactions | See section 7 |
| Conditions to avoid | See section 7 |
| Incompatible materials | See section 7 |
| Hazardous decomposition products | See section 5 |

SECTION 11 Toxicological information

Information on toxicological effects

| | |
|--------------|---|
| Inhaled | <p>Strong evidence exists that exposure to the material may produce very serious irreversible damage (other than carcinogenesis, mutagenesis and teratogenesis) following a single exposure by inhalation.</p> <p>The material is not thought to produce either adverse health effects or irritation of the respiratory tract following inhalation (as classified by EC Directives using animal models). Nevertheless, adverse systemic effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.</p> <p>Minor but regular methanol exposures may effect the central nervous system, optic nerves and retinae. Symptoms may be delayed, with headache, fatigue, nausea, blurring of vision and double vision. Continued or severe exposures may cause damage to optic nerves, which may become severe with permanent visual impairment even blindness resulting.</p> <p>Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may produce toxic effects.</p> |
| Ingestion | <p>Strong evidence exists that exposure to the material may produce very serious irreversible damage (other than carcinogenesis, mutagenesis and teratogenesis) following a single exposure by swallowing.</p> <p>The material is not thought to produce adverse health effects following ingestion (as classified by EC Directives using animal models). Nevertheless, adverse systemic effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum.</p> <p>Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.</p> <p>Methanol may produce a burning or painful sensation in the mouth, throat, chest and stomach. This may be accompanied by nausea, vomiting, headache, dizziness, shortness of breath, weakness, fatigue, leg cramps, restlessness, confusion, drunken behaviour, visual disturbance, drowsiness, coma and death. Onset of symptoms may be delayed for several hours.</p> |
| Skin Contact | <p>Skin contact with the material may produce toxic effects; systemic effects may result following absorption.</p> <p>Strong evidence exists that exposure to the material may produce very serious irreversible damage (other than carcinogenesis, mutagenesis and teratogenesis) following a single exposure by skin contact.</p> <p>The material is not thought to be a skin irritant (i.e. is unlikely to produce irritant dermatitis as described in EC Directives using animal models). Temporary discomfort, however, may result from prolonged dermal exposures. Good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p> <p>Strong evidence exists that exposure to the material may produce serious irreversible damage (other than carcinogenesis, mutagenesis and teratogenesis) following a single exposure by skin contact.</p> |

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| | |
|----------------|---|
| Eye | <p>Although the liquid is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).</p> <p>Methanol is a mild to moderate eye irritant. High vapor concentration or liquid contact with eyes causes irritation, tearing, and burning.</p> <p>Direct contact of the eye with ethanol may cause immediate stinging and burning with reflex closure of the lid and tearing, transient injury of the corneal epithelium and hyperaemia of the conjunctiva.</p> |
| Chronic | <p>Long-term exposure to the product is not thought to produce chronic effects adverse to health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course.</p> <p>Long-term exposure to methanol vapour, at concentrations exceeding 3000 ppm, may produce cumulative effects characterised by gastrointestinal disturbances (nausea, vomiting), headache, ringing in the ears, insomnia, trembling, unsteady gait, vertigo, conjunctivitis and clouded or double vision. Liver and/or kidney injury may also result. Some individuals show severe eye damage following prolonged exposure to 800 ppm of the vapour.</p> |

| | | |
|--|---|--|
| CHLORIDE PHOTOMETER MO401 Reagent A | TOXICITY | IRRITATION |
| | Not Available | Not Available |
| methanol | TOXICITY | IRRITATION |
| | Dermal (rabbit) LD50: 15800 mg/kg ^[2] | Eye (rabbit): 100 mg/24h-moderate |
| | Inhalation(Rat) LC50; 64000 ppm4h ^[2] | Eye (rabbit): 40 mg-moderate |
| | Oral (Rat) LD50; 5628 mg/kg ^[2] | Eye: no adverse effect observed (not irritating) ^[1] |
| | | Skin (rabbit): 20 mg/24 h-moderate |
| | | Skin: no adverse effect observed (not irritating) ^[1] |
| mercury thiocyanate | TOXICITY | IRRITATION |
| | dermal (rat) LD50: 685 mg/kg ^[2] | Not Available |
| | Oral (Rat) LD50; 46 mg/kg ^[2] | |
| Legend: | 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances | |

| | |
|-----------------|---|
| METHANOL | <p>The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.</p> |
|-----------------|---|

| | | | |
|--|---|---------------------------------|---|
| Acute Toxicity | ✓ | Carcinogenicity | ✗ |
| Skin Irritation/Corrosion | ✗ | Reproductivity | ✗ |
| Serious Eye Damage/Irritation | ✗ | STOT - Single Exposure | ✓ |
| Respiratory or Skin sensitisation | ✗ | STOT - Repeated Exposure | ✗ |
| Mutagenicity | ✗ | Aspiration Hazard | ✗ |

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

| | | | | | |
|--|-----------------|---------------------------|-------------------------------|------------------|---------------|
| CHLORIDE PHOTOMETER MO401 Reagent A | Endpoint | Test Duration (hr) | Species | Value | Source |
| | Not Available | Not Available | Not Available | Not Available | Not Available |
| methanol | Endpoint | Test Duration (hr) | Species | Value | Source |
| | NOEC(ECx) | 720h | Fish | 0.007mg/L | 4 |
| | LC50 | 96h | Fish | 290mg/l | 2 |
| | EC50 | 48h | Crustacea | >10000mg/l | 2 |
| | EC50 | 96h | Algae or other aquatic plants | 14.11-20.623mg/l | 4 |

CHLORIDE PHOTOMETER MO401 Reagent A

| | Endpoint | Test Duration (hr) | Species | Value | Source |
|---------------------|-----------|--------------------|-----------|---------------|--------|
| mercury thiocyanate | EC50(ECx) | 96h | Crustacea | 0.09mg/L | 5 |
| | LC50 | 96h | Fish | 0.08-0.22mg/l | 4 |

Legend: Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data

Harmful to aquatic organisms.

DO NOT discharge into sewer or waterways.

For methanol:

log Kow: -0.82- -0.66

Half-life (hr) air: 427

Half-life (hr) H2O surface water: 5.3-64

Henry's atm m3 /mol: 1.35E-04

BOD 5 0.76-1.12

COD: 1.05-1.50, 99%

ThOD: 1.5

BCF: 0.2-10

Environmental Fate:

ERRESTRIAL FATE: An estimated Koc value of 1 indicates that methanol is expected to have very high mobility in soil. Volatilisation of methanol from moist soil surfaces is expected to be an important fate process given a Henry's Law constant of 4.55x10⁻⁶ atm-cu m/mole. The potential for volatilisation of methanol from dry soil surfaces may exist based upon a vapor pressure of 127 mm Hg.

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|------------|-------------------------|------------------|
| methanol | LOW | LOW |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|------------|-----------------|
| methanol | LOW (BCF = 10) |

Mobility in soil

| Ingredient | Mobility |
|------------|----------------|
| methanol | HIGH (KOC = 1) |



SECTION 13 Disposal considerations

Waste treatment methods

| | |
|------------------------------|---|
| Product / Packaging disposal | <ul style="list-style-type: none"> ▶ Containers may still present a chemical hazard/ danger when empty. ▶ Return to supplier for reuse/ recycling if possible. <p>Otherwise:</p> <ul style="list-style-type: none"> ▶ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. ▶ DO NOT allow wash water from cleaning or process equipment to enter drains. ▶ It may be necessary to collect all wash water for treatment before disposal. ▶ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▶ Recycle wherever possible. ▶ Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. ▶ Dispose of by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or Incineration in a licensed apparatus (after admixture with suitable combustible material). |
|------------------------------|---|

SECTION 14 Transport information

Labels Required

| | |
|--|---|
| |   |
|--|---|

| | |
|------------------|----|
| Marine Pollutant | NO |
|------------------|----|

Land transport (UN)

| | | |
|------------------------------|--|-----|
| UN number | 1992 | |
| UN proper shipping name | FLAMMABLE LIQUID, TOXIC, N.O.S. (METHANOL; MERCURY (II) THIOCYANATE) | |
| Transport hazard class(es) | Class | 3 |
| | Subrisk | 6.1 |
| Packing group | II | |
| Environmental hazard | Not Applicable | |
| Special precautions for user | Special provisions | 274 |
| | Limited quantity | 1 L |

Air transport (ICAO-IATA / DGR)

| | | |
|------------------------------|--|------|
| UN number | 1992 | |
| UN proper shipping name | Flammable liquid, toxic, n.o.s. * (METHANOL; MERCURY (II) THIOCYANATE) | |
| Transport hazard class(es) | ICAO/IATA Class | 3 |
| | ICAO / IATA Subrisk | 6.1 |
| | ERG Code | 3HP |
| Packing group | II | |
| Environmental hazard | Not Applicable | |
| Special precautions for user | Special provisions | A3 |
| | Cargo Only Packing Instructions | 364 |
| | Cargo Only Maximum Qty / Pack | 60 L |
| | Passenger and Cargo Packing Instructions | 352 |
| | Passenger and Cargo Maximum Qty / Pack | 1 L |
| | Passenger and Cargo Limited Quantity Packing Instructions | Y341 |
| | Passenger and Cargo Limited Maximum Qty / Pack | 1 L |

Sea transport (IMDG-Code / GGVSee)

| | | |
|------------------------------|--|----------|
| UN number | 1992 | |
| UN proper shipping name | FLAMMABLE LIQUID, TOXIC, N.O.S. (METHANOL; MERCURY (II) THIOCYANATE) | |
| Transport hazard class(es) | IMDG Class | 3 |
| | IMDG Subrisk | 6.1 |
| Packing group | II | |
| Environmental hazard | Not Applicable | |
| Special precautions for user | EMS Number | F-E, S-D |
| | Special provisions | 274 |
| | Limited Quantities | 1 L |

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

| Product name | Group |
|---------------------|---------------|
| methanol | Not Available |
| mercury thiocyanate | Not Available |

Transport in bulk in accordance with the ICG Code

| Product name | Ship Type |
|---------------------|---------------|
| methanol | Not Available |
| mercury thiocyanate | Not Available |

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

methanol is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List

Singapore Permissible Exposure Limits of Toxic Substances

mercury thiocyanate is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List

United Nations List of Prior Informed Consent Chemicals

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

WHO Recommended Classification of Pesticides by Hazard - Table 7.

Pesticides subject to the Rotterdam Convention

Singapore Permissible Exposure Limits of Toxic Substances

National Inventory Status

| National Inventory | Status |
|--|--|
| Australia - AIC / Australia Non-Industrial Use | Yes |
| Canada - DSL | Yes |
| Canada - NDSL | No (methanol; mercury thiocyanate) |
| China - IECSC | Yes |
| Europe - EINEC / ELINCS / NLP | Yes |
| Japan - ENCS | No (mercury thiocyanate) |
| Korea - KECI | Yes |
| New Zealand - NZIoC | Yes |
| Philippines - PICCS | Yes |
| USA - TSCA | Yes |
| Taiwan - TCSI | Yes |
| Mexico - INSQ | Yes |
| Vietnam - NCI | No (mercury thiocyanate) |
| Russia - FBEPH | No (mercury thiocyanate) |
| Legend: | <p>Yes = All CAS declared ingredients are on the inventory</p> <p>No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.</p> |

SECTION 16 Other information

| | |
|----------------------|------------|
| Revision Date | 21/08/2019 |
| Initial Date | 16/06/2016 |

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

SDS Version Summary

| Version | Date of Update | Sections Updated |
|---------|----------------|------------------|
| 2.4 | 21/08/2019 | Ingredients |

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks

in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

CHLORIDE PHOTOMETER MO401 Reagent B

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 777179

Version No: 1.3

Safety Data Sheet

Issue Date: 21/08/2019

Print Date: 24/03/2022

L.GHS.SGP.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

| | |
|-------------------------------|--|
| Product name | CHLORIDE PHOTOMETER MO401 Reagent B |
| Chemical Name | Not Applicable |
| Synonyms | Part B of Product Number 777179 |
| Proper shipping name | CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (contains nitric acid) |
| Chemical formula | Not Applicable |
| Other means of identification | 777179 |

Relevant identified uses of the substance or mixture and uses advised against

| | |
|--------------------------|---|
| Relevant identified uses | Use according to manufacturer's directions. |
|--------------------------|---|

Details of the supplier of the safety data sheet

| | | | |
|-------------------------|---|---|--|
| Registered company name | Wilhelmsen Ships Service (S) Pte. Ltd. | Wilhelmsen Ships Service AS* Central Warehouse | Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen |
| Address | 186 Pandan Loop Singapore 128376 Singapore | Willem Barentszstraat 50 Rotterdam Netherlands | -----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway |
| Telephone | +65 6395 4545 | +31 10 4877 777 | Not Available |
| Fax | Not Available | Not Available | Not Available |
| Website | http://www.wilhelmsen.com/services/maritime/compan | http://www.wilhelmsen.com | http://www.wilhelmsen.com |
| Email | wss.singapore@wilhelmsen.com | wss.rotterdam@wilhelmsen.com | wss.global.sdsinfo@wilhelmsen.com |

| | |
|-------------------------|---|
| Registered company name | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +31 10 4877 777 |
| Fax | Not Available |
| Website | http://www.wilhelmsen.com |
| Email | wss.rotterdam@wilhelmsen.com |

Emergency telephone number

CHLORIDE PHOTOMETER MO401 Reagent B

| Association / Organisation | 24hrs - Chemtrec | Dutch nat. poison centre | 24hrs - Chemtrec |
|-----------------------------------|------------------|--------------------------|------------------|
| Emergency telephone numbers | +31-10-4877700 | + 31 88 7558561 | +31-10-4877700 |
| Other emergency telephone numbers | +31-10-4877700 | + 31 10 4877700 | +1 800 424 9300 |


| Association / Organisation | Dutch nat. poison centre |
|-----------------------------------|--------------------------|
| Emergency telephone numbers | + 31 30 274 88 88 |
| Other emergency telephone numbers | + 31-10-4877700 |

SECTION 2 Hazards identification

Classification of the substance or mixture

| Classification | Corrosive to Metals Category 1, Serious Eye Damage/Eye Irritation Category 1, Skin Corrosion/Irritation Category 2 |
|----------------|--|
|----------------|--|

Label elements

| | |
|---------------------|---|
| Hazard pictogram(s) |  |
|---------------------|---|

| | |
|-------------|---------------|
| Signal word | Danger |
|-------------|---------------|

Hazard statement(s)

| | |
|------|-----------------------------|
| H290 | May be corrosive to metals. |
| H318 | Causes serious eye damage. |
| H315 | Causes skin irritation. |

Precautionary statement(s) Prevention

| | |
|------|--|
| P280 | Wear protective gloves, protective clothing, eye protection and face protection. |
| P234 | Keep only in original container. |
| P264 | Wash all exposed external body areas thoroughly after handling. |

Precautionary statement(s) 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/doctor/physician/first aider. |
| P390 | Absorb spillage to prevent material damage. |

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

| CAS No | %[weight] | Name |
|-----------|-----------|-----------------------|
| 7782-61-8 | 10-20 | <u>ferric nitrate</u> |
| 7697-37-2 | 3-5 | <u>nitric acid</u> |

Continued...

| CAS No | %[weight] | Name |
|-----------|-----------|--------------|
| 7732-18-5 | >75 | <u>water</u> |

SECTION 4 First aid measures

Description of first aid measures

| | |
|---------------------|--|
| Eye Contact | <p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▶ Immediately hold eyelids apart and flush the eye continuously with running water. ▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▶ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▶ Transport to hospital or doctor without delay. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. |
| Skin Contact | <p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately flush body and clothes with large amounts of water, using safety shower if available. ▶ Quickly remove all contaminated clothing, including footwear. ▶ Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre. ▶ Transport to hospital, or doctor. |
| Inhalation | <ul style="list-style-type: none"> ▶ If fumes or combustion products are inhaled remove from contaminated area. ▶ Lay patient down. Keep warm and rested. ▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▶ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▶ Transport to hospital, or doctor. ▶ Inhalation of vapours or aerosols (mists, fumes) may cause lung oedema. ▶ Corrosive substances may cause lung damage (e.g. lung oedema, fluid in the lungs). ▶ As this reaction may be delayed up to 24 hours after exposure, affected individuals need complete rest (preferably in semi-recumbent posture) and must be kept under medical observation even if no symptoms are (yet) manifested. ▶ Before any such manifestation, the administration of a spray containing a dexamethasone derivative or beclomethasone derivative may be considered. <p>This must definitely be left to a doctor or person authorised by him/her. (ICSC13719)</p> |
| Ingestion | <ul style="list-style-type: none"> ▶ For advice, contact a Poisons Information Centre or a doctor at once. ▶ Urgent hospital treatment is likely to be needed. ▶ If swallowed do NOT induce vomiting. ▶ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▶ Observe the patient carefully. ▶ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▶ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▶ Transport to hospital or doctor without delay. |

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

For acute or short term repeated exposures to iron and its derivatives:

- ▶ Always treat symptoms rather than history.
- ▶ In general, however, toxic doses exceed 20 mg/kg of ingested material (as elemental iron) with lethal doses exceeding 180 mg/kg.
- ▶ Control of iron stores depend on variation in absorption rather than excretion. Absorption occurs through aspiration, ingestion and burned skin.
- ▶ Hepatic damage may progress to failure with hypoprothrombinaemia and hypoglycaemia. Hepatorenal syndrome may occur.
- ▶ Iron intoxication may also result in decreased cardiac output and increased cardiac pooling which subsequently produces hypotension.
- ▶ Serum iron should be analysed in symptomatic patients. Serum iron levels (2-4 hrs post-ingestion) greater than 100 ug/dL indicate poisoning with levels, in excess of 350 ug/dL, being potentially serious. Emesis or lavage (for obtunded patients with no gag reflex) are the usual means of decontamination.
- ▶ Activated charcoal does not effectively bind iron.
- ▶ Catharsis (using sodium sulfate or magnesium sulfate) may only be used if the patient already has diarrhoea.
- ▶ Deferoxamine is a specific chelator of ferric (3+) iron and is currently the antidote of choice. It should be administered parenterally. [Ellenhorn and Barceloux: Medical Toxicology]

For acute or short term repeated exposures to strong acids:

- ▶ Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
- ▶ Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling
- ▶ Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
- ▶ Strong acids produce a coagulation necrosis characterised by formation of a coagulum (eschar) as a result of the desiccating action of the acid on proteins in specific tissues.

INGESTION:

- ▶ Immediate dilution (milk or water) within 30 minutes post ingestion is recommended.
- ▶ **DO NOT attempt to neutralise the acid since exothermic reaction may extend the corrosive injury.**

- Be careful to avoid further vomit since re-exposure of the mucosa to the acid is harmful. Limit fluids to one or two glasses in an adult.
- Charcoal has no place in acid management.
- Some authors suggest the use of lavage within 1 hour of ingestion.

SKIN:

- Skin lesions require copious saline irrigation. Treat chemical burns as thermal burns with non-adherent gauze and wrapping.
- Deep second-degree burns may benefit from topical silver sulfadiazine.

EYE:

- Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjunctival cul-de-sacs. Irrigation should last at least 20-30 minutes. **DO NOT use neutralising agents or any other additives.** Several litres of saline are required.
- Cycloplegic drops, (1% cyclopentolate for short-term use or 5% homatropine for longer term use) antibiotic drops, vasoconstrictive agents or artificial tears may be indicated dependent on the severity of the injury.
- Steroid eye drops should only be administered with the approval of a consulting ophthalmologist).

[Ellenhorn and Barceloux: Medical Toxicology]

The toxicity of nitrates and nitrites result from their vasodilating properties and their propensity to form methaemoglobin.

- Most produce a peak effect within 30 minutes.
- Clinical signs of cyanosis appear before other symptoms because of the dark pigmentation of methaemoglobin.
- Initial attention should be directed towards improving oxygen delivery, with assisted ventilation, if necessary. Hyperbaric oxygen has not demonstrated conclusive benefits.
- Institute cardiac monitoring, especially in patients with coronary artery or pulmonary disease.
- Hypotension should respond to Trendelenburg's position and intravenous fluids; otherwise dopamine may be needed.
- Naloxone, glucose and thiamine should be given if a multiple ingestion is suspected.
- Decontaminate using Ipecac Syrup for alert patients or lavage for obtunded patients who present within 2-4 hours of ingestion.
- Symptomatic patients with methaemoglobin levels over 30% should receive methylene blue.(Cyanosis alone, is not an indication for treatment). The usual dose is 1-2 mg/kg of a 1% solution (10 mg/ml) IV over 5 minutes; repeat, using the same dose if symptoms of hypoxia fail to subside within 1 hour.

[Ellenhorn and Barceloux: Medical Toxicology]

BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker who has been exposed at the Exposure Standard (ES or TLV):

| Determinant | Index | Sampling Time | Comments |
|----------------------------|---------------------|------------------------|----------|
| 1. Methaemoglobin in blood | 1.5% of haemoglobin | During or end of shift | B,NS,SQ |

B: Background levels occur in specimens collected from subjects **NOT** exposed

NS: Non-specific determinant;also observed after exposure to other materials

SQ: Semi-quantitative determinant - Interpretation may be ambiguous; should be used as a screening test or confirmatory test.

SECTION 5 Firefighting measures**Extinguishing media**

- There is no restriction on the type of extinguisher which may be used.
- Use extinguishing media suitable for surrounding area.

Special hazards arising from the substrate or mixture

| | |
|-----------------------------|-------------|
| Fire Incompatibility | None known. |
|-----------------------------|-------------|

Advice for firefighters

| | |
|------------------------------|---|
| Fire Fighting | <ul style="list-style-type: none"> ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves in the event of a fire. ▸ Prevent, by any means available, spillage from entering drains or water courses. |
| Fire/Explosion Hazard | <ul style="list-style-type: none"> ▸ Non combustible. ▸ Not considered to be a significant fire risk. ▸ Acids may react with metals to produce hydrogen, a highly flammable and explosive gas. Decomposition may produce toxic fumes of: <ul style="list-style-type: none"> , nitrogen oxides (NOx) , metal oxides |

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

| Minor Spills | <ul style="list-style-type: none"> ▶ Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material. ▶ Check regularly for spills and leaks. ▶ Clean up all spills immediately. ▶ Avoid breathing vapours and contact with skin and eyes. ▶ Control personal contact with the substance, by using protective equipment. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------------|--|-----------------|------------|-----------------|------------|-------------|--------------------|--|--|--|--|------------------------|---|-------|-----------|---------------|--------------------------------|---|--------|--------|-----------------|----------------------------|---|--------|--------|--------------|---------------------|--|--|--|--|-------------------------------|---|--------|------------|-----------------|---------------------------|---|--------|------------|--------------|----------------------------|---|-------|------------|--------------|
| Major Spills | <ul style="list-style-type: none"> ▶ Clear area of personnel and move upwind. ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus plus protective gloves. <p>Chemical Class:acidic compounds, inorganic For release onto land: recommended sorbents listed in order of priority.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">SORBENT TYPE</th> <th style="text-align: center;">RANK</th> <th style="text-align: left;">APPLICATION</th> <th style="text-align: left;">COLLECTION</th> <th style="text-align: left;">LIMITATIONS</th> </tr> </thead> <tbody> <tr> <td colspan="5">LAND SPILL - SMALL</td> </tr> <tr> <td>foamed glass - pillows</td> <td style="text-align: center;">1</td> <td>throw</td> <td>pitchfork</td> <td>R, P, DGC, RT</td> </tr> <tr> <td>expanded mineral - particulate</td> <td style="text-align: center;">2</td> <td>shovel</td> <td>shovel</td> <td>R, I, W, P, DGC</td> </tr> <tr> <td>foamed glass - particulate</td> <td style="text-align: center;">2</td> <td>shovel</td> <td>shovel</td> <td>R, W, P, DGC</td> </tr> <tr> <td colspan="5">LAND SPILL - MEDIUM</td> </tr> <tr> <td>expanded mineral -particulate</td> <td style="text-align: center;">1</td> <td>blower</td> <td>skiploader</td> <td>R, I, W, P, DGC</td> </tr> <tr> <td>foamed glass- particulate</td> <td style="text-align: center;">2</td> <td>blower</td> <td>skiploader</td> <td>R, W, P, DGC</td> </tr> <tr> <td>foamed glass - particulate</td> <td style="text-align: center;">3</td> <td>throw</td> <td>skiploader</td> <td>R, W, P, DGC</td> </tr> </tbody> </table> <p>Legend DGC: Not effective where ground cover is dense R; Not reusable I: Not incinerable P: Effectiveness reduced when rainy RT:Not effective where terrain is rugged SS: Not for use within environmentally sensitive sites W: Effectiveness reduced when windy Reference: Sorbents for Liquid Hazardous Substance Cleanup and Control; R.W Melvold et al: Pollution Technology Review No. 150: Noyes Data Corporation 1988</p> | SORBENT TYPE | RANK | APPLICATION | COLLECTION | LIMITATIONS | LAND SPILL - SMALL | | | | | foamed glass - pillows | 1 | throw | pitchfork | R, P, DGC, RT | expanded mineral - particulate | 2 | shovel | shovel | R, I, W, P, DGC | foamed glass - particulate | 2 | shovel | shovel | R, W, P, DGC | LAND SPILL - MEDIUM | | | | | expanded mineral -particulate | 1 | blower | skiploader | R, I, W, P, DGC | foamed glass- particulate | 2 | blower | skiploader | R, W, P, DGC | foamed glass - particulate | 3 | throw | skiploader | R, W, P, DGC |
| SORBENT TYPE | RANK | APPLICATION | COLLECTION | LIMITATIONS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LAND SPILL - SMALL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| foamed glass - pillows | 1 | throw | pitchfork | R, P, DGC, RT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| expanded mineral - particulate | 2 | shovel | shovel | R, I, W, P, DGC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| foamed glass - particulate | 2 | shovel | shovel | R, W, P, DGC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LAND SPILL - MEDIUM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| expanded mineral -particulate | 1 | blower | skiploader | R, I, W, P, DGC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| foamed glass- particulate | 2 | blower | skiploader | R, W, P, DGC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| foamed glass - particulate | 3 | throw | skiploader | R, W, P, DGC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

| | |
|--------------------------|---|
| Safe handling | <ul style="list-style-type: none"> ▶ Avoid all personal contact, including inhalation. ▶ Wear protective clothing when risk of exposure occurs. ▶ Use in a well-ventilated area. |
| Other information | <ul style="list-style-type: none"> ▶ Store in original containers. ▶ Keep containers securely sealed. ▶ Store in a cool, dry, well-ventilated area. |

Conditions for safe storage, including any incompatibilities

| | |
|---------------------------|---|
| Suitable container | <ul style="list-style-type: none"> ▶ DO NOT use aluminium or galvanised containers ▶ Check regularly for spills and leaks ▶ Lined metal can, lined metal pail/ can. ▶ Plastic pail. ▶ Polyliner drum. <p>For low viscosity materials</p> <ul style="list-style-type: none"> ▶ Drums and jerricans must be of the non-removable head type. ▶ Where a can is to be used as an inner package, the can must have a screwed enclosure. <p>For materials with a viscosity of at least 2680 cSt.</p> |
|---------------------------|---|

CHLORIDE PHOTOMETER MO401 Reagent B

Storage incompatibility

Derivative of electropositive metal.

Metal nitrites:

- ▶ are incompatible with chlorates, hypophosphites, iodides, mercury salts, permanganates, sulfites, primary amines and amides, secondary amines and amides, ammonium salts, activated carbon, cyanogen compounds, thiocyanates, thiosulfates, cyanides, sodium amide, boron, acetanilide, antipyrine, tannic acid and cellulose
- ▶ react explosively with hydrazine and liquid ammonia .
- ▶ react explosively following fusion with metal cyanides
- ▶ react (often) with salts of nitrogenous bases to produce an unstable corresponding nitrite salt.
- ▶ Inorganic acids are generally soluble in water with the release of hydrogen ions. The resulting solutions have pH's of less than 7.0.
- ▶ Inorganic acids neutralise chemical bases (for example: amines and inorganic hydroxides) to form salts - neutralisation can generate dangerously large amounts of heat in small spaces.
- ▶ Inorganic peroxy compounds are potent oxidisers that pose fire or explosive hazards when in contact with ordinary combustible materials.
- ▶ Inorganic peroxides react with organic compounds to generate organic peroxide and hydroperoxide products that react violently with reducing agents.
- ▶ Inorganic oxidising agents can react with reducing agents to generate heat and products that may be gaseous (causing pressurization of closed containers).
- ▶ Inorganic reducing agents react with oxidizing agents to generate heat and products that may be flammable, combustible, or otherwise reactive. Their reactions with oxidizing agents may be violent.
- ▶ Incidents involving interaction of active oxidants and reducing agents, either by design or accident, are usually very energetic and examples of so-called redox reactions.
- ▶ WARNING: Avoid or control reaction with peroxides. All *transition metal* peroxides should be considered as potentially explosive. For example transition metal complexes of alkyl hydroperoxides may decompose explosively.

for metal nitrates:

- ▶ Segregate from heavy metals, phosphides, sodium acetate, lead nitrate, tartrates, trichloroethylene,
- ▶ Avoid shock and heat.
- ▶ Mixtures of metal nitrates with alkyl esters may explode due to the formation of unstable alkyl nitrates.
- ▶ Mixtures of a nitrate with phosphorous, tin(II) chloride and other reducing agents may react explosively.
- ▶ Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous
- ▶ Avoid storage with reducing agents.



X — Must not be stored together

O — May be stored together with specific precautions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

| Source | Ingredient | Material name | TWA | STEL | Peak | Notes |
|---|----------------|----------------------------|-------------------------------|------------------------------|---------------|---------------|
| Singapore Permissible Exposure Limits of Toxic Substances | ferric nitrate | Iron salts, soluble, as Fe | 1 mg/m ³ | Not Available | Not Available | Not Available |
| Singapore Permissible Exposure Limits of Toxic Substances | nitric acid | Nitric acid | 2 ppm / 5.2 mg/m ³ | 10 mg/m ³ / 4 ppm | Not Available | Not Available |

Emergency Limits

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|----------------|----------------------|-----------------------|-----------------------|
| ferric nitrate | 13 mg/m ³ | 140 mg/m ³ | 850 mg/m ³ |
| ferric nitrate | 22 mg/m ³ | 110 mg/m ³ | 640 mg/m ³ |
| nitric acid | Not Available | Not Available | Not Available |

| Ingredient | Original IDLH | Revised IDLH |
|----------------|---------------|---------------|
| ferric nitrate | Not Available | Not Available |

Continued...

| Ingredient | Original IDLH | Revised IDLH |
|-------------|---------------|---------------|
| nitric acid | 25 ppm | Not Available |
| water | Not Available | Not Available |

MATERIAL DATA

The recommended TLV is thought to reduce the likelihood of respiratory irritation and skin irritation from exposure to aerosols and mists of soluble iron salts.


For nitric acid:

Odour Threshold Value: 0.27 ppm (detection)

NOTE: Detector tubes for nitric acid, measuring in excess of 5 ppm, are commercially available.

The TLV-TWA is protective against corrosion of the skin, tissue and other membranes, against irritation to the eyes and mucous membranes, and against acute pulmonary oedema or chronic obstructive lung disease. It is not clear whether the TLV-TWA and STEL values will prevent potentiation of the toxicity of inhaled nitrogen dioxide.

Exposure controls

| | |
|---|---|
| Appropriate engineering controls | Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. |
| Personal protection |  |
| Eye and face protection | <ul style="list-style-type: none"> ▶ Chemical goggles. ▶ Full face shield may be required for supplementary but never for primary protection of eyes. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. |
| Skin protection | See Hand protection below |
| Hands/feet protection | <ul style="list-style-type: none"> ▶ Wear chemical protective gloves, e.g. PVC. ▶ Wear safety footwear or safety gumboots, e.g. Rubber ▶ When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots. |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none"> ▶ Overalls. ▶ PVC Apron. ▶ PVC protective suit may be required if exposure severe. |

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the

computer-generated selection:

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| Material | CPI |
|------------------|-----|
| BUTYL | A |
| NEOPRENE | A |
| HYPALON | C |
| NATURAL RUBBER | C |
| NATURAL+NEOPRENE | C |
| NEOPRENE/NATURAL | C |
| NITRILE+PVC | C |
| PE/EVAL/PE | C |
| PVA | C |
| PVC | C |
| SARANEX-23 | C |
| VITON | C |

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

Respiratory protection

- Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
- Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory protection. These may be government mandated or vendor recommended.
- Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
- Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU)
- Use approved positive flow mask if significant quantities of dust becomes airborne.
- Try to avoid creating dust conditions.

Continued...

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

| | | | |
|---|----------------|--|----------------|
| Appearance | Brown | | |
| Physical state | Liquid | Relative density (Water = 1) | 1.11 |
| Odour | Pungent | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | Not Available |
| pH (as supplied) | 1.6 | Decomposition temperature | Not Available |
| Melting point / freezing point (°C) | Not Available | Viscosity (cSt) | Not Available |
| Initial boiling point and boiling range (°C) | Not Available | Molecular weight (g/mol) | Not Applicable |
| Flash point (°C) | Not Applicable | Taste | Not Available |
| Evaporation rate | Not Available | Explosive properties | Not Available |
| Flammability | Not Applicable | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | Not Applicable | Surface Tension (dyn/cm or mN/m) | Not Available |
| Lower Explosive Limit (%) | Not Applicable | Volatile Component (%vol) | >75 |
| Vapour pressure (kPa) | Not Available | Gas group | Not Available |
| Solubility in water | Miscible | pH as a solution (Not Available%) | Not Available |
| Vapour density (Air = 1) | Not Available | VOC g/L | Not Applicable |

SECTION 10 Stability and reactivity

| | |
|---|---|
| Reactivity | See section 7 |
| Chemical stability | ▸ Contact with alkaline material liberates heat |
| Possibility of hazardous reactions | See section 7 |
| Conditions to avoid | See section 7 |
| Incompatible materials | See section 7 |
| Hazardous decomposition products | See section 5 |

SECTION 11 Toxicological information

Information on toxicological effects

| | |
|----------------|--|
| Inhaled | <p>The material is not thought to produce adverse health effects following inhalation (as classified by EC Directives using animal models). Nevertheless, adverse systemic effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.</p> <p>Not normally a hazard due to non-volatile nature of product</p> <p>Acidic corrosives produce respiratory tract irritation with coughing, choking and mucous membrane damage. Symptoms of exposure may include dizziness, headache, nausea and weakness. In more severe exposures, pulmonary oedema may be evident either immediately or after a latent period of 5-72 hours.</p> |
|----------------|--|

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| | |
|---------------------|--|
| Ingestion | <p>The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion. Accidental ingestion of the material may be damaging to the health of the individual.</p> <p>The substance and/or its metabolites may bind to haemoglobin inhibiting normal uptake of oxygen. This condition, known as "methaemoglobinemia", is a form of oxygen starvation (anoxia). Symptoms include cyanosis (a bluish discolouration skin and mucous membranes) and breathing difficulties.</p> <p>Ingestion of acidic corrosives may produce circumoral burns with a distinct discolouration of the mucous membranes of the mouth, throat and oesophagus. Immediate pain and difficulties in swallowing and speaking may also be evident. Oedema of the epiglottis may produce respiratory distress and possibly, asphyxia.</p> <p>The lethal oral dose of nitrite for adults has been variously reported to be between 0.7 and 6 g NO₂- (approximately 10 to 100 mg NO₂-/kg). Lower doses may apply for children (especially neonates), the elderly and people with certain enzyme deficiencies. The first symptoms of oral nitrite poisoning develop within 15 to 45 minutes</p> <p>In humans, inorganic nitrites produce smooth muscle relaxation, methaemoglobinaemia and cyanosis. The primary effect of nitrite intoxication in animals is methaemoglobinaemia whilst secondary effects include vasodilation, relaxation of smooth muscle and lowering of blood pressure.</p> |
| Skin Contact | <p>The material can produce chemical burns following direct contact with the skin.</p> <p>Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.</p> <p>Skin contact with acidic corrosives may result in pain and burns; these may be deep with distinct edges and may heal slowly with the formation of scar tissue.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p> |
| Eye | <p>The material can produce chemical burns to the eye following direct contact. Vapours or mists may be extremely irritating. When applied to the eye(s) of animals, the material produces severe ocular lesions which are present twenty-four hours or more after instillation.</p> <p>Irritation of the eyes may produce a heavy secretion of tears (lachrymation).</p> <p>Direct eye contact with acid corrosives may produce pain, lachrymation, photophobia and burns. Mild burns of the epithelia generally recover rapidly and completely. Severe burns produce long-lasting and possible irreversible damage.</p> |
| Chronic | <p>Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.</p> <p>Repeated or prolonged exposure to acids may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue. Gastrointestinal disturbances may also occur.</p> <p>Chronic excessive iron exposure has been associated with haemosiderosis and consequent possible damage to the liver and pancreas. Haemosiderin is a golden-brown insoluble protein produced by phagocytic digestion of haematin (an iron-based pigment). Haemosiderin is found in most tissues, especially in the liver, in the form of granules.</p> <p>Overexposure to respirable dust may cause coughing, wheezing, difficulty in breathing and impaired lung function. Chronic symptoms may include decreased vital lung capacity, chest infections</p> <p>Repeated exposures, in an occupational setting, to high levels of fine- divided dusts may produce a condition known as pneumoconiosis which is the lodgement of any inhaled dusts in the lung irrespective of the effect. This is particularly true when a significant number of particles less than 0.5 microns (1/50,000 inch), are present.</p> |

| | | |
|--|---|---|
| CHLORIDE PHOTOMETER MO401 Reagent B | TOXICITY Not Available | IRRITATION Not Available |
| ferric nitrate | TOXICITY dermal (rat) LD50: >2000 mg/kg ^[1] Oral (Rat) LD50; >2000 mg/kg ^[1] | IRRITATION Not Available |
| nitric acid | TOXICITY Inhalation(Rat) LC50; 0.13 mg/L4h ^[2] | IRRITATION Eye: adverse effect observed (irritating) ^[1] Skin: adverse effect observed (corrosive) ^[1] |
| water | TOXICITY Oral (Rat) LD50; >90000 mg/kg ^[2] | IRRITATION Not Available |
| Legend: | 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances | |

| | |
|--------------------|---|
| NITRIC ACID | <p>Oral (?) LD50: 50-500 mg/kg * [Various Manufacturers]</p> <p>The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.</p> <p>The material may produce respiratory tract irritation. Symptoms of pulmonary irritation may include coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and a burning sensation.</p> |
|--------------------|---|

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| | |
|---|---|
| | <p>Unlike most organs, the lung can respond to a chemical insult or a chemical agent, by first removing or neutralising the irritant and then repairing the damage (inflammation of the lungs may be a consequence).</p> <p>The repair process (which initially developed to protect mammalian lungs from foreign matter and antigens) may, however, cause further damage to the lungs (fibrosis for example) when activated by hazardous chemicals. Often, this results in an impairment of gas exchange, the primary function of the lungs.</p> <p>The material may produce severe skin irritation after prolonged or repeated exposure, and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) thickening of the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis. Prolonged contact is unlikely, given the severity of response, but repeated exposures may produce severe ulceration.</p> |
| WATER | No significant acute toxicological data identified in literature search. |
| CHLORIDE PHOTOMETER MO401 Reagent B & NITRIC ACID | <p>for acid mists, aerosols, vapours</p> <p>Data from assays for genotoxic activity in vitro suggest that eukaryotic cells are susceptible to genetic damage when the pH falls to about 6.5. Cells from the respiratory tract have not been examined in this respect. Mucous secretion may protect the cells of the airways from direct exposure to inhaled acidic mists, just as mucous plays an important role in protecting the gastric epithelium from its auto-secreted hydrochloric acid.</p> |
| CHLORIDE PHOTOMETER MO401 Reagent B & FERRIC NITRATE & NITRIC ACID | Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. |

| | | | |
|--|---|---------------------------------|---|
| Acute Toxicity | ✗ | Carcinogenicity | ✗ |
| Skin Irritation/Corrosion | ✓ | Reproductivity | ✗ |
| Serious Eye Damage/Irritation | ✓ | STOT - Single Exposure | ✗ |
| Respiratory or Skin sensitisation | ✗ | STOT - Repeated Exposure | ✗ |
| Mutagenicity | ✗ | Aspiration Hazard | ✗ |

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

| CHLORIDE PHOTOMETER MO401 Reagent B | Endpoint | Test Duration (hr) | Species | Value | Source |
|-------------------------------------|---------------|--------------------|-------------------------------|---------------|---------------|
| | Not Available | Not Available | Not Available | Not Available | Not Available |
| ferric nitrate | Endpoint | Test Duration (hr) | Species | Value | Source |
| | NOEC(ECx) | 3504h | Fish | 1.6mg/l | 2 |
| | LC50 | 96h | Fish | 1010mg/l | 2 |
| | EC50 | 72h | Algae or other aquatic plants | 18mg/l | 2 |
| nitric acid | Endpoint | Test Duration (hr) | Species | Value | Source |
| | EC50(ECx) | 96h | Crustacea | 39mg/l | 2 |
| | LC50 | 96h | Fish | 102.24mg/L | 4 |
| | EC50 | 48h | Crustacea | 490mg/l | 2 |
| water | Endpoint | Test Duration (hr) | Species | Value | Source |
| | Not Available | Not Available | Not Available | Not Available | Not Available |

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

Ecotoxicity:

The tolerance of water organisms towards pH margin and variation is diverse. Recommended pH values for test species listed in OECD guidelines are between 6.0 and almost 9. Acute testing with fish showed 96h-LC50 at about pH 3.5

The nitrates are of environmental concern because of their high water solubility and consequent leaching, diffusion, and environmental mobility in soil and water. Nitrate can contaminate groundwater to unacceptable levels. Nitrite is formed from nitrate or ammonium ion by micro-organisms in soil, water, sewage and the

Continued...

alimentary tract.

Prevent, by any means available, spillage from entering drains or water courses.

DO NOT discharge into sewer or waterways.

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|------------|-------------------------|------------------|
| water | LOW | LOW |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|------------|---------------------------------------|
| | No Data available for all ingredients |

Mobility in soil

| Ingredient | Mobility |
|------------|---------------------------------------|
| | No Data available for all ingredients |


SECTION 13 Disposal considerations

Waste treatment methods

| Product / Packaging disposal | |
|------------------------------|--|
| | <ul style="list-style-type: none"> ▸ Recycle wherever possible. ▸ Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. ▸ Treat and neutralise at an approved treatment plant. |

SECTION 14 Transport information

Labels Required

| | |
|------------------|---|
| |  |
| Marine Pollutant | NO |

Land transport (UN)

| | | |
|------------------------------|--|----------------|
| UN number | 3264 | |
| UN proper shipping name | CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (contains nitric acid) | |
| Transport hazard class(es) | Class | 8 |
| | Subrisk | Not Applicable |
| Packing group | III | |
| Environmental hazard | Not Applicable | |
| Special precautions for user | Special provisions | 223; 274 |
| | Limited quantity | 5 L |

Air transport (ICAO-IATA / DGR)

| | | |
|----------------------------|--|----------------|
| UN number | 3264 | |
| UN proper shipping name | Corrosive liquid, acidic, inorganic, n.o.s. * (contains nitric acid) | |
| Transport hazard class(es) | ICAO/IATA Class | 8 |
| | ICAO / IATA Subrisk | Not Applicable |
| | ERG Code | 8L |
| Packing group | III | |
| Environmental hazard | Not Applicable | |

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| | | |
|-------------------------------------|---|---------|
| Special precautions for user | Special provisions | A3 A803 |
| | Cargo Only Packing Instructions | 856 |
| | Cargo Only Maximum Qty / Pack | 60 L |
| | Passenger and Cargo Packing Instructions | 852 |
| | Passenger and Cargo Maximum Qty / Pack | 5 L |
| | Passenger and Cargo Limited Quantity Packing Instructions | Y841 |
| | Passenger and Cargo Limited Maximum Qty / Pack | 1 L |

Sea transport (IMDG-Code / GGVSee)

| | | |
|-------------------------------------|--|----------------|
| UN number | 3264 | |
| UN proper shipping name | CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (contains nitric acid) | |
| Transport hazard class(es) | IMDG Class | 8 |
| | IMDG Subrisk | Not Applicable |
| Packing group | III | |
| Environmental hazard | Not Applicable | |
| Special precautions for user | EMS Number | F-A, S-B |
| | Special provisions | 223 274 |
| | Limited Quantities | 5 L |

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

| Product name | Group |
|----------------|---------------|
| ferric nitrate | Not Available |
| nitric acid | Not Available |
| water | Not Available |

Transport in bulk in accordance with the ICG Code

| Product name | Ship Type |
|----------------|---------------|
| ferric nitrate | Not Available |
| nitric acid | Not Available |
| water | Not Available |

SECTION 15 Regulatory information**Safety, health and environmental regulations / legislation specific for the substance or mixture****ferric nitrate is found on the following regulatory lists**

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

Singapore Permissible Exposure Limits of Toxic Substances

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2A: Probably carcinogenic to humans

nitric acid is found on the following regulatory lists

Singapore Permissible Exposure Limits of Toxic Substances

water is found on the following regulatory lists

Not Applicable

National Inventory Status

| National Inventory | Status |
|--|--------|
| Australia - AIIIC / Australia Non-Industrial Use | Yes |

Continued...

CHLORIDE PHOTOMETER MO401 Reagent B

| National Inventory | Status |
|-------------------------------|--|
| Canada - DSL | Yes |
| Canada - NDSL | No (ferric nitrate; nitric acid; water) |
| China - IECSC | Yes |
| Europe - EINEC / ELINCS / NLP | Yes |
| Japan - ENCS | Yes |
| Korea - KECI | Yes |
| New Zealand - NZIoC | Yes |
| Philippines - PICCS | Yes |
| USA - TSCA | Yes |
| Taiwan - TCSI | Yes |
| Mexico - INSQ | Yes |
| Vietnam - NCI | Yes |
| Russia - FBEPH | Yes |
| Legend: | <p>Yes = All CAS declared ingredients are on the inventory</p> <p>No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.</p> |

SECTION 16 Other information

| | |
|---------------|------------|
| Revision Date | 21/08/2019 |
| Initial Date | 21/08/2019 |

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

SDS Version Summary

| Version | Date of Update | Sections Updated |
|---------|----------------|----------------------------------|
| 0.3 | 21/08/2019 | Ingredients, Physical Properties |

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

CHLORIDE T1

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 666661

Version No: 2.3

Safety Data Sheet

Issue Date: 17/03/2020

Print Date: 24/03/2022

L.GHS.SGP.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

| | |
|-------------------------------|----------------|
| Product name | CHLORIDE T1 |
| Chemical Name | Not Applicable |
| Synonyms | 666661 |
| Chemical formula | Not Applicable |
| Other means of identification | 666661 |

Relevant identified uses of the substance or mixture and uses advised against

| | |
|--------------------------|---|
| Relevant identified uses | Use according to manufacturer's directions. |
|--------------------------|---|

Details of the supplier of the safety data sheet

| | | | |
|-------------------------|---|---|--|
| Registered company name | Wilhelmsen Ships Service (S) Pte. Ltd. | Wilhelmsen Ships Service AS* Central Warehouse | Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen |
| Address | 186 Pandan Loop Singapore 128376 Singapore | Willem Barentszstraat 50 Rotterdam Netherlands | -----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway |
| Telephone | +65 6395 4545 | +31 10 4877 777 | Not Available |
| Fax | Not Available | Not Available | Not Available |
| Website | http://www.wilhelmsen.com/services/maritime/compan | http://www.wilhelmsen.com | http://www.wilhelmsen.com |
| Email | wss.singapore@wilhelmsen.com | wss.rotterdam@wilhelmsen.com | wss.global.sdsinfo@wilhelmsen.com |

| | |
|-------------------------|---|
| Registered company name | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +31 10 4877 777 |
| Fax | Not Available |
| Website | http://www.wilhelmsen.com |
| Email | wss.rotterdam@wilhelmsen.com |

Emergency telephone number

| | | | |
|----------------------------|------------------|--------------------------|------------------|
| Association / Organisation | 24hrs - Chemtrec | Dutch nat. poison centre | 24hrs - Chemtrec |
|----------------------------|------------------|--------------------------|------------------|


| | | | |
|-----------------------------------|--------------------------|-----------------|-----------------|
| Emergency telephone numbers | +31-10-4877700 | + 31 88 7558561 | +31-10-4877700 |
| Other emergency telephone numbers | +31-10-4877700 | + 31 10 4877700 | +1 800 424 9300 |
| Association / Organisation | Dutch nat. poison centre | | |
| Emergency telephone numbers | + 31 30 274 88 88 | | |
| Other emergency telephone numbers | + 31-10-4877700 | | |

SECTION 2 Hazards identification

Classification of the substance or mixture

| | |
|----------------|--|
| Classification | Serious Eye Damage/Eye Irritation Category 1, Skin Corrosion/Irritation Category 2 |
|----------------|--|

Label elements

| | |
|---------------------|---|
| Hazard pictogram(s) |  |
| Signal word | Danger |

Hazard statement(s)

| | |
|------|----------------------------|
| H318 | Causes serious eye damage. |
| H315 | Causes skin irritation. |

Precautionary statement(s) Prevention

| | |
|------|--|
| P280 | Wear protective gloves, protective clothing, eye protection and face protection. |
| P264 | Wash all exposed external body areas thoroughly after handling. |

Precautionary statement(s) 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/doctor/physician/first aider. |
| P302+P352 | IF ON SKIN: Wash with plenty of water. |

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

| CAS No | %[weight] | Name |
|-----------|-----------|-------------------------|
| 7681-38-1 | 45-55 | sodium hydrogen sulfate |

SECTION 4 First aid measures

Description of first aid measures

Continued...

| | |
|---------------------|---|
| Eye Contact | <ul style="list-style-type: none"> ▸ Generally not applicable. |
| Skin Contact | <p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▸ Immediately flush body and clothes with large amounts of water, using safety shower if available. ▸ Quickly remove all contaminated clothing, including footwear. ▸ Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre. ▸ Transport to hospital, or doctor. ▸ Generally not applicable. |
| Inhalation | <ul style="list-style-type: none"> ▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor, without delay. ▸ Generally not applicable. |
| Ingestion | <ul style="list-style-type: none"> ▸ For advice, contact a Poisons Information Centre or a doctor at once. ▸ Urgent hospital treatment is likely to be needed. ▸ If swallowed do NOT induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully. ▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Transport to hospital or doctor without delay. ▸ Generally not applicable. |

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

For acute or short term repeated exposures to strong acids:

- Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
- Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling
- Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
- Strong acids produce a coagulation necrosis characterised by formation of a coagulum (eschar) as a result of the dessicating action of the acid on proteins in specific tissues.

INGESTION:

- Immediate dilution (milk or water) within 30 minutes post ingestion is recommended.
- **DO NOT attempt to neutralise the acid since exothermic reaction may extend the corrosive injury.**
- Be careful to avoid further vomit since re-exposure of the mucosa to the acid is harmful. Limit fluids to one or two glasses in an adult.
- Charcoal has no place in acid management.
- Some authors suggest the use of lavage within 1 hour of ingestion.

SKIN:

- Skin lesions require copious saline irrigation. Treat chemical burns as thermal burns with non-adherent gauze and wrapping.
- Deep second-degree burns may benefit from topical silver sulfadiazine.

EYE:

- Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjunctival cul-de-sacs. Irrigation should last at least 20-30 minutes. **DO NOT use neutralising agents or any other additives.** Several litres of saline are required.
- Cycloplegic drops, (1% cyclopentolate for short-term use or 5% homatropine for longer term use) antibiotic drops, vasoconstrictive agents or artificial tears may be indicated dependent on the severity of the injury.
- Steroid eye drops should only be administered with the approval of a consulting ophthalmologist).

[Ellenhorn and Barceloux: Medical Toxicology]

SECTION 5 Firefighting measures

Extinguishing media

- There is no restriction on the type of extinguisher which may be used.
- Use extinguishing media suitable for surrounding area.

Special hazards arising from the substrate or mixture

| | |
|-----------------------------|-------------|
| Fire Incompatibility | None known. |
|-----------------------------|-------------|

Advice for firefighters

| | |
|----------------------|--|
| Fire Fighting | <ul style="list-style-type: none"> ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves in the event of a fire. ▸ Prevent, by any means available, spillage from entering drains or water courses. |
|----------------------|--|

| | |
|------------------------------|---|
| | Slight hazard when exposed to heat, flame and oxidisers. |
| Fire/Explosion Hazard | <p>Decomposition may produce toxic fumes of:</p> <ul style="list-style-type: none"> • sulfur oxides (SOx) <p>May emit poisonous fumes. May emit corrosive fumes.</p> <p>Articles and manufactured articles may constitute a fire hazard where polymers form their outer layers or where combustible packaging remains in place.</p> <p>Certain substances, found throughout their construction, may degrade or become volatile when heated to high temperatures. This may create a secondary hazard.</p> |

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

| | |
|---------------------|---|
| Minor Spills | <ul style="list-style-type: none"> ▶ Clean up all spills immediately. ▶ Secure load if safe to do so. ▶ Bundle/collect recoverable product. |
| Major Spills | <p>Minor hazard.</p> <ul style="list-style-type: none"> ▶ Clear area of personnel. ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Clean up all spills immediately. ▶ Wear protective clothing, safety glasses, dust mask, gloves. ▶ Secure load if safe to do so. |

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

| | |
|--------------------------|---|
| Safe handling | <ul style="list-style-type: none"> ▶ Avoid all personal contact, including inhalation. ▶ Wear protective clothing when risk of exposure occurs. ▶ Use in a well-ventilated area. |
| Other information | <ul style="list-style-type: none"> ▶ Store away from incompatible materials. |

Conditions for safe storage, including any incompatibilities

| | |
|--------------------------------|---|
| Suitable container | <p>Generally packaging as originally supplied with the article or manufactured item is sufficient to protect against physical hazards. If repackaging is required ensure the article is intact and does not show signs of wear. As far as is practicably possible, reuse the original packaging or something providing a similar level of protection to both the article and the handler.</p> <ul style="list-style-type: none"> ▶ DO NOT use aluminium or galvanised containers ▶ Lined metal can, lined metal pail/ can. ▶ Plastic pail. ▶ Polyliner drum. |
| Storage incompatibility | <ul style="list-style-type: none"> ▶ Inorganic acids are generally soluble in water with the release of hydrogen ions. The resulting solutions have pH's of less than 7.0. ▶ Inorganic acids neutralise chemical bases (for example: amines and inorganic hydroxides) to form salts - neutralisation can generate dangerously large amounts of heat in small spaces. |



X — Must not be stored together

O — May be stored together with specific preventions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Not Available

Emergency Limits

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|-------------------------|------------------------|---------------------|----------------------|
| sodium hydrogen sulfate | 0.63 mg/m ³ | 7 mg/m ³ | 42 mg/m ³ |
| sodium hydrogen sulfate | 0.82 mg/m ³ | 9 mg/m ³ | 54 mg/m ³ |


| Ingredient | Original IDLH | Revised IDLH |
|-------------------------|---------------|---------------|
| sodium hydrogen sulfate | Not Available | Not Available |

MATERIAL DATA

NOTE: Detector tubes for sulfuric acid, measuring in excess of 1 mg/m³, are commercially available.

Based on controlled inhalation studies the TLV-TWA is thought to be protective against the significant risk of pulmonary irritation and incorporates a margin of safety so as to prevent injury to the skin and teeth seen in battery workers acclimatised to workplace concentrations of 16 mg/m³. Experimental evidence in normal unacclimated humans indicates the recognition, by all subjects, of odour, taste or irritation at 3 mg/m³ or 5 mg/m³.

Exposure controls

| | |
|---|---|
| Appropriate engineering controls | <p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.</p> <p>The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> <p>Articles or manufactured items, in their original condition, generally don't require engineering controls during handling or in normal use.</p> <p>Exceptions may arise following extensive use and subsequent wear, during recycling or disposal operations where substances, found in the article, may be released to the environment.</p> |
| Personal protection |  |
| Eye and face protection | <ul style="list-style-type: none"> ▸ Safety glasses with unperforated side shields may be used where continuous eye protection is desirable, as in laboratories; spectacles are not sufficient where complete eye protection is needed such as when handling bulk-quantities, where there is a danger of splashing, or if the material may be under pressure. ▸ Chemical goggles whenever there is a danger of the material coming in contact with the eyes; goggles must be properly fitted. ▸ Full face shield (20 cm, 8 in minimum) may be required for supplementary but never for primary protection of eyes; these afford face protection. <p>No special equipment required due to the physical form of the product.</p> <ul style="list-style-type: none"> ▸ Safety glasses with side shields. ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. |
| Skin protection | See Hand protection below |
| Hands/feet protection | <p>Wear general protective gloves, eg. light weight rubber gloves.</p> <ul style="list-style-type: none"> ▸ Elbow length PVC gloves |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none"> ▸ Overalls. ▸ P.V.C apron. ▸ Barrier cream. |

Respiratory protection

Particulate. (AS/NZS 1716 & 1715, EN 143:2000 & 149:001, ANSI Z88 or national equivalent)

Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

| Required minimum protection factor | Maximum gas/vapour concentration present in air p.p.m. (by volume) | Half-face Respirator | Full-Face Respirator |
|------------------------------------|--|----------------------|----------------------|
| up to 10 | 1000 | -AUS / Class1 P2 | - |

Continued...

| | | | |
|-----------|-------|-----------|-------------------|
| up to 50 | 1000 | - | -AUS / Class 1 P2 |
| up to 50 | 5000 | Airline * | - |
| up to 100 | 5000 | - | -2 P2 |
| up to 100 | 10000 | - | -3 P2 |
| 100+ | | | Airline** |

* - Continuous Flow ** - Continuous-flow or positive pressure demand

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO₂), G = Agricultural chemicals, K = Ammonia(NH₃), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

Respiratory protection not normally required due to the physical form of the product.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

| | | | |
|---|------------------------|--|---------------|
| Appearance | Not Available | | |
| Physical state | article | Relative density (Water = 1) | 1.78 |
| Odour | Not Available | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | Not Available |
| pH (as supplied) | -0.4 | Decomposition temperature | Not Available |
| Melting point / freezing point (°C) | Not Available | Viscosity (cSt) | Not Available |
| Initial boiling point and boiling range (°C) | Not Available | Molecular weight (g/mol) | Not Available |
| Flash point (°C) | Not Available | Taste | Not Available |
| Evaporation rate | Not Available BuAC = 1 | Explosive properties | Not Available |
| Flammability | Not Available | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | Not Available | Surface Tension (dyn/cm or mN/m) | Not Available |
| Lower Explosive Limit (%) | Not Available | Volatile Component (%vol) | Not Available |
| Vapour pressure (kPa) | Not Available | Gas group | Not Available |
| Solubility in water | Miscible | pH as a solution (Not Available%) | 1.6 |
| Vapour density (Air = 1) | Not Available | VOC g/L | Not Available |

SECTION 10 Stability and reactivity

| | |
|---|---|
| Reactivity | See section 7 |
| Chemical stability | Product is considered stable and hazardous polymerisation will not occur. |
| Possibility of hazardous reactions | See section 7 |
| Conditions to avoid | See section 7 |
| Incompatible materials | See section 7 |
| Hazardous decomposition products | See section 5 |

SECTION 11 Toxicological information

Information on toxicological effects

| | |
|----------------|--|
| Inhaled | Evidence shows, or practical experience predicts, that the material produces irritation of the respiratory system, in a substantial number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of |
|----------------|--|

| | |
|---------------------|--|
| | <p>gas exchange, the primary function of the lungs.</p> <p>Acidic corrosives produce respiratory tract irritation with coughing, choking and mucous membrane damage. Symptoms of exposure may include dizziness, headache, nausea and weakness. In more severe exposures, pulmonary oedema may be evident either immediately or after a latent period of 5-72 hours.</p> <p>Levels above 10 ug/m3 of suspended inorganic sulfates in the air may cause an excess risk of asthmatic attacks in susceptible persons</p> <p>Exposure to high concentrations causes bronchitis and is characterised by the onset of haemorrhagic pulmonary oedema.</p> |
| Ingestion | <p>Ingestion of acidic corrosives may produce circumoral burns with a distinct discolouration of the mucous membranes of the mouth, throat and oesophagus. Immediate pain and difficulties in swallowing and speaking may also be evident. Oedema of the epiglottis may produce respiratory distress and possibly, asphyxia.</p> <p>Sulfate salts are poorly absorbed from the gastro-intestinal tract but because of osmotic activity are able to draw water from the lumen to produce diarrhoea (purging). Sulfate ion usually has little toxicological potential.</p> <p>The material has NOT been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence. The material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g liver, kidney) damage is evident.</p> |
| Skin Contact | <p>Skin contact with acidic corrosives may result in pain and burns; these may be deep with distinct edges and may heal slowly with the formation of scar tissue.</p> <p>Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p> |
| Eye | <p>Direct eye contact with acid corrosives may produce pain, lachrymation, photophobia and burns. Mild burns of the epithelia generally recover rapidly and completely. Severe burns produce long-lasting and possible irreversible damage.</p> <p>When applied to the eye(s) of animals, the material produces severe ocular lesions which are present twenty-four hours or more after instillation.</p> <p>Irritation of the eyes may produce a heavy secretion of tears (lachrymation).</p> |
| Chronic | <p>Repeated or prolonged exposure to acids may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue. Gastrointestinal disturbances may also occur.</p> <p>Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.</p> <p>Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.</p> |

| | | |
|--------------------------------|--|-------------------|
| CHLORIDE T1 | TOXICITY | IRRITATION |
| | Not Available | Not Available |
| sodium hydrogen sulfate | TOXICITY | IRRITATION |
| | Inhalation(Rat) LC50; >2.4 mg/4h ^[1] Oral (Rat) LD50; >2000 mg/kg ^[1] | Not Available |
| Legend: | 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances | |

| | |
|--------------------------------|---|
| CHLORIDE T1 | <p>for acid mists, aerosols, vapours</p> <p>Data from assays for genotoxic activity in vitro suggest that eukaryotic cells are susceptible to genetic damage when the pH falls to about 6.5. Cells from the respiratory tract have not been examined in this respect. Mucous secretion may protect the cells of the airways from direct exposure to inhaled acidic mists, just as mucous plays an important role in protecting the gastric epithelium from its auto-secreted hydrochloric acid.</p> |
| SODIUM HYDROGEN SULFATE | <p>The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.</p> <p>The material may produce respiratory tract irritation. Symptoms of pulmonary irritation may include coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and a burning sensation.</p> <p>Unlike most organs, the lung can respond to a chemical insult or a chemical agent, by first removing or neutralising the irritant and then repairing the damage (inflammation of the lungs may be a consequence).</p> <p>The repair process (which initially developed to protect mammalian lungs from foreign matter and antigens) may, however, cause further damage to the lungs (fibrosis for example) when activated by hazardous chemicals. Often, this results in an impairment of gas exchange, the primary function of the lungs.</p> <p>The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.</p> |

| | | | |
|--|--|--|--|
| CHLORIDE T1 & SODIUM HYDROGEN SULFATE | Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. | | |
|--|--|--|--|

| | | | |
|--|---|---------------------------------|---|
| Acute Toxicity | ✗ | Carcinogenicity | ✗ |
| Skin Irritation/Corrosion | ✓ | Reproductivity | ✗ |
| Serious Eye Damage/Irritation | ✓ | STOT - Single Exposure | ✗ |
| Respiratory or Skin sensitisation | ✗ | STOT - Repeated Exposure | ✗ |
| Mutagenicity | ✗ | Aspiration Hazard | ✗ |

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

| CHLORIDE T1 | Endpoint | Test Duration (hr) | Species | Value | Source |
|-------------|---------------|--------------------|---------------|---------------|---------------|
| | Not Available | Not Available | Not Available | Not Available | Not Available |

| sodium hydrogen sulfate | Endpoint | Test Duration (hr) | Species | Value | Source |
|-------------------------|-----------|--------------------|-----------|---------|--------|
| | EC50 | 48h | Crustacea | 190mg/l | 1 |
| | EC50(ECx) | 48h | Crustacea | 190mg/l | 1 |
| | LC50 | 96h | Fish | 120mg/l | 2 |

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

Ecotoxicity:

The tolerance of water organisms towards pH margin and variation is diverse. Recommended pH values for test species listed in OECD guidelines are between 6.0 and almost 9. Acute testing with fish showed 96h-LC50 at about pH 3.5 for inorganic sulfates:

Environmental fate:

Data from tap water studies with human volunteers indicate that sulfates produce a laxative effect at concentrations of 1000 - 1200 mg/litre, but no increase in diarrhoea, dehydration or weight loss. The presence of sulfate in drinking-water can also result in a noticeable taste; the lowest taste threshold concentration for sulfate is approximately 250 mg/litre as the sodium salt. Sulfate may also contribute to the corrosion of distribution systems.

DO NOT discharge into sewer or waterways.

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|-------------------------|-------------------------|------------------|
| sodium hydrogen sulfate | HIGH | HIGH |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|-------------------------|------------------------|
| sodium hydrogen sulfate | LOW (LogKOW = -2.2002) |

Mobility in soil

| Ingredient | Mobility |
|-------------------------|-------------------|
| sodium hydrogen sulfate | LOW (KOC = 6.124) |

SECTION 13 Disposal considerations

Waste treatment methods

| | |
|-------------------------------------|--|
| Product / Packaging disposal | <ul style="list-style-type: none"> · Recycle wherever possible or consult manufacturer for recycling options. · Consult State Land Waste Management Authority for disposal. ▶ DO NOT allow wash water from cleaning or process equipment to enter drains. ▶ It may be necessary to collect all wash water for treatment before disposal. ▶ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. |
|-------------------------------------|--|

SECTION 14 Transport information

Labels Required

| | |
|-------------------------|----|
| Marine Pollutant | NO |
|-------------------------|----|

Land transport (UN): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

| Product name | Group |
|-------------------------|---------------|
| sodium hydrogen sulfate | Not Available |

Transport in bulk in accordance with the ICG Code

| Product name | Ship Type |
|-------------------------|---------------|
| sodium hydrogen sulfate | Not Available |

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

sodium hydrogen sulfate is found on the following regulatory lists

Not Applicable

National Inventory Status

| National Inventory | Status |
|---|--|
| Australia - AIIC / Australia Non-Industrial Use | Yes |
| Canada - DSL | Yes |
| Canada - NDSL | No (sodium hydrogen sulfate) |
| China - IECSC | Yes |
| Europe - EINEC / ELINCS / NLP | Yes |
| Japan - ENCS | Yes |
| Korea - KECI | Yes |
| New Zealand - NZIoC | Yes |
| Philippines - PICCS | Yes |
| USA - TSCA | Yes |
| Taiwan - TCSI | Yes |
| Mexico - INSQ | Yes |
| Vietnam - NCI | Yes |
| Russia - FBEPH | Yes |
| Legend: | <p>Yes = All CAS declared ingredients are on the inventory</p> <p>No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.</p> |

SECTION 16 Other information

| | |
|----------------------|------------|
| Revision Date | 17/03/2020 |
| Initial Date | 07/09/2017 |

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

SDS Version Summary

| Version | Date of Update | Sections Updated |
|---------|----------------|---|
| 1.3 | 17/03/2020 | Acute Health (eye), Acute Health (inhaled), Acute Health (swallowed), Environmental, Ingredients, Physical Properties, Synonyms |

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

CHLORIDE T2 TABLETS

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 666663

Version No: 2.3

Safety Data Sheet

Issue Date: 11/08/2021

Print Date: 24/03/2022

L.GHS.SGP.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

| | |
|--------------------------------------|--|
| Product name | CHLORIDE T2 TABLETS |
| Chemical Name | Not Applicable |
| Synonyms | Not Available |
| Proper shipping name | CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S. (contains silver nitrate and potassium peroxymonosulfate) |
| Chemical formula | Not Applicable |
| Other means of identification | 666663 |

Relevant identified uses of the substance or mixture and uses advised against

| | |
|---------------------------------|---|
| Relevant identified uses | Use according to manufacturer's directions. |
|---------------------------------|---|

Details of the supplier of the safety data sheet

| | | | |
|--------------------------------|---|--|---|
| Registered company name | Wilhelmsen Ships Service (S) Pte. Ltd. | Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | 186 Pandan Loop Singapore 128376 Singapore | -----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +65 6395 4545 | Not Available | +31 10 4877 777 |
| Fax | Not Available | Not Available | Not Available |
| Website | http://www.wilhelmsen.com/services/maritime/compan | http://www.wilhelmsen.com | http://www.wilhelmsen.com |
| Email | wss.singapore@wilhelmsen.com | wss.global.sdsinfo@wilhelmsen.com | wss.rotterdam@wilhelmsen.com |

| | |
|--------------------------------|---|
| Registered company name | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +31 10 4877 777 |
| Fax | Not Available |
| Website | http://www.wilhelmsen.com |
| Email | wss.rotterdam@wilhelmsen.com |

Emergency telephone number

| Association / Organisation | 24hrs - Chemtrec | 24hrs - Chemtrec | Dutch nat. poison centre |
|-----------------------------------|------------------|------------------|--------------------------|
| Emergency telephone numbers | +31-10-4877700 | +31-10-4877700 | + 31 88 7558561 |
| Other emergency telephone numbers | +31-10-4877700 | +1 800 424 9300 | + 31 10 4877700 |


| Association / Organisation | Dutch nat. poison centre |
|-----------------------------------|--------------------------|
| Emergency telephone numbers | + 31 30 274 88 88 |
| Other emergency telephone numbers | + 31-10-4877700 |

SECTION 2 Hazards identification

Classification of the substance or mixture

| Classification | Skin Corrosion/Irritation Category 1, Hazardous to the Aquatic Environment Long-Term Hazard Category 1 |
|----------------|--|
|----------------|--|

Label elements

| Hazard pictogram(s) |  |
|---------------------|---|
|---------------------|---|

| Signal word | Danger |
|-------------|---------------|
|-------------|---------------|

Hazard statement(s)

| | |
|------|---|
| H314 | Causes severe skin burns and eye damage. |
| H410 | Very toxic to aquatic life with long lasting effects. |

Precautionary statement(s) Prevention

| | |
|------|--|
| P260 | Do not breathe dust/fume. |
| P264 | Wash all exposed external body areas thoroughly after handling. |
| P280 | Wear protective gloves, protective clothing, eye protection and face protection. |

Precautionary statement(s) Response

| | |
|----------------|--|
| P301+P330+P331 | IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. |
| P303+P361+P353 | IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. |
| P305+P351+P338 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. |

Precautionary statement(s) Storage

| | |
|------|------------------|
| P405 | Store locked up. |
|------|------------------|

Precautionary statement(s) Disposal

| | |
|------|--|
| P501 | Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation. |
|------|--|

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

| CAS No | %[weight] | Name |
|------------|-----------|------------------------------------|
| 37222-66-5 | 10-20 | <u>potassium peroxymonosulfate</u> |

| CAS No | %[weight] | Name |
|-----------|-----------|----------------|
| 7761-88-8 | <2.5 | silver nitrate |

SECTION 4 First aid measures

Description of first aid measures

| | |
|---------------------|---|
| Eye Contact | <p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▶ Immediately hold eyelids apart and flush the eye continuously with running water. ▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▶ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▶ Transport to hospital or doctor without delay. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. |
| Skin Contact | <p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately flush body and clothes with large amounts of water, using safety shower if available. ▶ Quickly remove all contaminated clothing, including footwear. ▶ Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre. ▶ Transport to hospital, or doctor. |
| Inhalation | <ul style="list-style-type: none"> ▶ If fumes or combustion products are inhaled remove from contaminated area. ▶ Lay patient down. Keep warm and rested. ▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▶ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▶ Transport to hospital, or doctor, without delay. ▶ Inhalation of vapours or aerosols (mists, fumes) may cause lung oedema. ▶ Corrosive substances may cause lung damage (e.g. lung oedema, fluid in the lungs). ▶ As this reaction may be delayed up to 24 hours after exposure, affected individuals need complete rest (preferably in semi-recumbent posture) and must be kept under medical observation even if no symptoms are (yet) manifested. ▶ Before any such manifestation, the administration of a spray containing a dexamethasone derivative or beclomethasone derivative may be considered. <p>This must definitely be left to a doctor or person authorised by him/her. (ICSC13719)</p> |
| Ingestion | <ul style="list-style-type: none"> ▶ For advice, contact a Poisons Information Centre or a doctor at once. ▶ Urgent hospital treatment is likely to be needed. ▶ If swallowed do NOT induce vomiting. ▶ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▶ Observe the patient carefully. ▶ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▶ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▶ Transport to hospital or doctor without delay. |

Indication of any immediate medical attention and special treatment needed

53ag

For acute or short term repeated exposures to strong acids:

- ▶ Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
- ▶ Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling
- ▶ Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
- ▶ Strong acids produce a coagulation necrosis characterised by formation of a coagulum (eschar) as a result of the desiccating action of the acid on proteins in specific tissues.

INGESTION:

- ▶ Immediate dilution (milk or water) within 30 minutes post ingestion is recommended.
- ▶ **DO NOT attempt to neutralise the acid since exothermic reaction may extend the corrosive injury.**
- ▶ Be careful to avoid further vomit since re-exposure of the mucosa to the acid is harmful. Limit fluids to one or two glasses in an adult.
- ▶ Charcoal has no place in acid management.
- ▶ Some authors suggest the use of lavage within 1 hour of ingestion.

SKIN:

- ▶ Skin lesions require copious saline irrigation. Treat chemical burns as thermal burns with non-adherent gauze and wrapping.
- ▶ Deep second-degree burns may benefit from topical silver sulfadiazine.

EYE:

- ▶ Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjunctival cul-de-sacs. Irrigation should last at least 20-30 minutes. **DO NOT use neutralising agents or any other additives.** Several litres of saline are required.
- ▶ Cycloplegic drops, (1% cyclopentolate for short-term use or 5% homatropine for longer term use) antibiotic drops, vasoconstrictive agents or artificial tears may be indicated dependent on the severity of the injury.
- ▶ Steroid eye drops should only be administered with the approval of a consulting ophthalmologist).

[Ellenhorn and Barceloux: Medical Toxicology]

SECTION 5 Firefighting measures

Extinguishing media

- Water spray or fog.
- Foam.
- Dry chemical powder.

Special hazards arising from the substrate or mixture

| | |
|-----------------------------|-------------|
| Fire Incompatibility | None known. |
|-----------------------------|-------------|

Advice for firefighters

| | |
|------------------------------|---|
| Fire Fighting | <ul style="list-style-type: none"> ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear full body protective clothing with breathing apparatus. ▸ Prevent, by any means available, spillage from entering drains or water course. |
| Fire/Explosion Hazard | <ul style="list-style-type: none"> ▸ Non combustible. ▸ Not considered to be a significant fire risk. ▸ Acids may react with metals to produce hydrogen, a highly flammable and explosive gas. Decomposition may produce toxic fumes of: <ul style="list-style-type: none"> , sulfur oxides (SOx) , metal oxides |

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

| | |
|---------------------|---|
| Minor Spills | Environmental hazard - contain spillage. <ul style="list-style-type: none"> ▸ Remove all ignition sources. ▸ Clean up all spills immediately. ▸ Avoid contact with skin and eyes. ▸ Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material. ▸ Check regularly for spills and leaks. |
| Major Spills | Environmental hazard - contain spillage. <ul style="list-style-type: none"> ▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear full body protective clothing with breathing apparatus. |

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

| | |
|--------------------------|---|
| Safe handling | <ul style="list-style-type: none"> ▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area. |
| Other information | <ul style="list-style-type: none"> ▸ Store in original containers. ▸ Keep containers securely sealed. ▸ Store in a cool, dry, well-ventilated area. |

Conditions for safe storage, including any incompatibilities

| | |
|---------------------------|--|
| Suitable container | <ul style="list-style-type: none"> ▸ DO NOT use aluminium or galvanised containers ▸ Check regularly for spills and leaks |
|---------------------------|--|

| | |
|--------------------------------|---|
| | <ul style="list-style-type: none"> ▶ Lined metal can, lined metal pail/ can. ▶ Plastic pail. ▶ Polyliner drum. <p>For low viscosity materials</p> <ul style="list-style-type: none"> ▶ Drums and jerricans must be of the non-removable head type. ▶ Where a can is to be used as an inner package, the can must have a screwed enclosure. <p>For materials with a viscosity of at least 2680 cSt.</p> |
| Storage incompatibility | <p>Inorganic derivative of Group 11 metal. Derivative of electronegative metal.</p> <ul style="list-style-type: none"> ▶ Inorganic acids are generally soluble in water with the release of hydrogen ions. The resulting solutions have pH's of less than 7.0. ▶ Inorganic acids neutralise chemical bases (for example: amines and inorganic hydroxides) to form salts - neutralisation can generate dangerously large amounts of heat in small spaces. ▶ Inorganic peroxy compounds are potent oxidisers that pose fire or explosive hazards when in contact with ordinary combustible materials. ▶ Inorganic peroxides react with organic compounds to generate organic peroxide and hydroperoxide products that react violently with reducing agents. ▶ Inorganic oxidising agents can react with reducing agents to generate heat and products that may be gaseous (causing pressurization of closed containers). ▶ Inorganic reducing agents react with oxidizing agents to generate heat and products that may be flammable, combustible, or otherwise reactive. Their reactions with oxidizing agents may be violent. ▶ Incidents involving interaction of active oxidants and reducing agents, either by design or accident, are usually very energetic and examples of so-called redox reactions. ▶ WARNING: Avoid or control reaction with peroxides. All <i>transition metal</i> peroxides should be considered as potentially explosive. For example transition metal complexes of alkyl hydroperoxides may decompose explosively. ▶ Metals and their oxides or salts may react violently with chlorine trifluoride and bromine trifluoride. ▶ These trifluorides are hypergolic oxidisers. They ignite on contact (without external source of heat or ignition) with recognised fuels - contact with these materials, following an ambient or slightly elevated temperature, is often violent and may produce ignition. <ul style="list-style-type: none"> · Silver or silver salts readily form explosive silver fulminate in the presence of both nitric acid and ethanol. The resulting fulminate is much more sensitive and a more powerful detonator than mercuric fulminate. · Silver and its compounds and salts may also form explosive compounds in the presence of acetylene and nitromethane. <p>For persulfate salts:</p> <ul style="list-style-type: none"> ▶ Segregate from organics and other readily oxidisable materials. ▶ Segregate from powdered metals, phosphorous, hydrides, halogens, acids and alkalis. ▶ Avoid contact with combustibles, organic matter. ▶ Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous ▶ Avoid storage with reducing agents. ▶ Many of the salts of peroxyacids are unstable or explosive and are capable of initiation by heat, friction or impact, and all are powerful oxidants. <p>BREITHERICK L.: Handbook of Reactive Chemical Hazards</p> |



X — Must not be stored together

0 — May be stored together with specific preventions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

| Source | Ingredient | Material name | TWA | STEL | Peak | Notes |
|---|----------------|----------------------------------|------------------------|---------------|---------------|---------------|
| Singapore Permissible Exposure Limits of Toxic Substances | silver nitrate | Silver: Soluble compounds, as Ag | 0.01 mg/m ³ | Not Available | Not Available | Not Available |

Emergency Limits

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|------------|----------------------|-----------------------|-------------------------|
| potassium | 30 mg/m ³ | 330 mg/m ³ | 2,000 mg/m ³ |

Continued...

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|-----------------------------|-------------|-----------|-------------|
| peroxymonosulfate | | | |
| potassium peroxymonosulfate | 30 mg/m3 | 330 mg/m3 | 2,000 mg/m3 |
| silver nitrate | 0.047 mg/m3 | 0.9 mg/m3 | 5.4 mg/m3 |


| Ingredient | Original IDLH | Revised IDLH |
|-----------------------------|---------------|---------------|
| potassium peroxymonosulfate | Not Available | Not Available |
| silver nitrate | 10 mg/m3 | Not Available |

MATERIAL DATA

The adopted TLV-TWA for silver dust and fumes is 0.1 mg/m3 and for the more toxic soluble silver compounds the adopted value is 0.01 mg/m3. Cases of argyria (a slate to blue-grey discolouration of epithelial tissues) have been recorded when workers were exposed to silver nitrate at concentrations of 0.1 mg/m3 (as silver). Exposure to very high concentrations of silver fume has caused diffuse pulmonary fibrosis.

Persulfates produce irritation of the respiratory tract.

Exposure controls

| | |
|---|---|
| Appropriate engineering controls | Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. |
| Personal protection |  |
| Eye and face protection | <ul style="list-style-type: none"> ▶ Safety glasses with unperforated side shields may be used where continuous eye protection is desirable, as in laboratories; spectacles are not sufficient where complete eye protection is needed such as when handling bulk-quantities, where there is a danger of splashing, or if the material may be under pressure. ▶ Chemical goggles whenever there is a danger of the material coming in contact with the eyes; goggles must be properly fitted. ▶ Full face shield (20 cm, 8 in minimum) may be required for supplementary but never for primary protection of eyes; these afford face protection. |
| Skin protection | See Hand protection below |
| Hands/feet protection | ▶ Elbow length PVC gloves |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none"> ▶ Overalls. ▶ PVC Apron. ▶ PVC protective suit may be required if exposure severe. |

Respiratory protection

Particulate. (AS/NZS 1716 & 1715, EN 143:2000 & 149:001, ANSI Z88 or national equivalent)

| Required Minimum Protection Factor | Half-Face Respirator | Full-Face Respirator | Powered Air Respirator |
|------------------------------------|----------------------|----------------------|------------------------|
| up to 10 x ES | P1 Air-line* | - - | PAPR-P1 - |
| up to 50 x ES | Air-line** | P2 | PAPR-P2 |
| up to 100 x ES | - | P3 | - |
| | | Air-line* | - |
| 100+ x ES | - | Air-line** | PAPR-P3 |

* - Negative pressure demand ** - Continuous flow

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO₂), G = Agricultural chemicals, K = Ammonia(NH₃), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

| | | | |
|---|----------------------------------|--|----------------|
| Appearance | Light sensitive. white powder | | |
| Physical state | Solid | Relative density (Water = 1) | Not Available |
| Odour | Not Available | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | Not Available |
| pH (as supplied) | 2.2 | Decomposition temperature | Not Available |
| Melting point / freezing point (°C) | Not Available | Viscosity (cSt) | Not Available |
| Initial boiling point and boiling range (°C) | Not Available | Molecular weight (g/mol) | Not Available |
| Flash point (°C) | Not Available | Taste | Not Available |
| Evaporation rate | Not Available BuAC = 1 | Explosive properties | Not Available |
| Flammability | Not Available | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | Not Available | Surface Tension (dyn/cm or mN/m) | Not Applicable |
| Lower Explosive Limit (%) | Not Available | Volatile Component (%vol) | Not Available |
| Vapour pressure (kPa) | Not Available | Gas group | Not Available |
| Solubility in water | Miscible | pH as a solution (Not Available%) | Not Available |
| Vapour density (Air = 1) | Not Available | VOC g/L | Not Available |

SECTION 10 Stability and reactivity

| | |
|---|---|
| Reactivity | See section 7 |
| Chemical stability | <ul style="list-style-type: none"> ▶ Many of the salts of peroxyacids are unstable or explosive and are capable of initiation by heat, friction or impact, and all are powerful oxidants. BRETHERICK L.: Handbook of Reactive Chemical Hazards <ul style="list-style-type: none"> ▶ Contact with alkaline material liberates heat ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur. |
| Possibility of hazardous reactions | See section 7 |
| Conditions to avoid | See section 7 |
| Incompatible materials | See section 7 |
| Hazardous decomposition products | See section 5 |

SECTION 11 Toxicological information

Information on toxicological effects

| | |
|----------------|---|
| Inhaled | <p>Evidence shows, or practical experience predicts, that the material produces irritation of the respiratory system, in a substantial number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs.</p> <p>Acidic corrosives produce respiratory tract irritation with coughing, choking and mucous membrane damage. Symptoms of exposure may include dizziness, headache, nausea and weakness. In more severe exposures, pulmonary oedema may be evident either immediately or after a latent period of 5-72 hours.</p> <p>Levels above 10 ug/m3 of suspended inorganic sulfates in the air may cause an excess risk of asthmatic attacks in susceptible persons</p> <p>Clinical signs in persulfate salt inhalation studies include ocular and nasal discharge and respiratory distress. Persulfates also can be irritating to the respiratory track of occupationally exposed individuals such as hairdressers.</p> <p>Acute dermal, oral, and inhalation toxicity studies are available, but only the latter are remarkable, with gross lesions observed in the lungs, liver, stomach, and spleen.</p> |
|----------------|---|

| | |
|---------------------|--|
| Ingestion | <p>Ingestion of acidic corrosives may produce circumoral burns with a distinct discolouration of the mucous membranes of the mouth, throat and oesophagus. Immediate pain and difficulties in swallowing and speaking may also be evident. Oedema of the epiglottis may produce respiratory distress and possibly, asphyxia.</p> <p>Accidental ingestion of the material may be damaging to the health of the individual.</p> <p>In short-term and subchronic feeding studies, with persulfates, the results were mixed; some studies found no evidence of toxicity and others found local damage to the mucous membrane in the gastrointestinal tract, but no other systemic effects.</p> <p>Following ingestion, persulfate salts are likely to decomposes to hydrogen peroxide and sulfate. The hydrogen peroxide will be rapidly converted to oxygen and water by various enzymes.</p> |
| Skin Contact | <p>Skin contact with acidic corrosives may result in pain and burns; these may be deep with distinct edges and may heal slowly with the formation of scar tissue.</p> <p>Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.</p> <p>Studies in humans indicate that aqueous solutions of 5% persulfate or higher can cause skin irritation. Persulfates may be irritating to skin of occupationally exposed individuals such as hairdressers.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p> |
| Eye | <p>Direct eye contact with acid corrosives may produce pain, lachrymation, photophobia and burns. Mild burns of the epithelia generally recover rapidly and completely. Severe burns produce long-lasting and possible irreversible damage.</p> <p>When applied to the eye(s) of animals, the material produces severe ocular lesions which are present twenty-four hours or more after instillation.</p> <p>Irritation of the eyes may produce a heavy secretion of tears (lachrymation).</p> |
| Chronic | <p>Repeated or prolonged exposure to acids may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue. Gastrointestinal disturbances may also occur.</p> <p>Repeated or long-term occupational exposure is likely to produce cumulative health effects involving organs or biochemical systems.</p> <p>Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.</p> <p>Silver is one of the most physically and physiologically cumulative of the elements. Chronic exposure to silver salts may cause argyria, a permanent ashen-grey discolouration of the skin, conjunctiva and internal organs (due to the deposit of an insoluble albuminate of silver).</p> <p>The respiratory tract may also be a site of local argyria (following chronic inhalation exposures) with a mild chronic bronchitis being the only obvious symptom.</p> <p>Persulfate allergy is not uncommon and manifests itself in the form of a skin rash, eczema and respiratory conditions such as asthma. Allergy may develop after repeated exposures. Asthmatic complaints ("persulfate asthma") have been described following use of persulfate salts particularly amongst hairdressers.</p> |

| | | |
|------------------------------------|--|---------------------------------|
| CHLORIDE T2 TABLETS | TOXICITY | IRRITATION |
| | Not Available | Not Available |
| potassium peroxymonosulfate | TOXICITY | IRRITATION |
| | Oral (Rat) LD50; >2000 mg/kg ^[2] | Eyes (rabbit) (-) (-) Irritant |
| | | Skin (rabbit) (-) (-) Corrosive |
| silver nitrate | TOXICITY | IRRITATION |
| | dermal (rat) LD50: >2000 mg/kg ^[1] | Eye (rabbit): 1 mg - SEVERE |
| | Oral (Rat) LD50; 50 mg/kg ^[2] | Eye (rabbit): 10 mg - moderate |
| Legend: | 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances | |

| | |
|----------------------------|--|
| CHLORIDE T2 TABLETS | <p>for acid mists, aerosols, vapours</p> <p>Data from assays for genotoxic activity in vitro suggest that eukaryotic cells are susceptible to genetic damage when the pH falls to about 6.5. Cells from the respiratory tract have not been examined in this respect. Mucous secretion may protect the cells of the airways from direct exposure to inhaled acidic mists, just as mucous plays an important role in protecting the gastric epithelium from its auto-secreted hydrochloric acid.</p> <p>The persulfates were reported to cause both delayed-type and immediate skin reactions, including irritant dermatitis, allergic eczematous dermatitis, localized contact urticaria, generalized urticaria, rhinitis, asthma, and syncope. The most common causes of allergic dermatitis in hairdressers are the active ingredients in hair dyes, and ammonium persulfate has been identified as a frequent allergen. A sensitisation study that also examined the incidence of urticarial reactions was performed with 17.5% ammonium, potassium, and sodium persulfate under occlusive patches.</p> |
| SILVER NITRATE | <p>The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.</p> |

CHLORIDE T2 TABLETS

| | | | | |
|---|--|---------------------------------|----------|--|
| | Reproductive effector in rats Human lymphocyte mutagen Equivocal tumorigen by RTECS criteria | | | |
| CHLORIDE T2 TABLETS & POTASSIUM PEROXYMONOSULFATE & SILVER NITRATE | Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. | | | |
| Acute Toxicity | × | Carcinogenicity | × | |
| Skin Irritation/Corrosion | × | Reproductivity | × | |
| Serious Eye Damage/Irritation | × | STOT - Single Exposure | × | |
| Respiratory or Skin sensitisation | × | STOT - Repeated Exposure | × | |
| Mutagenicity | × | Aspiration Hazard | × | |

Legend: **×** – Data either not available or does not fill the criteria for classification
✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

| CHLORIDE T2 TABLETS | Endpoint | Test Duration (hr) | Species | Value | Source |
|-----------------------------|---------------|--------------------|-------------------------------|---------------|---------------|
| | Not Available | Not Available | Not Available | Not Available | Not Available |
| potassium peroxymonosulfate | Endpoint | Test Duration (hr) | Species | Value | Source |
| | LC50 | 96h | Fish | 51.6-81.6mg/L | 4 |
| | EC50(ECx) | 96h | Algae or other aquatic plants | 1.2mg/L | 4 |
| | EC50 | 96h | Algae or other aquatic plants | 1.2mg/L | 4 |
| silver nitrate | Endpoint | Test Duration (hr) | Species | Value | Source |
| | BCF | 792h | Fish | <54-310 | 7 |
| | NOEC(ECx) | 12960h | Fish | <0.001mg/l | 1 |
| | LC50 | 96h | Fish | 0.003mg/l | 1 |
| | EC50 | 72h | Algae or other aquatic plants | 0.153mg/L | 4 |
| | EC50 | 48h | Crustacea | <0.001mg/L | 4 |
| | EC50 | 96h | Algae or other aquatic plants | 0.011mg/L | 4 |

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

Harmful to aquatic organisms.

On the basis of available evidence concerning either toxicity, persistence, potential to accumulate and/or observed environmental fate and behaviour, the material may present a danger, immediate or long-term and/or delayed, to the structure and/or functioning of natural ecosystems.

Ecotoxicity:

The tolerance of water organisms towards pH margin and variation is diverse. Recommended pH values for test species listed in OECD guidelines are between 6.0 and almost 9. Acute testing with fish showed 96h-LC50 at about pH 3.5

for inorganic sulfates:

Environmental fate:

Data from tap water studies with human volunteers indicate that sulfates produce a laxative effect at concentrations of 1000 - 1200 mg/litre, but no increase in diarrhoea, dehydration or weight loss. The presence of sulfate in drinking-water can also result in a noticeable taste; the lowest taste threshold concentration for sulfate is approximately 250 mg/litre as the sodium salt. Sulfate may also contribute to the corrosion of distribution systems.

For silver and its compounds:

Environmental fate:

Silver is a rare but naturally occurring metal, often found deposited as a mineral ore in association with other elements. Emissions from smelting operations, manufacture and disposal of certain photographic and electrical supplies, coal combustion, and cloud seeding are some of the anthropogenic sources of silver in the biosphere. The global biogeochemical movements of silver are characterized by releases to the atmosphere, water, and land by natural and anthropogenic sources, long-range transport of fine particles in the atmosphere, wet and dry deposition, and sorption to soils and sediments.

for persulfates (salts):

Environmental fate:

Aqueous solutions of persulfates decompose at ordinary temperatures. Decomposition occurs under moist conditions or at higher temperatures, and when heated

to decomposition (120 degree C) toxic fumes of SOx are emitted. During use oxygen may be formed. Prevent, by any means available, spillage from entering drains or water courses.

DO NOT discharge into sewer or waterways.

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|----------------|-------------------------|------------------|
| silver nitrate | LOW | LOW |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|----------------|--------------------|
| silver nitrate | MEDIUM (BCF = 600) |

Mobility in soil

| Ingredient | Mobility |
|----------------|------------------|
| silver nitrate | LOW (KOC = 14.3) |



SECTION 13 Disposal considerations

Waste treatment methods

| | |
|-------------------------------------|--|
| Product / Packaging disposal | <ul style="list-style-type: none"> ▸ Waste persulfate solids or solutions will be treated to decompose the material into innocuous metal sulfates or diluted to levels where they are no longer hazardous. ▸ Used product containers and residual (waste) persulfate solutions will either be diluted and sent to a wastewater treatment facility or sent into a domestic waste system. Under these conditions the product is expected to be dilute and to degrade into sulfate or bisulfate salts. <p>Recycle wherever possible.</p> <ul style="list-style-type: none"> ▸ Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. ▸ Treat and neutralise at an approved treatment plant. |
|-------------------------------------|--|

SECTION 14 Transport information

Labels Required

| | |
|-------------------------------------|---|
| Product / Packaging disposal |  |
| Marine Pollutant |  |

Land transport (UN)

| | | |
|-------------------------------------|--|----------------|
| UN number | 3260 | |
| UN proper shipping name | CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S. (contains silver nitrate and potassium peroxymonosulfate) | |
| Transport hazard class(es) | Class | 8 |
| | Subrisk | Not Applicable |
| Packing group | II | |
| Environmental hazard | Environmentally hazardous | |
| Special precautions for user | Special provisions | 274 |
| | Limited quantity | 1 kg |

Air transport (ICAO-IATA / DGR)

| | |
|------------------|------|
| UN number | 3260 |
|------------------|------|

| | | |
|-------------------------------------|--|----------------|
| UN proper shipping name | Corrosive solid, acidic, inorganic, n.o.s. * (contains silver nitrate and potassium peroxymonosulfate) | |
| Transport hazard class(es) | ICAO/IATA Class | 8 |
| | ICAO / IATA Subrisk | Not Applicable |
| | ERG Code | 8L |
| Packing group | II | |
| Environmental hazard | Environmentally hazardous | |
| Special precautions for user | Special provisions | A3 A803 |
| | Cargo Only Packing Instructions | 863 |
| | Cargo Only Maximum Qty / Pack | 50 kg |
| | Passenger and Cargo Packing Instructions | 859 |
| | Passenger and Cargo Maximum Qty / Pack | 15 kg |
| | Passenger and Cargo Limited Quantity Packing Instructions | Y844 |
| | Passenger and Cargo Limited Maximum Qty / Pack | 5 kg |

Sea transport (IMDG-Code / GGVSee)

| | | |
|-------------------------------------|--|----------------|
| UN number | 3260 | |
| UN proper shipping name | CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S. (contains silver nitrate and potassium peroxymonosulfate) | |
| Transport hazard class(es) | IMDG Class | 8 |
| | IMDG Subrisk | Not Applicable |
| Packing group | II | |
| Environmental hazard | Marine Pollutant | |
| Special precautions for user | EMS Number | F-A, S-B |
| | Special provisions | 274 |
| | Limited Quantities | 1 kg |

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

| Product name | Group |
|-----------------------------|---------------|
| potassium peroxymonosulfate | Not Available |
| silver nitrate | Not Available |

Transport in bulk in accordance with the ICG Code

| Product name | Ship Type |
|-----------------------------|---------------|
| potassium peroxymonosulfate | Not Available |
| silver nitrate | Not Available |

SECTION 15 Regulatory information**Safety, health and environmental regulations / legislation specific for the substance or mixture****potassium peroxymonosulfate is found on the following regulatory lists**

Not Applicable

silver nitrate is found on the following regulatory lists

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2A: Probably carcinogenic to humans

Singapore Permissible Exposure Limits of Toxic Substances

National Inventory Status

| National Inventory | Status |
|--|---|
| Australia - AIIIC / Australia Non-Industrial Use | Yes |
| Canada - DSL | Yes |
| Canada - NDSL | No (potassium peroxymonosulfate; silver nitrate) |
| China - IECSC | Yes |
| Europe - EINEC / ELINCS / NLP | Yes |
| Japan - ENCS | Yes |
| Korea - KECI | Yes |
| New Zealand - NZIoC | Yes |
| Philippines - PICCS | Yes |
| USA - TSCA | Yes |
| Taiwan - TCSI | Yes |
| Mexico - INSQ | No (potassium peroxymonosulfate) |
| Vietnam - NCI | Yes |
| Russia - FBEPH | No (potassium peroxymonosulfate) |
| Legend: | Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration. |

SECTION 16 Other information

| | |
|----------------------|------------|
| Revision Date | 11/08/2021 |
| Initial Date | 19/07/2016 |

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

SDS Version Summary

| Version | Date of Update | Sections Updated |
|---------|----------------|---|
| 1.3 | 11/08/2021 | Acute Health (eye), Acute Health (inhaled), Acute Health (swallowed), Appearance, Chronic Health, Classification, Disposal, Engineering Control, Environmental, Fire Fighter (fire/explosion hazard), First Aid (inhaled), Ingredients, Personal Protection (hands/feet), Spills (major), Spills (minor), Storage (storage incompatibility) |

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

CHLORIDE TEST TABLETS

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 739458

Version No: 6.10

Safety Data Sheet

Issue Date: 28/11/2019

Print Date: 24/03/2022

L.GHS.SGP.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

| | |
|--------------------------------------|---|
| Product name | CHLORIDE TEST TABLETS |
| Chemical Name | Not Applicable |
| Synonyms | ALSO USED IN SPECTRAPAK 309 (739466) ,Product Part Number: 739458 (250 x 0.1 gram) |
| Proper shipping name | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (contains silver nitrate and potassium chromate) |
| Chemical formula | Not Applicable |
| Other means of identification | 739458, 5112-08, 555656, 739466, 739474, 739482, 739490 |

Relevant identified uses of the substance or mixture and uses advised against

| | |
|---------------------------------|---|
| Relevant identified uses | Use according to manufacturer's directions. |
|---------------------------------|---|

Details of the supplier of the safety data sheet

| | | | |
|--------------------------------|---|---|---|
| Registered company name | Wilhelmsen Ships Service (S) Pte. Ltd. | Wilhelmsen Ships Service AS* Central Warehouse | Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen |
| Address | 186 Pandan Loop Singapore 128376 Singapore | Willem Barentszstraat 50 Rotterdam Netherlands | -----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway |
| Telephone | +65 6395 4545 | +31 10 4877 777 | Not Available |
| Fax | Not Available | Not Available | Not Available |
| Website | http://www.wilhelmsen.com/services/maritime/compan | http://www.wilhelmsen.com | http://www.wilhelmsen.com |
| Email | wss.singapore@wilhelmsen.com | wss.rotterdam@wilhelmsen.com | wss.global.sdsinfo@wilhelmsen.com |

| | |
|--------------------------------|---|
| Registered company name | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +31 10 4877 777 |
| Fax | Not Available |
| Website | http://www.wilhelmsen.com |
| Email | wss.rotterdam@wilhelmsen.com |

Emergency telephone number

| Association / Organisation | 24hrs - Chemtrec | Dutch nat. poison centre | 24hrs - Chemtrec |
|-----------------------------------|------------------|--------------------------|------------------|
| Emergency telephone numbers | +31-10-4877700 | + 31 88 7558561 | +31-10-4877700 |
| Other emergency telephone numbers | +31-10-4877700 | + 31 10 4877700 | +1 800 424 9300 |

| Association / Organisation | Dutch nat. poison centre |
|-----------------------------------|--------------------------|
| Emergency telephone numbers | + 31 30 274 88 88 |
| Other emergency telephone numbers | + 31-10-4877700 |

SECTION 2 Hazards identification

Classification of the substance or mixture

| | |
|----------------|---|
| Classification | Carcinogenicity Category 1B, Hazardous to the Aquatic Environment Acute Hazard Category 1, Serious Eye Damage/Eye Irritation Category 1, Germ Cell Mutagenicity Category 1B, Acute Toxicity (Oral) Category 4, Skin Corrosion/Irritation Category 2, Reproductive Toxicity Category 1B, Sensitisation (Skin) Category 1, Hazardous to the Aquatic Environment Long-Term Hazard Category 1 |
|----------------|---|

Label elements

| | |
|---------------------|--|
| Hazard pictogram(s) |  |
|---------------------|--|

| | |
|-------------|---------------|
| Signal word | Danger |
|-------------|---------------|

Hazard statement(s)

| | |
|------|---|
| H350 | May cause cancer. |
| H318 | Causes serious eye damage. |
| H340 | May cause genetic defects. |
| H302 | Harmful if swallowed. |
| H315 | Causes skin irritation. |
| H360 | May damage fertility or the unborn child. |
| H317 | May cause an allergic skin reaction. |
| H410 | Very toxic to aquatic life with long lasting effects. |

Precautionary statement(s) Prevention

| | |
|------|--|
| P201 | Obtain special instructions before use. |
| P280 | Wear protective gloves, protective clothing, eye protection and face protection. |
| P261 | Avoid breathing dust/fumes. |

Precautionary statement(s) 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. |
| P308+P313 | IF exposed or concerned: Get medical advice/ attention. |
| P310 | Immediately call a POISON CENTER/doctor/physician/first aider. |

Precautionary statement(s) Storage

| | |
|------|------------------|
| P405 | Store locked up. |
|------|------------------|

Precautionary statement(s) Disposal

| | |
|------|--|
| P501 | Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation. |
|------|--|

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

| CAS No | %[weight] | Name |
|------------|-----------|-----------------------------|
| 7761-88-8 | 2.5-5 | <u>silver nitrate</u> |
| 10043-35-3 | 50-60 | <u>boric acid</u> |
| 7778-50-9 | 0.1-1 | <u>potassium dichromate</u> |
| 7789-00-6 | 2.5-5 | <u>potassium chromate</u> |

SECTION 4 First aid measures

Description of first aid measures

| | |
|---------------------|---|
| Eye Contact | <ul style="list-style-type: none"> Generally not applicable. |
| Skin Contact | <p>If skin contact occurs:</p> <ul style="list-style-type: none"> Immediately remove all contaminated clothing, including footwear. Flush skin and hair with running water (and soap if available). Seek medical attention in event of irritation. Generally not applicable. |
| Inhalation | <ul style="list-style-type: none"> Generally not applicable. |
| Ingestion | <ul style="list-style-type: none"> IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY. For advice, contact a Poisons Information Centre or a doctor. Urgent hospital treatment is likely to be needed. In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition. If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the SDS should be provided. Further action will be the responsibility of the medical specialist. If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the SDS. <p>Where medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:</p> <ul style="list-style-type: none"> INDUCE vomiting with fingers down the back of the throat, ONLY IF CONSCIOUS. Lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. <p>NOTE: Wear a protective glove when inducing vomiting by mechanical means.</p> <ul style="list-style-type: none"> Generally not applicable. |

Indication of any immediate medical attention and special treatment needed

#53ag

The material may induce methaemoglobinaemia following exposure.

- Initial attention should be directed at oxygen delivery and assisted ventilation if necessary. Hyperbaric oxygen has not demonstrated substantial benefits.
- Hypotension should respond to Trendelenburg's position and intravenous fluids; otherwise dopamine may be needed.
- Symptomatic patients with methaemoglobin levels over 30% should receive methylene blue. (Cyanosis, alone, is not an indication for treatment). The usual dose is 1-2 mg/kg of a 1% solution (10 mg/ml) IV over 50 minutes; repeat, using the same dose, if symptoms of hypoxia fail to subside within 1 hour.
- Thorough cleansing of the entire contaminated area of the body, including the scalp and nails, is of utmost importance.

BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

| Determinant | Index | Sampling Time | Comment |
|----------------------------|---------------------|------------------------|-----------|
| 1. Methaemoglobin in blood | 1.5% of haemoglobin | During or end of shift | B, NS, SQ |

B: Background levels occur in specimens collected from subjects **NOT** exposed

NS: Non-specific determinant; also observed after exposure to other materials

SQ: Semi-quantitative determinant - Interpretation may be ambiguous; should be used as a screening test or confirmatory test.

For acute or repeated short term exposures to boron and its compounds:

- Nausea, vomiting, diarrhoea and epigastric pain, haematemesis and blue-green discolouration of both faeces and vomitus characterise adult boron intoxication.
- Access and correct any abnormalities found in airway and circulation.
- A tidal volume of 10-15 mg/kg should be maintained.
- Emesis should be induced unless the patient is in coma, is experiencing seizures or has lost the gag reflex. If any of these are present, gastric lavage should be performed with a large-bore tube after endotracheal intubation or in the presence of continuous respiratory action.
- Activated charcoal is probably not of value though its use might be indicated following gastric evacuation. Catharsis might be useful to eliminate any borates

Continued...

remaining in the gastro-intestinal tract (magnesium sulfate: adults, 30 gms: children 250 mg/kg).

- ▶ Peritoneal dialysis and haemodialysis remove some borates.

[Ellenhorn and Barceloux: Medical Toxicology]

SECTION 5 Firefighting measures

Extinguishing media

- ▶ Water spray or fog.
- ▶ Foam.
- ▶ Dry chemical powder.

Special hazards arising from the substrate or mixture

| | |
|-----------------------------|-------------|
| Fire Incompatibility | None known. |
|-----------------------------|-------------|

Advice for firefighters

| | |
|------------------------------|---|
| Fire Fighting | <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus plus protective gloves. ▶ Prevent, by any means available, spillage from entering drains or water courses. <p>Slight hazard when exposed to heat, flame and oxidisers.</p> |
| Fire/Explosion Hazard | <p>Under certain conditions the material may become combustible because of the ease of ignition which occurs after the material reaches a high specific area ratio (thin sections, fine particles, or molten states). However, the same material in massive solid form is comparatively difficult to ignite. Nearly all metals will burn in air under certain conditions. Decomposition may produce toxic fumes of:</p> <ul style="list-style-type: none"> metal oxides <p>May emit poisonous fumes.</p> <p>Articles and manufactured articles may constitute a fire hazard where polymers form their outer layers or where combustible packaging remains in place.</p> <p>Certain substances, found throughout their construction, may degrade or become volatile when heated to high temperatures. This may create a secondary hazard.</p> |

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

| | |
|---------------------|--|
| Minor Spills | <p>Environmental hazard - contain spillage.</p> <ul style="list-style-type: none"> ▶ Clean up all spills immediately. ▶ Secure load if safe to do so. ▶ Bundle/collect recoverable product. |
| Major Spills | <p>Environmental hazard - contain spillage.</p> <ul style="list-style-type: none"> ▶ Clear area of personnel and move upwind. ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus plus protective gloves. <p>Clear area of personnel and move upwind.</p> <p>Alert Fire Brigade and tell them location and nature of hazard.</p> <p>Wear breathing apparatus plus protective gloves.</p> <ul style="list-style-type: none"> ▶ Clean up all spills immediately. ▶ Wear protective clothing, safety glasses, dust mask, gloves. ▶ Secure load if safe to do so. |

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

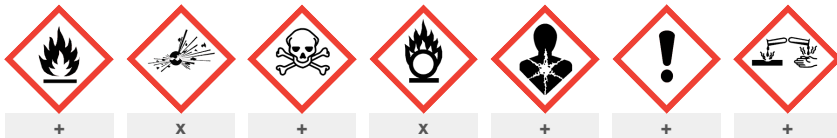
Precautions for safe handling

| | |
|----------------------|---|
| Safe handling | <ul style="list-style-type: none"> ▶ Avoid all personal contact, including inhalation. ▶ Wear protective clothing when risk of exposure occurs. ▶ Use in a well-ventilated area. |
|----------------------|---|

| | |
|--------------------------|---|
| Other information | <ul style="list-style-type: none"> ▶ Store in original containers. ▶ Keep containers securely sealed. ▶ Store in a cool, dry, well-ventilated area. ▶ Store away from incompatible materials. |
|--------------------------|---|

Conditions for safe storage, including any incompatibilities

| | |
|--------------------------------|---|
| Suitable container | <p>Generally packaging as originally supplied with the article or manufactured item is sufficient to protect against physical hazards. If repackaging is required ensure the article is intact and does not show signs of wear. As far as is practicably possible, reuse the original packaging or something providing a similar level of protection to both the article and the handler.</p> <p>For low viscosity materials</p> <ul style="list-style-type: none"> ▶ Drums and jerricans must be of the non-removable head type. ▶ Where a can is to be used as an inner package, the can must have a screwed enclosure. <p>For materials with a viscosity of at least 2680 cSt.</p> <p>No restriction on the type of containers. Packing as recommended by manufacturer. Check all material is clearly labelled.</p> |
| Storage incompatibility | <p>Inorganic derivative of Group 11 metal.</p> <p>Derivative of electronegative metal.</p> <p>The substance may be or contains a "metalloid"</p> <p>The following elements are considered to be metalloids; boron, silicon, germanium, arsenic, antimony, tellurium and (possibly) polonium</p> <p>The electronegativities and ionisation energies of the metalloids are between those of the metals and nonmetals, so the metalloids exhibit characteristics of both classes. The reactivity of the metalloids depends on the element with which they are reacting. For example, boron acts as a nonmetal when reacting with sodium yet as a metal when reacting with fluorine.</p> <p>Derivative of electropositive metal.</p> <p>Boric acid:</p> <ul style="list-style-type: none"> ▶ is a weak acid ▶ is incompatible with alkali carbonates, hydroxides (forming borate salts), strong reducing agents and alkali metals ▶ reacts violently with potassium metal ▶ forms heat-sensitive explosive compound on contact with acetic anhydride ▶ WARNING: Avoid or control reaction with peroxides. All <i>transition metal</i> peroxides should be considered as potentially explosive. For example transition metal complexes of alkyl hydroperoxides may decompose explosively. · Silver or silver salts readily form explosive silver fulminate in the presence of both nitric acid and ethanol. The resulting fulminate is much more sensitive and a more powerful detonator than mercuric fulminate. · Silver and its compounds and salts may also form explosive compounds in the presence of acetylene and nitromethane. ▶ Segregate from alcohol, water. ▶ Avoid strong bases. |



X — Must not be stored together

0 — May be stored together with specific preventions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

| Source | Ingredient | Material name | TWA | STEL | Peak | Notes |
|---|----------------------|---|------------------------|---------------|---------------|---------------|
| Singapore Permissible Exposure Limits of Toxic Substances | silver nitrate | Silver: Soluble compounds, as Ag | 0.01 mg/m ³ | Not Available | Not Available | Not Available |
| Singapore Permissible Exposure Limits of Toxic Substances | potassium dichromate | Chromium, metal and inorganic compounds, as Cr: Water-soluble Cr VI compounds | 0.05 mg/m ³ | Not Available | Not Available | Not Available |
| Singapore Permissible Exposure Limits of Toxic Substances | potassium chromate | Chromium, metal and inorganic compounds, as Cr: Water-soluble Cr VI compounds | 0.05 mg/m ³ | Not Available | Not Available | Not Available |

Emergency Limits

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|------------|--------|--------|--------|
|------------|--------|--------|--------|

Continued...

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|----------------------|-------------|-----------|-----------|
| silver nitrate | 0.047 mg/m3 | 0.9 mg/m3 | 5.4 mg/m3 |
| boric acid | 6 mg/m3 | 23 mg/m3 | 830 mg/m3 |
| potassium dichromate | 0.42 mg/m3 | 7.4 mg/m3 | 44 mg/m3 |
| potassium chromate | 0.56 mg/m3 | 9.7 mg/m3 | 58 mg/m3 |

| Ingredient | Original IDLH | Revised IDLH |
|----------------------|---------------|---------------|
| silver nitrate | 10 mg/m3 | Not Available |
| boric acid | Not Available | Not Available |
| potassium dichromate | Not Available | Not Available |
| potassium chromate | Not Available | Not Available |

MATERIAL DATA


For inorganic borates and tetraborates:

No data are currently available to establish a causal link between inhalation exposures to sodium tetraborates and chronic respiratory and/or systemic effects.

An occupationally important toxic effect of the sodium tetraborates is their acute irritant effect when in contact with skin and the mucous membranes of the eyes, nose and other sites of the respiratory tract. The irritant properties increase with decreasing water of hydration due to the exothermic effect of hydration.

The adopted TLV-TWA for silver dust and fumes is 0.1 mg/m3 and for the more toxic soluble silver compounds the adopted value is 0.01 mg/m3. Cases of argyria (a slate to blue-grey discolouration of epithelial tissues) have been recorded when workers were exposed to silver nitrate at concentrations of 0.1 mg/m3 (as silver). Exposure to very high concentrations of silver fume has caused diffuse pulmonary fibrosis.

Exposure controls

| | |
|---|--|
| Appropriate engineering controls | <p>Articles or manufactured items, in their original condition, generally don't require engineering controls during handling or in normal use.</p> <p>Exceptions may arise following extensive use and subsequent wear, during recycling or disposal operations where substances, found in the article, may be released to the environment.</p> <p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.</p> <p>The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> |
| Personal protection |  |
| Eye and face protection | <p>No special equipment required due to the physical form of the product.</p> <ul style="list-style-type: none"> ▸ Safety glasses with side shields. ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. |
| Skin protection | See Hand protection below |
| Hands/feet protection | <p>Wear general protective gloves, eg. light weight rubber gloves.</p> <p>NOTE:</p> <ul style="list-style-type: none"> ▸ The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact. ▸ Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed. |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none"> ▸ Overalls. ▸ Eyewash unit. ▸ Barrier cream. <p>No special equipment required due to the physical form of the product.</p> |

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the

computer-generated selection:

CHLORIDE TEST TABLETS

| Material | CPI |
|----------|-----|
| BUTYL | A |
| NEOPRENE | A |

Respiratory protection

Respiratory protection not normally required due to the physical form of the product.

| | |
|---------|---|
| NITRILE | A |
| VITON | A |

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

| | | | |
|---|---|--|----------------|
| Appearance | Light sensitive. Tablets, beige, partly soluble in water | | |
| Physical state | Manufactured | Relative density (Water = 1) | 1.838 |
| Odour | Not Available | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | Not Available |
| pH (as supplied) | Not Available | Decomposition temperature | Not Available |
| Melting point / freezing point (°C) | Not Available | Viscosity (cSt) | Not Available |
| Initial boiling point and boiling range (°C) | Not Applicable | Molecular weight (g/mol) | Not Available |
| Flash point (°C) | Not Available | Taste | Not Available |
| Evaporation rate | Not Available BuAC = 1 | Explosive properties | Not Available |
| Flammability | Not Available | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | Not Available | Surface Tension (dyn/cm or mN/m) | Not Applicable |
| Lower Explosive Limit (%) | Not Available | Volatile Component (%vol) | Not Available |
| Vapour pressure (kPa) | Not Available | Gas group | Not Available |
| Solubility in water | Partly miscible | pH as a solution (Not Available%) | 7.1 |
| Vapour density (Air = 1) | Not Available | VOC g/L | Not Available |

SECTION 10 Stability and reactivity

| | |
|---|--|
| Reactivity | See section 7 |
| Chemical stability | <ul style="list-style-type: none"> ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur. |
| Possibility of hazardous reactions | See section 7 |
| Conditions to avoid | See section 7 |
| Incompatible materials | See section 7 |
| Hazardous decomposition products | See section 5 |

SECTION 11 Toxicological information

Information on toxicological effects

| | |
|---------------------|--|
| Inhaled | <p>The material is not thought to produce either adverse health effects or irritation of the respiratory tract following inhalation (as classified by EC Directives using animal models). Nevertheless, adverse systemic effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.</p> <p>Inhalation may result in chrome ulcers or sores of nasal mucosa and lung damage.</p> <p>Borates, as represented by borax, may act as simple respiratory irritants. In a study of the respiratory effects of borax dust on active borax workers, the incidence of respiratory symptoms, pulmonary function and abnormalities of chest radiographs were related to estimated exposures. Dryness of the mouth, nose or throat, dry cough, nose bleeds, sore throat, productive cough, shortness of breath and chest tightness were related to exposures of 4 mg/m³ or more</p> <p>Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.</p> <p>Inhalation of small amounts of dust or fume over long periods may cause poisoning.</p> |
| Ingestion | <p>Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.</p> <p>The substance and/or its metabolites may bind to haemoglobin inhibiting normal uptake of oxygen. This condition, known as "methaemoglobinemia", is a form of oxygen starvation (anoxia).</p> <p>Symptoms include cyanosis (a bluish discolouration skin and mucous membranes) and breathing difficulties.</p> <p>Symptoms of borate poisoning include nausea, vomiting, diarrhoea, epigastric pain. These may be accompanied headache, weakness and a distinctive red skin rash. In severe cases there may be shock, increased heart rate and the skin may appear blue.</p> <p>Ingestion or percutaneous absorption of boric acid causes nausea, abdominal pain, diarrhoea and violent vomiting, sometimes bloody, which may be accompanied by headache and weakness, and characteristic erythematous (abnormally red) lesions on the skin. In severe cases, shock with fall in arterial pressure, tachycardia (increase in heart rate) and cyanosis (blue skin colour) may occur. Marked central nervous system irritation, oliguria (small volume of urine), and anuria (absence of or defective excretion of urine) may be present.</p> |
| Skin Contact | <p>Evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis.</p> <p>The material may accentuate any pre-existing dermatitis condition</p> <p>Skin contact may result in severe irritation particularly to broken skin. Ulceration known as "chrome ulcers" may develop. Chrome ulcers and skin cancer are significantly related.</p> <p>Boric acid is not absorbed through intact skin but is readily absorbed through areas of damaged, abraded, burned skin, areas of active dermatitis</p> <p>Irritation and skin reactions are possible with sensitive skin</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p> |
| Eye | <p>When applied to the eye(s) of animals, the material produces severe ocular lesions which are present twenty-four hours or more after instillation.</p> |
| Chronic | <p>Practical experience shows that skin contact with the material is capable either of inducing a sensitisation reaction in a substantial number of individuals, and/or of producing a positive response in experimental animals.</p> <p>Substances that can cause occupational asthma (also known as asthmagens and respiratory sensitisers) can induce a state of specific airway hyper-responsiveness via an immunological, irritant or other mechanism. Once the airways have become hyper-responsive, further exposure to the substance, sometimes even to tiny quantities, may cause respiratory symptoms.</p> <p>There is sufficient evidence to provide a strong presumption that human exposure to the material may result in the development of heritable genetic damage, generally on the basis of</p> <ul style="list-style-type: none"> - appropriate animal studies, - other relevant information <p>There is sufficient evidence to provide a strong presumption that human exposure to the material may result in impaired fertility on the basis of: - clear evidence in animal studies of impaired fertility in the absence of toxic effects, or evidence of impaired fertility occurring at around the same dose levels as other toxic effects but which is not a secondary non-specific consequence of other toxic effects.</p> <p>Silver is one of the most physically and physiologically cumulative of the elements. Chronic exposure to silver salts may cause argyria, a permanent ashen-grey discolouration of the skin, conjunctiva and internal organs (due to the deposit of an insoluble albuminate of silver).</p> <p>The respiratory tract may also be a site of local argyria (following chronic inhalation exposures) with a mild chronic bronchitis being the only obvious symptom.</p> <p>Chromium(III) is considered an essential trace nutrient serving as a component of the "glucose tolerance factor" and a cofactor for insulin action. High concentrations of chromium are also found in RNA. Trivalent chromium is the most common form found in nature.</p> <p>Chronic boric acid poisoning is characterized by mild gastrointestinal irritation, loss of appetite, disturbed digestion, nausea, possibly vomiting and a hard blotchy rash. Dryness of skin, reddening of tongue, loss of hair, conjunctivitis, and kidney injury have also been reported.</p> <p>[Occupational Diseases]</p> <p>Long term exposure to boric acid may be of more concern, causes kidney damage and eventually kidney failure.</p> <p>Chronic poisoning by borates may be characterised gastrointestinal disturbances and skin rash. Chronic absorption of small</p> |

CHLORIDE TEST TABLETS

| | | |
|-----------------------|---|--|
| | amounts of borax causes mild gastroenteritis and dermatitis. Chronic feeding studies involving borate administration to rats and dogs leads to accumulation in the testes, germ cell depletion and testicular atrophy. | |
| CHLORIDE TEST TABLETS | TOXICITY | IRRITATION |
| | Not Available | Not Available |
| silver nitrate | TOXICITY | IRRITATION |
| | dermal (rat) LD50: >2000 mg/kg ^[1] Oral (Rat) LD50; 50 mg/kg ^[2] | Eye (rabbit): 1 mg - SEVERE Eye (rabbit): 10 mg - moderate |
| boric acid | TOXICITY | IRRITATION |
| | Dermal (rabbit) LD50: >2000 mg/kg ^[1] Inhalation(Rat) LC50; >2.12 mg/l4h ^[1] Oral (Rat) LD50; >2600 mg/kg ^[1] | Eye: no adverse effect observed (not irritating) ^[1] Skin (human): 15 mg/3d -I- mild Skin: no adverse effect observed (not irritating) ^[1] |
| | | |
| potassium dichromate | TOXICITY | IRRITATION |
| | Dermal (rabbit) LD50: 14 mg/kg ^[2] Inhalation(Rat) LC50; 0.083 mg/L4h ^[1] Oral (Rat) LD50; 52 mg/kg ^[1] | Highly irritating & corrosive |
| | | |
| potassium chromate | TOXICITY | IRRITATION |
| | Dermal (rabbit) LD50: 960 mg/kg ^[1] Inhalation(Rat) LC50; 0.083 mg/L4h ^[1] Oral (Rat) LD50; 52 mg/kg ^[1] | Skin (human): Highly irritating & |
| | | |
| Legend: | 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances | |

| | |
|--|--|
| SILVER NITRATE | The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. Reproductive effector in rats Human lymphocyte mutagen Equivocal tumorigen by RTECS criteria |
| BORIC ACID | The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis. |
| POTASSIUM DICHROMATE | Allergic reactions which develop in the respiratory passages as bronchial asthma or rhinoconjunctivitis, are mostly the result of reactions of the allergen with specific antibodies of the IgE class and belong in their reaction rates to the manifestation of the immediate type. In addition to the allergen-specific potential for causing respiratory sensitisation, the amount of the allergen, the exposure period and the genetically determined disposition of the exposed person are likely to be decisive. Factors which increase the sensitivity of the mucosa may play a role in predisposing a person to allergy. Particular attention is drawn to so-called atopic diathesis which is characterised by an increased susceptibility to allergic rhinitis, allergic bronchial asthma and atopic eczema (neurodermatitis) which is associated with increased IgE synthesis. Exogenous allergic alveolitis is induced essentially by allergen specific immune-complexes of the IgG type; cell-mediated reactions (T lymphocytes) may be involved. Such allergy is of the delayed type with onset up to four hours following exposure. WARNING: This substance has been classified by the IARC as Group 1: CARCINOGENIC TO HUMANS. |
| POTASSIUM CHROMATE | Oral (rat) LD50: 50-500 mg/kg corrosive [CCINFO-Baker] |
| CHLORIDE TEST TABLETS & POTASSIUM DICHROMATE & POTASSIUM CHROMATE | The following information refers to contact allergens as a group and may not be specific to this product. Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. |
| SILVER NITRATE & POTASSIUM DICHROMATE & POTASSIUM CHROMATE | Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. |

| | | | |
|----------------------------------|---|------------------------|---|
| Acute Toxicity | ✓ | Carcinogenicity | ✓ |
| Skin Irritation/Corrosion | ✓ | Reproductivity | ✓ |

CHLORIDE TEST TABLETS

| | | | |
|-----------------------------------|---|--------------------------|---|
| Serious Eye Damage/Irritation | ✓ | STOT - Single Exposure | ✗ |
| Respiratory or Skin sensitisation | ✓ | STOT - Repeated Exposure | ✗ |
| Mutagenicity | ✓ | Aspiration Hazard | ✗ |

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

| CHLORIDE TEST TABLETS | Endpoint | Test Duration (hr) | Species | Value | Source |
|-----------------------|---|--------------------|-------------------------------|-----------------|---------------|
| | Not Available | Not Available | Not Available | Not Available | Not Available |
| silver nitrate | Endpoint | Test Duration (hr) | Species | Value | Source |
| | BCF | 792h | Fish | <54-310 | 7 |
| | NOEC(ECx) | 12960h | Fish | <0.001mg/l | 1 |
| | LC50 | 96h | Fish | 0.003mg/l | 1 |
| | EC50 | 72h | Algae or other aquatic plants | 0.153mg/L | 4 |
| | EC50 | 48h | Crustacea | <0.001mg/L | 4 |
| | EC50 | 96h | Algae or other aquatic plants | 0.011mg/L | 4 |
| boric acid | Endpoint | Test Duration (hr) | Species | Value | Source |
| | NOEC(ECx) | 576h | Fish | 0.001mg/L | 5 |
| | LC50 | 96h | Fish | 70-80mg/l | 4 |
| | BCF | 672h | Fish | <3.2 | 7 |
| | EC50 | 72h | Algae or other aquatic plants | 40.2mg/l | 2 |
| | EC50 | 48h | Crustacea | 230mg/L | 5 |
| | EC50 | 96h | Algae or other aquatic plants | 15.4mg/l | 2 |
| potassium dichromate | Endpoint | Test Duration (hr) | Species | Value | Source |
| | EC10(ECx) | 24h | Crustacea | 0.005-0.077mg/L | 4 |
| | LC50 | 96h | Fish | 14.25-36.79mg/l | 4 |
| | EC50 | 72h | Algae or other aquatic plants | 0.14-1.6mg/l | 4 |
| | EC50 | 48h | Crustacea | 0.01-0.45mg/l | 4 |
| | EC50 | 96h | Algae or other aquatic plants | 0.091-0.246mg/l | 4 |
| potassium chromate | Endpoint | Test Duration (hr) | Species | Value | Source |
| | NOEC(ECx) | 336h | Algae or other aquatic plants | <0.002mg/L | 4 |
| | LC50 | 96h | Fish | 16.16mg/l | 4 |
| | EC50 | 48h | Crustacea | 7.16-11.3mg/l | 4 |
| | EC50 | 96h | Algae or other aquatic plants | 0.332mg/l | 4 |
| Legend: | <i>Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data</i> | | | | |

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

Metal-containing inorganic substances generally have negligible vapour pressure and are not expected to partition to air. Once released to surface waters and moist soils their fate depends on solubility and dissociation in water. Environmental processes (such as oxidation and the presence of acids or bases) may transform insoluble metals to more soluble ionic forms.

For silver and its compounds:

Environmental fate:

Silver is a rare but naturally occurring metal, often found deposited as a mineral ore in association with other elements. Emissions from smelting operations, manufacture and disposal of certain photographic and electrical supplies, coal combustion, and cloud seeding are some of the anthropogenic sources of silver in

Continued...

the biosphere. The global biogeochemical movements of silver are characterized by releases to the atmosphere, water, and land by natural and anthropogenic sources, long-range transport of fine particles in the atmosphere, wet and dry deposition, and sorption to soils and sediments.

Chromium in the oxidation state +3 (the trivalent form) is poorly absorbed by cells found in microorganisms, plants and animals. Chromate anions (CrO₄⁻, oxidation state +6, the hexavalent form) are readily transported into cells and toxicity is closely linked to the higher oxidation state.

Chromium Ecotoxicology:

Toxicity in Aquatic Organisms:

Chromium is harmful to aquatic organisms in very low concentrations.

For boron and borates:

Environmental fate:

Boron is generally found in nature bound to oxygen and is never found as the free element. Atmospheric boron may be in the form of particulate matter or aerosols as borides, boron oxides, borates, boranes, organoboron compounds, trihalide boron compounds, or borazines. Borates are relatively soluble in water, and will probably be removed from the atmosphere by precipitation and dry deposition.

Since chromium compounds cannot volatilize from water, transport of chromium from water to the atmosphere is not likely, except by transport in windblown sea sprays. Most of the chromium released into water will ultimately be deposited in the sediment. A very small percentage of chromium can be present in water in both soluble and insoluble forms.

DO NOT discharge into sewer or waterways.

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|----------------------|-------------------------|------------------|
| silver nitrate | LOW | LOW |
| boric acid | LOW | LOW |
| potassium dichromate | HIGH | HIGH |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|----------------------|-----------------------|
| silver nitrate | MEDIUM (BCF = 600) |
| boric acid | LOW (BCF = 0) |
| potassium dichromate | LOW (LogKOW = 2.6724) |

Mobility in soil

| Ingredient | Mobility |
|----------------------|-------------------|
| silver nitrate | LOW (KOC = 14.3) |
| boric acid | LOW (KOC = 35.04) |
| potassium dichromate | LOW (KOC = 393.3) |


SECTION 13 Disposal considerations

Waste treatment methods

| | |
|------------------------------|--|
| Product / Packaging disposal | <ul style="list-style-type: none"> · Recycle wherever possible or consult manufacturer for recycling options. · Consult State Land Waste Management Authority for disposal. ▶ DO NOT allow wash water from cleaning or process equipment to enter drains. ▶ It may be necessary to collect all wash water for treatment before disposal. ▶ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. |
|------------------------------|--|

SECTION 14 Transport information

Labels Required

| | |
|--|---|
| |  |
|--|---|

Marine Pollutant



Land transport (UN)

| | | |
|------------------------------|---|--------------------|
| UN number | 3077 | |
| UN proper shipping name | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (contains silver nitrate and potassium chromate) | |
| Transport hazard class(es) | Class | 9 |
| | Subrisk | Not Applicable |
| Packing group | III | |
| Environmental hazard | Environmentally hazardous | |
| Special precautions for user | Special provisions | 274; 331; 335; 375 |
| | Limited quantity | 5 kg |

Air transport (ICAO-IATA / DGR)

| | | |
|------------------------------|---|-------------------------|
| UN number | 3077 | |
| UN proper shipping name | Environmentally hazardous substance, solid, n.o.s. * (contains silver nitrate and potassium chromate) | |
| Transport hazard class(es) | ICAO/IATA Class | 9 |
| | ICAO / IATA Subrisk | Not Applicable |
| | ERG Code | 9L |
| Packing group | III | |
| Environmental hazard | Environmentally hazardous | |
| Special precautions for user | Special provisions | A97 A158 A179 A197 A215 |
| | Cargo Only Packing Instructions | 956 |
| | Cargo Only Maximum Qty / Pack | 400 kg |
| | Passenger and Cargo Packing Instructions | 956 |
| | Passenger and Cargo Maximum Qty / Pack | 400 kg |
| | Passenger and Cargo Limited Quantity Packing Instructions | Y956 |
| | Passenger and Cargo Limited Maximum Qty / Pack | 30 kg G |

Sea transport (IMDG-Code / GGVSee)

| | | |
|------------------------------|---|---------------------|
| UN number | 3077 | |
| UN proper shipping name | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (contains silver nitrate and potassium chromate) | |
| Transport hazard class(es) | IMDG Class | 9 |
| | IMDG Subrisk | Not Applicable |
| Packing group | III | |
| Environmental hazard | Marine Pollutant | |
| Special precautions for user | EMS Number | F-A, S-F |
| | Special provisions | 274 335 966 967 969 |
| | Limited Quantities | 5 kg |

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

| Product name | Group |
|----------------|---------------|
| silver nitrate | Not Available |
| boric acid | Not Available |

Continued...

| Product name | Group |
|----------------------|---------------|
| potassium dichromate | Not Available |
| potassium chromate | Not Available |

Transport in bulk in accordance with the ICG Code

| Product name | Ship Type |
|----------------------|---------------|
| silver nitrate | Not Available |
| boric acid | Not Available |
| potassium dichromate | Not Available |
| potassium chromate | Not Available |

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

silver nitrate is found on the following regulatory lists

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

Singapore Permissible Exposure Limits of Toxic Substances

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2A: Probably carcinogenic to humans

boric acid is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List

potassium dichromate is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 1: Carcinogenic to humans

Singapore Permissible Exposure Limits of Toxic Substances

potassium chromate is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 1: Carcinogenic to humans

Singapore Permissible Exposure Limits of Toxic Substances

National Inventory Status

| National Inventory | Status |
|--|---|
| Australia - AIIIC / Australia Non-Industrial Use | Yes |
| Canada - DSL | Yes |
| Canada - NDSL | No (silver nitrate; boric acid; potassium dichromate; potassium chromate) |
| China - IECSC | Yes |
| Europe - EINEC / ELINCS / NLP | Yes |
| Japan - ENCS | Yes |
| Korea - KECI | Yes |
| New Zealand - NZIoC | Yes |
| Philippines - PICCS | Yes |
| USA - TSCA | Yes |
| Taiwan - TCSI | Yes |
| Mexico - INSQ | Yes |
| Vietnam - NCI | Yes |
| Russia - FBEPH | Yes |
| Legend: | Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration. |

SECTION 16 Other information

| | |
|----------------------|------------|
| Revision Date | 28/11/2019 |
| Initial Date | 24/11/2016 |

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

SDS Version Summary

| Version | Date of Update | Sections Updated |
|---------|----------------|---|
| 5.10 | 28/11/2019 | Classification, Disposal, Engineering Control, Fire Fighter (fire/explosion hazard), Fire Fighter (fire fighting), First Aid (eye), First Aid (inhaled), First Aid (skin), First Aid (swallowed), Ingredients, Personal Protection (other), Personal Protection (Respirator), Personal Protection (eye), Personal Protection (hands/feet), Physical Properties, Spills (major), Spills (minor), Storage (storage incompatibility), Storage (storage requirement), Storage (suitable container), Synonyms, Transport Information |

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

CHLORIDE TITRANT MBC2

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 777051

Version No: 8.13

Safety Data Sheet

Issue Date: 23/04/2021

Print Date: 24/03/2022

L.GHS.SGP.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

| | |
|--------------------------------------|---|
| Product name | CHLORIDE TITRANT MBC2 |
| Chemical Name | Not Applicable |
| Synonyms | mBC2, used in MO380 Boiler Plus Test Kit, MO246A Motor Ship Test Kit |
| Proper shipping name | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains silver nitrate) |
| Chemical formula | Not Applicable |
| Other means of identification | 777051, 1346538, 77051, 777056, 777066, 777100 |

Relevant identified uses of the substance or mixture and uses advised against

| | |
|---------------------------------|---------|
| Relevant identified uses | reagent |
|---------------------------------|---------|

Details of the supplier of the safety data sheet

| | | | |
|--------------------------------|---|---|---|
| Registered company name | Wilhelmsen Ships Service (S) Pte. Ltd. | Wilhelmsen Ships Service AS* Central Warehouse | Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen |
| Address | 186 Pandan Loop Singapore 128376 Singapore | Willem Barentszstraat 50 Rotterdam Netherlands | -----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway |
| Telephone | +65 6395 4545 | +31 10 4877 777 | Not Available |
| Fax | Not Available | Not Available | Not Available |
| Website | http://www.wilhelmsen.com/services/maritime/compan | http://www.wilhelmsen.com | http://www.wilhelmsen.com |
| Email | wss.singapore@wilhelmsen.com | wss.rotterdam@wilhelmsen.com | wss.global.sdsinfo@wilhelmsen.com |

| | |
|--------------------------------|---|
| Registered company name | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +31 10 4877 777 |
| Fax | Not Available |
| Website | http://www.wilhelmsen.com |
| Email | wss.rotterdam@wilhelmsen.com |

Emergency telephone number

| Association / Organisation | 24hrs - Chemtrec | Dutch nat. poison centre | 24hrs - Chemtrec |
|-----------------------------------|------------------|--------------------------|------------------|
| Emergency telephone numbers | +31-10-4877700 | + 31 88 7558561 | +31-10-4877700 |
| Other emergency telephone numbers | +31-10-4877700 | + 31 10 4877700 | +1 800 424 9300 |


| Association / Organisation | Dutch nat. poison centre |
|-----------------------------------|--------------------------|
| Emergency telephone numbers | + 31 30 274 88 88 |
| Other emergency telephone numbers | + 31-10-4877700 |

SECTION 2 Hazards identification

Classification of the substance or mixture

| | |
|----------------|--|
| Classification | Hazardous to the Aquatic Environment Acute Hazard Category 1, Acute Toxicity (Oral) Category 4, Skin Corrosion/Irritation Category 2, Serious Eye Damage/Eye Irritation Category 2, Hazardous to the Aquatic Environment Long-Term Hazard Category 1 |
|----------------|--|

Label elements

| | |
|---------------------|--|
| Hazard pictogram(s) |  |
|---------------------|--|

| | |
|-------------|---------|
| Signal word | Warning |
|-------------|---------|

Hazard statement(s)

| | |
|------|---|
| H302 | Harmful if swallowed. |
| H315 | Causes skin irritation. |
| H319 | Causes serious eye irritation. |
| H410 | Very toxic to aquatic life with long lasting effects. |

Precautionary statement(s) Prevention

| | |
|------|---|
| P264 | Wash all exposed external body areas thoroughly after handling. |
| P270 | Do not eat, drink or smoke when using this product. |
| P273 | Avoid release to the environment. |

Precautionary statement(s) 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. |
| P391 | Collect spillage. |

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

| | |
|------|--|
| P501 | Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation. |
|------|--|

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

| CAS No | %[weight] | Name |
|-----------|-----------|-----------------------|
| 7761-88-8 | 2.5-5 | <u>silver nitrate</u> |

SECTION 4 First aid measures

Description of first aid measures

| | |
|---------------------|---|
| Eye Contact | <p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. |
| Skin Contact | <p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation. |
| Inhalation | <ul style="list-style-type: none"> ▸ If fumes, aerosols or combustion products are inhaled remove from contaminated area. ▸ Other measures are usually unnecessary. |
| Ingestion | <ul style="list-style-type: none"> ▸ IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY. ▸ For advice, contact a Poisons Information Centre or a doctor. ▸ Urgent hospital treatment is likely to be needed. ▸ In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition. ▸ If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the SDS should be provided. Further action will be the responsibility of the medical specialist. ▸ If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the SDS. <p>Where medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:</p> <ul style="list-style-type: none"> ▸ INDUCE vomiting with fingers down the back of the throat, ONLY IF CONSCIOUS. Lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. <p>NOTE: Wear a protective glove when inducing vomiting by mechanical means.</p> |

Indication of any immediate medical attention and special treatment needed

As in all cases of suspected poisoning, follow the ABCDEs of emergency medicine (airway, breathing, circulation, disability, exposure), then the ABCDEs of toxicology (antidotes, basics, change absorption, change distribution, change elimination).

For poisons (where specific treatment regime is absent):

BASIC TREATMENT

- Establish a patent airway with suction where necessary.
- Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- Administer oxygen by non-rebreather mask at 10 to 15 L/min.
- Monitor and treat, where necessary, for pulmonary oedema.
- Monitor and treat, where necessary, for shock.
- Anticipate seizures.
- **DO NOT** use emetics. Where ingestion is suspected rinse mouth and give up to 200 ml water (5 ml/kg recommended) for dilution where patient is able to swallow, has a strong gag reflex and does not drool.

ADVANCED TREATMENT

- Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- Positive-pressure ventilation using a bag-valve mask might be of use.
- Monitor and treat, where necessary, for arrhythmias.
- Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- Drug therapy should be considered for pulmonary oedema.
- Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- Treat seizures with diazepam.
- Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

53ag

CHLORIDE TITRANT MBC2

SECTION 5 Firefighting measures

Extinguishing media

- ▶ Jets of water.
- ▶ Water spray or fog.
- ▶ Foam.

Special hazards arising from the substrate or mixture

| | |
|-----------------------------|-------------|
| Fire Incompatibility | None known. |
|-----------------------------|-------------|

Advice for firefighters

| | |
|------------------------------|--|
| Fire Fighting | <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus plus protective gloves in the event of a fire. ▶ Prevent, by any means available, spillage from entering drains or water courses. |
| Fire/Explosion Hazard | <ul style="list-style-type: none"> ▶ Non combustible. ▶ Not considered a significant fire risk, however containers may burn. |

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

| | |
|---------------------|--|
| Minor Spills | <p>Environmental hazard - contain spillage.</p> <ul style="list-style-type: none"> ▶ Clean up all spills immediately. ▶ Avoid breathing vapours and contact with skin and eyes. ▶ Control personal contact with the substance, by using protective equipment. |
| Major Spills | <p>Environmental hazard - contain spillage.</p> <ul style="list-style-type: none"> ▶ Clear area of personnel and move upwind. ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus plus protective gloves. |

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

| | |
|--------------------------|---|
| Safe handling | <ul style="list-style-type: none"> ▶ Avoid all personal contact, including inhalation. ▶ Wear protective clothing when risk of exposure occurs. ▶ Use in a well-ventilated area. |
| Other information | <ul style="list-style-type: none"> ▶ Store in original containers. ▶ Keep containers securely sealed. ▶ Store in a cool, dry, well-ventilated area. |

Conditions for safe storage, including any incompatibilities

| | |
|--------------------------------|--|
| Suitable container | <ul style="list-style-type: none"> ▶ Polyethylene or polypropylene container. ▶ Packing as recommended by manufacturer. ▶ Check all containers are clearly labelled and free from leaks. |
| Storage incompatibility | <ul style="list-style-type: none"> ▶ WARNING: Avoid or control reaction with peroxides. All <i>transition metal</i> peroxides should be considered as potentially explosive. For example transition metal complexes of alkyl hydroperoxides may decompose explosively. · Silver or silver salts readily form explosive silver fulminate in the presence of both nitric acid and ethanol. The resulting fulminate is much more sensitive and a more powerful detonator than mercuric fulminate. · Silver and its compounds and salts may also form explosive compounds in the presence of acetylene and nitromethane. |



- X — Must not be stored together
 0 — May be stored together with specific preventions
 + — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

| Source | Ingredient | Material name | TWA | STEL | Peak | Notes |
|---|----------------|----------------------------------|------------------------|---------------|---------------|---------------|
| Singapore Permissible Exposure Limits of Toxic Substances | silver nitrate | Silver: Soluble compounds, as Ag | 0.01 mg/m ³ | Not Available | Not Available | Not Available |

Emergency Limits


| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|----------------|-------------------------|-----------------------|-----------------------|
| silver nitrate | 0.047 mg/m ³ | 0.9 mg/m ³ | 5.4 mg/m ³ |

| Ingredient | Original IDLH | Revised IDLH |
|----------------|----------------------|---------------|
| silver nitrate | 10 mg/m ³ | Not Available |

MATERIAL DATA

The adopted TLV-TWA for silver dust and fumes is 0.1 mg/m³ and for the more toxic soluble silver compounds the adopted value is 0.01 mg/m³. Cases of argyria (a slate to blue-grey discolouration of epithelial tissues) have been recorded when workers were exposed to silver nitrate at concentrations of 0.1 mg/m³ (as silver). Exposure to very high concentrations of silver fume has caused diffuse pulmonary fibrosis.

Exposure controls

| | |
|---|---|
| Appropriate engineering controls | Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. |
| Personal protection |  |
| Eye and face protection | <ul style="list-style-type: none"> ▶ Safety glasses with side shields. ▶ Chemical goggles. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. |
| Skin protection | See Hand protection below |
| Hands/feet protection | <ul style="list-style-type: none"> ▶ Wear chemical protective gloves, e.g. PVC. ▶ Wear safety footwear or safety gumboots, e.g. Rubber <p>The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.</p> |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none"> ▶ Overalls. ▶ P.V.C apron. ▶ Barrier cream. |

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

| | |
|-------------------|--|
| Appearance | Light sensitive. Liquid, colourless |
|-------------------|--|

| | | | |
|---|------------------------|--|----------------|
| Physical state | Liquid | Relative density (Water = 1) | 1 |
| Odour | Not Available | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | Not Applicable |
| pH (as supplied) | 5 | Decomposition temperature | Not Applicable |
| Melting point / freezing point (°C) | Not Available | Viscosity (cSt) | Not Available |
| Initial boiling point and boiling range (°C) | 100 | Molecular weight (g/mol) | Not Applicable |
| Flash point (°C) | Not Applicable | Taste | Not Available |
| Evaporation rate | Not Available BuAC = 1 | Explosive properties | Not Available |
| Flammability | Not Applicable | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | Not Applicable | Surface Tension (dyn/cm or mN/m) | Not Available |
| Lower Explosive Limit (%) | Not Available | Volatile Component (%vol) | Not Available |
| Vapour pressure (kPa) | Not Available | Gas group | Not Available |
| Solubility in water | Miscible | pH as a solution (Not Available%) | Not Available |
| Vapour density (Air = 1) | Not Available | VOC g/L | Not Available |

SECTION 10 Stability and reactivity

| | |
|---|--|
| Reactivity | See section 7 |
| Chemical stability | <ul style="list-style-type: none"> ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur. |
| Possibility of hazardous reactions | See section 7 |
| Conditions to avoid | See section 7 |
| Incompatible materials | See section 7 |
| Hazardous decomposition products | See section 5 |

SECTION 11 Toxicological information

Information on toxicological effects

| | |
|---------------------|---|
| Inhaled | The material is not thought to produce either adverse health effects or irritation of the respiratory tract following inhalation (as classified by EC Directives using animal models). Nevertheless, adverse systemic effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting. |
| Ingestion | Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual. |
| Skin Contact | <p>Skin contact is not thought to produce harmful health effects (as classified under EC Directives using animal models). Systemic harm, however, has been identified following exposure of animals by at least one other route and the material may still produce health damage following entry through wounds, lesions or abrasions. Good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p> |
| Eye | <p>Evidence exists, or practical experience predicts, that the material may cause eye irritation in a substantial number of individuals and/or may produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals.</p> <p>Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.</p> |
| Chronic | <p>Repeated or long-term occupational exposure is likely to produce cumulative health effects involving organs or biochemical systems.</p> <p>Silver is one of the most physically and physiologically cumulative of the elements. Chronic exposure to silver salts may cause</p> |

| | | |
|-----------------------|---|--------------------------------|
| | argyria, a permanent ashen-grey discolouration of the skin, conjunctiva and internal organs (due to the deposit of an insoluble albuminate of silver). The respiratory tract may also be a site of local argyria (following chronic inhalation exposures) with a mild chronic bronchitis being the only obvious symptom. | |
| CHLORIDE TITRANT MBC2 | TOXICITY | IRRITATION |
| | Not Available | Not Available |
| silver nitrate | TOXICITY | IRRITATION |
| | dermal (rat) LD50: >2000 mg/kg ^[1] | Eye (rabbit): 1 mg - SEVERE |
| | Oral (Rat) LD50; 50 mg/kg ^[2] | Eye (rabbit): 10 mg - moderate |
| Legend: | 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances | |

| | |
|----------------|---|
| SILVER NITRATE | The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. |
| | Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Reproductive effector in rats Human lymphocyte mutagen Equivocal tumorigen by RTECS criteria |

| | | | |
|-----------------------------------|---|--------------------------|---|
| Acute Toxicity | ✓ | Carcinogenicity | ✗ |
| Skin Irritation/Corrosion | ✓ | Reproductivity | ✗ |
| Serious Eye Damage/Irritation | ✓ | STOT - Single Exposure | ✗ |
| Respiratory or Skin sensitisation | ✗ | STOT - Repeated Exposure | ✗ |
| Mutagenicity | ✗ | Aspiration Hazard | ✗ |

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

| | | | | | |
|-----------------------|--|---------------------------|-------------------------------|---------------|---------------|
| CHLORIDE TITRANT MBC2 | Endpoint | Test Duration (hr) | Species | Value | Source |
| | Not Available | Not Available | Not Available | Not Available | Not Available |
| silver nitrate | Endpoint | Test Duration (hr) | Species | Value | Source |
| | BCF | 792h | Fish | <54-310 | 7 |
| | NOEC(ECx) | 12960h | Fish | <0.001mg/l | 1 |
| | LC50 | 96h | Fish | 0.003mg/l | 1 |
| | EC50 | 72h | Algae or other aquatic plants | 0.153mg/L | 4 |
| | EC50 | 48h | Crustacea | <0.001mg/L | 4 |
| | EC50 | 96h | Algae or other aquatic plants | 0.011mg/L | 4 |
| Legend: | Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data | | | | |

Very toxic to aquatic organisms.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

Toxic to flora.

For silver and its compounds:

Environmental fate:

Continued...

Silver is a rare but naturally occurring metal, often found deposited as a mineral ore in association with other elements. Emissions from smelting operations, manufacture and disposal of certain photographic and electrical supplies, coal combustion, and cloud seeding are some of the anthropogenic sources of silver in the biosphere. The global biogeochemical movements of silver are characterized by releases to the atmosphere, water, and land by natural and anthropogenic sources, long-range transport of fine particles in the atmosphere, wet and dry deposition, and sorption to soils and sediments.

DO NOT discharge into sewer or waterways.

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|----------------|-------------------------|------------------|
| silver nitrate | LOW | LOW |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|----------------|--------------------|
| silver nitrate | MEDIUM (BCF = 600) |

Mobility in soil

| Ingredient | Mobility |
|----------------|------------------|
| silver nitrate | LOW (KOC = 14.3) |



SECTION 13 Disposal considerations

Waste treatment methods

| | |
|-------------------------------------|---|
| Product / Packaging disposal | <ul style="list-style-type: none"> ▸ Containers may still present a chemical hazard/ danger when empty. ▸ Return to supplier for reuse/ recycling if possible. <p>Otherwise:</p> <ul style="list-style-type: none"> ▸ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. <p>Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.</p> <ul style="list-style-type: none"> ▸ DO NOT allow wash water from cleaning or process equipment to enter drains. ▸ It may be necessary to collect all wash water for treatment before disposal. ▸ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▸ Recycle wherever possible or consult manufacturer for recycling options. ▸ Consult State Land Waste Management Authority for disposal. ▸ Bury residue in an authorised landfill. |
|-------------------------------------|---|

SECTION 14 Transport information

Labels Required

| | |
|-------------------------|---|
| |  |
| Marine Pollutant |  |

Land transport (UN)

| | | |
|-------------------------------------|---|--------------------|
| UN number | 3082 | |
| UN proper shipping name | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains silver nitrate) | |
| Transport hazard class(es) | Class | 9 |
| | Subrisk | Not Applicable |
| Packing group | III | |
| Environmental hazard | Environmentally hazardous | |
| Special precautions for user | Special provisions | 274; 331; 335; 375 |

| | |
|------------------|-----|
| Limited quantity | 5 L |
|------------------|-----|

Air transport (ICAO-IATA / DGR)

| | | |
|-------------------------------------|---|--------------------|
| UN number | 3082 | |
| UN proper shipping name | Environmentally hazardous substance, liquid, n.o.s. * (contains silver nitrate) | |
| Transport hazard class(es) | ICAO/IATA Class | 9 |
| | ICAO / IATA Subrisk | Not Applicable |
| | ERG Code | 9L |
| Packing group | III | |
| Environmental hazard | Environmentally hazardous | |
| Special precautions for user | Special provisions | A97 A158 A197 A215 |
| | Cargo Only Packing Instructions | 964 |
| | Cargo Only Maximum Qty / Pack | 450 L |
| | Passenger and Cargo Packing Instructions | 964 |
| | Passenger and Cargo Maximum Qty / Pack | 450 L |
| | Passenger and Cargo Limited Quantity Packing Instructions | Y964 |
| | Passenger and Cargo Limited Maximum Qty / Pack | 30 kg G |

Sea transport (IMDG-Code / GGVSee)

| | | |
|-------------------------------------|---|----------------|
| UN number | 3082 | |
| UN proper shipping name | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains silver nitrate) | |
| Transport hazard class(es) | IMDG Class | 9 |
| | IMDG Subrisk | Not Applicable |
| Packing group | III | |
| Environmental hazard | Marine Pollutant | |
| Special precautions for user | EMS Number | F-A, S-F |
| | Special provisions | 274 335 969 |
| | Limited Quantities | 5 L |

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

| Product name | Group |
|----------------|---------------|
| silver nitrate | Not Available |

Transport in bulk in accordance with the ICG Code

| Product name | Ship Type |
|----------------|---------------|
| silver nitrate | Not Available |

SECTION 15 Regulatory information**Safety, health and environmental regulations / legislation specific for the substance or mixture****silver nitrate is found on the following regulatory lists**

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

Singapore Permissible Exposure Limits of Toxic Substances

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2A: Probably carcinogenic to humans

National Inventory Status

Continued...

| National Inventory | Status |
|--|--|
| Australia - AIIIC / Australia Non-Industrial Use | Yes |
| Canada - DSL | Yes |
| Canada - NDSL | No (silver nitrate) |
| China - IECSC | Yes |
| Europe - EINEC / ELINCS / NLP | Yes |
| Japan - ENCS | Yes |
| Korea - KECI | Yes |
| New Zealand - NZIoC | Yes |
| Philippines - PICCS | Yes |
| USA - TSCA | Yes |
| Taiwan - TCSI | Yes |
| Mexico - INSQ | Yes |
| Vietnam - NCI | Yes |
| Russia - FBEPH | Yes |
| Legend: | <p>Yes = All CAS declared ingredients are on the inventory</p> <p>No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.</p> |

SECTION 16 Other information

| | |
|----------------------|------------|
| Revision Date | 23/04/2021 |
| Initial Date | 15/11/2017 |

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

SDS Version Summary

| Version | Date of Update | Sections Updated |
|---------|----------------|------------------|
| 7.13 | 23/04/2021 | Ingredients |

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by AuthorITe, from Chemwatch.

CHLORINE HR TABLETS

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 777938

Version No: 2.2

Safety Data Sheet

Issue Date: 06/09/2016

Print Date: 24/03/2022

L.GHS.SGP.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

| | |
|-------------------------------|---------------------|
| Product name | CHLORINE HR TABLETS |
| Chemical Name | Not Applicable |
| Synonyms | Not Available |
| Chemical formula | Not Applicable |
| Other means of identification | 777938, 1346539 |

Relevant identified uses of the substance or mixture and uses advised against

| | |
|--------------------------|---------|
| Relevant identified uses | reagent |
|--------------------------|---------|

Details of the supplier of the safety data sheet

| | | | |
|-------------------------|---|--|---|
| Registered company name | Wilhelmsen Ships Service (S) Pte. Ltd. | Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | 186 Pandan Loop Singapore 128376 Singapore | -----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +65 6395 4545 | Not Available | +31 10 4877 777 |
| Fax | Not Available | Not Available | Not Available |
| Website | http://www.wilhelmsen.com/services/maritime/compan | http://www.wilhelmsen.com | http://www.wilhelmsen.com |
| Email | wss.singapore@wilhelmsen.com | wss.global.sdsinfo@wilhelmsen.com | wss.rotterdam@wilhelmsen.com |

| | |
|-------------------------|---|
| Registered company name | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +31 10 4877 777 |
| Fax | Not Available |
| Website | http://www.wilhelmsen.com |
| Email | wss.rotterdam@wilhelmsen.com |

Emergency telephone number

| | | | |
|----------------------------|------------------|------------------|--------------------------|
| Association / Organisation | 24hrs - Chemtrec | 24hrs - Chemtrec | Dutch nat. poison centre |
|----------------------------|------------------|------------------|--------------------------|

| | | | |
|-----------------------------------|--------------------------|-----------------|-----------------|
| Emergency telephone numbers | +31-10-4877700 | +31-10-4877700 | + 31 88 7558561 |
| Other emergency telephone numbers | +31-10-4877700 | +1 800 424 9300 | + 31 10 4877700 |
| Association / Organisation | Dutch nat. poison centre | | |
| Emergency telephone numbers | + 31 30 274 88 88 | | |
| Other emergency telephone numbers | + 31-10-4877700 | | |

SECTION 2 Hazards identification

Classification of the substance or mixture

| | |
|----------------|----------------|
| Classification | Not Applicable |
|----------------|----------------|

Label elements

| | |
|---------------------|-----------------------|
| Hazard pictogram(s) | Not Applicable |
| Signal word | Not Applicable |

Hazard statement(s)

Not Applicable

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

| CAS No | %[weight] | Name |
|---------------|-----------|----------------------------|
| Not Available | NotSpec. | Non-classified ingredients |

SECTION 4 First aid measures

Description of first aid measures

| | |
|--------------|---|
| Eye Contact | <ul style="list-style-type: none"> Generally not applicable. |
| Skin Contact | If skin or hair contact occurs: <ul style="list-style-type: none"> Flush skin and hair with running water (and soap if available). Seek medical attention in event of irritation. |
| Inhalation | <ul style="list-style-type: none"> If fumes, aerosols or combustion products are inhaled remove from contaminated area. Other measures are usually unnecessary. |
| Ingestion | <ul style="list-style-type: none"> Immediately give a glass of water. First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor. |

Indication of any immediate medical attention and special treatment needed

Continued...

CHLORINE HR TABLETS

Treat symptomatically.

SECTION 5 Firefighting measures

Extinguishing media

- There is no restriction on the type of extinguisher which may be used.
- Use extinguishing media suitable for surrounding area.

Special hazards arising from the substrate or mixture

| | |
|-----------------------------|-------------|
| Fire Incompatibility | None known. |
|-----------------------------|-------------|

Advice for firefighters

| | |
|------------------------------|--|
| Fire Fighting | Slight hazard when exposed to heat, flame and oxidisers. |
| Fire/Explosion Hazard | <ul style="list-style-type: none"> ▸ Non combustible. ▸ Not considered a significant fire risk, however containers may burn. |

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

| | |
|---------------------|--|
| Minor Spills | <ul style="list-style-type: none"> ▸ Clean up all spills immediately. ▸ Secure load if safe to do so. ▸ Bundle/collect recoverable product. |
| Major Spills | <ul style="list-style-type: none"> ▸ Minor hazard. ▸ Clear area of personnel. ▸ Alert Fire Brigade and tell them location and nature of hazard. |

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

| | |
|--------------------------|---|
| Safe handling | <ul style="list-style-type: none"> ▸ Limit all unnecessary personal contact. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area. |
| Other information | ▸ Store away from incompatible materials. |

Conditions for safe storage, including any incompatibilities

| | |
|--------------------------------|---|
| Suitable container | <ul style="list-style-type: none"> ▸ Polyethylene or polypropylene container. ▸ Packing as recommended by manufacturer. ▸ Check all containers are clearly labelled and free from leaks. |
| Storage incompatibility | Avoid contamination of water, foodstuffs, feed or seed. None known |



- X — Must not be stored together
- 0 — May be stored together with specific preventions
- + — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

CHLORINE HR TABLETS

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Not Available


Emergency Limits

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|---------------------|---------------|---------------|---------------|
| CHLORINE HR TABLETS | Not Available | Not Available | Not Available |

| Ingredient | Original IDLH | Revised IDLH |
|---------------------|---------------|---------------|
| CHLORINE HR TABLETS | Not Available | Not Available |

MATERIAL DATA

Exposure controls

| | |
|---|---|
| Appropriate engineering controls | <p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.</p> <p>The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> |
| Personal protection |  |
| Eye and face protection | <ul style="list-style-type: none"> ▸ Safety glasses. ▸ Safety glasses with side shields. ▸ Chemical goggles. <p>No special equipment for minor exposure i.e. when handling small quantities.</p> <p>OTHERWISE:</p> <ul style="list-style-type: none"> ▸ Safety glasses with side shields. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. ▸ Safety glasses with side shields ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. <p>No special equipment required due to the physical form of the product.</p> |
| Skin protection | See Hand protection below |
| Hands/feet protection | <p>Wear general protective gloves, eg. light weight rubber gloves.</p> <p>No special equipment required due to the physical form of the product.</p> |
| Body protection | See Other protection below |
| Other protection | <p>No special equipment needed when handling small quantities.</p> <p>OTHERWISE:</p> <ul style="list-style-type: none"> ▸ Overalls. ▸ Barrier cream. <p>No special equipment required due to the physical form of the product.</p> |

Respiratory protection

- Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
- Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory protection. These may be government mandated or vendor recommended.
- Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
- Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU)
- Use approved positive flow mask if significant quantities of dust becomes airborne.
- Try to avoid creating dust conditions.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

| | | | |
|---|------------------------|--|----------------|
| Appearance | Tablets, white | | |
| Physical state | Manufactured | Relative density (Water = 1) | 3.13 |
| Odour | Not Available | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | Not Available |
| pH (as supplied) | 6.3 | Decomposition temperature | Not Available |
| Melting point / freezing point (°C) | 686 | Viscosity (cSt) | Not Available |
| Initial boiling point and boiling range (°C) | 1330 | Molecular weight (g/mol) | Not Available |
| Flash point (°C) | Not Available | Taste | Not Available |
| Evaporation rate | Not Available BuAC = 1 | Explosive properties | Not Available |
| Flammability | Not Available | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | Not Available | Surface Tension (dyn/cm or mN/m) | Not Applicable |
| Lower Explosive Limit (%) | Not Available | Volatile Component (%vol) | Not Available |
| Vapour pressure (kPa) | Not Available | Gas group | Not Available |
| Solubility in water | Immiscible | pH as a solution (Not Available%) | Not Available |
| Vapour density (Air = 1) | Not Available | VOC g/L | Not Available |

SECTION 10 Stability and reactivity

| | |
|---|---|
| Reactivity | See section 7 |
| Chemical stability | Product is considered stable and hazardous polymerisation will not occur. |
| Possibility of hazardous reactions | See section 7 |
| Conditions to avoid | See section 7 |
| Incompatible materials | See section 7 |
| Hazardous decomposition products | See section 5 |

SECTION 11 Toxicological information

Information on toxicological effects

| | |
|---------------------|--|
| Inhaled | The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting. |
| Ingestion | The material has NOT been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence. The material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g liver, kidney) damage is evident. |
| Skin Contact | The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting. |
| Eye | Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn). |
| Chronic | Long-term exposure to the product is not thought to produce chronic effects adverse to health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course. |

| | | |
|----------------------------|-----------------|-------------------|
| CHLORINE HR TABLETS | TOXICITY | IRRITATION |
|----------------------------|-----------------|-------------------|

CHLORINE HR TABLETS

| | | |
|----------------|--|---------------|
| | Not Available | Not Available |
| Legend: | 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances | |

| | | | |
|--|---|---------------------------------|---|
| Acute Toxicity | ✗ | Carcinogenicity | ✗ |
| Skin Irritation/Corrosion | ✗ | Reproductivity | ✗ |
| Serious Eye Damage/Irritation | ✗ | STOT - Single Exposure | ✗ |
| Respiratory or Skin sensitisation | ✗ | STOT - Repeated Exposure | ✗ |
| Mutagenicity | ✗ | Aspiration Hazard | ✗ |

Legend: ✗ – Data either not available or does not fill the criteria for classification
✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

| CHLORINE HR TABLETS | Endpoint | Test Duration (hr) | Species | Value | Source |
|---------------------|--|--------------------|---------------|---------------|---------------|
| | Not Available | Not Available | Not Available | Not Available | Not Available |
| Legend: | Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data | | | | |

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|------------|---------------------------------------|---------------------------------------|
| | No Data available for all ingredients | No Data available for all ingredients |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|------------|---------------------------------------|
| | No Data available for all ingredients |

Mobility in soil

| Ingredient | Mobility |
|------------|---------------------------------------|
| | No Data available for all ingredients |

SECTION 13 Disposal considerations

Waste treatment methods

| | |
|-------------------------------------|--|
| Product / Packaging disposal | <ul style="list-style-type: none"> ▸ Recycle wherever possible or consult manufacturer for recycling options. ▸ Consult State Land Waste Management Authority for disposal. ▸ Bury residue in an authorised landfill. |
|-------------------------------------|--|

SECTION 14 Transport information

Labels Required

| | |
|-------------------------|----|
| Marine Pollutant | NO |
|-------------------------|----|

Land transport (UN): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

| Product name | Group |
|--------------|-------|
|--------------|-------|

Transport in bulk in accordance with the ICG Code

| Product name | Ship Type |
|--------------|-----------|
|--------------|-----------|

SECTION 15 Regulatory information**Safety, health and environmental regulations / legislation specific for the substance or mixture****National Inventory Status**

| National Inventory | Status |
|---|---|
| Australia - AIIC / Australia Non-Industrial Use | Not Available |
| Canada - DSL | Not Available |
| Canada - NDSL | Not Available |
| China - IECSC | Not Available |
| Europe - EINEC / ELINCS / NLP | Not Available |
| Japan - ENCS | Not Available |
| Korea - KECI | Not Available |
| New Zealand - NZIoC | Not Available |
| Philippines - PICCS | Not Available |
| USA - TSCA | Not Available |
| Taiwan - TCSI | Not Available |
| Mexico - INSQ | Not Available |
| Vietnam - NCI | Not Available |
| Russia - FBEPH | Not Available |
| Legend: | <i>Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.</i> |

SECTION 16 Other information

| | |
|----------------------|------------|
| Revision Date | 06/09/2016 |
| Initial Date | 06/09/2016 |

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com - Telephone: Tel.: +31 10 4877775

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Powered by Author!Te, from Chemwatch.

CLEANBREAK

Wilhelmsen Ships Service (S) Pte. Ltd.

Part Number: 571497 (25 liter), 571505 (210 liter)

Version No: 6.6

Safety Data Sheet

Issue Date: 07/05/2021

Print Date: 24/03/2022

L.GHS.SGP.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

| | |
|-------------------------------|---|
| Product name | CLEANBREAK |
| Chemical Name | Not Applicable |
| Synonyms | Not Available |
| Chemical formula | Not Applicable |
| Other means of identification | 571497 (25 liter), 571505 (210 liter), 571497 |

Relevant identified uses of the substance or mixture and uses advised against

| | |
|--------------------------|---|
| Relevant identified uses | Use according to manufacturer's directions. |
|--------------------------|---|

Details of the supplier of the safety data sheet

| | | | |
|-------------------------|---|--|---|
| Registered company name | Wilhelmsen Ships Service (S) Pte. Ltd. | Outback (M)SDS portal: http://jr.chemwatch.net/outb/account/autologin?login=wilhelmsen | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | 186 Pandan Loop Singapore 128376 Singapore | -----Use our Outback portal to obtain our (M)SDSs in other languages and/or format.----- For questions relating to our SDSs please use Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com ----- Norway | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +65 6395 4545 | Not Available | +31 10 4877 777 |
| Fax | Not Available | Not Available | Not Available |
| Website | http://www.wilhelmsen.com/services/maritime/compan | http://www.wilhelmsen.com | http://www.wilhelmsen.com |
| Email | wss.singapore@wilhelmsen.com | wss.global.sdsinfo@wilhelmsen.com | wss.rotterdam@wilhelmsen.com |

| | |
|-------------------------|---|
| Registered company name | Wilhelmsen Ships Service AS* Central Warehouse |
| Address | Willem Barentszstraat 50 Rotterdam Netherlands |
| Telephone | +31 10 4877 777 |
| Fax | Not Available |
| Website | http://www.wilhelmsen.com |
| Email | wss.rotterdam@wilhelmsen.com |

Emergency telephone number

| | | | |
|----------------------------|------------------|------------------|--------------------------|
| Association / Organisation | 24hrs - Chemtrec | 24hrs - Chemtrec | Dutch nat. poison centre |
|----------------------------|------------------|------------------|--------------------------|


| | | | |
|-----------------------------------|--------------------------|-----------------|-----------------|
| Emergency telephone numbers | +31-10-4877700 | +31-10-4877700 | + 31 88 7558561 |
| Other emergency telephone numbers | +31-10-4877700 | +1 800 424 9300 | + 31 10 4877700 |
| Association / Organisation | Dutch nat. poison centre | | |
| Emergency telephone numbers | + 31 30 274 88 88 | | |
| Other emergency telephone numbers | + 31-10-4877700 | | |

SECTION 2 Hazards identification

Classification of the substance or mixture

| | |
|----------------|--|
| Classification | Flammable Liquids Category 4, Serious Eye Damage/Eye Irritation Category 2, Aspiration Hazard Category 1 |
|----------------|--|

Label elements

| | |
|---------------------|---|
| Hazard pictogram(s) |  |
| Signal word | Danger |

Hazard statement(s)

| | |
|------|---|
| H227 | Combustible liquid. |
| H319 | Causes serious eye irritation. |
| H304 | May be fatal if swallowed and enters airways. |

Precautionary statement(s) Prevention

| | |
|------|--|
| P210 | Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. |
| P280 | Wear protective gloves, protective clothing, eye protection and face protection. |
| P264 | Wash all exposed external body areas thoroughly after handling. |

Precautionary statement(s) Response

| | |
|-----------|--|
| P301+P310 | IF SWALLOWED: Immediately call a POISON CENTER/doctor/physician/first aider. |
| P331 | Do NOT induce vomiting. |
| P370+P378 | In case of fire: Use alcohol resistant foam or fine spray/water fog to extinguish. |

Precautionary statement(s) Storage

| | |
|-----------|--|
| P403+P235 | Store in a well-ventilated place. Keep cool. |
| P405 | Store locked up. |

Precautionary statement(s) Disposal

| | |
|------|--|
| P501 | Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation. |
|------|--|

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

| CAS No | %[weight] | Name |
|--------|-----------|------|
|--------|-----------|------|

| CAS No | %[weight] | Name |
|---------------|-----------|---|
| 68608-26-4* | 5-10 | <u>sodium petroleum sulfonate</u> |
| Not Available | 60-100 | <u>Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, <2% aromatics-</u> |

SECTION 4 First aid measures

Description of first aid measures

| | |
|---------------------|---|
| Eye Contact | <p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▶ Wash out immediately with fresh running water. ▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▶ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. |
| Skin Contact | <p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation. |
| Inhalation | <ul style="list-style-type: none"> ▶ If fumes, aerosols or combustion products are inhaled remove from contaminated area. ▶ Other measures are usually unnecessary. |
| Ingestion | <ul style="list-style-type: none"> ▶ Immediately give a glass of water. ▶ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor. ▶ If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus. |

Indication of any immediate medical attention and special treatment needed

Any material aspirated during vomiting may produce lung injury. Therefore emesis should not be induced mechanically or pharmacologically. Mechanical means should be used if it is considered necessary to evacuate the stomach contents; these include gastric lavage after endotracheal intubation. If spontaneous vomiting has occurred after ingestion, the patient should be monitored for difficult breathing, as adverse effects of aspiration into the lungs may be delayed up to 48 hours. Treat symptomatically.

SECTION 5 Firefighting measures

Extinguishing media

- ▶ Foam.
- ▶ Dry chemical powder.
- ▶ BCF (where regulations permit).

Special hazards arising from the substrate or mixture

| | |
|-----------------------------|-------------|
| Fire Incompatibility | None known. |
|-----------------------------|-------------|

Advice for firefighters

| | |
|------------------------------|--|
| Fire Fighting | <ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear full body protective clothing with breathing apparatus. ▶ Prevent, by any means available, spillage from entering drains or water course. |
| Fire/Explosion Hazard | <ul style="list-style-type: none"> ▶ Combustible. ▶ Slight fire hazard when exposed to heat or flame. ▶ Heating may cause expansion or decomposition leading to violent rupture of containers. <p>May emit poisonous fumes. May emit corrosive fumes.</p> |

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

| | |
|---------------------|---|
| Minor Spills | <ul style="list-style-type: none"> ▶ Remove all ignition sources. ▶ Clean up all spills immediately. ▶ Avoid breathing vapours and contact with skin and eyes. |
|---------------------|---|

CLEANBREAK

Major Spills

Moderate hazard.

- ▶ Clear area of personnel and move upwind.
- ▶ Alert Fire Brigade and tell them location and nature of hazard.

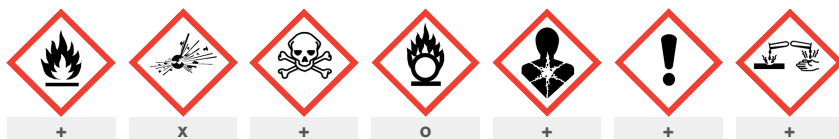
Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage**Precautions for safe handling**

| | |
|--------------------------|---|
| Safe handling | <ul style="list-style-type: none"> ▶ Avoid all personal contact, including inhalation. ▶ Wear protective clothing when risk of exposure occurs. ▶ Use in a well-ventilated area. |
| Other information | <ul style="list-style-type: none"> ▶ Store in original containers. ▶ Keep containers securely sealed. ▶ No smoking, naked lights or ignition sources. |

Conditions for safe storage, including any incompatibilities

| | |
|--------------------------------|--|
| Suitable container | <ul style="list-style-type: none"> ▶ Metal can or drum ▶ Packaging as recommended by manufacturer. ▶ Check all containers are clearly labelled and free from leaks. |
| Storage incompatibility | None known |



X — Must not be stored together

O — May be stored together with specific preventions

+ — May be stored together

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection**Control parameters****Occupational Exposure Limits (OEL)****INGREDIENT DATA**

Not Available

Emergency Limits

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|------------|---------------|---------------|---------------|
| CLEANBREAK | Not Available | Not Available | Not Available |

| Ingredient | Original IDLH | Revised IDLH |
|---|---------------|---------------|
| sodium petroleum sulfonate | Not Available | Not Available |
| Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, <2% aromatics- | Not Available | Not Available |

Occupational Exposure Banding

| Ingredient | Occupational Exposure Band Rating | Occupational Exposure Band Limit |
|----------------------------|-----------------------------------|----------------------------------|
| sodium petroleum sulfonate | E | ≤ 0.01 mg/m ³ |

Notes:

Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.


MATERIAL DATA

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or

Continued...

more.

Exposure controls

| | |
|---|---|
| Appropriate engineering controls | Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. |
| Personal protection |  |
| Eye and face protection | <ul style="list-style-type: none"> ▸ Safety glasses with side shields. ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. |
| Skin protection | See Hand protection below |
| Hands/feet protection | The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice. <ul style="list-style-type: none"> ▸ Wear chemical protective gloves, e.g. PVC. ▸ Wear safety footwear or safety gumboots, e.g. Rubber |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none"> ▸ Overalls. ▸ P.V.C apron. ▸ Barrier cream. |

SECTION 9 Physical and chemical properties**Information on basic physical and chemical properties**

| | | | |
|---|------------------------|--|---------------|
| Appearance | Brown | | |
| Physical state | Liquid | Relative density (Water = 1) | 0.785 - 0.810 |
| Odour | Not Available | Partition coefficient n-octanol / water | Not Available |
| Odour threshold | Not Available | Auto-ignition temperature (°C) | >200 |
| pH (as supplied) | Not Available | Decomposition temperature | Not Available |
| Melting point / freezing point (°C) | Not Available | Viscosity (cSt) | Not Available |
| Initial boiling point and boiling range (°C) | 160 - 245 | Molecular weight (g/mol) | Not Available |
| Flash point (°C) | >61 | Taste | Not Available |
| Evaporation rate | Not Available BuAC = 1 | Explosive properties | Not Available |
| Flammability | Combustible. | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | 7 | Surface Tension (dyn/cm or mN/m) | Not Available |
| Lower Explosive Limit (%) | 0.6 | Volatile Component (%vol) | Not Available |
| Vapour pressure (kPa) | Not Available | Gas group | Not Available |
| Solubility in water | Immiscible | pH as a solution (Not Available%) | Not Available |
| Vapour density (Air = 1) | >1 | VOC g/L | Not Available |

SECTION 10 Stability and reactivity

| | |
|-------------------|---------------|
| Reactivity | See section 7 |
|-------------------|---------------|

Continued...

| | |
|---|--|
| Chemical stability | <ul style="list-style-type: none"> ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur. |
| Possibility of hazardous reactions | See section 7 |
| Conditions to avoid | See section 7 |
| Incompatible materials | See section 7 |
| Hazardous decomposition products | See section 5 |

SECTION 11 Toxicological information

Information on toxicological effects

| | |
|---------------------|--|
| Inhaled | The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting. |
| Ingestion | Swallowing of the liquid may cause aspiration of vomit into the lungs with the risk of haemorrhaging, pulmonary oedema, progressing to chemical pneumonitis; serious consequences may result. Signs and symptoms of chemical (aspiration) pneumonitis may include coughing, gasping, choking, burning of the mouth, difficult breathing, and bluish coloured skin (cyanosis). The material has NOT been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence. The material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g liver, kidney) damage is evident. |
| Skin Contact | The liquid may be miscible with fats or oils and may degrease the skin, producing a skin reaction described as non-allergic contact dermatitis. The material is unlikely to produce an irritant dermatitis as described in EC Directives . Repeated exposure may cause skin cracking, flaking or drying following normal handling and use. Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected. |
| Eye | Evidence exists, or practical experience predicts, that the material may cause eye irritation in a substantial number of individuals and/or may produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur. |
| Chronic | Long-term exposure to the product is not thought to produce chronic effects adverse to health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course. Prolonged or repeated skin contact may cause drying with cracking, irritation and possible dermatitis following. |

| | | |
|---|--|-------------------|
| CLEANBREAK | TOXICITY | IRRITATION |
| | Not Available | Not Available |
| sodium petroleum sulfonate | TOXICITY | IRRITATION |
| | dermal (rat) LD50: >2000 mg/kg ^[1] | Not Available |
| | Inhalation(Rat) LC50; >1.9 mg/14h ^[1] | |
| | Oral (Rat) LD50; >2000 mg/kg ^[1] | |
| Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, <2% aromatics- | TOXICITY | IRRITATION |
| | Oral (Rat) LD50; >5000 mg/kg ^[2] | Not Available |
| Legend: | 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances | |

| | |
|-----------------------------------|---|
| sodium petroleum sulfonate | for alkaryl sulfonate petroleum additives: Mammalian Toxicology - Acute. Existing data on acute mammalian toxicity indicates a low concern for acute toxicity. Acute oral toxicity: In all but one studies, there were no deaths that could be attributed to treatment with the test material when administered at the limit dose of 2000 or 5000 mg/kg. In some studies, the primary clinical observations were diarrhea and reduced food consumption (without a change in body weight). No significant acute toxicological data identified in literature search. |
|-----------------------------------|---|

| | | | |
|----------------------------------|---|------------------------|---|
| Acute Toxicity | ✘ | Carcinogenicity | ✘ |
| Skin Irritation/Corrosion | ✘ | Reproductivity | ✘ |

CLEANBREAK

| | | | |
|-----------------------------------|---|--------------------------|---|
| Serious Eye Damage/Irritation | ✓ | STOT - Single Exposure | ✗ |
| Respiratory or Skin sensitisation | ✗ | STOT - Repeated Exposure | ✗ |
| Mutagenicity | ✗ | Aspiration Hazard | ✓ |

Legend: ✗ – Data either not available or does not fill the criteria for classification
✓ – Data available to make classification

SECTION 12 Ecological information

Toxicity

| CLEANBREAK | Endpoint | Test Duration (hr) | Species | Value | Source |
|---|--|--------------------|-------------------------------|---------------|---------------|
| | Not Available | Not Available | Not Available | Not Available | Not Available |
| sodium petroleum sulfonate | Endpoint | Test Duration (hr) | Species | Value | Source |
| | NOEC(ECx) | 96h | Algae or other aquatic plants | 125mg/l | 2 |
| | EC50 | 72h | Algae or other aquatic plants | >1000mg/l | 2 |
| | EC50 | 96h | Algae or other aquatic plants | >1000mg/l | 2 |
| Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, <2% aromatics- | Endpoint | Test Duration (hr) | Species | Value | Source |
| | EC50 | 72 | Algae/Plant Other | >1000mg/L | 8 |
| | EC50 | 48 | Crustacea Daphnia magna | >1000mg/L | 8 |
| | LC50 | 96 | Fish Other | >1000mg/L | 8 |
| Legend: | Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data | | | | |

Harmful to aquatic organisms.

DO NOT discharge into sewer or waterways.

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|------------|---------------------------------------|---------------------------------------|
| | No Data available for all ingredients | No Data available for all ingredients |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|------------|---------------------------------------|
| | No Data available for all ingredients |

Mobility in soil

| Ingredient | Mobility |
|------------|---------------------------------------|
| | No Data available for all ingredients |

SECTION 13 Disposal considerations

Waste treatment methods

| | |
|------------------------------|--|
| Product / Packaging disposal | <p>Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.</p> <ul style="list-style-type: none"> ▶ DO NOT allow wash water from cleaning or process equipment to enter drains. ▶ It may be necessary to collect all wash water for treatment before disposal. ▶ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▶ Recycle wherever possible or consult manufacturer for recycling options. ▶ Consult State Land Waste Management Authority for disposal. ▶ Bury residue in an authorised landfill. |
|------------------------------|--|

SECTION 14 Transport information

Labels Required

| | |
|------------------|----|
| Marine Pollutant | NO |
|------------------|----|

Land transport (UN): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

| Product name | Group |
|---|---------------|
| sodium petroleum sulfonate | Not Available |
| Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, <2% aromatics- | Not Available |

Transport in bulk in accordance with the ICG Code

| Product name | Ship Type |
|---|---------------|
| sodium petroleum sulfonate | Not Available |
| Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, <2% aromatics- | Not Available |

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

sodium petroleum sulfonate is found on the following regulatory lists

Not Applicable

Hydrocarbons, C10-C13, n-alkanes, isoalkanes, cyclics, <2% aromatics- is found on the following regulatory lists

Not Applicable

National Inventory Status

| National Inventory | Status |
|--|---|
| Australia - AIIIC / Australia Non-Industrial Use | Yes |
| Canada - DSL | Yes |
| Canada - NDSL | No (sodium petroleum sulfonate) |
| China - IECSC | Yes |
| Europe - EINEC / ELINCS / NLP | Yes |
| Japan - ENCS | Yes |
| Korea - KECI | Yes |
| New Zealand - NZIoC | Yes |
| Philippines - PICCS | Yes |
| USA - TSCA | Yes |
| Taiwan - TCSI | Yes |
| Mexico - INSQ | Yes |
| Vietnam - NCI | Yes |
| Russia - FBEPH | No (sodium petroleum sulfonate) |
| Legend: | Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration. |

SECTION 16 Other information

| | |
|----------------------|------------|
| Revision Date | 07/05/2021 |
| Initial Date | 13/12/2016 |

CONTACT POINT

- For quotations contact your local Customer Services - <http://wssdirectory.wilhelmsen.com/#/customerservices> - - Responsible for safety data sheet Wilhelmsen Ships Service AS - Prepared by: Product HSE Manager, - Email: [Email: WSS.GLOBAL.SDSINFO@wilhelmsen.com](mailto:WSS.GLOBAL.SDSINFO@wilhelmsen.com) - Telephone: Tel.: +31 10 4877775

SDS Version Summary

| Version | Date of Update | Sections Updated |
|---------|----------------|----------------------------------|
| 5.6 | 07/05/2021 | Ingredients, Physical Properties |

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios.

Notes

“This composition meets the criteria for not being harmful to the marine environment according to MARPOL Annex V and may be discharged into the sea when used to clean cargo holds and external surfaces on ships.”

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