

SECTION 1 – MATERIAL IDENTIFICATION AND USE

Material Name: LIQUIFIED NATURAL GAS (CRYOGENIC LIQUID)
Use: Vehicle Fuel Gas
WHMIS Classification: Class A; Class B, Div. 1
Fire: 4 **Reactivity:** 0 **Health:** 1 **Inventory No.:**
TDG: **UN:** 1972 **Class:** 2.1 **Packing Group:** N.Av.
Shipping Name: LIQUIFIED NATURAL GAS (CRYOGENIC LIQUID)
Manufacturer/Supplier: ENCANA CORPORATION
#1800, 855 - 2nd Street S.W., P.O. BOX 2850
CALGARY, ALBERTA, T2P 2S5
Emergency Telephone: 403-645-3333
Chemical Family: Liquified aliphatic paraffinic hydrocarbon

SECTION 2 – HAZARDOUS INGREDIENTS OF MATERIAL

| Hazardous Ingredients | Approximate Concentrations % | C.A.S. Nos. | LD50/LC50 Specify Species & Route | Exposure Limits |
|------------------------------|-------------------------------------|--------------------|--|------------------------------|
| Methane | >97% | 74-82-8 | N.Av. | 1000 ppm (TLV ¹) |
| Ethane | 2-3% | 74-84-0 | N.Av. | 1000 ppm (TLV ¹) |

(see also section 6)

TLV = Threshold Limit Value (8 hrs)

¹ As Aliphatic hydrocarbon gases**SECTION 3 – PHYSICAL DATA FOR MATERIAL**

Physical State: Liquified Gas **Vapour Pressure (mmHg):** N.App.
Specific Gravity: 0.422 to 0.546 **Odour Threshold (ppm):** N.Av.
Vapour Density (air=1): 0.55 to 1.1 **Evaporation Rate:** N.Av.
Percent Volatiles, by volume: 100 **Boiling Pt. (deg.C):** -88.15
Odour & Appearance: colourless, odourless or mercaptan odour
Freezing Pt. (deg.C): -172.15
pH: N.App. **Coefficient of Water/Oil Distribution:** <0.1
(N.Av. = not available N.App. = not applicable)

SECTION 4 – FIRE AND EXPLOSION

Flammability: Yes **Conditions:** Material may ignite at normal temperatures.
Means of Extinction: Foam, CO2, dry chemical. Explosive accumulations can build up in areas of poor ventilation.
Special Procedures: Use water spray to cool fire-exposed containers, and to disperse gas if leak has not ignited. Do not direct water at spill or source of leak. If safe to do so, cut off fuel and allow flame to burn out. If flames are accidentally extinguished, explosive re-ignition may occur.
Flash Point (deg.C): -187.78 to -135.15 **Hazardous Combustion Products:** Carbon monoxide
Upper Explosive Limit (% by vol.): 12.4 **Sensitivity to Impact:** No
Lower Explosive Limit (% by vol.): 3 **Sensitivity to Static Discharge:** Yes, may ignite
Auto-Ignition Temp. (deg.C): 530 **TDG Flammability Classification:** 2.1

SECTION 5 – REACTIVITY DATA

Chemical Stability: Yes **Conditions:** N.App.
Incompatibility: Yes **Substances:** Chlorine and other strong oxidizing agents.
Reactivity: Yes **Conditions:** Heat, strong sunlight
Hazardous Decomposition Products: Carbon dioxide, carbon monoxide

SECTION 6 – TOXICOLOGICAL PROPERTIES OF PRODUCT

Routes of Entry:**Skin Absorption:** Yes**Skin Contact:** Yes (liquid)**Eye Contact:** Yes**Inhalation: Acute:** Yes**Chronic:** No**Ingestion:** No

Effects of Acute Exposure: Drowsiness, headache, dizziness and possibly unconsciousness at concentrations below those required for oxygen deficiency, for example 10% LEL and above. At higher concentrations can cause oxygen deficiency and possible asphyxiation. Contact can cause frostbite to skin and eyes.

Effects of Chronic Exposure: N.Av.

Occupational Exposure Limit: 1000 ppm (TLV)

Sensitization to Product: No

Exposure Limits of Product: 1000 ppm (TLV)

Irritancy: N.Av.

Synergistic Materials: None reported

Carcinogenicity: N.Av. **Reproductive Effects:** N.Av.

Teratogenicity: N.Av. **Mutagenicity:** N.Av.

SECTION 7 – PREVENTIVE MEASURES

Personal Protective Equipment: Gloves: Insulated gloves (e.g.: cryogenic) **Eye:** Splash goggles and face shield or equivalent

Footwear: Covered footwear such as steel-toed boots **Clothing:** Fire retardant coveralls. For situations or activities involving elevated risk of fluid contact, wear an insulated apron or smock.

Respiratory Protection: Use positive pressure self-contained breathing apparatus or supplied air breathing apparatus when entering areas where high concentrations may be present.

Engineering Controls: Use only in well ventilated areas. Mechanical ventilation recommended in confined areas. Equipment must be explosion proof.

Leaks & Spills: If safe to do so, stop liquid flow. Remove all ignition sources. Provide explosion-proof clearing ventilation if possible. Prevent from entering confined spaces. Use personal protective equipment.

Waste Disposal: Controlled burning or venting in accordance with regulatory requirements.

Handling Procedures & Equipment: Avoid contact with liquid or liquid cooled equipment. Avoid inhalation. Bond and ground all transfers. Avoid sparking conditions.

Storage Requirements: Store in a cool, dry, well ventilated area away from heat, strong sunlight, and ignition sources.

Special Shipping Information: N.Av.

SECTION 8 – FIRST AID MEASURES

Skin: If freeze burn occurs, gently bathe affected area in warm water (38 – 43 deg. C). Do not rub. Get medical attention. Seek immediate medical attention if blistering, tissue freezing or frost bite has occurred.

Eye: Immediately flush with large amounts of luke warm water for 15 minutes, lifting upper and lower lids at intervals. Seek medical attention if irritation persists.

Inhalation: Remove to fresh air. Give oxygen, artificial respiration, or CPR if needed. Seek medical attention.

Ingestion: Ingestion of liquid causes freeze burns to mouth, throat, oesophagus and lungs. Get immediate medical attention.

SECTION 9 – PREPARATION DATE OF MSDS

Prepared By: EnCana Environment, Health and Safety (EHS)

Phone Number: (403) 645-2000 Preparation Date: July 1, 2011 Expiry Date: July 1, 2014

MATERIAL SAFETY DATA SHEET – NATURAL GAS (PIPELINE QUALITY - MSDS #526)



Revision Date: January 26, 2012
Supersedes Date: July 10, 2009

Section 1: PRODUCT AND COMPANY IDENTIFICATION

FortisBC
16705 Fraser Highway
Surrey, BC
V3S 2X7

Company Phone Number: (604) 592-7629
Emergency Phone Number: 1-800-663-9911

Product Name: Natural Gas (Pipeline Quality)
Material Use: Fuel

Manufacturer: Duke Energy Inc.
1333 West Georgia Street
Vancouver, BC
V6E 3K9

Supplier: FortisBC
16705 Fraser Highway
Surrey, BC
V3S 2X7

WHMIS Class: A – Compressed Gas;
B1 – Flammable and Combustible Material – Division 1 Flammable Gases
UN/PIN Number: 1971
TDG Classification: Class 2.1 Flammable Gases
TDG Shipping Name: Natural gas, compressed with high methane content
Chemical Family: Simple hydrocarbon
Chemical Formula: Natural gas (considered a complex mixture)
Molecular Weight: Not applicable (natural gas is considered a complex mixture)
CAS Number: 8006-14-2
Trade Names / Synonyms: Methane, marsh gas

Section 2: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Appearance/Odour: Gas like odour and colourless gas
Flammable: Yes. Can cause flash fire
Potential Health Effects: See Section 11 for more information
Potential Environmental Effects: See Section 12 for more information
Likely Routes of Exposure: Acute inhalation
Acute Inhalation: At high concentrations, natural gas can displace oxygen causing asphyxiation and cause central nervous system (CNS) depression and cardiac sensitization.
Eye and Skin Contact: None
Chronic- Inhalation: None
Ingestion: None
Skin Adsorption: None

Section 3: COMPOSITION / INFORMATION ON INGREDIENTS

| Component | CAS # | % by Wt. | Exposure Limits |
|--------------------|---------------|----------|---|
| Methane | 74-82-8 | 95 | 1000 ppm |
| Ethane | 74-84-0 | 3 | 1000 ppm |
| Propane | 74-98-6 | 1 | 1000 ppm |
| Inert Gas | Not available | <1 | Not available |
| Sulphur Compounds | Not available | Trace | Not available |
| Mercaptan Odourant | Mixture | 3 ppm | 0.5 ppm (ethyl mercaptan) 0.5 ppm (methyl mercaptan) |

MATERIAL SAFETY DATA SHEET – NATURAL GAS (PIPELINE QUALITY - MSDS #526)

Section 4: FIRST AID MEASURES

| | |
|------------------------|--|
| Skin Contact: | First aid is not normally required. |
| Eye contact: | If irritation/redness develops, move victim away from exposure into fresh air and flush eyes with clean water. |
| Inhalation: | Ensure your own safety before attempting rescue. Move victim to fresh air. Administer oxygen if breathing has stopped. If heart beat can not be detected begin CPR. If person is overcome or been adversely affected by the emergency, obtain medical attention immediately. |
| Ingestion: | Unlikely route of exposure as this is a gas at normal room temperature and pressure. |
| General Advise: | Use extreme care in handling due to high flammability. |

Section 5: FIRE FIGHTING MEASURES

| | |
|--|--|
| Flammability: | Flammable gas and can be ignited by heat, flames, sparks or other sources of ignition (e.g., static electricity, pilot lights or mechanical/electrical equipment). |
| Suitable Extinguishing Media: | Dry chemical, carbon dioxide, water spray or fog. |
| Special Procedures: | Shut off flow of gas from a safe location. Use full protective equipment and self-contained breathing apparatus (SCBA). Do not extinguish flame until gas flow is shut off. Use gas detectors in confined spaces. Evaporate area if cooling of containers is not possible. For large fires nonessential personnel should be evacuated beyond 750 metres. |
| Products of Combustion: | Carbon dioxide and carbon monoxide |
| Protection of Firefighters: | Firefighters should wear SCBA in case of oxygen deficient atmosphere. |
| Sensitivity to Static Discharge: | Flammable |
| Sensitivity to Mechanical Impact: | None |
| Explosive Power: | Not available |
| Rate of Burning: | Not available |
| TDG Flammability Class | 2.1 |

Section 6: ACCIDENTAL RELEASE MEASURES

| | |
|-----------------------------------|---|
| Personal Precautions: | Use personal protection recommended in Section 8. |
| Environmental Precautions: | Not applicable |
| Leak and Spill Procedure: | Evacuate area. Call emergency services and gas supplier. For large releases nonessential personnel should be evacuated beyond 750 metres. Eliminate any source of ignition. |
| Methods for Containment: | Stay away and upwind of spill/release. |
| Waste Disposal: | Vent to outside atmosphere. |
| Other Information: | Allow to vapourize and disperse to atmosphere. |

In case of an emergency and no response at FortisBC, call SERVICE CENTER: 1 (800) 663-9911.

Section 7: HANDLING AND STORAGE

| | |
|------------------|---|
| Handling: | Observe handling regulations for compressed gases and flammable materials. To be handled by trained personnel only and followed with approved operating procedures. |
| Storage: | Comply with storage regulations for compressed gases and flammable materials. No smoking or open flames in storage area. |

MATERIAL SAFETY DATA SHEET – NATURAL GAS (PIPELINE QUALITY - MSDS #526)

Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Limits: Simple asphyxiant - Maintain 19.5% oxygen level (below 19.5% oxygen is considered to be oxygen deficient).

| Constituent ^{NOTE1} | ACGIH (8-hour TWA) | WorkSafeBC (8-hour TWA) |
|------------------------------|----------------------------|----------------------------|
| Methane | 1000 ppm | 1000 ppm |
| Ethane | 1000 ppm | 1000 ppm |
| Propane | 1000 ppm | 1000 ppm |
| Mercaptan Odourant | 0.5 ppm (ethyl mercaptan) | 0.5 ppm (ethyl mercaptan) |
| | 0.5 ppm (methyl mercaptan) | 0.5 ppm (methyl mercaptan) |

NOTE 1. Methane, ethane and propane are classified as C₁ to C₄ Aliphatic Hydrocarbon Gases. The ACGIH TLV-TWA for C₁ to C₄ Aliphatic Hydrocarbon Gases is believed to be protective against potential health effects that include CNS depression and cardiac sensitization. Mercaptan odourant mixtures commonly contain ethyl mercaptan and/or methyl mercaptan (both ethyl mercaptan and methyl mercaptan have 8-hour TWA exposure limits of 0.5 ppm).

Personal Protective

Equipment: Ensure use of proper personal protective equipment (PPE) at all times when handling this product.

Eye/face: Eye protection (e.g., safety glasses) and/or face shields.

Skin: Safety work boots. Chemical resistant gloves are not required but recommended as good practice when handling chemicals. Flame retardant clothing should be worn in potentially flammable areas.

Respiratory: If engineering controls and work practices are not effective in controlling exposure to natural gas, then wear suitable respiratory protection. Supplied air or SCBA.

Other Considerations: None

Engineering Controls: All installations (i.e., mechanical ventilation) must conform to code requirements. Provide adequate ventilation to maintain below exposure limits and explosive limits.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

| | |
|---|--|
| Physical State: | Gas |
| Colour: | Colourless |
| Odour: | Gas odour |
| Specific Gravity (Water = 1): | Not applicable |
| Odour Threshold (ppm): | 2500 |
| Vapour Pressure (mm Hg): | Not applicable |
| Vapour Density (Air = 1): | 0.59 |
| Evaporation Rate (nButAC = 1): | Not applicable (gas at room temperature) |
| Boiling Point (°C): | -160 |
| Freezing Point (°C): | Not applicable |
| Solubility in water (20°C): | Slight |
| Percent Volatile (by volume): | Not available |
| pH: | Not available |
| Density (g/ml): | Not available |
| Partition Coefficient (water/oil): | Not available |
| Flash Point (°C): | Flammable gas |
| Flammability (solid, gas): | Flammable gas |
| Lower Explosion Limit (%): | 5 (by volume) |
| Upper Explosion Limit (%): | 15 (by volume) |
| Auto-ignition Temperature (°C): | 537 |

MATERIAL SAFETY DATA SHEET – NATURAL GAS (PIPELINE QUALITY - MSDS #526)

Section 10: STABILITY AND REACTIVITY

| | |
|--|---|
| Chemical Stability: | Yes |
| Conditions to Avoid: | High heat |
| Incompatibility with Other Substances: | Avoid contact with strong oxidizing agents |
| Hazardous Decomposition Products: | COx, luminous clean flame on combustion |
| Reactivity (and Under What Conditions): | Strong oxidizing agents increase risk of fire (peroxides, perchlorates, chlorine, liquid oxygen). |

Section 11: TOXICOLOGICAL INFORMATION

| | |
|------------------------------|---|
| LD50: | Not applicable |
| LC50: | Not applicable |
| Acute Effects: | Simple asphyxiant: at high concentrations, natural gas can displace oxygen and cause asphyxiation. The ACGIH TLV-TWA for C ₁ to C ₄ Aliphatic Hydrocarbon Gases is believed to be protective against potential health effects that include CNS depression and cardiac sensitization. The TLV-TWA is based upon the abilities of these gases (methane, ethane, propane, etc) to produce weak depressant effects on the CNS at high concentration levels approaching the lower explosive limit. It has also been reported that ethane and propane can induce cardiac arrhythmias under certain conditions leading to ventricular fibrillation which can result in death in the presence of high epinephrine levels. |
| Chronic Effects: | None |
| Carcinogenicity: | Not considered carcinogenic by IARC, NTP, ACGIH or OSHA. |
| Reproductive Effects: | Not available |
| Teratogenicity: | Not available |
| Mutagenicity: | Not available |
| Irritant: | Not available |
| Sensitizer: | Not available |
| Synergistic Effects: | Not available |

Section 12: ECOLOGICAL INFORMATION

| | |
|---------------------------------------|---------------|
| Ecotoxicity: | Not available |
| Persistence/ Degradability: | Not available |
| Bioaccumulation/ Accumulation: | Not available |

There is no information available on the ecotoxicological effects of natural gas. Because of the high volatility of natural gas, it is unlikely to cause ground or water pollution. Natural gas released into the environment will disperse rapidly into the atmosphere and undergo photochemical degradation.

Section 13: DISPOSAL CONSIDERATIONS

| | |
|------------------|--|
| Disposal: | Allow to dissipate to the atmosphere (if permitted by federal/provincial/municipal requirements). Dispose in a safe location, preferably by burning with a flare. If disposal of natural gas cannot be flared, care must be taken to ensure complete dissipation of the gas to a concentration below its flammable limits. |
|------------------|--|

Section 14: TRANSPORT INFORMATION

| | |
|----------------------------------|---|
| TDG Classification: | Class 2.1 Flammable Gases |
| UN/PIN Number: | 1971 |
| TDG Shipping Description: | Natural gas, compressed with high methane content |

MATERIAL SAFETY DATA SHEET – NATURAL GAS (PIPELINE QUALITY - MSDS #526)

Special Shipping Information: Handle as extremely flammable gas. Electronically ground/bond during transfer to avoid static accumulation. Precaution should be taken to minimize inhalation of natural gas.

Section 15: REGULATORY INFORMATION

DSL (Canada): This product is on the DSL list (Canada).
WHMIS Class: A – Compressed Gas;
B1 – Flammable and Combustible Material – Division 1 Flammable Gases

Section 16: OTHER INFORMATION

National Fire Protection Association (NFPA 704) Ratings:

| | | | |
|---------------------------------|---|--------|---------------------|
| Health | 1 | LEGEND | 0 = minimal hazard |
| Flammability | 4 | | 1 = slight hazard |
| Instability | 0 | | 2 = moderate hazard |
| (For natural gas from NFPA 325) | | | 3 = severe hazard |
| | | | 4 = extreme hazard |

Hazardous Materials Identification System (HMIS) Ratings:

| | | | |
|--|---|--------|---------------------|
| Health | 1 | LEGEND | 0 = minimal hazard |
| Flammability | 4 | | 1 = slight hazard |
| Physical Hazard | 3 | | 2 = moderate hazard |
| (For methane from HMIS Chemical Ratings Guide) | | | 3 = serious hazard |
| | | | 4 = severe hazard |

Prepared by: AMEC Environment & Infrastructure
Occupational Hygiene and Safety Group

Phone Number: (604) 294-3811
Preparation Date: January 26, 2012

Additional Information and Comments: This MSDS has been revised and updated from the last revision date of July 10, 2009. All sections and the order that which they appear have been documented as per American National Standard – *For Hazardous Industrial Chemicals – Material Safety Data Sheets Preparation* (ANSI Z400.1-2004).

The information contained in this document applies to this specific material as supplied. It may not be valid for this material if it is used in combination with any other materials. It is the user's responsibility to satisfy oneself as to the suitability and completeness of this information for their own particular use.

Information Sources: Various

SAFETY DATA SHEET

Propane

Issue Date: 16.01.2013
Last revised date: 08.09.2015

Version: 1.0

SDS No.: 000010021747
1/14

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

1.1 Product identifier

Product name: Propane

Trade name: Propane Instrument Grade N2.5, Propane Pure Grade N2.0, Propane Research Grade N3.5, Propane Tech Grade N1.5, Care 40

Additional identification

Chemical name: propane

Chemical formula: C₃H₈

INDEX No. 601-003-00-5

CAS-No. 74-98-6

EC No. 200-827-9

REACH Registration No. 01-2119486944-21

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

Identified uses: Industrial and professional. Perform risk assessment prior to use.
Aerosol propellant. Refrigerant. Transfilling gas or liquid, Use as a fuel. Using gas alone or in mixtures for the calibration of analysis equipment. Formulation of mixtures with gas in pressure receptacles.
Consumer use.

Uses advised against Aerosol propellant. Use as a fuel.
Uses other than those listed above are not supported.

1.3 Details of the supplier of the safety data sheet

Supplier

BOC
Priestley Road, Worsley
M28 2UT Manchester

Telephone: 0800 111 333

E-mail: ReachSDS@boc.com

1.4 Emergency telephone number: 0800 111 333

SAFETY DATA SHEET

Propane

Issue Date: 16.01.2013
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Version: 1.0

SDS No.: 000010021747
2/14

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Directive 67/548/EEC or 1999/45/EC as amended.

F+; R12

The full text for all R-phrases is displayed in section 16.

Classification according to Regulation (EC) No 1272/2008 as amended.

Physical Hazards

| | | |
|----------------------|---------------|---|
| Flammable gas | Category 1 | H220: Extremely flammable gas. |
| Gases under pressure | Liquefied gas | H280: Contains gas under pressure; may explode if heated. |

2.2 Label Elements



Signal Words: Danger

Hazard Statement(s): H220: Extremely flammable gas.
H280: Contains gas under pressure; may explode if heated.

Precautionary Statement

| | |
|--------------------|---|
| Prevention: | P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. |
| Response: | P377: Leaking gas fire: Do not extinguish, unless leak can be stopped safely. P381: Eliminate all ignition sources if safe to do so. |
| Storage: | P403: Store in a well-ventilated place. |
| Disposal: | None. |

2.3 Other hazards: Contact with evaporating liquid may cause frostbite or freezing of skin.

SAFETY DATA SHEET

Propane

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Last revised date: 08.09.2015

Version: 1. 0

SDS No.: 000010021747
3/14

SECTION 3: Composition/information on ingredients

3.1 Substances

| | |
|--------------------------------|--|
| Chemical name | propane |
| INDEX No.: | 601-003-00-5 |
| CAS-No.: | 74-98-6 |
| EC No.: | 200-827-9 |
| REACH Registration No.: | 01-2119486944-21 |
| Purity: | 100% |
| | The purity of the substance in this section is used for classification only, and does not represent the actual purity of the substance as supplied, for which other documentation should be consulted. |
| Trade name: | Propane Instrument Grade N2.5, Propane Pure Grade N2.0, Propane Research Grade N3.5, Propane Tech Grade N1.5, Care 40 |

SECTION 4: First Aid Measures

General: In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

4.1 Description of first aid measures

Inhalation: In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

Eye contact: Rinse the eye with water immediately. Remove contact lenses, if present and easy to do. Continue rinsing. Flush thoroughly with water for at least 15 minutes. Get immediate medical assistance. If medical assistance is not immediately available, flush an additional 15 minutes.

Skin Contact: Contact with evaporating liquid may cause frostbite or freezing of skin.

Ingestion: Ingestion is not considered a potential route of exposure.

4.2 Most important symptoms and effects, both acute and delayed: Respiratory arrest. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling. Loss of co-ordination. In low concentrations may cause narcotic effects. Dizziness. Headache. Unconsciousness. Nausea, vomiting.

4.3 Indication of any immediate medical attention and special treatment needed

Hazards: Respiratory arrest. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.

Treatment: Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.

SAFETY DATA SHEET

Propane

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Last revised date: 08.09.2015

Version: 1. 0

SDS No.: 000010021747
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SECTION 5: Firefighting Measures

General Fire Hazards: Heat may cause the containers to explode.

5.1 Extinguishing media

Suitable extinguishing media: Water Spray or Fog. Dry powder. Foam.

Unsuitable extinguishing media: Carbon dioxide.

5.2 Special hazards arising from the substance or mixture: May explode in a fire.

Hazardous Combustion Products: Incomplete combustion may form carbon monoxide

5.3 Advice for firefighters

Special fire fighting procedures: In case of fire: Stop leak if safe to do so. Do not extinguish flames at leak because possibility of uncontrolled explosive re-ignition exists. Continue water spray from protected position until container stays cool. Use extinguishants to contain the fire. Isolate the source of the fire or let it burn out.

Special protective equipment for firefighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Guideline: EN 469 Protective clothing for firefighters. Performance requirements for protective clothing for firefighting. EN 15090 Footwear for firefighters. EN 659 Protective gloves for firefighters. EN 443 Helmets for fire fighting in buildings and other structures. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.

SECTION 6: Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures: Evacuate area. Provide adequate ventilation. Consider the risk of potentially explosive atmospheres. Eliminate all ignition sources if safe to do so. Monitor the concentration of the released product. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.

6.2 Environmental Precautions: Prevent further leakage or spillage if safe to do so.

6.3 Methods and material for containment and cleaning up: Provide adequate ventilation. Eliminate sources of ignition.

6.4 Reference to other sections: Refer to sections 8 and 13.

SAFETY DATA SHEET

Propane

Issue Date: 16.01.2013
Last revised date: 08.09.2015

Version: 1. 0

SDS No.: 000010021747
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SECTION 7: Handling and Storage:

7.1 Precautions for safe handling:

Only experienced and properly instructed persons should handle gases under pressure. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service. Purge air from system before introducing gas. Containers, which contain or have contained flammable or explosive substances, must not be inerted with liquid carbon dioxide. Assess the risk of a potentially explosive atmosphere and the need for suitable equipment i.e. explosion-proof. Take precautionary measures against static discharges. Keep away from ignition sources (including static discharges). Provide electrical earthing of equipment and electrical equipment usable in explosive atmospheres. Use only non-sparking tools. Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. Ensure the complete system has been (or is regularly) checked for leaks before use. Protect containers from physical damage; do not drag, roll, slide or drop. Do not remove or deface labels provided by the supplier for the identification of the container contents. When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc. Secure cylinders in an upright position at all times, close all valves when not in use. Provide adequate ventilation. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Avoid suckback of water, acid and alkalis. Observe all regulations and local requirements regarding storage of containers. When using do not eat, drink or smoke. Store in accordance with local/regional/national/international regulations. Never use direct flame or electrical heating devices to raise the pressure of a container. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. Damaged valves should be reported immediately to the supplier. Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Keep container valve outlets clean and free from contaminants particularly oil and water. If user experiences any difficulty operating container valve discontinue use and contact supplier. Never attempt to transfer gases from one container to another. Container valve guards or caps should be in place.

7.2 Conditions for safe storage, including any incompatibilities:

All electrical equipment in the storage areas should be compatible with the risk of a potentially explosive atmosphere. Segregate from oxidant gases and other oxidants being stored. Containers should not be stored in conditions likely to encourage corrosion. Stored containers should be periodically checked for general conditions and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible material. Keep container below 50°C in a well ventilated place.

7.3 Specific end use(s):

None.

SAFETY DATA SHEET

Propane

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SECTION 8: Exposure Controls/Personal Protection

8.1 Control Parameters

Occupational Exposure Limits

None of the components have assigned exposure limits.

8.2 Exposure controls

Appropriate engineering controls:

Consider a work permit system e.g. for maintenance activities. Ensure adequate air ventilation. Provide adequate general and local exhaust ventilation. Keep concentrations well below lower explosion limits. Gas detectors should be used when quantities of flammable gases or vapours may be released. Systems under pressure should be regularly checked for leakages. Product to be handled in a closed system. Use only permanent leak tight installations (e.g. welded pipes). Take precautionary measures against static discharges. Gas detectors should be used when toxic quantities may be released.

Individual protection measures, such as personal protective equipment

General information:

A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered. Keep self contained breathing apparatus readily available for emergency use. Personal protective equipment for the body should be selected based on the task being performed and the risks involved. Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment. Do not eat, drink or smoke when using the product.

Eye/face protection:

Safety eyewear, goggles or face-shield to EN166 should be used to avoid exposure to liquid splashes. Wear eye protection to EN 166 when using gases. Guideline: EN 166 Personal Eye Protection.

Skin protection

Hand Protection:

Wear working gloves while handling containers
Guideline: EN 388 Protective gloves against mechanical risks.

Body protection:

Wear fire/flame resistant/retardant clothing.
Guideline: EN 943 Protective clothing against liquid and gaseous chemicals, including liquid aerosols and solid particles.

Other:

Wear safety shoes while handling containers
Guideline: ISO 20345 Personal protective equipment - Safety footwear.

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Respiratory Protection: Respiratory protection may be required. When allowed by a risk assessment Respiratory Protective Equipment (RPE) may be used The selection of the Respiratory Protective Device (RPD) must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected RPD.
Material: Filter AX
Guideline: EN 14387 Respiratory protective devices. Gas filter(s) and combined filter(s). Requirements, testing, marking.
Guideline: EN 136 Respiratory protective devices. Full face masks. Requirements, testing, marking.

Thermal hazards: No precautionary measures are necessary.

Hygiene measures: Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Do not eat, drink or smoke when using the product.

Environmental exposure controls: For waste disposal, see section 13.

SECTION 9: Physical And Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance

| | |
|---|---|
| Physical state: | Gas |
| Form: | Liquefied gas |
| Colour: | Colourless |
| Odour: | Odourless |
| Odour Threshold: | Odour threshold is subjective and is inadequate to warn of over exposure. |
| pH: | not applicable. |
| Melting Point: | - 187.6 °C |
| Boiling Point: | - 42.1 °C (101.325 kPa) |
| Sublimation Point: | not applicable. |
| Critical Temp. (°C): | 96.7 °C |
| Flash Point: | Not applicable to gases and gas mixtures. |
| Evaporation Rate: | Not applicable to gases and gas mixtures. |
| Flammability (solid, gas): | Flammable Gas |
| Flammability limit - upper (%): | 12.5 %(V) |
| Flammability limit - lower(%): | 1.7 %(V) |
| Vapour pressure: | 953.25 kPa (25 °C) |
| Vapour density (air=1): | 1.56 (0 °C) AIR=1 |
| Relative density: | 0.5853 (-45 °C) 4 °C |
| Solubility(ies) | |
| Solubility in Water: | 75 mg/l |
| Partition coefficient (n-octanol/water): | 2.36 |
| Autoignition Temperature: | 472 °C |

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Decomposition Temperature: 650 °C Decomp to ethylene and ethane.

Viscosity

Kinematic viscosity: No data available.

Dynamic viscosity: 0.08 mPa.s (17.9 °C)

Explosive properties: Not applicable.

Oxidising Properties: not applicable.

9.2 Other information: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

Molecular weight: 44.09 g/mol (C₃H₈)

Minimum ignition energy: 0.25 mJ

SECTION 10: Stability and Reactivity

10.1 Reactivity: No reactivity hazard other than the effects described in sub-section below.

10.2 Chemical Stability: Stable under normal conditions.

10.3 Possibility of Hazardous Reactions: Can form a potentially explosive atmosphere in air. May react violently with oxidants.

10.4 Conditions to Avoid: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

10.5 Incompatible Materials: Air and oxidisers. For material compatibility see latest version of ISO-11114.

10.6 Hazardous Decomposition Products: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological Information

General information: None.

11.1 Information on toxicological effects

Acute toxicity - Oral Product Based on available data, the classification criteria are not met.

Acute toxicity - Dermal Product Based on available data, the classification criteria are not met.

Acute toxicity - Inhalation Product

Skin Corrosion/Irritation Product Based on available data, the classification criteria are not met.

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Serious Eye Damage/Eye Irritation

Product Based on available data, the classification criteria are not met.

Respiratory or Skin Sensitisation

Product Based on available data, the classification criteria are not met.

Germ Cell Mutagenicity

Product Based on available data, the classification criteria are not met.

Carcinogenicity

Product Based on available data, the classification criteria are not met.

Reproductive toxicity

Product Based on available data, the classification criteria are not met.

Specific Target Organ Toxicity - Single Exposure

Product Based on available data, the classification criteria are not met.

Specific Target Organ Toxicity - Repeated Exposure

Product Based on available data, the classification criteria are not met.

Aspiration Hazard

Product Not applicable to gases and gas mixtures..

SECTION 12: Ecological Information

12.1 Toxicity

Acute toxicity

Product No ecological damage caused by this product.

Acute toxicity - Fish

propane LC50 (Fish, 96 h): 49.9 mg/l

Acute toxicity - Aquatic Invertebrates

propane EC50 (Water flea (Daphnia magna), 48 h): 27.1 mg/l

Toxicity to microorganisms

propane EC50 (Alga, 72 h): 11.9 mg/l

12.2 Persistence and Degradability

Product Not applicable to gases and gas mixtures..

12.3 Bioaccumulative Potential

Product The product is expected to biodegrade and is not expected to persist for long periods in an aquatic environment.

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12.4 Mobility in Soil Product

Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5 Results of PBT and vPvB assessment Product

Not classified as PBT or vPvB.

12.6 Other Adverse Effects:

Global Warming Potential

Global warming potential: 3
Contains greenhouse gas(es). When discharged in large quantities may contribute to the greenhouse effect.
Global warming potential: 3
Contains greenhouse gas(es) not covered by 842/2006/EC. Contains greenhouse gas(es). When discharged in large quantities may contribute to the greenhouse effect.

propane

Global warming potential: 3

Global warming potential: 3

SECTION 13: Disposal Considerations

13.1 Waste treatment methods

General information:

Do not discharge into any place where its accumulation could be dangerous. Consult supplier for specific recommendations. Do not discharge into areas where there is a risk of forming an explosive mixture with air. Waste gas should be flared through a suitable burner with flash back arrestor.

Disposal methods:

Refer to the EIGA code of practice (Doc.30 "Disposal of Gases", downloadable at <http://www.eiga.org>) for more guidance on suitable disposal methods. Dispose of container via supplier only. Discharge, treatment, or disposal may be subject to national, state, or local laws.

European Waste Codes

Container:

16 05 04*: gases in pressure containers (including halons) containing dangerous substances

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SECTION 14: Transport Information

ADR

| | |
|------------------------------------|----------------|
| 14.1 UN Number: | UN 1978 |
| 14.2 UN Proper Shipping Name: | PROPANE |
| 14.3 Transport Hazard Class(es) | |
| Class: | 2 |
| Label(s): | 2.1 |
| Hazard No. (ADR): | 23 |
| Tunnel restriction code: | (B/D) |
| Emergency Action Code: | 2YE |
| 14.4 Packing Group: | - |
| 14.5 Environmental hazards: | not applicable |
| 14.6 Special precautions for user: | - |

RID

| | |
|------------------------------------|----------------|
| 14.1 UN Number: | UN 1978 |
| 14.2 UN Proper Shipping Name | PROPANE |
| 14.3 Transport Hazard Class(es) | |
| Class: | 2 |
| Label(s): | 2.1 |
| 14.4 Packing Group: | - |
| 14.5 Environmental hazards: | not applicable |
| 14.6 Special precautions for user: | - |

IMDG

| | |
|------------------------------------|----------------|
| 14.1 UN Number: | UN 1978 |
| 14.2 UN Proper Shipping Name: | PROPANE |
| 14.3 Transport Hazard Class(es) | |
| Class: | 2.1 |
| Label(s): | 2.1 |
| EmS No.: | F-D, S-U |
| 14.3 Packing Group: | - |
| 14.5 Environmental hazards: | not applicable |
| 14.6 Special precautions for user: | - |

IATA

| | |
|------------------------------------|----------------|
| 14.1 UN Number: | UN 1978 |
| 14.2 Proper Shipping Name: | Propane |
| 14.3 Transport Hazard Class(es): | |
| Class: | 2.1 |
| Label(s): | 2.1 |
| 14.4 Packing Group: | - |
| 14.5 Environmental hazards: | not applicable |
| 14.6 Special precautions for user: | - |
| Other information | |
| Passenger and cargo aircraft: | Forbidden. |
| Cargo aircraft only: | Allowed. |

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: not applicable

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Additional identification:

Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers ensure that they are firmly secured. Ensure that the container valve is closed and not leaking. Container valve guards or caps should be in place. Ensure adequate air ventilation.

SECTION 15: Regulatory information

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

EU Regulations

Regulation (EC) No. 1907/2006 Annex XVII Substances subject to restriction on marketing and use:

| Chemical name | CAS-No. | Concentration |
|---------------|---------|---------------|
| propane | 74-98-6 | |

Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens and mutagens at work.:

| Chemical name | CAS-No. | Concentration |
|---------------|---------|---------------|
| propane | 74-98-6 | 100% |

Directive 92/85/EEC: on the safety and health of pregnant workers and workers who have recently given birth or are breast feeding.:

| Chemical name | CAS-No. | Concentration |
|---------------|---------|---------------|
| propane | 74-98-6 | 100% |

Directive 96/82/EC (Seveso II): on the control of major accident hazards involving dangerous substances:

| Chemical name | CAS-No. | Concentration |
|---------------|---------|---------------|
| propane | 74-98-6 | 100% |

Directive 98/24/EC on the protection of workers from the risks related to chemical agents at work:

| Chemical name | CAS-No. | Concentration |
|---------------|---------|---------------|
| propane | 74-98-6 | 100% |

National Regulations

Dangerous Substances and Explosive Atmospheres Regulations (DSEAR 2002 No. 2776). Management of Health and Safety at Work Regulations (1999 No. 3242). The Regulatory Reform (Fire Safety) Order 2005 (2005 No. 1541). Control of Substances Hazardous to Health Regulations (COSHH, 2002 No. 2677). Provision and Use of Work

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Equipment Regulations (PUWER, 1998 No. 2306). Personal Protective Equipment Regulations (1992 No. 2966). Control of Major Accident Hazards Regulations (COMAH, 2015 No. 483). Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations (EPS, 1996 No. 192). Pressure Systems Safety Regulations (PSSR, 2000 No. 128). Only products that comply with the food regulations (EC) No. 1333/2008 and (EU) No. 231/2012 and are labelled as such may be used as food additives.
This Safety Data Sheet has been produced to comply with Regulation (EU) 453/2010.

15.2 Chemical safety assessment: CSA has been carried out.

SECTION 16: Other Information

Revision Information: Not relevant.

Key literature references and sources for data: Various sources of data have been used in the compilation of this SDS, they include but are not exclusive to:
 Agency for Toxic Substances and Diseases Registry (ATSDR) (<http://www.atsdr.cdc.gov/>).
 European Chemical Agency: Guidance on the Compilation of Safety Data Sheets.
 European Chemical Agency: Information on Registered Substances <http://apps.echa.europa.eu/registered/registered-sub.aspx#search>
 European Industrial Gases Association (EIGA) Doc. 169 Classification and Labelling guide.
 International Programme on Chemical Safety (<http://www.inchem.org/>)
 ISO 10156:2010 Gases and gas mixtures - Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets.
 Matheson Gas Data Book, 7th Edition.
 National Institute for Standards and Technology (NIST) Standard Reference Database Number 69.
 The ESIS (European chemical Substances 5 Information System) platform of the former European Chemicals Bureau (ECB) ESIS (<http://ecb.jrc.ec.europa.eu/esis/>).
 The European Chemical Industry Council (CEFIC) ERICards.
 United States of America's National Library of Medicine's toxicology data network TOXNET (<http://toxnet.nlm.nih.gov/index.html>)
 Threshold Limit Values (TLV) from the American Conference of Governmental Industrial Hygienists (ACGIH).
 Substance specific information from suppliers.
 Details given in this document are believed to be correct at the time of publication.
 EH40 (as amended) Workplace exposure limits.

Wording of the R-phrases and H-statements in sections 2 and 3

| | |
|------|---|
| H220 | Extremely flammable gas. |
| H280 | Contains gas under pressure; may explode if heated. |
| R12 | Extremely flammable. |

Training information: Users of breathing apparatus must be trained. Ensure operators understand the flammability hazard.

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Classification according to Regulation (EC) No 1272/2008 as amended.

Flam. Gas 1, H220
Press. Gas Liq. Gas, H280

Other information:

Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out. Ensure adequate air ventilation. Ensure all national/local regulations are observed. Ensure equipment is adequately earthed. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted. Note: When the Product Name appears in the SDS header the decimal sign and its position comply with rules for the structure and drafting of international standards, and is a comma on the line. As an example 2,000 is two (to three decimal places) and not two thousand, whilst 1.000 is one thousand and not one (to three decimal places).

Last revised date:

08.09.2015

Disclaimer:

This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

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

1.1. Product identifier

Trade name/designation : Long Life Engine Coolant Concentrate-C2053

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

Specific use(s) : Coolant

1.3. Details of the supplier of the safety data sheet

Company: : Solventis BVBA
Sint Maartenstraat 1
2000 Antwerpen , België
Telephone: +32 3 205 16 66
Fax: +32 3 233 93 83

Company: : Solventis Ltd
Bank Terrace, Gomshall Lane, Shere, Guildford
GU5 9HB Surrey , UK
Telephone: +44 1483 203224
Fax: +44 1483 205040
E-mail: sds@solventis.net

1.4. Emergency telephone number

Emergency telephone : +32 (0)3 575 55 55 (24h/24h)

IRELAND (REPUBLIC OF)
National Poisons Information Centre
Beaumont Hospital : +35 318 37 99 64
UNITED KINGDOM
National Poisons Information Service
(Newcastle Centre) : 0870 600 6266 (UK only)
Regional Drugs and Therapeutics Centre,
Wolfson Unit

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

2.1.1. Classification according to Regulation (EU) 1272/2008

CLP-Classification : The product is classified as hazardous in accordance with Regulation (EC) No. 1272/2008.

Acute Tox. 4 (Oral) H302
Skin Irrit. 2 H315
Eye Irrit. 2 H319
Repr. 2 H361d

| | |
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Full text of H-phrases: see section 16

2.1.2. Classification according to EU Directives 67/548/EEC or 1999/45/EC

Classification : The mixture is classified as dangerous in accordance with Directive 1999/45/EC.

Xn; R22
Xi; R36/38

Full text of R-phrases: see section 16

2.2. Label elements

2.2.1. Labelling according to Regulation (EU) 1272/2008

CLP pictograms :



Signal word :

Contains :

Hazard statements :

Precautionary statements :

- : Warning
- : Ethylene glycol
- : Diethylene glycol
- : 2-ethylhexanoic acid
- : H302 - Harmful if swallowed.
- : H315 - Causes skin irritation.
- : H319 - Causes serious eye irritation.
- : H361d - Suspected of damaging the unborn child.
- : P201 - Obtain special instructions before use.
- : P308+P313 - IF exposed or concerned: Get medical advice/attention.
- : P264 - Wash skin thoroughly after handling.
- : P280 - Wear protective gloves and eye protection/face protection.
- : P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- : P501 - Dispose of contents/ container to an approved waste disposal plant.

2.2.2. Labelling according to Directives (67/548 - 1999/45)

Not relevant

2.3. Other hazards

Other hazards which do not result in classification : Results of PBT and vPvB assessment :
No data available

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

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| Substance name | Product identifier | % | Classification according to Directive 67/548/EEC |
|----------------------|---|---------|---|
| Ethylene glycol | (CAS No.) 107-21-1 (EC No) 203-473-3 (EC Index) 603-027-00-1 | 75 - 95 | Xn; R22 |
| Diethylene glycol | (CAS No.) 111-46-6 (EC No) 203-872-2 (EC Index) 603-140-00-6 | 0 - 15 | Xn; R22 |
| 2-ethylhexanoic acid | (CAS No.) 149-57-5 (EC No) 205-743-6 (EC Index) 607-230-00-6 | < 5 | Repr.Cat.3; R63 |
| Potassium hydroxide | (CAS No.) 1310-58-3 (EC No) 215-181-3 (EC Index) 019-002-00-8 | < 2 | Xn; R22 C; R35 |
| Substance name | Product identifier | % | Classification according to Regulation (EC) No. 1272/2008 [CLP] |
| Ethylene glycol | (CAS No.) 107-21-1 (EC No) 203-473-3 (EC Index) 603-027-00-1 | 75 - 95 | Acute Tox. 4 (Oral), H302 |
| Diethylene glycol | (CAS No.) 111-46-6 (EC No) 203-872-2 (EC Index) 603-140-00-6 | 0 - 15 | Acute Tox. 4 (Oral), H302 |
| 2-ethylhexanoic acid | (CAS No.) 149-57-5 (EC No) 205-743-6 (EC Index) 607-230-00-6 | < 5 | Repr. 2, H361d |
| Potassium hydroxide | (CAS No.) 1310-58-3 (EC No) 215-181-3 (EC Index) 019-002-00-8 | < 2 | Acute Tox. 4 (Oral), H302 Skin Corr. 1A, H314 |

Full text of R-, H- and EUH-phrases: see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

| | |
|-------------------|--|
| Inhalation | : Keep at rest. Provide fresh air. Consult a physician if necessary. |
| Skin contact | : Wash with plenty of soap and water. Take off immediately all contaminated clothing. Wash contaminated clothing before reuse. Consult a physician if necessary. |
| Eye contact | : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician if irritation develops or persists. |
| Ingestion | : Rinse mouth immediately and drink plenty of water. Do not induce vomiting. Never give anything by mouth to an unconscious person or a person with cramps. Call a physician immediately. |
| Additional advice | : First aider: Pay attention to self-protection! See also section 8 Never give anything by mouth to an unconscious person or a person with cramps. Show this safety data sheet to the doctor in attendance. Treat symptomatically. |

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4.2. Most important symptoms and effects, both acute and delayed

| | |
|-----------------------|---|
| Inhalation | : May cause irritation of respiratory tract. The following symptoms may occur: Cough Dizziness Headache. |
| Skin contact | : Causes skin irritation. May be absorbed through the skin. Repeated exposure may cause skin dryness or cracking. |
| Eye contact | : Causes serious eye irritation. The following symptoms may occur: Redness Pain. |
| Ingestion | : Harmful if swallowed. The following symptoms may occur: Abdominal pain Feeling of weakness Vomiting Unconsciousness nausea. |
| Other adverse effects | : Suspected of damaging the unborn child. |

4.3. Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1. Extinguishing media

| | |
|--|--|
| Suitable extinguishing media | : Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. |
| Extinguishing media which shall not be used for safety reasons | : Strong water jet |

5.2. Special hazards arising from the substance or mixture

| | |
|------------------|---|
| Fire hazard | : Combustible material |
| Specific hazards | : Provide adequate ventilation. Evacuate area. Hazardous decomposition products: COx Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. |

5.3. Advice for firefighters

| | |
|-------------------------|---|
| Advice for firefighters | : Special protective equipment for firefighters. . In case of fire: Wear self-contained breathing apparatus. Evacuate area. In the event of fire, cool tanks with water spray. |
|-------------------------|---|

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

| | |
|------------------------------------|--|
| Advice for non-emergency personnel | : Provide adequate ventilation. Use personal protective equipment as required. See also section 8. Do not breathe vapour/spray. Avoid contact with skin, eyes and clothes. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. |
| Advice for emergency responders | : Only qualified personnel equipped with suitable protective equipment may intervene. See also section 8. |

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6.2. Environmental precautions

Environmental precautions : Do not allow to enter into surface water or drains.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Prevent further leakage or spillage if safe to do so.
 Dam up.
 Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust).
 Sweep up and shovel into suitable containers for disposal.
 Large spills should be collected mechanically (remove by pumping) for disposal.
 Local authorities should be advised if significant spillages cannot be contained.
 Dispose according to legislation.

6.4. Reference to other sections

See also section 8
 See also section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Handling : Provide adequate ventilation.
 Use personal protective equipment as required.
 See also section 8
 Do not breathe vapour/spray.
 Avoid contact with skin, eyes and clothes.
 Take any precaution to avoid mixing with incompatible materials.
 See also section 10
 Take care to avoid waste and spillage when weighing, loading and mixing the product.
 After use replace the closing cap immediately.
 Do not allow to enter into surface water or drains.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.
 Wash hands and face before breaks and immediately after handling of the product.
 When using do not eat, drink or smoke.
 Keep working clothes separately.
 Take off contaminated clothing and wash before reuse.
 Keep away from food, drink and animal feedingstuffs.

7.2. Conditions for safe storage, including any incompatibilities

Storage : Keep container tightly closed in a cool, well-ventilated place.
 Keep away from sources of heat (e.g. hot surfaces), sparks and open flames.
 Do not store near or with any of the incompatible materials listed in section 10.

Packaging material : Keep/Store only in original container.

7.3. Specific end use(s)

No data available

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SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Exposure limit(s) :

| Potassium hydroxide (1310-58-3) | | |
|---------------------------------|--|-----------------------|
| Austria | MAK (mg/m ³) | 2 mg/m ³ |
| Bulgaria | OEL TWA (mg/m ³) | 2,0 mg/m ³ |
| France | VLE (mg/m ³) | 2 mg/m ³ |
| Greece | OEL TWA (mg/m ³) | 2 mg/m ³ |
| Greece | OEL STEL (mg/m ³) | 2 mg/m ³ |
| Italy - Portugal - USA ACGIH | ACGIH Ceiling (mg/m ³) | 2 mg/m ³ |
| Spain | VLA-EC (mg/m ³) | 2 mg/m ³ |
| Switzerland | VME (mg/m ³) | 2 mg/m ³ |
| United Kingdom | WEL STEL (mg/m ³) | 2 mg/m ³ |
| Czech Republic | Expoziční limity (PEL) (mg/m ³) | 1 mg/m ³ |
| Denmark | Grænseværdie (kortvarig) (mg/m ³) | 2 mg/m ³ |
| Finland | HTP-arvo (15 min) | 2 mg/m ³ |
| Hungary | AK-érték | 2 mg/m ³ |
| Hungary | CK-érték | 2 mg/m ³ |
| Ireland | OEL (15 min ref) (mg/m ³) | 2 mg/m ³ |
| Norway | Gjennomsnittsverdier (Takverdi) (mg/m ³) | 2 mg/m ³ |
| Poland | NDS (mg/m ³) | 0,5 mg/m ³ |
| Poland | NDSch (mg/m ³) | 1 mg/m ³ |
| Sweden | nivågränsvärde (NVG) (mg/m ³) | 1 mg/m ³ |
| Sweden | takgränsvärde (TGV) (mg/m ³) | 2 mg/m ³ |

2-ethylhexanoic acid (149-57-5)

| | | |
|---------------------------------|--|---------------------|
| Belgium | Limit value (mg/m ³) | 5 mg/m ³ |
| Italy - Portugal - USA ACGIH | ACGIH TWA (mg/m ³) | 5 mg/m ³ |
| Ireland | OEL (8 hours ref) (mg/m ³) | 4 mg/m ³ |

Ethylene glycol (107-21-1)

| | | |
|----------|---------------------------------|------------------------|
| EU | IOELV TWA (mg/m ³) | 52 mg/m ³ |
| EU | IOELV TWA (ppm) | 20 ppm |
| EU | IOELV STEL (mg/m ³) | 104 mg/m ³ |
| EU | IOELV STEL (ppm) | 40 ppm |
| Austria | MAK (mg/m ³) | 52 mg/m ³ |
| Austria | MAK (ppm) | 10 ppm |
| Austria | MAK Short time value (ppm) | 20 ppm |
| Bulgaria | OEL TWA (mg/m ³) | 52,0 mg/m ³ |

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| Ethylene glycol (107-21-1) | | |
|---------------------------------|---|---|
| Bulgaria | OEL STEL (mg/m ³) | 104,0 mg/m ³ |
| Bulgaria | OEL STEL (ppm) | 40 ppm |
| Cyprus | OEL TWA (mg/m ³) | 52 mg/m ³ |
| Cyprus | OEL TWA (ppm) | 20 ppm |
| Cyprus | OEL STEL (mg/m ³) | 104 mg/m ³ |
| Cyprus | OEL STEL (ppm) | 40 ppm |
| France | VLE (mg/m ³) | 104 mg/m ³ (indicative limit) |
| France | VLE (ppm) | 40 ppm (indicative limit) |
| France | VME (mg/m ³) | 52 mg/m ³ (indicative limit) |
| France | VME (ppm) | 20 ppm (indicative limit) |
| Germany | TRGS 900 Occupational exposure limit value (mg/m ³) | 26 mg/m ³ (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed) |
| Germany | TRGS 900 Occupational exposure limit value (ppm) | 10 ppm (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed) |
| Gibraltar | OEL TWA (mg/m ³) | 52 mg/m ³ |
| Gibraltar | OEL TWA (ppm) | 20 ppm |
| Gibraltar | OEL STEL (mg/m ³) | 104 mg/m ³ |
| Gibraltar | OEL STEL (ppm) | 40 ppm |
| Greece | OEL TWA (mg/m ³) | 125 mg/m ³ |
| Greece | OEL TWA (ppm) | 50 ppm |
| Greece | OEL STEL (mg/m ³) | 125 mg/m ³ |
| Greece | OEL STEL (ppm) | 50 ppm |
| Italy - Portugal - USA ACGIH | ACGIH Ceiling (mg/m ³) | 100 mg/m ³ |
| Italy | OEL TWA (mg/m ³) | 52 mg/m ³ |
| Italy | OEL TWA (ppm) | 20 ppm |
| Italy | OEL STEL (mg/m ³) | 104 mg/m ³ |
| Italy | OEL STEL (ppm) | 40 ppm |
| Latvia | OEL TWA (mg/m ³) | 52 mg/m ³ |
| Latvia | OEL TWA (ppm) | 20 ppm |
| Spain | VLA-ED (mg/m ³) | 52 mg/m ³ (indicative limit value) |
| Spain | VLA-ED (ppm) | 20 ppm (indicative limit value) |
| Spain | VLA-EC (mg/m ³) | 104 mg/m ³ |
| Spain | VLA-EC (ppm) | 40 ppm |
| Switzerland | VLE (mg/m ³) | 52 mg/m ³ |
| Switzerland | VLE (ppm) | 20 ppm |
| Switzerland | VME (mg/m ³) | 26 mg/m ³ |
| Switzerland | VME (ppm) | 10 ppm |
| The Netherlands | MAC TGG 8H (mg/m ³) | 10 mg/m ³ |
| The Netherlands | MAC TGG 15MIN (mg/m ³) | 104 mg/m ³ |

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| Ethylene glycol (107-21-1) | | |
|----------------------------|--|--|
| United Kingdom | WEL TWA (mg/m ³) | 10 mg/m ³ |
| United Kingdom | WEL TWA (ppm) | 20 ppm |
| United Kingdom | WEL STEL (mg/m ³) | 30 mg/m ³ (calculated) |
| United Kingdom | WEL STEL (ppm) | 40 ppm |
| Czech Republic | Expoziční limity (PEL) (mg/m ³) | 50 mg/m ³ |
| Denmark | Grænseværdie (langvarig) (mg/m ³) | 10 mg/m ³ |
| Denmark | Grænseværdie (langvarig) (ppm) | 10 ppm |
| Finland | HTP-arvo (8h) (mg/m ³) | 50 mg/m ³ |
| Finland | HTP-arvo (8h) (ppm) | 20 ppm |
| Finland | HTP-arvo (15 min) | 100 mg/m ³ |
| Finland | HTP-arvo (15 min) (ppm) | 40 ppm |
| Hungary | AK-érték | 52 mg/m ³ |
| Hungary | CK-érték | 104 mg/m ³ |
| Ireland | OEL (8 hours ref) (mg/m ³) | 52 mg/m ³ |
| Ireland | OEL (8 hours ref) (ppm) | 20 ppm |
| Ireland | OEL (15 min ref) (mg/m ³) | 104 mg/m ³ |
| Ireland | OEL (15 min ref) (ppm) | 40 ppm |
| Lithuania | IPRV (mg/m ³) | 25 mg/m ³ |
| Lithuania | IPRV (ppm) | 10 ppm |
| Lithuania | TPRV (mg/m ³) | 50 mg/m ³ |
| Lithuania | TPRV (ppm) | 20 ppm |
| Malta | OEL TWA (mg/m ³) | 52 mg/m ³ |
| Malta | OEL TWA (ppm) | 20 ppm |
| Malta | OEL STEL (mg/m ³) | 104 mg/m ³ |
| Malta | OEL STEL (ppm) | 40 ppm |
| Norway | Gjennomsnittsverdier (AN) (mg/m ³) | 52 mg/m ³ (Total sum of limit values for both vapor and dust) |
| Norway | Gjennomsnittsverdier (AN) (ppm) | 20 ppm (Total sum of limit values for both vapor and dust) |
| Norway | Gjennomsnittsverdier (Kortidsverdi) (mg/m ³) | 104 mg/m ³ (Norm is based on the sum calculation for the total gas and particulate form of the substance) |
| Norway | Gjennomsnittsverdier (Kortidsverdi) (ppm) | 40 ppm (Norm is based on the sum calculation for the total gas and particulate form of the substance) |
| Norway | Gjennomsnittsverdier (Takverdi) (ppm) | 25 ppm |
| Poland | NDS (mg/m ³) | 15 mg/m ³ |
| Poland | NDSch (mg/m ³) | 50 mg/m ³ |
| Romania | OEL TWA (mg/m ³) | 52 mg/m ³ |
| Romania | OEL TWA (ppm) | 20 ppm |
| Romania | OEL STEL (mg/m ³) | 104 mg/m ³ |
| Romania | OEL STEL (ppm) | 40 ppm |

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Ethylene glycol (107-21-1)

| | | |
|----------|---|-----------------------|
| Slovakia | NPHV (priemerná) (mg/m ³) | 52 mg/m ³ |
| Slovakia | NPHV (priemerná) (ppm) | 20 ppm |
| Slovakia | NPHV (Hraničná) (mg/m ³) | 104 mg/m ³ |
| Sweden | nivågränsvärde (NVG) (mg/m ³) | 25 mg/m ³ |
| Sweden | nivågränsvärde (NVG) (ppm) | 10 ppm |
| Sweden | kortidsvärde (KTV) (mg/m ³) | 50 mg/m ³ |
| Sweden | kortidsvärde (KTV) (ppm) | 20 ppm |

Diethylene glycol (111-46-6)

| | | |
|----------------|---|---|
| Austria | MAK (mg/m ³) | 176 mg/m ³ |
| Austria | MAK (ppm) | 10 ppm |
| Austria | MAK Short time value (ppm) | 40 ppm |
| Bulgaria | OEL TWA (mg/m ³) | 10,0 mg/m ³ |
| Germany | TRGS 900 Occupational exposure limit value (mg/m ³) | 44 mg/m ³ (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed) |
| Germany | TRGS 900 Occupational exposure limit value (ppm) | 10 ppm (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed) |
| Latvia | OEL TWA (mg/m ³) | 10 mg/m ³ |
| Switzerland | VLE (mg/m ³) | 176 mg/m ³ |
| Switzerland | VLE (ppm) | 40 ppm |
| Switzerland | VME (mg/m ³) | 44 mg/m ³ |
| Switzerland | VME (ppm) | 10 ppm |
| United Kingdom | WEL TWA (mg/m ³) | 101 mg/m ³ |
| United Kingdom | WEL TWA (ppm) | 23 ppm |
| United Kingdom | WEL STEL (mg/m ³) | 303 mg/m ³ (calculated) |
| United Kingdom | WEL STEL (ppm) | 69 ppm (calculated) |
| Denmark | Grænseværdie (langvarig) (mg/m ³) | 11 mg/m ³ |
| Denmark | Grænseværdie (langvarig) (ppm) | 2,5 ppm |
| Ireland | OEL (8 hours ref) (mg/m ³) | 100 mg/m ³ |
| Ireland | OEL (8 hours ref) (ppm) | 23 ppm |
| Lithuania | IPRV (mg/m ³) | 45 mg/m ³ |
| Lithuania | IPRV (ppm) | 10 ppm |
| Lithuania | TPRV (mg/m ³) | 90 mg/m ³ |
| Lithuania | TPRV (ppm) | 20 ppm |
| Poland | NDS (mg/m ³) | 10 mg/m ³ |
| Romania | OEL TWA (mg/m ³) | 500 mg/m ³ |
| Romania | OEL TWA (ppm) | 115 ppm |
| Romania | OEL STEL (mg/m ³) | 800 mg/m ³ |
| Romania | OEL STEL (ppm) | 184 ppm |

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| Diethylene glycol (111-46-6) | | |
|------------------------------|------------------------------|----------------------|
| Slovakia | NPHV (priemerná) (mg/m3) | 44 mg/m ³ |
| Slovakia | NPHV (priemerná) (ppm) | 10 ppm |
| Slovakia | NPHV (Hraničná) (mg/m3) | 90 mg/m ³ |
| Sweden | nivågränsvärde (NVG) (mg/m3) | 45 mg/m ³ |
| Sweden | nivågränsvärde (NVG) (ppm) | 10 ppm |
| Sweden | kortidsvärde (KTV) (mg/m3) | 90 mg/m ³ |
| Sweden | kortidsvärde (KTV) (ppm) | 20 ppm |

Recommended monitoring procedures: : Concentration measurement in air
Personal monitoring

8.2. Exposure controls

Personal protective equipment : The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection : Not required under normal use.
In case of insufficient ventilation, wear suitable respiratory equipment.
Respirator with a full face mask (EN 136)
Respirator with a half face mask (EN 140)
Recommended Filter type: ABEK (EN 141)

Hand protection : Wear chemically resistant gloves (tested to EN374) The selection of specific gloves for a specific application and time of use in a working area, should also take into account other factors on the working space, such as (but not limited to): other chemicals that are possibly used, physical requirements (protection against cutting/drilling, skill, thermal protection), and the instructions/specification of the supplier of gloves. Neoprene gloves Nitrile rubber

Eye protection : Safety glasses (EN166)

Skin and body protection : Wear suitable protective clothing.
Chemical-resistant overalls
Chemical resistant safety shoes

Thermal hazard protection : Not required under normal use.

Engineering control measures : Provide adequate ventilation.
Use only in area provided with appropriate exhaust ventilation.
Organisational measures to prevent /limit releases, dispersion and exposure :
See also section 7 .

Environmental exposure controls : Do not allow to enter into surface water or drains.
Comply with applicable Community environmental protection legislation.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance : liquid

Colour : Variable

Odour : odourless

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| | |
|--|---|
| Odour Threshold | : No data available |
| pH | : No data available |
| Melting point/range | : No data available |
| Boiling point/boiling range | : > 170 °C |
| Flash point | : > 111 °C |
| Evaporation rate | : no data available |
| Flammability (solid, gas) | : Not applicable, liquid |
| Explosion limits (LEL, UEL) | : No data available |
| Vapour pressure | : No data available |
| Vapour density | : no data available |
| Relative density | : > 1,1 (20°C) |
| Water solubility | : Soluble |
| Solubility in other solvents | : No data available |
| Partition coefficient: n-octanol/water | : No data available |
| Autoignition temperature | : No data available |
| Decomposition temperature | : No data available |
| Viscosity | : No data available |
| Explosive properties | : Not applicable The study does not need to be conducted because there are no chemical groups associated with explosive properties present in the molecule. |
| Oxidizing properties | : Not applicable The classification procedure needs not to be applied because there are no chemical groups present in the molecule which are associated with oxidising properties. |

9.2. Other information

No data available

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity : hygroscopic
See also section 10.5

10.2. Chemical stability

Stability : The product is stable under storage at normal ambient temperatures.

10.3. Possibility of hazardous reactions

Hazardous reactions : Reacts vigorously with strong oxidizers and acids.
See also section 7
Handling and storage

10.4. Conditions to avoid

Conditions to avoid : Heat, flames and sparks.
See also section 7
Handling and storage

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10.5. Incompatible materials

Incompatible materials : Strong acids and oxidizing agents See also section 7 Handling and storage

10.6. Hazardous decomposition products

Hazardous decomposition products : Burning produces noxious and toxic fumes. See also section 5.2

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Harmful if swallowed.
Ethylene glycol,
Diethylene glycol :
Harmful if swallowed.

Potassium hydroxide (1310-58-3)

| | |
|---------------|-----------|
| LD50/oral/rat | 214 mg/kg |
|---------------|-----------|

2-ethylhexanoic acid (149-57-5)

| | |
|--------------------|---------------------------|
| LD50/oral/rat | 3 g/kg |
| LD50/dermal/rat | > 2000 mg/kg |
| LD50/dermal/rabbit | 1260 µl/kg |
| ATE (oral) | 3000,000 mg/kg bodyweight |

Ethylene glycol (107-21-1)

| | |
|------------------------|--------------------------|
| LD50/oral/rat | 4000 mg/kg |
| LD50/dermal/rat | > 3500 mg/kg (mouse) |
| LC50/inhalation/4h/rat | > 2,5 (6h) |
| ATE (oral) | 500,000 mg/kg bodyweight |

Diethylene glycol (111-46-6)

| | |
|--------------------|----------------------------|
| LD50/oral/rat | 12565 mg/kg |
| LD50/dermal/rabbit | 11890 mg/kg |
| ATE (oral) | 500,000 mg/kg bodyweight |
| ATE (dermal) | 11890,000 mg/kg bodyweight |

Skin corrosion/irritation : Causes skin irritation.
potassium hydroxide :
Causes skin irritation
pH: No data available

Serious eye damage/irritation : Causes serious eye irritation.
potassium hydroxide :
Causes serious eye irritation
pH: No data available

Respiratory/skin sensitisation : Not classified (Based on available data, the classification criteria are not met.)

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| | |
|--|---|
| Germ cell mutagenicity | : Not classified (Based on available data, the classification criteria are not met.) |
| Carcinogenicity | : Not classified (Based on available data, the classification criteria are not met.) |
| Reproductive toxicity | : Suspected of damaging the unborn child. 2-ethylhexanoic acid : Suspected of damaging the unborn child |
| Specific target organ toxicity (single exposure) | : Not classified (Based on available data, the classification criteria are not met.) |
| Specific target organ toxicity (repeated exposure) | : Not classified (Based on available data, the classification criteria are not met.) |
| Aspiration hazard | : Not classified (Based on available data, the classification criteria are not met.) |

Further information

Symptoms related to the physical, chemical and toxicological characteristics, See section 4.2.

SECTION 12: Ecological information

12.1. Toxicity

Ecotoxicity effects : Ecological injuries are not known or expected under normal use.

| Potassium hydroxide (1310-58-3) | |
|--|--|
| LC50 fish 1 | 80 mg/l (Exposure time: 96 h - Species: Gambusia affinis [static]) |
| 2-ethylhexanoic acid (149-57-5) | |
| LC50 fish 1 | 70 mg/l (Exposure time: 96 h - Species: Pimephales promelas) |
| EC50 Daphnia 1 | 85,4 mg/l (Exposure time: 48 h - Species: Daphnia magna) |
| EC50 other aquatic organisms 1 | 61 mg/l (Exposure time: 72 h - Species: Desmodesmus subspicatus) |
| EC50 other aquatic organisms 2 | 41 mg/l (Exposure time: 96 h - Species: Desmodesmus subspicatus) |
| Ethylene glycol (107-21-1) | |
| LC50 fish 1 | 41000 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss) |
| EC50 Daphnia 1 | 46300 mg/l (Exposure time: 48 h - Species: Daphnia magna) |
| EC50 other aquatic organisms 1 | 6500 - 13000 mg/l (Exposure time: 96 h - Species: Pseudokirchneriella subcapitata) |
| LC50 fish 2 | 14 - 18 ml/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [static]) |
| Diethylene glycol (111-46-6) | |
| LC50 fish 1 | 75200 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through]) |
| EC50 Daphnia 1 | 84000 mg/l (Exposure time: 48 h - Species: Daphnia magna) |

12.2. Persistence and degradability

Persistence and degradability : No data available

| | |
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12.3. Bioaccumulative potential

Bioaccumulation : No data available
 Partition coefficient: n-octanol/water : No data available

12.4. Mobility in soil

Mobility : Adsorbs on soil.

12.5. Results of PBT and vPvB assessment

PBT/vPvB : No data available

12.6. Other adverse effects

Further information : No data available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste from residues / unused products : Handle with care.
 See also section 7
 Where possible recycling is preferred to disposal or incineration.
 Collect and dispose of waste product at an authorised disposal facility.
 Dispose according to legislation.

Contaminated packaging : Empty containers should be taken to an approved waste handling site for recycling or disposal.
 Dispose according to legislation.

Additional ecological information : Avoid release to the environment.

List of suggested waste codes/waste designations in accordance with the EWC: : Classified as hazardous waste according to European Union regulations.
 Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.

SECTION 14: Transport information

14.1. UN number

UN-No. : NA

14.2. UN proper shipping name

Proper Shipping Name : NA

14.3. Transport hazard class(es)

14.3.1. Overland transport

ADR/RID : Not classified as dangerous in the meaning of transport regulations.
 Class : Not applicable

14.3.2. Inland waterway transport (ADN)

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ADN : Not classified as dangerous in the meaning of transport regulations.

14.3.3. Transport by sea

IMDG : Not classified as dangerous in the meaning of transport regulations.
Class : Not applicable

14.3.4. Air transport

ICAO/IATA : Not classified as dangerous in the meaning of transport regulations.
Class : Not applicable

14.4. Packing group

Packing group : NA

14.5. Environmental hazards

Other information : Not applicable.

14.6. Special precautions for user

Special precautions : Not applicable.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Code: IBC : Not applicable.

SECTION 15: Regulatory information

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

15.1.1. EU-Regulations

Restrictions on use :

3. Liquid substances or mixtures which are regarded as dangerous in accordance with Directive 1999/45/EC or are fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008

Long Life Engine Coolant Concentrate-C2053 - 2-ethylhexanoic acid -
Ethylene glycol - Diethylene glycol

This product contains an ingredient according to the candidate list of Annex XIV of the REACH Regulation 1907/2006/EC.

: none

Authorisations : Not applicable

15.1.2. National regulations

DE: WGK : 1

15.2. Chemical safety assessment

Chemical Safety Assessment : No data available

| | |
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| | |



SECTION 16: Other information

Full text of R-, H- and EUH-phrases:

| | |
|---------------------|--|
| Acute Tox. 4 (Oral) | : Acute toxicity Category 4 |
| Eye Irrit. 2 | : Serious eye damage/eye irritation Category 2 |
| Repr. 2 | : Reproductive toxicity, Hazard Category 2 |
| Skin Corr. 1A | : skin corrosion/irritation Category 1A |
| Skin Irrit. 2 | : skin corrosion/irritation Category 2 |
| H302 | : Harmful if swallowed. |
| H314 | : Causes severe skin burns and eye damage. |
| H315 | : Causes skin irritation. |
| H319 | : Causes serious eye irritation. |
| H361d | : Suspected of damaging the unborn child. |
| R22 | : Harmful if swallowed. |
| R35 | : Causes severe burns. |
| R36/38 | : Irritating to eyes and skin. |
| R63 | : Possible risk of harm to the unborn child. |
| C | : Corrosive |
| Xi | : Irritant |
| Xn | : Harmful |

Sources of key data used to compile the Safety Data Sheet : European Chemicals Bureau

Abbreviations and acronyms :

- ADN = Accord Européen relatif au Transport International des Marchandises Dangereuses par voie de Navigation du Rhin
- ADR = Accord européen relatif au transport international des marchandises Dangereuses par Route
- CLP = Classification, Labelling and Packaging Regulation according to 1272/2008/EC
- IATA = International Air Transport Association
- IMDG = International Maritime Dangerous Goods Code
- LEL = Lower Explosive Limit/Lower Explosion Limit
- UEL = Upper Explosion Limit/Upper Explosive Limit
- REACH = Registration, Evaluation, Authorisation and Restriction of Chemicals
- CSR = CSR = Chemical Safety Report
- DNEL = DNEL = Derived No Effect Level
- LD50 = Median lethal dose
- N.O.S. = Not Otherwise Specified
- PNEC = Predicted No Effect Concentration
- TWA = time weighted average
- STEL = Short term exposure limit
- TLV = Threshold limits
- WGK = Wassergefährdungsklasse (Water Hazard Class under German Federal Water Management Act)

The contents and format of this SDS are in accordance with EEC Commission Directive 1999/45/EC, 67/548/EC, 1272/2008/EC and EEC Commission Regulation 1907/2006/EC (REACH) Annex II.

DISCLAIMER OF LIABILITY The information in this SDS was obtained from sources which we believe are reliable. However,

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| | |





1. Identification of the material and supplier

| | |
|-----------------------------------|---|
| Product name | BP DMA Marine Distillate Low Sulphur |
| SDS no. | 0000003682 |
| Product use | Fuel for compression ignition diesel engines. Fuel for marine engines. For specific application advice see appropriate Technical Data Sheet or consult our company representative. |
| Synonyms | Marine diesel fuel Automotive Diesel Fuel G10 |
| Supplier | BP Australia Pty Ltd (ABN 53 004 085 616) 717 Bourke Street Docklands VIC 3008 Australia Tel: +61 (03) 9268 4111 Fax: +61 (03) 9268 3321 |
| EMERGENCY TELEPHONE NUMBER | 1800 638 556 |
| Product code | 0000003682 |

2. Hazards identification

| | |
|--|--|
| Statement of hazardous/dangerous nature | HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS. |
| Risk phrases | R40- Limited evidence of a carcinogenic effect. R65- Harmful: may cause lung damage if swallowed. R66- Repeated exposure may cause skin dryness or cracking. R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. |
| Safety phrases | S2- Keep out of the reach of children. S24- Avoid contact with skin. S29- Do not empty into drains. S36/37- Wear suitable protective clothing and gloves. S43- In case of fire, use water, dry chemical powder or carbon dioxide. Do not use water jet. S61- Avoid release to the environment. Refer to special instructions/safety data sheet. S62- If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label. |

3. Composition/information on ingredients

May Contain Fatty Acid Methyl Esters (FAME). May also contain small quantities of proprietary performance additives.

| Ingredient name | CAS no. | % |
|------------------------|----------------|----------|
| Fuels, diesel | 68334-30-5 | > 95 |

Contains small quantities of polycyclic aromatic hydrocarbons (PAHs).

Other ingredients, determined not to be hazardous according to Safe Work Australia criteria, and not dangerous according to the ADG Code, make up the product concentration to 100%.

4. First-aid measures

| | |
|-------------------------|---|
| Eye contact | In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation develops. |
| Skin contact | In case of contact, immediately flush skin with plenty of water while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention if irritation occurs. |
| Inhalation | If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention. |
| Ingestion | Do not induce vomiting. Never give anything by mouth to an unconscious person. Aspiration hazard if swallowed. Can enter lungs and cause damage. Get medical attention. |
| Advice to doctor | Treatment should in general be symptomatic and directed to relieving any effects. Product can be aspirated on swallowing or following regurgitation of stomach contents, and can cause severe and potentially fatal chemical pneumonitis, which will require urgent treatment. Because of the risk of aspiration, induction of vomiting and gastric lavage should be avoided. Gastric lavage should be undertaken only after endotracheal intubation. Monitor for cardiac dysrhythmias. Note: High Pressure Applications Injections through the skin resulting from contact with the product at high pressure constitute a major |

medical emergency. Injuries may not appear serious at first but within a few hours tissue becomes swollen, discoloured and extremely painful with extensive subcutaneous necrosis. Surgical exploration should be undertaken without delay. Thorough and extensive debridement of the wound and underlying tissue is necessary to minimise tissue loss and prevent or limit permanent damage. Note that high pressure may force the product considerable distances along tissue planes.

5. Fire-fighting measures

Extinguishing media

Suitable Use foam or all-purpose dry chemical to extinguish.

Not suitable Do not use water jet.

Hazardous decomposition products

Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
other hazardous substances.

Unusual fire/explosion hazards

Combustible liquid and vapour. Vapour may cause flash fire. Vapours may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

Special fire-fighting procedures

Do not fight fire when it reaches the material. Withdraw from fire and let it burn. Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. First move people out of line-of-sight of the scene and away from windows.

Protection of fire-fighters

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

Personal precautions

No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

Environmental precautions

Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities. Collect spillage.

Large spill

Stop leak if without risk. Eliminate all ignition sources. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Small spill

Stop leak if without risk. Eliminate all ignition sources. Move containers from spill area. Absorb with an inert material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.

7. Handling and storage

Handling

Aspiration hazard if swallowed. Can enter lungs and cause damage. Do not ingest. If ingested, do not induce vomiting. Never siphon by mouth. Avoid breathing vapours, spray or mists. Use only with adequate ventilation. Keep away from heat, sparks and flame. To avoid fire or explosion, dissipate static electricity during transfer by earthing and bonding containers and equipment before transferring material. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Avoid contact of spilt material and runoff with soil and surface waterways. Wash thoroughly after handling. When using do not eat, drink or smoke.

Storage

Keep container tightly closed. Keep container in a cool, well-ventilated area. Store and use only in equipment/containers designed for use with this product. Empty packages may contain some remaining product. Hazard warning labels are a guide to the safe handling of empty packaging and should not be removed. Do not enter storage tanks without breathing apparatus unless the tank has been well ventilated and the tank atmosphere has been shown to contain hydrocarbon vapour concentrations of less than 1% of the lower flammability limit and an oxygen concentration of at least 20% volume. Always have sufficient people standing by outside the tank with appropriate breathing apparatus and equipment to effect a quick rescue.

Combustibility Classification

Combustible liquid Class C1 (AS 1940).

Additional information-Storage

This product must be handled in compliance with Australian Standard: The storage and handling of flammable and combustible liquids [Standard 1940-2004 as amended and adapted].

Light hydrocarbon vapours can build up in the headspace of tanks. These can cause flammability/explosion hazards even at temperatures below the normal flash point (note: flash point must not be regarded as a reliable indicator of the potential flammability of vapour in tank headspaces). Tank headspaces should always be regarded as potentially flammable and care should be taken to avoid static electrical discharge and all ignition sources during filling, ullaging and sampling from storage tanks.

Will present a flammability hazard if heated above flash point but bulk liquids at normal storage temperatures will present virtually no fire hazard. If fuel contacts hot surfaces, or leaks from high pressure fuel pipes, the vapour and/or mists generated will create a flammability or explosion hazard.

Product contaminated rags, paper or material used to absorb spillages, represent a fire hazard, and should not be allowed to accumulate. Dispose of safely immediately after use.
Empty containers represent a fire hazard as they may contain flammable product residues and vapour. Never weld, solder or braze empty containers.
To avoid fire, eliminate ignition sources.

8 . Exposure controls/personal protection

| Ingredient name | Occupational exposure limits |
|---|---|
| Fuels, diesel | ACGIH TLV (United States). Absorbed through skin. TWA: 100 mg/m ³ , (measured as total hydrocarbons) 8 hour(s). Issued/Revised: 1/2007 Form: Total hydrocarbons |
| For information and guidance, the ACGIH values are included. For further information on these please consult your supplier. | |
| Biological Limit Values | No biological limit allocated. |
| Exposure controls | |
| Occupational exposure controls | Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapours below their respective occupational exposure limits. In accordance with good industrial hygiene and safety work practices, airborne exposures should be controlled to the lowest extent practicable. |
| Hygiene measures | Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Ensure that eyewash stations and safety showers are close to the workstation location. |
| Personal protective equipment | |
| Respiratory protection | Use only with adequate ventilation. Avoid breathing of vapours, mists or spray. Select and use respirators in accordance with AS/NZS 1715/1716. When mists or vapours exceed the exposure standards then the use of the following is recommended: Approved respirator with organic vapour and dust/mist filters. Filter capacity and respirator type depends on exposure level. |
| Skin and body | Avoid contact with skin and clothing. Wear clothing and footwear that cannot be penetrated by chemicals or oil. |
| Hand protection | Wear protective gloves if prolonged or repeated contact is likely. Recommended: Nitrile gloves. The correct choice of protective gloves depends upon the chemicals being handled, the conditions of work and use, and the condition of the gloves (even the best chemically resistant glove will break down after repeated chemical exposures). Most gloves provide only a short time of protection before they must be discarded and replaced. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. Gloves should therefore be chosen in consultation with the supplier/manufacturer and with a full assessment of the working conditions. |
| Eye protection | Chemical splash goggles. |

9 . Physical and chemical properties

| | |
|--|--|
| Physical state | Liquid. |
| Colour | Water white to straw including fluorescent green, blue or yellow. |
| Odour | Mild. |
| Flash point | >61.5 °C (Closed cup) Pensky-Martens. |
| Auto-ignition temperature | 240°C (464°F) |
| Explosive properties | Combustible liquid and vapour. Vapour may cause flash fire. Vapours may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard. |
| Explosion limits | Lower: 0.7% Upper: 5% |
| Vapour pressure | <0.1 kPa (<0.755 mm Hg) |
| Vapour density | Not available. |
| Viscosity | Kinematic: 2.1 to 5.5 mm ² /s (2.1 to 5.5 cSt) at 40°C |
| pH | Not available. |
| Boiling point / range | 180 to 380°C (356 to 716°F) |
| Melting point / range | Not available. |
| Relative density/Specific gravity | 0.84 |
| Density | 810 to 850 kg/m ³ (0.81 to 0.85 g/cm ³) at 15°C |
| Solubility | Not available. |

10 . Stability and reactivity

| | |
|--|--|
| Stability | The product is stable. |
| Conditions to avoid | Avoid all possible sources of ignition (spark or flame). Avoid excessive heat. |
| Incompatibility with various substances/Hazardous Reactions | Reactive or incompatible with the following materials: oxidising materials. |

Hazardous decomposition products

Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
other hazardous substances.

11 . Toxicological information

Effects and symptoms

| | |
|-------------------|--|
| Eyes | Vapour, mist or fume may cause eye irritation. Exposure to vapour, mist or fume may cause stinging, redness and watering of the eyes. |
| Skin | Prolonged or repeated contact can defat the skin and lead to irritation and/or dermatitis. |
| Inhalation | May cause irritation of respiratory tract, coughing, shortness of breath. |
| Ingestion | Aspiration of this product into the lungs may cause chemical pneumonia and can be fatal. Aspiration into the lungs can occur while vomiting after ingestion of this product. Do not siphon by mouth. Irritating to mouth, throat and stomach. |

Chronic toxicity

| | |
|-----------------------------|--|
| Carcinogenic effects | POSSIBLE CANCER HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE CANCER, BASED ON ANIMAL DATA. -- Carcinogenic Category 3 Risk of cancer depends on duration and level of exposure. |
| Mutagenic effects | No known significant effects or critical hazards. |
| Other information | May cause damage to organs through prolonged or repeated exposure. Vapour, mists or fumes may contain polycyclic aromatic hydrocarbons some of which are known to produce skin cancer. Diesel exhaust particulates have been classified by the National Toxicological Program (NTP) to be a reasonably anticipated human carcinogen. Exposure should be minimized to reduce potential risk. |

12 . Ecological information





| | |
|-------------------------------------|--|
| Ecotoxicity | Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. |
| Biodegradability | |
| Persistence/degradability | This product is inherently biodegradable. |
| Mobility | Spillages may penetrate the soil causing ground water contamination. This material may accumulate in sediments. |
| Bioaccumulative potential | This product is not expected to bioaccumulate through food chains in the environment. |
| Other ecological information | Spills may form a film on water surfaces causing physical damage to organisms. Oxygen transfer could also be impaired. |

13 . Disposal considerations

| | |
|---|---|
| Disposal considerations / Waste information | The generation of waste should be avoided or minimised wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. |
| Special Precautions for Landfill or Incineration | Empty packages may contain some remaining product. Hazard warning labels are a guide to the safe handling of empty packaging and should not be removed. |

14 . Transport information

International transport regulations

| Regulatory information | UN number | Proper shipping name | Class | PG* | Label | Additional information |
|---------------------------------|----------------|-------------------------------|-------|-----|--|--|
| ADG Classification | Not regulated. | - | - | - | ----- | Remarks Combustible liquid Class C1 (AS 1940). |
| IMDG Classification | UN 1202 | DIESEL FUEL. Marine pollutant | 3 | III |   | Emergency schedules (EmS) F-E, S-E |
| IATA/ICAO Classification | UN 1202 | DIESEL FUEL | 3 | III |   | - |

| Regulatory information | UN number | Proper shipping name | Class | PG* | Label | Additional information |
|------------------------|-----------|----------------------|-------|-----|-------|------------------------|
| | | | | | | |

PG* : Packing group

Special precautions for user No known special precautions required. See Section: "Handling and storage" for additional information.

15 . Regulatory information

Standard for the Uniform Scheduling of Medicines and Poisons

Not scheduled

Consumer products - This product is exempt per Appendix A of the SUSMP.
Industrial Products - Labelling requirements for SUSMP do not apply to a poison that is packed and sold solely for industrial, laboratory or manufacturing use. However, this product is labelled in accordance with NOSHC National Code of Practice for labelling of workplace substances.

Control of Scheduled Carcinogenic Substances

Ingredient name

Schedule

No Listed Substance

Other regulations

- REACH Status** For the REACH status of this product please consult your company contact, as identified in Section 1.
- United States inventory (TSCA 8b)** All components are listed or exempted.
- Australia inventory (AICS)** All components are listed or exempted.
- Canada inventory** All components are listed or exempted.
- China inventory (IECSC)** All components are listed or exempted.
- Japan inventory (ENCS)** All components are listed or exempted.
- Korea inventory (KECI)** All components are listed or exempted.
- Philippines inventory (PICCS)** All components are listed or exempted.

16 . Other information

Key to abbreviations

AMP = Acceptable Maximum Peak
ACGIH = American Conference of Governmental Industrial Hygienists, an agency that promulgates exposure standards.
ADG = Australian Code for the Transport of Dangerous Goods by Road and Rail
ADG Code = Australian Code for the Transport of Dangerous Goods by Road and Rail
CAS Number = Chemical Abstracts Service Registry Number
HAZCHEM Code = Emergency action code of numbers and letters which gives information to emergency services. Its use is required by the ADG Code for Dangerous Goods in bulk.
ICAO = International Civil Aviation Organization.
IATA = International Air Transport Association, the organization promulgating rules governing shipment of goods by air.
IMDG = International Maritime Organization Rules, rules governing shipment of goods by water.
IP 346 = A chemical screening assay for dermal toxicity. The European Commission has recommended that Method IP 346 be used as the basis for labelling certain lubricant oil base stocks for carcinogenicity. The EU Commission has stipulated that the classification as a carcinogen need not apply if it can be shown that the substance contains less than 3% DMSO extract as measured by IP 346. (See Note L, European Commission Directive 67/548/EEC as amended and adapted.) DMSO is a solvent.
NOHSC = National Occupational Health & Safety Commission, Australia
TWA = Time weighted average
STEL = Short term exposure limit
UN Number = United Nations Number, a four digit number assigned by the United Nations Committee of Experts on the Transport of Dangerous Goods.

History

- Date of issue** 27/10/2011.
- Date of previous issue** 23/06/2011.
- Prepared by** Product Stewardship

Notice to reader

All reasonably practicable steps have been taken to ensure this data sheet and the health, safety and environmental information contained in it is accurate as of the date specified below. No warranty or representation, express or implied is made as to the accuracy or completeness of the data and information in this data sheet.

The data and advice given apply when the product is sold for the stated application or applications. You should not use the product other than for the stated application or applications without seeking advice from us.

It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. The BP Group shall not be responsible for any damage or injury resulting from use, other than the stated product use of the material, from any failure to adhere to recommendations, or from any hazards inherent in the nature of the material. Purchasers of the product for supply to a third party for use at work, have a duty to take all necessary steps to ensure that any person handling or using the product is provided with the information in this sheet. Employers have a duty to tell employees and others who may be affected of any hazards described in this sheet and of any precautions that should be taken.

| | | |
|--|--------------------------------------|-------------------------------------|
| Product name BP DMA Marine Distillate Low Sulphur | Product code 0000003682 | Page: 5/5 |
| Version 2 | Date of issue 27 October 2011 | Format Australia (Australia) |
| | | Language ENGLISH (ENGLISH) |



Safety Data Sheet

This safety data sheet complies with the requirements of: 2012 OSHA Hazard Communication Standard (29CFR 1910.1200)

Product name METEOR T-10 High Expansion Foam Concentrate

1. Identification

1.1. Product Identifier

Product name METEOR T-10 High Expansion Foam Concentrate

1.2. Other means of identification

Product code F203163D1

Synonyms None

Chemical Family No information available

1.3. Recommended use of the chemical and restrictions on use

Recommended use Fire extinguishing agent

Uses advised against Consumer use

1.4. Details of the Supplier of the Safety Data Sheet

Company Name SABO FOAM s.r.l.
Via Caravaggi
Levate (BG), Italy 24040
Telephone: +39.035.205.7011

Contact point Product Stewardship at 1-715-735-7411

E-mail address psra@tycofp.com

1.5. Emergency Telephone Number

2. Hazards Identification

Classification

OSHA Regulatory Status

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Corrosion/Irritation - Category 2

Serious eye damage/eye irritation - Category 1

2.2. Label Elements

Signal Word

DANGER

hazard statements

CAUSES SKIN IRRITATION

Causes serious eye damage



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/

Product name METEOR T-10 /
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Precautionary Statements

Prevention

Wash face, hands and any exposed skin thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection.

Response

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.

IF ON SKIN: Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse.

2.3. Hazards Not Otherwise Classified (HNOC)

Not Applicable.

2.4. OTHER INFORMATION

Unknown Acute Toxicity

15.5% of the mixture consists of ingredient(s) of unknown toxicity

3. Composition/information on Ingredients

3.1. Mixture

The following component(s) in this product are considered hazardous under applicable OSHA(USA)

| Chemical name | CAS No | weight-% |
|---------------------------------------|------------|----------|
| Water | 7732-18-5 | 30 - 60 |
| Molasses | 68476-78-8 | 10 - 30 |
| Sodium Octyl Sulfate | 142-31-4 | 5 - 10 |
| 2-Butoxyethanol | 111-76-2 | 5 - 10 |
| 2-(2-Butoxyethoxy)ethanol | 112-34-5 | 5 - 10 |
| Ethylene Glycol | 107-21-1 | 1 - 5 |
| Lauryl-/ Myristylsulfate, sodium salt | 85586-07-8 | 1 - 5 |



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| | | |
|------------------------------------|-----------|---------|
| Fatty Alcohol sulfate, sodium salt | 9004-82-4 | 1 - 5 |
| Lauryl Alcohol | 112-53-8 | 1 - 5 |
| Sodium Citrate | 68-04-2 | 0.1 - 1 |

4. First aid measures

4.1. Description of first aid measures

Eye Contact Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.

Skin contact Wash skin with soap and water. Get medical attention if irritation develops and persists.

Inhalation Remove to fresh air. If breathing is difficult, give oxygen. (Get medical attention immediately if symptoms occur.).

Ingestion Rinse mouth. Do not induce vomiting without medical advice. If swallowed, call a poison control center or physician immediately.

4.2. Most Important Symptoms and Effects, Both Acute and Delayed

Symptoms No information available.

4.3. Indication of Any Immediate Medical Attention and Special Treatment Needed

Note to physicians Treat symptomatically.

5. Fire-fighting measures

5.1. Suitable Extinguishing Media

Product is extinguishing agent. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

5.2. Unsuitable Extinguishing Media

None.

5.3. Specific Hazards Arising from the Chemical

None known.

Hazardous Combustion Products Carbon oxides, Nitrogen oxides (NOx), Oxides of sulfur

5.4. Explosion Data

Sensitivity to Mechanical Impact None.

Sensitivity to Static Discharge None.

5.5. Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.



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6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal Precautions Ensure adequate ventilation, especially in confined areas.

For emergency responders Use personal protection recommended in Section 8.

6.2. Environmental Precautions

Environmental Precautions Prevent further leakage or spillage if safe to do so. Prevent entry into waterways, sewers, basements or confined areas. See Section 12 for additional Ecological Information.

6.3. Methods and material for containment and cleaning up

Methods for Containment Prevent further leakage or spillage if safe to do so.

Methods for Cleaning Up Pick up and transfer to properly labeled containers.

7. Handling and Storage

7.1. Precautions for Safe Handling

Advice on safe handling Avoid contact with skin and eyes. Handle in accordance with good industrial hygiene and safety practice.

7.2. Conditions for safe storage, including any incompatibilities

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place.

Incompatible Materials Strong oxidizing agents. Strong acids. Strong bases.

8. Exposure Controls/Personal Protection

8.1. Control Parameters

Exposure guidelines

| Chemical name | ACGIH TLV | OSHA PEL | NIOSH IDLH |
|---------------------------------------|---|----------|--|
| 2-Butoxyethanol 111-76-2 | TWA: 20 ppm | S* | IDLH: 700 ppm TWA: 5 ppm TWA: 24 mg/m ³ |
| 2-(2-Butoxyethoxy)ethanol 112-34-5 | TWA: 10 ppm inhalable fraction and vapor | - | - |
| Ethylene Glycol 107-21-1 | Ceiling: 100 mg/m ³ aerosol only | - | - |

ACGIH (American Conference of Governmental Industrial Hygienists) OSHA (Occupational Safety and Health Administration of the US Department of Labor) NIOSH IDLH Immediately Dangerous to Life or Health

8.2. Appropriate Engineering Controls



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Engineering controls

Showers
Eyewash stations
Ventilation systems.

8.3. Individual protection measures, such as personal protective equipment

Eye/Face Protection

Avoid contact with eyes. Tight sealing safety goggles.

Skin and Body Protection

Wear protective gloves and protective clothing.

Respiratory Protection

If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

Ventilation

Use local exhaust or general dilution ventilation to control exposure with applicable limits

8.4. General hygiene considerations

Do not eat, drink or smoke when using this product. Handle in accordance with good industrial hygiene and safety practice.

9. Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

| | | | |
|----------------|-------------------|-------|-------|
| Physical State | Liquid | | |
| Odor | Characteristic | Color | Amber |
| odor threshold | No data available | | |

| <u>Property</u> | <u>VALUES</u> | <u>Remarks • Method</u> |
|-------------------------------|---------------------|-------------------------|
| pH | 7 | |
| Melting point/freezing point | No data available | |
| Boiling point / boiling range | 100 °C / 212 °F | |
| Flash Point | > 100 °C / > 212 °F | |
| Evaporation Rate | No data available | |
| flammability (solid, gas) | No data available | |
| Flammability limit in air | | |
| Upper flammability limit: | No data available | |
| Lower flammability limit: | No data available | |
| Vapor Pressure | No data available | |
| Vapor Density | No data available | |
| Specific gravity | No data available | |
| Water Solubility | No data available | |
| Solubility in Other Solvents | No data available | |
| Partition coefficient | No data available | |
| Autoignition Temperature | No data available | |
| Decomposition Temperature | No data available | |
| Kinematic viscosity | No data available | |



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10. Stability and Reactivity

10.1. Chemical Stability

Stable under recommended storage conditions.

10.2. Reactivity

No data available

10.3. Possibility of hazardous reactions

None under normal processing.

hazardous polymerization

Hazardous polymerization does not occur.

10.4. Conditions to Avoid

Extremes of temperature and direct sunlight.

10.5. Incompatible Materials

Strong oxidizing agents. Strong acids. Strong bases.

10.6. Hazardous decomposition products

Carbon oxides. Nitrogen oxides (NO_x). Oxides of sulfur.

11. Toxicological Information

11.1. Information on Likely Routes of Exposure

Product information no data available

INHALATION no data available.

Eye Contact no data available.

Skin contact no data available.

INGESTION no data available.

Acute Toxicity

| Chemical name | Oral LD50 | dermal LD50 | Inhalation LC50 |
|----------------------------------|----------------------|-------------|-----------------|
| Water 7732-18-5 | > 90 mL/kg (Rat) | - | - |
| Sodium Octyl Sulfate 142-31-4 | = 3200 mg/kg (Rat) | - | - |



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| | | | |
|---|----------------------|-------------------------|-----------------------|
| 2-Butoxyethanol 111-76-2 | = 470 mg/kg (Rat) | = 220 mg/kg (Rabbit) | = 450 ppm (Rat) 4 h |
| 2-(2-Butoxyethoxy)ethanol 112-34-5 | = 3384 mg/kg (Rat) | = 2700 mg/kg (Rabbit) | - |
| Ethylene Glycol 107-21-1 | = 4000 mg/kg (Rat) | = 9530 µL/kg (Rabbit) | - |
| Lauryl-/ Myristylsulfate, sodium salt 85586-07-8 | > 1000 mg/kg (Rat) | - | - |
| Fatty Alcohol sulfate, sodium salt 9004-82-4 | = 1600 mg/kg (Rat) | - | - |
| Lauryl Alcohol 112-53-8 | > 5000 mg/kg (Rat) | - | - |

11.2. Information on Toxicological Effects

Symptoms No information available.

11.3. Delayed and immediate effects as well as chronic effects from short and long-term exposure sensitization

No information available.

Germ Cell Mutagenicity
carcinogenicity

No information available.

No information available.

| Chemical name | ACGIH | IARC | NTP | OSHA |
|-----------------------------|-------|---------|-----|------|
| 2-Butoxyethanol 111-76-2 | A3 | Group 3 | - | - |

ACGIH (American Conference of Governmental Industrial Hygienists)

A3 - Animal Carcinogen

IARC (International Agency for Research on Cancer)

Not classifiable as a human carcinogen

Reproductive Toxicity

No information available.

STOT - Single Exposure

No information available.

STOT - Repeated Exposure

No information available.

Chronic Toxicity

May cause adverse effects on the bone marrow and blood-forming system. May cause adverse liver effects.

Target organ effects

Blood, Central Nervous System, EYES, hematopoietic system, Kidney, Liver, Respiratory System, skin.

Aspiration Hazard

No information available.

11.4. Numerical Measures of Toxicity - Product information

The following values are calculated based on chapter 3.1 of the GHS document mg/kg mg/l

12. Ecological Information

12.1. ecotoxicity

Not classified

0% of the mixture consists of components(s) of unknown hazards to the aquatic environment

| Chemical name | Algae/aquatic plants | Fish | Crustacea |
|-----------------------------|----------------------|--|--|
| 2-Butoxyethanol 111-76-2 | - | LC50 96 h = 1490 mg/L Lepomis macrochirus static LC50 96 h = 2950 mg/L Lepomis macrochirus | EC50 48 h > 1000 mg/L Daphnia magna EC50 24 h 1698 - 1940 mg/L Daphnia magna |



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| | | | |
|---|--|---|--|
| 2-(2-Butoxyethoxy)ethanol 112-34-5 | EC50 96 h > 100 mg/L Desmodesmus subspicatus | LC50 96 h = 1300 mg/L Lepomis macrochirus static | EC50 24 h = 2850 mg/L Daphnia magna EC50 48 h > 100 mg/L Daphnia magna |
| Ethylene Glycol 107-21-1 | EC50 96 h 6500 - 13000 mg/L Pseudokirchneriella subcapitata | LC50 96 h = 41000 mg/L Oncorhynchus mykiss LC50 96 h 14 - 18 mL/L Oncorhynchus mykiss static LC50 96 h = 27540 mg/L Lepomis macrochirus static LC50 96 h = 40761 mg/L Oncorhynchus mykiss static LC50 96 h 40000 - 60000 mg/L Pimephales promelas static LC50 96 h = 16000 mg/L Poecilia reticulata static | EC50 48 h = 46300 mg/L Daphnia magna |
| Lauryl-/ Myristylsulfate, sodium salt 85586-07-8 | - | LC50 96 h = 2.5 mg/L Pimephales promelas LC50 96 h 10 - 100 mg/L Brachydanio rerio static | EC50 48 h = 2.8 mg/L Daphnia magna |
| Lauryl Alcohol 112-53-8 | EC50 96 h = 0.62 mg/L Desmodesmus subspicatus | LC50 96 h = 1.01 mg/L Pimephales promelas flow-through LC50 96 h = 0.1855 mg/L Pimephales promelas | EC50 48 h = 320 mg/L Daphnia magna |
| Sodium Citrate 68-04-2 | EC50 96 h 18000 - 32000 mg/L Chlorella vulgaris | LC50 96 h 18000 - 32000 mg/L Poecilia reticulata | EC50 48 h 5600 - 10000 mg/L Daphnia magna |

12.2. Persistence and Degradability

No information available.

12.3. Bioaccumulation

No information available.

| Chemical name | Partition coefficient |
|-----------------------------|-----------------------|
| 2-Butoxyethanol 111-76-2 | 0.81 |
| Ethylene Glycol 107-21-1 | -1.93 |
| Lauryl Alcohol 112-53-8 | 5.36 |

12.4. Other Adverse Effects

No information available

13. Disposal Considerations

13.1. Waste Treatment Methods

Disposal of wastes

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated Packaging

Do not reuse container.

14. Transport Information



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| | |
|--------------------------|---------------|
| <u>DOT</u> | NOT REGULATED |
| <u>TDG</u> | NOT REGULATED |
| <u>MEX</u> | NOT REGULATED |
| <u>ICAO (air)</u> | NOT REGULATED |
| <u>IATA</u> | NOT REGULATED |
| <u>IMDG</u> | NOT REGULATED |

15. Regulatory Information

15.1. International Inventories

| | |
|-----------------|-----------------|
| TSCA | Does not comply |
| DSL/NDSL | Does not comply |
| ENCS | Does not comply |
| IECSC | Complies |
| KECL | Complies |
| PICCS | Complies |
| AICS | Complies |

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

15.2. US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

| Chemical name | SARA 313 - Threshold Values % |
|--------------------------------------|--------------------------------------|
| 2-Butoxyethanol - 111-76-2 | 1.0 |
| 2-(2-Butoxyethoxy)ethanol - 112-34-5 | 1.0 |
| Ethylene Glycol - 107-21-1 | 1.0 |

SARA 311/312 Hazard Categories

| | |
|--|----|
| Acute Health Hazard | No |
| Chronic health hazard | No |
| Fire Hazard | No |
| Sudden Release of Pressure Hazard | No |
| Reactive Hazard | No |



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CWA (Clean Water Act)

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

| Chemical name | Hazardous Substances RQs | CERCLA/SARA RQ | Reportable Quantity (RQ) |
|-----------------------------|--------------------------|----------------|--|
| Ethylene Glycol 107-21-1 | 5000 lb | - | RQ 5000 lb final RQ RQ 2270 kg final RQ |

15.3. US State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

| Chemical name | New Jersey | Massachusetts | Pennsylvania |
|---------------------------------------|------------|---------------|--------------|
| 2-Butoxyethanol 111-76-2 | X | X | X |
| 2-(2-Butoxyethoxy)ethanol 112-34-5 | X | - | X |
| Ethylene Glycol 107-21-1 | X | X | X |

16. Other information, including date of preparation of the last revision

| | | | | |
|-------------|------------------|----------------|--------------------|------------------------------------|
| NFPA | Health Hazards 2 | flammability 1 | Instability 0 | Physical and chemical properties - |
| HMIS | Health Hazards 2 | flammability 1 | Physical Hazards 0 | Personal Protection X |

Revision date 25-May-2015

Revision note

No information available

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet



ADJUNCT B

Drew Marine

Chemwatch Hazard Alert Code: 2

Chemwatch: 22576

Version No: 8.1.1.1

Safety Data Sheet according to OSHA HazCom Standard (2012) requirements

Issue Date: 01/01/2013

Print Date: 11/10/2014

Initial Date: Not Available

S.GHS.USA.EN

SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

Product Identifier

| | |
|-------------------------------|--|
| Product name | ADJUNCT B |
| Chemical Name | SODIUM PHOSPHATE, DIBASIC |
| Proper shipping name | Not Applicable |
| Chemical formula | $\text{H}_3\text{O}_4\text{P}_2\text{H}_2\text{O}_2\cdot 2\text{Na} \text{H}_3\text{O}_4\text{P}_2\text{Na}$ |
| Other means of identification | Not Available |
| CAS number | 7558-79-4 |

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

| | |
|--------------------------|---|
| Relevant identified uses | Used as sequestrant, emulsifier and buffer in foods; as mordant in dyeing; for weighting silk; in tanning; in manufacture of enamels, ceramics, detergents, boiler compounds; as fire-proofing agent. Also used in soldering and brazing instead of borax; as reagent and buffer in analytical chemistry. |
|--------------------------|---|

Details of the manufacturer/importer

| | |
|-------------------------|--|
| Registered company name | Drew Marine |
| Address | 100 South Jefferson Road Whippany 07981 NJ United States |
| Telephone | 973 526-5700. |
| Fax | Not Available |
| Website | Not Available |
| Email | Not Available |

Emergency telephone number

| | |
|-----------------------------------|--|
| Association / Organisation | Not Available |
| Emergency telephone numbers | The numbers below are for EMERGENCY USE ONLY. Use the corporate number above for all other calls. |
| Other emergency telephone numbers | CHEMWATCH: From within the US and CANADA: 1 877-715-9305 OR call + 613 9573 3112. From outside the US and Canada: + 800 2436 2255 (+800 CHEMCALL) or +613 9573 3112 |

CHEMWATCH EMERGENCY RESPONSE

| Primary Number | Alternative Number 1 | Alternative Number 2 |
|----------------|----------------------|----------------------|
| 877 715 9305 | +612 9186 1132 | Not Available |

Once connected and if the message is not in your preferred language then please dial 01


Una vez conectado y si el mensaje no está en su idioma preferido, por favor marque 02

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

| | |
|--------------------|---|
| GHS Classification | Skin Corrosion/Irritation Category 2, Eye Irritation Category 2A, STOT - SE (Resp. Irr.) Category 3 |
|--------------------|---|

Label elements

| | |
|--------------------|---|
| GHS label elements |  |
|--------------------|---|

| | |
|-------------|----------------|
| SIGNAL WORD | WARNING |
|-------------|----------------|

Hazard statement(s)

| | |
|------|----------------------------------|
| H315 | Causes skin irritation |
| H319 | Causes serious eye irritation |
| H335 | May cause respiratory irritation |

Continued...

ADJUNCT B

Supplementary statement(s)

Not Applicable

Precautionary statement(s): Prevention

| | |
|------|--|
| P271 | Use only outdoors or in a well-ventilated area. |
| P261 | Avoid breathing dust/fume/gas/mist/vapours/spray. |
| P280 | Wear protective gloves/protective clothing/eye protection/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. |
| P312 | Call a POISON CENTER/doctor/physician/first aider/if you feel unwell. |
| P337+P313 | If eye irritation persists: Get medical advice/attention. |
| P302+P352 | IF ON SKIN: Wash with plenty of water and soap |
| P304+P340 | IF INHALED: Remove person to fresh air and keep comfortable for breathing. |
| P332+P313 | If skin irritation occurs: Get medical advice/attention. |
| P362+P364 | Take off contaminated clothing and wash it before reuse. |

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 chemical landfill or if organic to high temperature incineration |
|------|--|

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

| CAS No | %[weight] | Name |
|-----------|-----------|---|
| 7558-79-4 | >98 | sodium phosphate, dibasic |

Mixtures

See section above for composition of Substances

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, 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. |

Indication of any immediate medical attention and special treatment needed

for phosphate salts intoxication:

- All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.
- Ingestion of large quantities of phosphate salts (over 1.0 grams for an adult) may cause an osmotic catharsis resulting in diarrhoea and probable abdominal cramps. Larger doses such as 4-8 grams will almost certainly cause these effects in everyone. In healthy individuals most of the ingested salt will be excreted in the faeces with the diarrhoea and, thus, not cause any systemic toxicity. Doses greater than 10 grams hypothetically may cause systemic toxicity.
- Treatment should take into consideration both anionic and cation portion of the molecule.
- All phosphate salts, except calcium salts, have a hypothetical risk of hypocalcaemia, so calcium levels should be monitored.

Treat symptomatically.

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

Continued...

ADJUNCT B

- ▶ 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

- ▶ 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.
- ▶ Use fire fighting procedures suitable for surrounding area.
- ▶ **DO NOT** approach containers suspected to be hot.
- ▶ Cool fire exposed containers with water spray from a protected location.
- ▶ If safe to do so, remove containers from path of fire.
- ▶ Equipment should be thoroughly decontaminated after use.

Fire/Explosion Hazard

- ▶ Non combustible.
 - ▶ Not considered a significant fire risk, however containers may burn.
- Decomposition may produce toxic fumes of: phosphorus oxides (POx), metal oxides. May emit poisonous fumes. May emit corrosive fumes.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Minor Spills

- ▶ Remove all ignition sources.
- ▶ Clean up all spills immediately.
- ▶ Avoid contact with skin and eyes.
- ▶ Control personal contact with the substance, by using protective equipment.
- ▶ Use dry clean up procedures and avoid generating dust.
- ▶ Place in a suitable, labelled container for waste disposal.

Major Spills

Moderate hazard.

- ▶ **CAUTION:** Advise personnel in area.
- ▶ Alert Emergency Services and tell them location and nature of hazard.
- ▶ Control personal contact by wearing protective clothing.
- ▶ Prevent, by any means available, spillage from entering drains or water courses.
- ▶ Recover product wherever possible.
- ▶ **IF DRY:** Use dry clean up procedures and avoid generating dust. Collect residues and place in sealed plastic bags or other containers for disposal. **IF WET:** Vacuum/shovel up and place in labelled containers for disposal.
- ▶ **ALWAYS:** Wash area down with large amounts of water and prevent runoff into drains.
- ▶ If contamination of drains or waterways occurs, advise Emergency Services.

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

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling

- ▶ Avoid all personal contact, including inhalation.
- ▶ Wear protective clothing when risk of exposure occurs.
- ▶ Use in a well-ventilated area.
- ▶ Prevent concentration in hollows and sumps.
- ▶ **DO NOT** enter confined spaces until atmosphere has been checked.
- ▶ **DO NOT** allow material to contact humans, exposed food or food utensils.
- ▶ Avoid contact with incompatible materials.
- ▶ **When handling, DO NOT eat, drink or smoke.**
- ▶ Keep containers securely sealed when not in use.
- ▶ Avoid physical damage to containers.
- ▶ Always wash hands with soap and water after handling.
- ▶ Work clothes should be laundered separately. Launder contaminated clothing before re-use.
- ▶ Use good occupational work practice.
- ▶ Observe manufacturer's storage and handling recommendations contained within this MSDS.
- ▶ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

Other information

- ▶ Store in original containers.
 - ▶ Keep containers securely sealed.
 - ▶ Store in a cool, dry area protected from environmental extremes.
 - ▶ Store away from incompatible materials and foodstuff containers.
 - ▶ Protect containers against physical damage and check regularly for leaks.
 - ▶ Observe manufacturer's storage and handling recommendations contained within this MSDS.
- For major quantities:
- ▶ Consider storage in bunded areas - ensure storage areas are isolated from sources of community water (including stormwater, ground water, lakes and streams).
 - ▶ Ensure that accidental discharge to air or water is the subject of a contingency disaster management plan; this may require consultation with local authorities.

Conditions for safe storage, including any incompatibilities

Suitable container

- ▶ Glass container is suitable for laboratory quantities
- ▶ Polyethylene or polypropylene container.
- ▶ Check all containers are clearly labelled and free from leaks.

Storage incompatibility

- ▶ 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.
- ▶ The state of subdivision may affect the results.
- ▶ Phosphates are incompatible with oxidising and reducing agents.

Continued...

ADJUNCT B

- ▶ Phosphates are susceptible to formation of highly toxic and flammable phosphine gas in the presence of strong reducing agents such as hydrides.
- ▶ Partial oxidation of phosphates by oxidizing agents may result in the release of toxic phosphorus oxides.
- ▶ Avoid oxidising agents, acids, acid chlorides, acid anhydrides, chloroformates.

PACKAGE MATERIAL INCOMPATIBILITIES

Not Available

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Not Available

EMERGENCY LIMITS

| Ingredient | TEEL-0 | TEEL-1 | TEEL-2 | TEEL-3 |
|------------|---------------|---------------|---------------|---------------|
| ADJUNCT B | Not Available | Not Available | Not Available | Not Available |

| Ingredient | Original IDLH | Revised IDLH |
|---------------------------|---------------|---------------|
| sodium phosphate, dibasic | Not Available | Not Available |

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>Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.</p> <p>Employers may need to use multiple types of controls to prevent employee overexposure.</p> | | | | | | | | | |
| | <ul style="list-style-type: none">▶ Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.▶ If in spite of local exhaust an adverse concentration of the substance in air could occur, respiratory protection should be considered. <p>Such protection might consist of:</p> <p>(a): particle dust respirators, if necessary, combined with an absorption cartridge;</p> <p>(b): filter respirators with absorption cartridge or canister of the right type;</p> <p>(c): fresh-air hoods or masks.</p> <p>Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.</p> | | | | | | | | | |
| | <table><tr><td>Type of Contaminant:</td><td>Air Speed:</td></tr><tr><td>direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)</td><td>1-2.5 m/s (200-500 f/min.)</td></tr><tr><td>grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).</td><td>2.5-10 m/s (500-2000 f/min.)</td></tr></table> | Type of Contaminant: | Air Speed: | direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion) | 1-2.5 m/s (200-500 f/min.) | grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion). | 2.5-10 m/s (500-2000 f/min.) | | | |
| | Type of Contaminant: | Air Speed: | | | | | | | | |
| | direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion) | 1-2.5 m/s (200-500 f/min.) | | | | | | | | |
| grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion). | 2.5-10 m/s (500-2000 f/min.) | | | | | | | | | |
| <p>Within each range the appropriate value depends on:</p> <table><tr><td>Lower end of the range</td><td>Upper end of the range</td></tr><tr><td>1: Room air currents minimal or favourable to capture</td><td>1: Disturbing room air currents</td></tr><tr><td>2: Contaminants of low toxicity or of nuisance value only.</td><td>2: Contaminants of high toxicity</td></tr><tr><td>3: Intermittent, low production.</td><td>3: High production, heavy use</td></tr><tr><td>4: Large hood or large air mass in motion</td><td>4: Small hood-local control only</td></tr></table> | Lower end of the range | Upper end of the range | 1: Room air currents minimal or favourable to capture | 1: Disturbing room air currents | 2: Contaminants of low toxicity or of nuisance value only. | 2: Contaminants of high toxicity | 3: Intermittent, low production. | 3: High production, heavy use | 4: Large hood or large air mass in motion | 4: Small hood-local control only |
| Lower end of the range | Upper end of the range | | | | | | | | | |
| 1: Room air currents minimal or favourable to capture | 1: Disturbing room air currents | | | | | | | | | |
| 2: Contaminants of low toxicity or of nuisance value only. | 2: Contaminants of high toxicity | | | | | | | | | |
| 3: Intermittent, low production. | 3: High production, heavy use | | | | | | | | | |
| 4: Large hood or large air mass in motion | 4: Small hood-local control only | | | | | | | | | |
| <p>Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 4-10 m/s (800-2000 f/min) for extraction of crusher dusts generated 2 metres distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.</p> | | | | | | | | | | |
| Personal protection | <div></div> | | | | | | | | | |
| 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. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent] | | | | | | | | | |
| Skin protection | See Hand protection below | | | | | | | | | |
| Hands/feet protection | <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</p> | | | | | | | | | |

Continued...

ADJUNCT B

| | |
|-------------------------|---|
| | <p>choice.</p> <p>Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:</p> <ul style="list-style-type: none"> ▶ frequency and duration of contact, ▶ chemical resistance of glove material, ▶ glove thickness and ▶ dexterity <p>Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).</p> <ul style="list-style-type: none"> ▶ When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended. ▶ When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended. ▶ Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use. ▶ Contaminated gloves should be replaced. <p>Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.</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. ▶ butyl rubber. ▶ fluorocautchouc. ▶ polyvinyl chloride. <p>Gloves should be examined for wear and/ or degradation constantly.</p> |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none"> ▶ Overalls. ▶ P.V.C. apron. ▶ Barrier cream. ▶ Skin cleansing cream. ▶ Eye wash unit. |
| Thermal hazards | Not Available |

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:

ADJUNCT B Not Available

| Material | CPI |
|----------|-----|
|----------|-----|

* 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

Particulate. (AS/NZS 1716 & 1715, EN 143:000 & 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 | Colourless, translucent, hygroscopic crystals, or white powder. Soluble in water; insoluble in alcohol. | | |
| Physical state | Divided 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 Applicable |
| pH (as supplied) | Not Applicable | Decomposition temperature | Not available. |
| Melting point / freezing point (°C) | Not available. | Viscosity (cSt) | Not Applicable |
| Initial boiling point and boiling range (°C) | Not Applicable | Molecular weight (g/mol) | 142 |
| Flash point (°C) | Not Applicable | Taste | Not Available |
| Evaporation rate | Not Applicable | Explosive properties | Not Available |
| Flammability | Not Applicable | Oxidising properties | Not Available |
| Upper Explosive Limit (%) | Not Applicable | Surface Tension (dyn/cm or mN/m) | Not Applicable |
| Lower Explosive Limit (%) | Not Applicable | Volatile Component (%vol) | Not Applicable |
| Vapour pressure (kPa) | Not Applicable | Gas group | Not Available |
| Solubility in water (g/L) | Miscible | pH as a solution(1%) | 9.1 |
| Vapour density (Air = 1) | Not Applicable | VOC g/L | Not Available |

Continued...

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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. Respiratory tract irritation often results in an inflammatory response involving the recruitment and activation of many cell types, mainly derived from the vascular system.</p> <p>Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.</p> <p>If prior damage to the circulatory or nervous systems has occurred or if kidney damage has been sustained, proper screenings should be conducted on individuals who may be exposed to further risk if handling and use of the material result in excessive exposures.</p> |
| Ingestion | <p>Accidental ingestion of the material may be damaging to the health of the individual.</p> <p>Phosphates are slowly and incompletely absorbed from the gastrointestinal tract and are unlikely (other than in abuse) to produce the systemic effects which occur when introduced by other routes. Such effects include vomiting, lethargy, fever, diarrhoea, falls in blood pressure, slow pulse, cyanosis, carpal spasm, coma and tetany. These effects result following sequestration of blood calcium.</p> <p>Ingestion of large amounts of phosphate salts (over 1 gm for an adult) may produce osmotic catharsis resulting in diarrhoea and probably, abdominal cramp. Large doses (4-8 gm) will almost certainly produce these effects in most individuals. Most of the ingested salt will be excreted in the faeces of healthy individuals without producing systemic toxicity. Doses in excess of 10 gm may produce systemic toxicity.</p> <p>Ingestion of large amounts may cause abdominal pain, cramps, diarrhoea, nausea and vomiting.</p> |
| Skin Contact | <p>The material produces mild skin irritation; evidence exists, or practical experience predicts, that the material either</p> <ul style="list-style-type: none"> ▶ produces mild inflammation of the skin in a substantial number of individuals following direct contact, and/or ▶ produces significant, but mild, 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. <p>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. At the microscopic level there may be intercellular oedema of the spongy layer of the skin (spongiosis) and intracellular oedema of the epidermis.</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>Evidence exists, or practical experience predicts, that the material may cause eye irritation in a substantial number of individuals. Repeated or prolonged eye contact may cause inflammation (similar to windburn) characterised by a temporary redness of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.</p> <p>Alkaline salts may be intensely irritating to the eyes and precautions should be taken to ensure direct eye contact is avoided.</p> |
| Chronic | <p>Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems. Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.</p> <p>Long term exposure to high dust concentrations may cause changes in lung function (i.e. pneumoconiosis) caused by particles less than 0.5 micron penetrating and remaining in the lung. A prime symptom is breathlessness. Lung shadows show on X-ray.</p> <p>Dogs given daily doses of sodium phosphate dibasic for 9-22 weeks showed calcium deposits in the kidneys (nephrocalcinosis) with disseminated atrophy of the proximal tubule. Animals fed on sodium phosphate dibasic and potassium dihydrogen phosphate, in both short- and long-term studies, showed increased bone porosity; hyperparathyroidism and soft tissue calcification were also evident.</p> |

| sodium phosphate, dibasic | TOXICITY | IRRITATION |
|---------------------------|------------------------------|----------------------------------|
| | Oral (rat) LD50: 17000 mg/kg | Eye (rabbit): 500 mg/24h - mild |
| | | Skin (rabbit): 500 mg/24h - mild |
| | Not Available | Not Available |

* Value obtained from manufacturer's MSDs

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances

| | |
|----------------------------------|--|
| SODIUM PHOSPHATE, DIBASIC | <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. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included</p> |
|----------------------------------|--|

Continued...

ADJUNCT B

in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

The material may be irritating to the eye, with prolonged contact causing 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.

| | | | |
|-----------------------------------|---|--------------------------|---|
| 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 required to make classification available
 ✗ – Data available but does not fill the criteria for classification
 ⊖ – Data Not Available to make classification

CMR STATUS

Not Applicable

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

The principal problems of phosphate contamination of the environment relates to eutrophication processes in lakes and ponds. Phosphorus is an essential plant nutrient and is usually the limiting nutrient for blue-green algae. A lake undergoing eutrophication shows a rapid growth of algae in surface waters. Planktonic algae cause turbidity and flotation films. Shore algae cause ugly muddying, films and damage to reeds. Decay of these algae causes oxygen depletion in the deep water and shallow water near the shore. The process is self-perpetuating because anoxic conditions at the sediment/water interface causes the release of more adsorbed phosphates from the sediment. The growth of algae produces undesirable effects on the treatment of water for drinking purposes, on fisheries, and on the use of lakes for recreational purposes.

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> <p>A Hierarchy of Controls seems to be common - the user should investigate:</p> <ul style="list-style-type: none"> ▶ Reduction ▶ Reuse ▶ Recycling ▶ Disposal (if all else fails) <p>This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate. In most instances the supplier of the material should be consulted.</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. ▶ Where in doubt contact the responsible authority. ▶ Recycle wherever possible or consult manufacturer for recycling options. ▶ Consult State Land Waste Management Authority for disposal. ▶ Bury residue in an authorised landfill. ▶ Recycle containers if possible, or dispose of in an authorised landfill. |
|------------------------------|--|

SECTION 14 TRANSPORT INFORMATION

Labels Required

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

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

Continued...

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

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

SECTION 15 REGULATORY INFORMATION

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

sodium phosphate,
dibasic(7558-79-4) is found
on the following regulatory
lists

"US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

SECTION 16 OTHER 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.

A list of reference resources used to assist the committee may be found at:

www.chemwatch.net/references

The (M)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.

Section 1. Chemical product and company identification

| | |
|--|---|
| Product name | : Nitrogen |
| Supplier | : AIRGAS INC., on behalf of its subsidiaries 259 North Radnor-Chester Road Suite 100 Radnor, PA 19087-5283 1-610-687-5253 |
| Product use | : Synthetic/Analytical chemistry. Liquid – cryogenic coolant. |
| Synonym | : nitrogen (dot); nitrogen gas; Nitrogen NF, LIN, Cryogenic Liquid Nitrogen, Liquid Nitrogen |
| MSDS # | : 001040 |
| Date of Preparation/ Revision | : 11/22/2013. |
| In case of emergency | : 1-866-734-3438 |

Section 2. Hazards identification

| | |
|---|--|
| Physical state | : Gas. [NORMALLY A COLORLESS GAS: MAY BE A CLEAR COLORLESS LIQUID AT LOW TEMPERATURES. SOLD AS A COMPRESSED GAS OR LIQUID IN STEEL CYLINDERS.] |
| Emergency overview | : WARNING! GAS: CONTENTS UNDER PRESURE. Do not puncture or incinerate container. Can cause rapid suffocation. May cause severe frostbite. LIQUID: Extremely cold liquid and gas under pressure. Can cause rapid suffocation. May cause severe frostbite. Do not puncture or incinerate container. May cause target organ damage, based on animal data. Contact with rapidly expanding gases or liquids can cause frostbite. |
| Target organs | : May cause damage to the following organs: lungs. |
| Routes of entry | : Inhalation |
| Potential acute health effects | |
| Eyes | : Contact with rapidly expanding gas may cause burns or frostbite. Contact with cryogenic liquid can cause frostbite and cryogenic burns. |
| Skin | : Contact with rapidly expanding gas may cause burns or frostbite. Contact with cryogenic liquid can cause frostbite and cryogenic burns. |
| Inhalation | : Acts as a simple asphyxiant. |
| Ingestion | : Ingestion is not a normal route of exposure for gases. Contact with cryogenic liquid can cause frostbite and cryogenic burns. |
| Potential chronic health effects | |
| Chronic effects | : May cause target organ damage, based on animal data. |
| Target organs | : May cause damage to the following organs: lungs. |
| Medical conditions aggravated by over-exposure | : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product. |

Nitrogen

See toxicological information (Section 11)

Section 3. Composition, Information on Ingredients

| <u>Name</u> | <u>CAS number</u> | <u>% Volume</u> | <u>Exposure limits</u> |
|-------------|-------------------|-----------------|-------------------------------|
| Nitrogen | 7727-37-9 | 100 | Oxygen Depletion [Asphyxiant] |

Section 4. First aid measures

No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : None expected.
- Frostbite** : Try to warm up the frozen tissues and seek medical attention.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : As this product is a gas, refer to the inhalation section.

Section 5. Fire-fighting measures

- Flammability of the product** : Non-flammable.
- Products of combustion** : Decomposition products may include the following materials:
nitrogen oxides
- Fire-fighting media and instructions** : Use an extinguishing agent suitable for the surrounding fire.
- Apply water from a safe distance to cool container and protect surrounding area. If involved in fire, shut off flow immediately if it can be done without risk.
- Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

- Personal precautions** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.
- Methods for cleaning up** : Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

- Handling** : High pressure gas. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.
- Never allow any unprotected part of the body to touch uninsulated pipes or vessels that contain cryogenic liquids. Prevent entrapment of liquid in closed systems or piping without pressure relief devices. Some materials may become brittle at low temperatures and will easily fracture.

Nitrogen

- Storage** : Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).
For additional information concerning storage and handling refer to Compressed Gas Association pamphlets P-1 Safe Handling of Compressed Gases in Containers and P-12 Safe Handling of Cryogenic Liquids available from the Compressed Gas Association, Inc.

Section 8. Exposure controls/personal protection

- Engineering controls** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Personal protection

- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

When working with cryogenic liquids, wear a full face shield.

- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

The applicable standards are (US) 29 CFR 1910.134 and (Canada) Z94.4-93

- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Insulated gloves suitable for low temperatures

- Personal protection in case of a large spill** : Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product.

Product name

Nitrogen

Oxygen Depletion [Asphyxiant]

Consult local authorities for acceptable exposure limits.

Section 9. Physical and chemical properties

- Molecular weight** : 28.02 g/mole
Molecular formula : N₂
Boiling/condensation point : -195.79°C (-320.4°F)
Melting/freezing point : -210.01°C (-346°F)
Critical temperature : -146.9°C (-232.4°F)
Vapor density : 0.967 (Air = 1) Liquid Density@BP: 50.46 lb/ft³ (808.3 kg/m³)
Specific Volume (ft³/lb) : 13.8889
Gas Density (lb/ft³) : 0.072

Section 10. Stability and reactivity

- Stability and reactivity** : The product is stable.
Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Toxicity data

Chronic effects on humans : May cause damage to the following organs: lungs.

Other toxic effects on humans : No specific information is available in our database regarding the other toxic effects of this material to humans.

Specific effects

Carcinogenic effects : No known significant effects or critical hazards.

Mutagenic effects : No known significant effects or critical hazards.

Reproduction toxicity : No known significant effects or critical hazards.

Section 12. Ecological information

Aquatic ecotoxicity

Not available.

Environmental fate : Not available.



Environmental hazards : No known significant effects or critical hazards.


Toxicity to the environment : Not available.

Section 13. Disposal considerations

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation. Return cylinders with residual product to Airgas, Inc. Do not dispose of locally.

Section 14. Transport information

| Regulatory information | UN number | Proper shipping name | Class | Packing group | Label | Additional information |
|---------------------------|-----------|-------------------------------|-------|-----------------------|---|---|
| DOT Classification | UN1066 | NITROGEN, COMPRESSED | 2.2 | Not applicable (gas). |  | Limited quantity Yes. |
| | UN1977 | Nitrogen, refrigerated liquid | | | | Packaging instruction Passenger aircraft Quantity limitation: 75 kg Cargo aircraft Quantity limitation: 150 kg |
| TDG Classification | UN1066 | NITROGEN, COMPRESSED | 2.2 | Not applicable (gas). |  | Explosive Limit and Limited Quantity Index 0.125 |
| | UN1977 | Nitrogen, refrigerated liquid | | | | Passenger Carrying Road or Rail Index 75 |

| Nitrogen | | | | | | |
|--------------------------|--------|----------------------------------|-----|-----------------------|---|---|
| Mexico Classification | UN1066 | NITROGEN, COMPRESSED | 2.2 | Not applicable (gas). |  | - |
| | UN1977 | Nitrogen, refrigerated liquid | | | | |

“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

Section 15. Regulatory information

United States

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption:** This material is listed or exempted.
United States inventory (TSCA 8b): This material is listed or exempted.
SARA 302/304: No products were found.
SARA 311/312 Hazards identification: Sudden release of pressure, Delayed (chronic) health hazard

State regulations : **Connecticut Carcinogen Reporting:** This material is not listed.
Connecticut Hazardous Material Survey: This material is not listed.
Florida substances: This material is not listed.
Illinois Chemical Safety Act: This material is not listed.
Illinois Toxic Substances Disclosure to Employee Act: This material is not listed.
Louisiana Reporting: This material is not listed.
Louisiana Spill: This material is not listed.
Massachusetts Spill: This material is not listed.
Massachusetts Substances: This material is listed.
Michigan Critical Material: This material is not listed.
Minnesota Hazardous Substances: This material is not listed.
New Jersey Hazardous Substances: This material is listed.
New Jersey Spill: This material is not listed.
New Jersey Toxic Catastrophe Prevention Act: This material is not listed.
New York Acutely Hazardous Substances: This material is not listed.
New York Toxic Chemical Release Reporting: This material is not listed.
Pennsylvania RTK Hazardous Substances: This material is listed.
Rhode Island Hazardous Substances: This material is not listed.

Canada

WHMIS (Canada) : Class A: Compressed gas.
CEPA Toxic substances: This material is not listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is not listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Section 16. Other information

United States

Label requirements : GAS:
 CONTENTS UNDER PRESURE.
 Do not puncture or incinerate container.
 Can cause rapid suffocation.
 May cause severe frostbite.
 LIQUID:
 Extremely cold liquid and gas under pressure.
 Can cause rapid suffocation.
 May cause severe frostbite.

Canada

Nitrogen

Label requirements : Class A: Compressed gas.

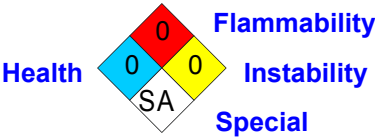
Hazardous Material
Information System (U.S.A.)

| | |
|------------------|---|
| Health | 0 |
| Flammability | 0 |
| Physical hazards | 0 |
| | |

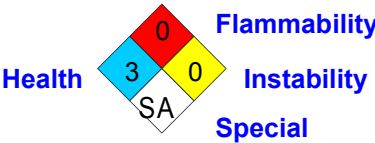
liquid:

| | |
|---------------------|---|
| Health | 3 |
| Fire hazard | 0 |
| Reactivity | 0 |
| Personal protection | |

National Fire Protection
Association (U.S.A.)



liquid:



Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



Material Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Chevron Synthetic Turbine Oil SGT

Product Number(s): CPS253100

Company Identification

Chevron Products Company

a division of Chevron U.S.A. Inc.

6001 Bollinger Canyon Rd.

San Ramon, CA 94583

United States of America

www.chevronlubricants.com

Transportation Emergency Response

CHEMTREC: (800) 424-9300 or (703) 527-3887

Health Emergency

Chevron Emergency Information Center: Located in the USA. International collect calls accepted.
(800) 231-0623 or (510) 231-0623

Product Information

email : lubemsds@chevron.com

Product Information: (800) LUBE TEK

MSDS Requests: (800) 414-6737

SECTION 2 COMPOSITION/ INFORMATION ON INGREDIENTS

| COMPONENTS | CAS NUMBER | AMOUNT |
|------------------------|--------------|---------------|
| 01154100-5086P | Trade secret | < 2.5 %weight |
| PHENYL-1-NAPHTHYLAMINE | 90-30-2 | < 1 %weight |

SECTION 3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

- MAY CAUSE ADVERSE REPRODUCTIVE EFFECTS BASED ON ANIMAL DATA
- HARMFUL TO AQUATIC ORGANISMS. MAY CAUSE LONG-TERM ADVERSE EFFECTS IN THE AQUATIC ENVIRONMENT

IMMEDIATE HEALTH EFFECTS

Eye: Not expected to cause prolonged or significant eye irritation.

Skin: Contact with the skin is not expected to cause prolonged or significant irritation. Contact with the skin is not expected to cause an allergic skin response. Not expected to be harmful to internal organs if absorbed through the skin. High-Pressure Equipment Information: Accidental high-velocity injection under the skin of materials of this type may result in serious injury. Seek medical attention at once should an accident like this occur. The initial wound at the injection site may not appear to be serious at first; but, if left untreated, could result in disfigurement or amputation of the affected part.

Ingestion: Not expected to be harmful if swallowed.

Inhalation: Not expected to be harmful if inhaled. Contains a synthetic hydrocarbon oil. May cause respiratory irritation or other pulmonary effects following prolonged or repeated inhalation of oil mist at airborne levels above the recommended mineral oil mist exposure limit. Symptoms of respiratory irritation may include coughing and difficulty breathing.

DELAYED OR OTHER HEALTH EFFECTS:

Reproduction and Birth Defects: May cause adverse reproductive effects based on animal data.

See Section 11 for additional information. Risk depends on duration and level of exposure.

SECTION 4 FIRST AID MEASURES

Eye: No specific first aid measures are required. As a precaution, remove contact lenses, if worn, and flush eyes with water.

Skin: No specific first aid measures are required. As a precaution, remove clothing and shoes if contaminated. To remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.

Ingestion: No specific first aid measures are required. Do not induce vomiting. As a precaution, get medical advice.

Inhalation: No specific first aid measures are required. If exposed to excessive levels of material in the air, move the exposed person to fresh air. Get medical attention if coughing or respiratory discomfort occurs.

Note to Physicians: In an accident involving high-pressure equipment, this product may be injected under the skin. Such an accident may result in a small, sometimes bloodless, puncture wound. However, because of its driving force, material injected into a fingertip can be deposited into the palm of the hand. Within 24 hours, there is usually a great deal of swelling, discoloration, and intense throbbing pain. Immediate treatment at a surgical emergency center is recommended.

SECTION 5 FIRE FIGHTING MEASURES

Leaks/ruptures in high pressure system using materials of this type can create a fire hazard when in the vicinity of ignition sources (eg. open flame, pilot lights, sparks, or electric arcs).

FIRE CLASSIFICATION:

OSHA Classification (29 CFR 1910.1200): Not classified by OSHA as flammable or combustible.

NFPA RATINGS: Health: 0 Flammability: 1 Reactivity: 0

FLAMMABLE PROPERTIES:

Flashpoint: (Cleveland Open Cup) 246 °C (475 °F) Minimum

Autoignition: > 300 °C (> 572 °F)

Flammability (Explosive) Limits (% by volume in air): Lower: Not Applicable Upper: Not Applicable

EXTINGUISHING MEDIA: Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

PROTECTION OF FIRE FIGHTERS:

Fire Fighting Instructions: This material will burn although it is not easily ignited. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.

Combustion Products: Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures: Eliminate all sources of ignition in vicinity of spilled material.

Spill Management: Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations.

Reporting: Report spills to local authorities and/or the U.S. Coast Guard's National Response Center at (800) 424-8802 as appropriate or required.

SECTION 7 HANDLING AND STORAGE

Precautionary Measures: DO NOT USE IN HIGH PRESSURE SYSTEMS in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling.

General Handling Information: Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.

Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids', National Fire Protection Association (NFPA 77, 'Recommended Practice on Static Electricity', and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents'.

Container Warnings: Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue

(solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

GENERAL CONSIDERATIONS:

Consider the potential hazards of this material (see Section 3), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

ENGINEERING CONTROLS:

Use in a well-ventilated area.

PERSONAL PROTECTIVE EQUIPMENT

Eye/Face Protection: No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields as a good safety practice.

Skin Protection: No special protective clothing is normally required. Where splashing is possible, select protective clothing depending on operations conducted, physical requirements and other substances in the workplace. Suggested materials for protective gloves include: Nitrile Rubber, Silver Shield, Viton.

Respiratory Protection: No respiratory protection is normally required.

If user operations generate an oil mist, determine if airborne concentrations are below the occupational exposure limit for mineral oil mist. If not, wear an approved respirator that provides adequate protection from the measured concentrations of this material. For air-purifying respirators use a particulate cartridge.

Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not provide adequate protection.

Consult local authorities for appropriate values.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Attention: the data below are typical values and do not constitute a specification.

Color: No data available

Physical State: Liquid

Odor: Faint or Mild

pH: Not Applicable

Vapor Pressure: <0.01 mmHg @ 37.8 °C (100 °F)

Vapor Density (Air = 1): >1

Boiling Point: >300°C (572°F)

Solubility: Negligible

Freezing Point: Not Applicable

Density: 0.97 kg/l - 1.02 kg/l @ 15°C (59°F)

Viscosity: 23 mm²/s @ 40°C (104°F) Minimum

SECTION 10 STABILITY AND REACTIVITY

Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

Incompatibility With Other Materials: May react with strong acids or strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

Hazardous Decomposition Products: None known (None expected)

Hazardous Polymerization: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

IMMEDIATE HEALTH EFFECTS

Eye Irritation: The eye irritation hazard is based on evaluation of data for similar materials or product components.

Skin Irritation: The skin irritation hazard is based on evaluation of data for similar materials or product components.

Skin Sensitization: The skin sensitization hazard is based on evaluation of data for similar materials or product components. No product toxicology data available.

Acute Dermal Toxicity: The acute dermal toxicity hazard is based on evaluation of data for similar materials or product components.

Acute Oral Toxicity: The acute oral toxicity hazard is based on evaluation of data for similar materials or product components.

Acute Inhalation Toxicity: The acute inhalation toxicity hazard is based on evaluation of data for similar materials or product components.

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY

This material is expected to be harmful to aquatic organisms and may cause long-term adverse effects in the aquatic environment.

ENVIRONMENTAL FATE

Ready Biodegradability: This material is not expected to be readily biodegradable. The biodegradability of this material is based on an evaluation of data for the components or a similar material.

SECTION 13 DISPOSAL CONSIDERATIONS

Use material for its intended purpose or recycle if possible. Oil collection services are available for used oil recycling or disposal. Place contaminated materials in containers and dispose of in a manner consistent with applicable regulations. Contact your sales representative or local environmental or health authorities for approved disposal or recycling methods.

SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

DOT Shipping Description: PETROLEUM OIL, N.E.C.; NOT REGULATED AS A HAZARDOUS MATERIAL FOR TRANSPORTATION UNDER 49 CFR

Additional Information: NOT HAZARDOUS BY U.S. DOT. ADR/RID HAZARD CLASS NOT APPLICABLE.

IMO/IMDG Shipping Description: MAY BE REGULATED AS DANGEROUS GOODS FOR TRANSPORTATION UNDER THE IMDG CODE

ICAO/IATA Shipping Description: NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORTATION UNDER ICAO

SECTION 15 REGULATORY INFORMATION

EPCRA 311/312 CATEGORIES: 1. Immediate (Acute) Health Effects: NO

2. Delayed (Chronic) Health Effects: NO

3. Fire Hazard: NO

4. Sudden Release of Pressure Hazard: NO

5. Reactivity Hazard: NO

REGULATORY LISTS SEARCHED:

| | |
|---------------------|----------------------|
| 01-1=IARC Group 1 | 03=EPCRA 313 |
| 01-2A=IARC Group 2A | 04=CA Proposition 65 |
| 01-2B=IARC Group 2B | 05=MA RTK |
| 02=NTP Carcinogen | 06=NJ RTK |
| | 07=PA RTK |

No components of this material were found on the regulatory lists above.

CHEMICAL INVENTORIES:

All components comply with the following chemical inventory requirements: AICS (Australia), DSL (Canada), EINECS (European Union), ENCS (Japan), IECSC (China), KECI (Korea), PICCS (Philippines), TSCA (United States).

NEW JERSEY RTK CLASSIFICATION:

Under the New Jersey Right-to-Know Act L. 1983 Chapter 315 N.J.S.A. 34:5A-1 et. seq., the product is to be identified as follows: (Lubricating oil)

WHMIS CLASSIFICATION:

Class D, Division 2, Subdivision A: Very Toxic Material -

Reproductive Toxicity

SECTION 16 OTHER INFORMATION

NFPA RATINGS: Health: 0 Flammability: 1 Reactivity: 0

HMIS RATINGS: Health: 1 Flammability: 1 Reactivity: 0

(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, *- Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

REVISION STATEMENT: This revision updates the following sections of this Material Safety Data Sheet: 2,3,7,9,10,11,12,14,15,16

Revision Date: APRIL 19, 2010

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

| | |
|--|--|
| TLV - Threshold Limit Value | TWA - Time Weighted Average |
| STEL - Short-term Exposure Limit | PEL - Permissible Exposure Limit |
| | CAS - Chemical Abstract Service Number |
| ACGIH - American Conference of Government Industrial Hygienists | IMO/IMDG - International Maritime Dangerous Goods Code |
| API - American Petroleum Institute | MSDS - Material Safety Data Sheet |
| CVX - Chevron | NFPA - National Fire Protection Association (USA) |
| DOT - Department of Transportation (USA) | NTP - National Toxicology Program (USA) |
| IARC - International Agency for Research on Cancer | OSHA - Occupational Safety and Health Administration |
| Prepared according to the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the ANSI MSDS Standard (Z400.1) by the Chevron Energy Technology Company, 100 Chevron Way, Richmond, California 94802. | |

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.



ISO CERT NO. 160067



ISO CERT NO. 190018

FALCHEM® CHLORINE TABLET

FALCHEM CHLORINE TABLET is a slime and bacteria control agent, which is appropriate for cooling water systems, swimming pools and waste water systems. It has strong biocidal effect to the bacteria and fungi.

| | | |
|-------------------|---------------|--------------|
| <u>PROPERTIES</u> | Appearance | White tablet |
| | pH (1% soln.) | 11.5 ± 0.5 |
| | Flash point | none |
| | | |

COMPONENTS Chlorine compound (effective chlorine 70% up)

- FEATURES
- * FALCHEM CHLORINE TABLET has a strong biocidal effect
 - * It can be used for cooling water systems, waste water systems, water tanks and pools.
 - * Since it comes in tablets, it is easy to handle and safe.
 - * Contains no heavy metals, polychlorinated biphenyl (PCB), phenols and similar harmful substances.

- HOW TO USE
- * FALCHEM CHLORINE TABLET should be dosed to the water by batch feeding.
 - * Standard dosage
10 - 100 ppm to the holding water at one time every 5 - 10 days interval.
 - * Optimum dosage should be determined by slime volume, water temperature and water quality.

- PRECAUTION
- * Since FALCHEM CHLORINE TABLET is an oxidizing Agent, do not mix with acid, alkali, another chlorine Compound and chemicals.
 - * Do not give a strong shock.
 - * Do not get wet with water and keep out of sunlight.

- HANDLING
- * Wear rubber gloves and goggles when handling.
 - * If FALCHEM CHLORINE TABLET contact with skin, Immediately wash with water and soap.
 - * If eye contact occurs, immediately flush with large amount of water for at least 15 minutes and get medical attention.
 - * Do not use empty containers for drinking water supply.



ISO CERT NO. 160067



ISO CERT NO. 190018

SAFETY AND HANDLING

| | |
|-----------------------------|---|
| HANDLING | Handle with care. Store in dry, cool and well ventilated environment. |
| SAFETY | IMMEDIATE ACTIONS |
| Eye Contact | Avoid Eye Contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention. |
| Skin Contact | Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention. |
| Inhalation | Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.. |
| If Swallowed | Avoid ingestion. Otherwise, consume considerable quantity of water. Do not induce vomiting. Seek medical attention. |
| General instructions | Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use. |

PACKING SIZE: 10KGS PAIL

Read the Material Safety Data Sheet before using this product

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or product label.

ENERCHEM (S) PTE LTD (Manufacturer of trademark FALCHEM®) of or any subsidiaries or associated companies warranties of merchantability and competence, if any, along with any expressed warranties concerning this merchandise, shall not be actionable or pertinent or effective if goods is used contrarily or differently to the directions herein and in no other way may due to impending hazards from inappropriate use of the good explained herein. Merchants might vary insubstantially depending on country of origin. The information provided concerning merchandise is exclusively presented to the customer.



1 . Identification of the material and supplier

| | |
|-----------------------------------|---|
| Product name | Turbinol X-EP 32 F |
| SDS no. | 465728 |
| Product use | Turbine Oil For specific application advice see appropriate Technical Data Sheet or consult our company representative. |
| Supplier | BP Australia Pty Ltd (ABN 53 004 085 616) Melbourne Central, 360 Elizabeth Street, Melbourne, Victoria 3000, Australia Tel: +61 (03) 9268 4111 Fax: +61 (03) 9268 3321 |
| EMERGENCY TELEPHONE NUMBER | 1-800 14 14 74 |
| OTHER PRODUCT INFORMATION | Technical Help Line 1 300 139 700 (Local Call) |
| Product code | 465728-AU07 |

2 . Hazards identification

| | |
|--|---|
| Statement of hazardous/dangerous nature | NON-HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS. |
|--|---|

3 . Composition/information on ingredients

Highly refined base oil and additives

This product does not contain any hazardous ingredients at or above regulated thresholds.

4 . First-aid measures

| | |
|---------------------|--|
| Eye contact | In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs. |
| Skin contact | In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention if irritation develops. |
| Inhalation | If inhaled, remove to fresh air. Get medical attention if symptoms appear. |
| Ingestion | Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If potentially dangerous quantities of this material have been swallowed, call a physician immediately. |

5 . Fire-fighting measures

| | |
|---|--|
| Extinguishing media | |
| Suitable | In case of fire, use water fog, foam, dry chemical or carbon dioxide extinguisher or spray. |
| Not suitable | Do not use water jet. |
| Hazardous decomposition products | Decomposition products may include the following materials: carbon dioxide carbon monoxide |
| Unusual fire/explosion hazards | This material is not explosive as defined by established regulatory criteria. |
| Special fire-fighting procedures | None identified. |
| Protection of fire-fighters | Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear. |

6 . Accidental release measures

| | |
|----------------------------------|---|
| Personal precautions | No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8). |
| Environmental precautions | Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). |
| Large spill | Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product. Note: see section 1 for emergency contact information and section 13 for waste disposal. |
| Small spill | Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor. |

7 . Handling and storage

| | |
|--------------------------------------|--|
| Handling | Wash thoroughly after handling. Avoid strong oxidisers. |
| Storage | Keep container tightly closed. Keep container in a cool, well-ventilated area. |
| Combustibility Classification | Combustible liquid Class C2 (AS 1940). |

8 . Exposure controls/personal protection

| | |
|------------------------|--|
| Ingredient name | Occupational exposure limits |
| Base oil - unspecified | NOHSC (Australia). TWA: 5 mg/m ³ 8 hour(s). Form: Oil mist, mineral |

Whilst specific OELs for certain components are included in this SDS, it should be noted that other components of the preparation will be present in any mist, vapour or dust produced. For this reason, the specific OELs may not be applicable to the product and are provided for guidance purposes.

| | |
|---------------------------------------|---|
| Biological Limit Values | No biological limit allocated. |
| Exposure controls | |
| Occupational exposure controls | Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapours below their respective occupational exposure limits. |
| Hygiene measures | Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. |
| Personal protective equipment | |
| Respiratory protection | Avoid breathing of vapours, mists or spray. Select and use respirators in accordance with AS/NZS 1715/1716. When mists or vapours exceed the exposure standards then the use of the following is recommended: Approved respirator with organic vapour and dust/mist (Type P1) filters. Filter capacity and respirator type depends on exposure level. |
| Skin and body | Avoid prolonged or repeated contact with skin. Wear protective clothing if prolonged or repeated contact is likely. |
| Hand protection | Wear protective gloves if prolonged or repeated contact is likely. Chemical-resistant gloves. Recommended: Nitrile gloves. The correct choice of protective gloves depends upon the chemicals being handled, the conditions of work and use, and the condition of the gloves (even the best chemically resistant glove will break down after repeated chemical exposures). Most gloves provide only a short time of protection before they must be discarded and replaced. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. Gloves should therefore be chosen in consultation with the supplier/manufacturer and with a full assessment of the working conditions. |
| Eye protection | Safety glasses with side shields. |

9 . Physical and chemical properties

| | |
|-----------------------------------|---|
| Physical state | Liquid. |
| Colour | Clear. Amber. |
| Odour | Bland. |
| Flash point | 222 °C (Open cup) Cleveland. |
| Vapour pressure | Not available. |
| Vapour density | Not available. |
| Viscosity | Kinematic: 32 mm ² /s (32 cSt) at 40°C Kinematic: 5.7 mm ² /s (5.7 cSt) at 100°C |
| pH | Not available. |
| Boiling point / range | Not available. |
| Melting point / range | Not available. |
| Pour point | -15 °C |
| Relative density/Specific gravity | 0.849 [at 15°C] |
| Solubility | insoluble in water. |

10 . Stability and reactivity

| | |
|---|--|
| Stability | The product is stable. |
| Conditions to avoid | Avoid extreme temperatures, strong oxidizers, fire. |
| Incompatibility with various substances/Hazardous Reactions | No hazardous reactions identified. |
| Hazardous decomposition products | Decomposition products may include the following materials: carbon dioxide carbon monoxide |

11 . Toxicological information

| | |
|----------------------|---|
| Effects and symptoms | |
| Eyes | Unlikely to cause more than transient stinging or redness if accidental eye contact occurs. |
| Skin | Unlikely to cause harm to the skin on brief or occasional contact but prolonged or repeated exposure may lead to dermatitis. |
| Inhalation | At normal ambient temperatures this product will be unlikely to present an inhalation hazard because of its low volatility. Inhalation of oil mist or vapours at elevated temperatures may cause respiratory irritation. May be harmful by inhalation if exposure to vapour, mists or fumes resulting from thermal decomposition products occurs. |
| Ingestion | Unlikely to cause harm if accidentally swallowed in small doses, though larger quantities may cause nausea and diarrhoea. |
| Chronic toxicity | |
| Carcinogenic effects | No component of this product at levels greater than or equal to 0.1% is identified as a carcinogen by ACGIH, the International Agency for Research on Cancer (IARC), the European Commission (EC), or the National Occupational Health and Safety Commission (Australia). |
| Mutagenic effects | No known significant effects or critical hazards. |

12 . Ecological information

| | |
|---------------------------|---|
| Ecotoxicity | Not classified as environmentally hazardous in accordance with the 'Approved Criteria for Classifying Hazardous Substances' [NOHSC (1008)/2004 as amended and adapted]. |
| Biodegradability | |
| Persistence/degradability | The biodegradability of this material has not been determined. |

13 . Disposal considerations

Disposal considerations / Waste information

The generation of waste should be avoided or minimised wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Special Precautions for Landfill or Incineration

No additional special precautions identified.

14 . Transport information

International transport regulations

Not classified as dangerous for transport (ADG, IMDG, ICAO/IATA).

Special precautions for user

No known special precautions required. See Section: "Handling and storage" for additional information.

15 . Regulatory information

Standard for the Uniform Scheduling of Drugs and Poisons

Not regulated.

Control of Scheduled Carcinogenic Substances

Ingredient name

Schedule

No Listed Substance

Other regulations

Inventories

Europe inventory: All components are listed or exempted.

United States inventory (TSCA 8b): All components are listed or exempted.

Australia inventory (AICS): All components are listed or exempted.

Canada inventory: All components are listed or exempted.

China inventory (IECSC): All components are listed or exempted.

Japan inventory (ENCS): All components are listed or exempted.

Korea inventory (KECI): All components are listed or exempted.

Philippines inventory (PICCS): All components are listed or exempted.

16 . Other information

Key to abbreviations

AMP = Acceptable Maximum Peak
ACGIH = American Conference of Governmental Industrial Hygienists, an agency that promulgates exposure standards.
ADG = Australian Code for the Transport of Dangerous Goods by Road and Rail
ADG Code = Australian Code for the Transport of Dangerous Goods by Road and Rail
CAS Number = Chemical Abstracts Service Registry Number
HAZCHEM Code = Emergency action code of numbers and letters which gives information to emergency services. Its use is required by the ADG Code for Dangerous Goods in bulk.
ICAO = International Civil Aviation Organization.
IATA = International Air Transport Association, the organization promulgating rules governing shipment of goods by air.
IMDG = International Maritime Organization Rules, rules governing shipment of goods by water.
IP 346 = A chemical screening assay for dermal toxicity. The European Commission has recommended that Method IP 346 be used as the basis for labelling certain lubricant oil base stocks for carcinogenicity. The EU Commission has stipulated that the classification as a carcinogen need not apply if it can be shown that the substance contains less than 3% DMSO extract as measured by IP 346. (See Note L, European Commission Directive 67/548/EEC as amended and adapted.) DMSO is a solvent.
NOHSC = National Occupational Health & Safety Commission, Australia
TWA = Time weighted average
STEL = Short term exposure limit
UN Number = United Nations Number, a four digit number assigned by the United Nations Committee of Experts on the Transport of Dangerous Goods.

History

Date of issue

15/01/2008.

Date of previous issue

No previous validation.

Prepared by

Product Stewardship

Notice to reader

Product name Turbinol X-EP 32 F

Product code 465728-AU07

Page: 4/5

Version 1

Date of issue 15 January 2008

Format Australia

Language ENGLISH

Build 3.6.0

(Australia)

All reasonably practicable steps have been taken to ensure this data sheet and the health, safety and environmental information contained in it is accurate as of the date specified below. No warranty or representation, express or implied is made as to the accuracy or completeness of the data and information in this data sheet.

The data and advice given apply when the product is sold for the stated application or applications. You should not use the product other than for the stated application or applications without seeking advice from us.

It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. The BP Group shall not be responsible for any damage or injury resulting from use, other than the stated product use of the material, from any failure to adhere to recommendations, or from any hazards inherent in the nature of the material. Purchasers of the product for supply to a third party for use at work, have a duty to take all necessary steps to ensure that any person handling or using the product is provided with the information in this sheet. Employers have a duty to tell employees and others who may be affected of any hazards described in this sheet and of any precautions that should be taken.

SAFETY DATA SHEET

IONAC NM-60

LANXESS
Energizing Chemistry

05650232

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Identification of the substance or preparation

Product name : IONAC NM-60
Use of the substance/preparation : Ion exchange, resins and catalysts
Supplier/Manufacturer : LANXESS Deutschland GmbH, Industrial & Environmental Affairs
 51369 Leverkusen, Germany, Telephone: +49 214 30 65109
 E-mail: infosds@lanxess.com
Emergency telephone number : +49 214 30 99300 (Sicherheitszentrale CHEMPARK Leverkusen)

2. HAZARDS IDENTIFICATION

The product is classified as dangerous according to Directive 1999/45/EC and its amendments.

Human health hazards : Risk of serious damage to eyes.

See section 11 for more detailed information on health effects and symptoms.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Product definition (REACH) : Preparation
 styrene-divinylbenzene-copolymer with sulphonic acid groups in H-form and trialkyl ammonium groups in OH-form

| Ingredient name | CAS number | % | EC number | Classification | REACH number |
|---|------------|---------|-----------|----------------|--------------|
| styrene-divinylbenzene-copolymer with trialkyl ammonium groups in OH-form | 69011-18-3 | 20 - 25 | | Xi; R41 | - |
| styrene-divinylbenzene-copolymer with sulphonic acid groups in H-form | 69011-20-7 | 20 - 25 | | Xi; R41 | - |

Occupational exposure limits, if available, are listed in section 8.

4. FIRST AID MEASURES

First-aid measures

Inhalation : Move exposed person to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical

Date of issue : 2009-03-06

Page: 1/7

surveillance for 48 hours.

- Ingestion** : Wash out mouth with water. Move exposed person to fresh air. Keep person warm and at rest. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
- Skin contact** : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Eye contact** : Get medical attention immediately. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.

See section 11 for more detailed information on health effects and symptoms.

5. FIRE-FIGHTING MEASURES

Extinguishing media

- Suitable** : In case of fire, use water spray (fog), foam, dry chemical or CO₂.
- Not suitable** : None known.
- Special exposure hazards** : No specific fire or explosion hazard.
Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
- Hazardous combustion products** : Decomposition products may include the following materials:
carbon oxides
nitrogen oxides
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. ACCIDENTAL RELEASE MEASURES

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Provide adequate ventilation. Put on appropriate personal protective equipment (see section 8).
- Environmental precautions** : Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

- Large spill** : Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labelled waste container. Dispose of via a licensed waste disposal contractor. Note: see section 1 for emergency contact information and section 13 for waste disposal.
- Small spill** : Move containers from spill area. Vacuum or sweep up material and place in a designated, labelled waste container. Dispose of via a licensed waste disposal contractor.

7. HANDLING AND STORAGE

- Handling** : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not get in eyes or on skin or clothing. Do not ingest. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous.
- Storage** : Store between the following temperatures: -20 to 40°C (-4 to 104°F). Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination.
- Packaging materials**
- Recommended** : Use original container.
- Remarks** : Take precautionary measures against electrostatic discharges. Do not allow to dry out.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

- Exposure limit values** : Not available.

- Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to European Standard EN 689 for methods for the assessment of exposure by inhalation to chemical agents and national guidance documents for methods for the determination of hazardous substances.

Risk management measures

Occupational exposure controls

- Technical measures** : If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.

Personal protection measures

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- Respiratory protection** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. After contamination with product change the gloves immediately and dispose of them according to relevant national and local regulations <1 hours (breakthrough time): Polyvinyl chloride - PVC, Nitrile rubber - NBR, Polychloroprene - CR
- Eye protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts.
Recommended: safety glasses with side-shields
- Skin protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Recommended: Wear protective clothing.
- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Environmental exposure controls

- Technical measures** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. PHYSICAL AND CHEMICAL PROPERTIES

General information

Appearance

- Physical state** : Solid. [beads]
Colour : Brown. / Black.
Odour : Amine-like.

Important health, safety and environmental information

- pH** : 6 to 9 [Conc. (% w/w): 10%]
Density : 1.2 kg/L (20 °C)
Solubility : Insoluble in the following materials: cold water

10. STABILITY AND REACTIVITY

| | |
|---|---|
| Stability | : The product is stable. |
| Possibility of hazardous reactions | : Under normal conditions of storage and use, hazardous reactions will not occur. |
| Conditions to avoid | : Contact with strong oxidising agents may cause hazardous reactions. No hazardous reactions when used as directed. |
| Materials to avoid | : No specific data. |
| Hazardous decomposition products | : Under normal conditions of storage and use, hazardous decomposition products should not be produced. |

11. TOXICOLOGICAL INFORMATION

Potential acute health effects

Eye contact : Severely irritating to eyes. Risk of serious damage to eyes.

Acute toxicity

| Product/ingredient name | Result | Species | Dose | Exposure | Test |
|-------------------------|--------------|---------|----------------|----------|------|
| IONAC NM-60 | LD50 Oral | * Rat | >5000 mg/kg | - | - |

*Test results on an analogous product

Irritation/Corrosion

Skin : ☒ Non-irritating *Test results on an analogous product
Eyes : ☒ Severe irritant *Test results on an analogous product

Over-exposure signs/symptoms

Eyes : Adverse symptoms may include the following:
 pain or irritation
 watering
 redness

12. ECOLOGICAL INFORMATION

Remarks : The product is insoluble in water. Therefore, ecological tests have not been conducted.

13. DISPOSAL CONSIDERATIONS

- Methods of disposal** : Examine possibilities for re-utilisation. Product residues and uncleaned empty containers should be packaged, sealed, labelled, and disposed of or recycled according to relevant national and local regulations. Where large quantities are concerned, consult the supplier. When uncleaned empty containers are passed on, the recipient must be warned of any possible hazard that may be caused by residues. For disposal within the EC, the appropriate code according to the European Waste List (EWL) should be used. It is among the tasks of the polluter to assign the waste to waste codes specific to industrial sectors and processes according to the European Waste List (EWL).
- Hazardous waste** : The classification of the product may meet the criteria for a hazardous waste.

14. TRANSPORT INFORMATION

| Regulation | UN number | Proper shipping name | Class | PG | Label | Additional information |
|------------|-----------|----------------------|-------|----|-------|------------------------|
| ADR/RID | - | - | - | - | - | Not regulated. |
| GGVSE | - | - | - | - | - | Not regulated. |
| ADNR | - | - | - | - | - | Not regulated. |
| IMDG | - | - | - | - | - | Not regulated. |
| IATA | - | - | - | - | - | Not regulated. |

PG: Packing group

Not dangerous cargo.
 Avoid temperatures below -20 °C.
 Has a slight odour.
 Keep away from acids and oxidizing agents.
 Keep separated from foodstuffs.

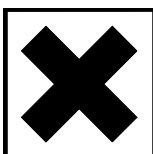
15. REGULATORY INFORMATION

EU regulations

Classification and labeling have been determined according to EU Directives 67/548/EEC and 1999/45/EC (including amendments) and take into account the intended product use.

Industrial applications.

Hazard symbol or symbols :



Irritant

Risk phrases : R41- Risk of serious damage to eyes.**Safety phrases** : S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S39- Wear eye/face protection.

16. OTHER INFORMATION

Full text of R-phrases : R41- Risk of serious damage to eyes.
referred to in sections 2 and
3 - Europe

History

Date of printing : 2009-03-06**Date of issue** : 2009-03-06**Date of previous issue** : 2009-02-26**Version** : 2

☑ Indicates information that has changed from previously issued version.

Notice to reader

The data given here is based on current knowledge and experience. The purpose of this Safety Data Sheet is to describe the products in terms of their safety requirements. The above details do not imply any guarantee concerning composition, properties or performance.



SAFETY DATA SHEET

PRODUCT

NALCO ELIMIN-OX®

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **NALCO ELIMIN-OX®**

APPLICATION : OXYGEN SCAVENGER

COMPANY IDENTIFICATION :
Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING

HEALTH : 2 / 2 FLAMMABILITY : 0 / 0 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme * = Chronic Health Hazard

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous.

| Hazardous Substance(s) | CAS NO | % (w/w) |
|------------------------|----------|------------|
| Carbohydrazide | 497-18-7 | 5.0 - 10.0 |

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

WARNING

May cause sensitization by skin contact.

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water. Protect product from freezing.

Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots.

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :

Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :

May cause irritation with prolonged contact.

SKIN CONTACT :

May cause irritation with prolonged contact. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

Nalco Company 1601 W. Diehl Road • Naperville, Illinois 60563-1198 • (630)305-1000

For additional copies of an MSDS visit www.nalco.com and request access



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INGESTION :

Not a likely route of exposure. No adverse effects expected.

INHALATION :

Not a likely route of exposure. No adverse effects expected.

AGGRAVATION OF EXISTING CONDITIONS :

A review of available data does not identify any worsening of existing conditions.

HUMAN HEALTH HAZARDS - CHRONIC :

Repeated or prolonged contact may cause sensitization in some individuals.

4. FIRST AID MEASURES

EYE CONTACT :

Immediately flush eye with water for at least 15 minutes while holding eyelids open. If symptoms develop, seek medical advice.

SKIN CONTACT :

Immediately flush with plenty of water for at least 15 minutes. If symptoms develop, seek medical advice.

INGESTION :

Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. Get medical attention.

INHALATION :

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : None

EXTINGUISHING MEDIA :

This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.



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6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Stop or reduce any leaks if it is safe to do so. Do not touch spilled material. Ventilate spill area if possible. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Ensure clean-up is conducted by trained personnel only. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :

SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :

Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Ensure all containers are labeled. Keep the containers closed when not in use. Do not breathe vapors/gases/dust. Have emergency equipment (for fires, spills, leaks, etc.) readily available.

STORAGE CONDITIONS :

Store the containers tightly closed. Store in suitable labeled containers.

SUITABLE CONSTRUCTION MATERIAL :

Brass, Carbon Steel C1018, EPDM, FEP (encapsulated), HDPE (high density polyethylene), Hastelloy C-276, MDPE, Nitrile, PVC, Polyurethane, Polypropylene, Polyethylene, Plexiglass, Perfluoroelastomer, PTFE, Stainless Steel 304, Stainless Steel 316L, TFE, Fluoroelastomer

UNSUITABLE CONSTRUCTION MATERIAL :

Aluminum, Buna-N, Ethylene propylene, Mild steel, Natural rubber, Neoprene, Polytetrafluoroethylene/polypropylene copolymer, Chlorosulfonated polyethylene rubber

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :

This product does not contain any substance that has an established exposure limit.

ENGINEERING MEASURES :

General ventilation is recommended.



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RESPIRATORY PROTECTION :

If significant mists, vapors or aerosols are generated an approved respirator is recommended. A suitable filter material depends on the amount and type of chemicals being handled. Consider the use of filter type: Multi-contaminant cartridge, with a Particulate pre-filter. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

HAND PROTECTION :

When handling this product, the use of chemical gauntlets is recommended. The choice of work glove depends on work conditions and what chemicals are handled. Please contact the PPE manufacturer for advice on what type of glove material may be suitable. Gloves should be replaced immediately if signs of degradation are observed.

SKIN PROTECTION :

When handling this product, the use of a chemical resistant suit and rubber boots is recommended.

EYE PROTECTION :

Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :

Use good work and personal hygiene practices to avoid exposure. Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

HUMAN EXPOSURE CHARACTERIZATION :

Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|---------------------|---------------------------|
| PHYSICAL STATE | Liquid |
| APPEARANCE | Colorless |
| ODOR | None |
| SPECIFIC GRAVITY | 1.02 @ 68 °F / 20 °C |
| DENSITY | 8.5 - 8.6 lb/gal |
| SOLUBILITY IN WATER | Complete |
| pH (1 %) | 6.7 |
| VISCOSITY | 3.0 cps @ 60 °F / 15.6 °C |
| FREEZING POINT | 28 °F / -2 °C |
| VAPOR PRESSURE | 12 mm Hg @ 68 °F / 20 °C |
| VOC CONTENT | 0.17 % EPA Method 24 |

Note: These physical properties are typical values for this product and are subject to change.



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10. STABILITY AND REACTIVITY

STABILITY :

Stable under normal conditions.

HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

CONDITIONS TO AVOID :

At temperatures below 4 °C (40 °F), this product loses its stability and forms precipitates. Once formed, the precipitate cannot be resolubilized and loss of product activity will occur.

MATERIALS TO AVOID :

Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Contact with strong acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) may generate heat, splattering or boiling and toxic vapors. Nitrites

HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Oxides of carbon, Oxides of nitrogen

11. TOXICOLOGICAL INFORMATION

The following results are for the product.

ACUTE ORAL TOXICITY :

Species: Rat
LD50: > 5,000 mg/kg
Test Descriptor: Product

ACUTE DERMAL TOXICITY :

Species: Rabbit
LD50: > 2,000 mg/kg
Test Descriptor: Product

PRIMARY SKIN IRRITATION :

Species: Rabbit
Draize Score: 0.2 /8.0
Test Descriptor: Product

PRIMARY EYE IRRITATION :

Species: Rabbit
Draize Score: 0.3 /110.0
Test Descriptor: Product

**SAFETY DATA SHEET****PRODUCT****NALCO ELIMIN-OX®****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****SENSITIZATION :**

Repeated or prolonged contact may cause skin sensitization.

CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :

Based on our hazard characterization, the potential human hazard is: High

12. ECOLOGICAL INFORMATION**ECOTOXICOLOGICAL EFFECTS :**

The following results are for the product.

ACUTE FISH RESULTS :

| Species | Exposure | LC50 | Test Descriptor |
|------------------|----------|----------|-----------------|
| Rainbow Trout | 96 hrs | 360 mg/l | Product |
| Bluegill Sunfish | 96 hrs | 190 mg/l | Product |
| Fathead Minnow | 96 hrs | 400 mg/l | Product |

ACUTE INVERTEBRATE RESULTS :

| Species | Exposure | LC50 | EC50 | Test Descriptor |
|---------------|----------|---------|------|-----------------|
| Daphnia magna | 48 hrs | 96 mg/l | | Product |

MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

| Air | Water | Soil/Sediment |
|-----|----------|---------------|
| <5% | 30 - 50% | 50 - 70% |

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL

This preparation or material is not expected to bioaccumulate.



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ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Moderate

Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Low

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

| | |
|-------------------------------------|---|
| Proper Shipping Name : | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. |
| Technical Name(s) : | HYDRAZINE |
| UN/ID No : | UN 3082 |
| Hazard Class - Primary : | 9 |
| Packing Group : | III |
| Flash Point : | None |
| Reportable Quantity (per package) : | 30,670 lbs |
| RQ Component : | HYDRAZINE |

AIR TRANSPORT (ICAO/IATA) :

| | |
|-------------------------------------|---|
| Proper Shipping Name : | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. |
| Technical Name(s) : | HYDRAZINE |
| UN/ID No : | UN 3082 |
| Hazard Class - Primary : | 9 |
| Packing Group : | III |
| IATA Cargo Packing Instructions : | 914 |
| IATA Cargo Aircraft Limit : | NO LIMIT (Max net quantity per package) |
| Reportable Quantity (per package) : | 30,670 lbs |
| RQ Component : | HYDRAZINE |



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MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :

PRODUCT IS NOT REGULATED DURING
TRANSPORTATION

15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :

Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Carbohydrazide : Dermal Sensitizer

CERCLA/SUPERFUND, 40 CFR 302 :

This product contains the following Reportable Quantity (RQ) Substance. Also listed is the RQ for the product. If a reportable quantity of product is released, it requires notification to the NATIONAL RESPONSE CENTER, WASHINGTON, D.C. (1-800-424-8802).

| <u>RQ Substance</u> | <u>RQ</u> |
|---------------------|------------|
| Hydrazine | 30,670 lbs |

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :

This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :

Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

| | |
|---|-----------------------------------|
| X | Immediate (Acute) Health Hazard |
| X | Delayed (Chronic) Health Hazard |
| - | Fire Hazard |
| - | Sudden Release of Pressure Hazard |
| - | Reactive Hazard |

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :

This product does not contain substances on the List of Toxic Chemicals.

**SAFETY DATA SHEET****PRODUCT****NALCO ELIMIN-OX®****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****TOXIC SUBSTANCES CONTROL ACT (TSCA) :**

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

This product has been certified as KOSHER/PAREVE for year-round use INCLUDING THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

CLEAN AIR ACT, Sec. 112 (Hazardous Air Pollutants, as amended by 40 CFR 63), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :

This product may contain trace levels (<0.1% for carcinogens, <1% all other substances) of the following substance(s) listed under the regulation. Additional components may be unintentionally present at trace levels.

| Substance(s) | Citations |
|--------------|-----------|
| • Hydrazine | Sec. 112 |

CALIFORNIA PROPOSITION 65 :

This product contains the following substances which require warning under California Proposition 65. Additional components may be unintentionally present at trace levels.

| Substance(s) | Concentration | EFFECTS |
|--------------|---------------|---------------|
| • Hydrazine | <= .01 % | Causes Cancer |

MICHIGAN CRITICAL MATERIALS :

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

STATE RIGHT TO KNOW LAWS :

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

INTERNATIONAL CHEMICAL CONTROL LAWS :**CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :**

The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).



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AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

CHINA

All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on the Inventory of Existing Chemical Substances China (IECSC).

EUROPE

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

JAPAN

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Existing and New Chemical Substances list (ENCS).

KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

NEW ZEALAND

All substances in this product comply with the Hazardous Substances and New Organisms (HSNO) Act 1996, and are listed on or are exempt from the New Zealand Inventory of Chemicals.

PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES



SAFETY DATA SHEET

PRODUCT

NALCO ELIMIN-OX®

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPST™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version),
Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH,
(TOMES CPST™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight™ (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPST™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 07/08/2010
Version Number : 1.13

Safety Data Sheet

Ammonia Solution 25-35%

Safety Data Sheet dated 5/2/2013, version 12

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

1.1. Product identifier

Identification of the substance

Trade name: Ammonia Solution 25-35%
Trade code: SDS 10S
CAS number: 1336-21-6
EC number: 215-647-6
Index 67/548/EEC: 007-001-01-2
REACH number: 01-2119488876-14

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

Recommended use:

FOR INDUSTRIAL USE
FERTILIZER

1.3. Details of the supplier of the safety data sheet

Company:
Esseco UK Limited
Calder Vale Road
Wakefield
West Yorkshire, WF1 5PH
UK
Esseco UK Limited - Phone n. +44 (0) 1924 371 919

Competent person responsible for the safety data sheet:

sds@essecouk.com

1.4. Emergency telephone number

Esseco UK Limited - Phone n. +44 (0) 1924 371 919

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Directive criteria, 67/548/CE, 99/45/EC and following amendments thereof:


Properties / Symbols:

C Corrosive
N Dangerous for the environment


R Phrases:

R34 Causes burns.
R50 Very toxic to aquatic organisms.

EC regulation criteria 1272/2008 (CLP)

 Danger, Skin Corr. 1B, Causes severe skin burns and eye damage.

 Warning, Aquatic Acute 1, Very toxic to aquatic life.

 Warning, STOT SE 3, May cause respiratory irritation.

Adverse physicochemical, human health and environmental effects:

No other hazards

2.2. Label elements

Symbols:

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Danger

Hazard statements:

H314 Causes severe skin burns and eye damage.

H400 Very toxic to aquatic life.

H335 May cause respiratory irritation.

Precautionary statements:

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P273 Avoid release to the environment.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.

P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Special Provisions:

None

Special provisions according to Annex XVII of REACH and subsequent amendments:

None

2.3. Other hazards

vPvB Substances: None - PBT Substances: None

Other Hazards:

No other hazards

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances

Trade name: Ammonia Solution 25-35%

CAS number: 1336-21-6

EC number: 215-647-6

REACH number:


Hazardous components within the meaning of EEC directive 67/548 and CLP regulation and related classification:

30% - 40% Anhydrous Ammonia

Index number: 007-001-00-5, CAS: 7664-41-7, EC: 231-635-3


T,C,N; R10-23-34-50

2.2/2 Flam. Gas 2 H221

 2.5 Press. Gas H280

 3.1/3/Inhal Acute Tox. 3 H331

 3.2/1B Skin Corr. 1B H314

 4.1/A1 Aquatic Acute 1 H400

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3.2. Mixtures
N.A.

SECTION 4: First aid measures

4.1. Description of first aid measures

In case of skin contact:

Immediately take off all contaminated clothing.

Areas of the body that have - or are only even suspected of having - come into contact with the product must be rinsed immediately with plenty of running water and possibly with soap.

OBTAIN IMMEDIATE MEDICAL ATTENTION.

Wash thoroughly the body (shower or bath).

Remove contaminated clothing immediately and dispose off safely.

After contact with skin, wash immediately with soap and plenty of water.

In case of eyes contact:

After contact with the eyes, rinse with water with the eyelids open for a sufficient length of time, then consult an ophthalmologist immediately.

Protect uninjured eye.

In case of Ingestion:

Do NOT induce vomiting.

In case of Inhalation:

Remove casualty to fresh air and keep warm and at rest.

If breathing is irregular or stopped, administer artificial respiration.

In case of inhalation, consult a doctor immediately and show him packing or label.

4.2. Most important symptoms and effects, both acute and delayed

None

4.3. Indication of any immediate medical attention and special treatment needed

In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).

Treatment:

None

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media:

Water.

Carbon dioxide (CO₂).

Extinguishing media which must not be used for safety reasons:

None in particular.

5.2. Special hazards arising from the substance or mixture

Do not inhale explosion and combustion gases.

5.3. Advice for firefighters

Use suitable breathing apparatus .

Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

Move undamaged containers from immediate hazard area if it can be done safely.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Wear personal protection equipment.

Remove persons to safety.

See protective measures under point 7 and 8.

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- 6.2. Environmental precautions
Do not allow to enter into soil/subsoil. Do not allow to enter into surface water or drains.
Retain contaminated washing water and dispose it.
In case of gas escape or of entry into waterways, soil or drains, inform the responsible authorities.
Suitable material for taking up: absorbing material, organic, sand
- 6.3. Methods and material for containment and cleaning up
Wash with plenty of water.
- 6.4. Reference to other sections
See also section 8 and 13

SECTION 7: Handling and storage

- 7.1. Precautions for safe handling
Avoid contact with skin and eyes, inhalation of vapours and mists.
Don't use empty container before they have been cleaned.
Before making transfer operations, assure that there aren't any incompatible material residuals in the containers.
Contaminated clothing should be changed before entering eating areas.
Do not eat or drink while working.
See also section 8 for recommended protective equipment.
- 7.2. Conditions for safe storage, including any incompatibilities
Keep away from food, drink and feed.
Incompatible materials:
Keep away from acids, metals, halogens, nitrogen oxides and hypochlorites.
Instructions as regards storage premises:
Adequately ventilated premises.
- 7.3. Specific end use(s)
None in particular

SECTION 8: Exposure controls/personal protection

- 8.1. Control parameters
No occupational exposure limit available
DNEL Exposure Limit Values
N.A.
PNEC Exposure Limit Values
N.A.
- 8.2. Exposure controls
Eye protection:
Use close fitting safety goggles, don't use eye lens.
Protection for skin:
Use clothing that provides comprehensive protection to the skin, e.g. cotton, rubber, PVC or viton.
Protection for hands:
Use protective gloves that provides comprehensive protection, e.g. P.V.C., neoprene or rubber.
Respiratory protection:
Use respiratory protection where ventilation is insufficient or exposure is prolonged, e.g. CEN/FFP-2 or CEN/FFP-3.
Thermal Hazards:
None
Environmental exposure controls:
None

SECTION 9: Physical and chemical properties

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9.1. Information on basic physical and chemical properties

| | |
|---|--------------------------------|
| Appearance and colour: | Liquid |
| Odour: | Pungent |
| Odour threshold: | 5 - 53 ppm |
| pH: | 14 |
| Melting point / freezing point: | -62 °C (25% w/w sol) |
| Initial boiling point and boiling range: | 37 °C (25% w/w sol) |
| Solid/gas flammability: | 16 - 27% ammonia |
| Upper/lower flammability or explosive limits: | N.A. |
| Vapour density: | N.A. |
| Flash point: | N.A. |
| Evaporation rate: | N.A. |
| Vapour pressure: | 50000 Pa @ 20 °C (25% w/w sol) |
| Relative density: | 0.910 @ 15.5 °C (25%) |
| Solubility in water: | Completely |
| Solubility in oil: | N.A. |
| Partition coefficient (n-octanol/water): | N.A. |
| Auto-ignition temperature: | 650 °C (ammonia gas) |
| Decomposition temperature: | N.A. |
| Viscosity: | N.A. |
| Explosive properties: | 16 - 27% ammonia |
| Oxidizing properties: | N.A. |

9.2. Other information

| | |
|--------------------------------------|------|
| Miscibility: | N.A. |
| Fat Solubility: | N.A. |
| Conductivity: | N.A. |
| Substance Groups relevant properties | N.A. |

SECTION 10: Stability and reactivity

10.1. Reactivity

Stable under normal conditions

10.2. Chemical stability

Stable under normal conditions

10.3. Possibility of hazardous reactions

None

10.4. Conditions to avoid

Stable under normal conditions.

10.5. Incompatible materials

Acids, mercury, cadmium, silver, halogens, nitric acid, nitrogen oxides and hypochlorites. It corrodes copper, cadmium, zinc, tin and their alloys.

10.6. Hazardous decomposition products

Toxic gas.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Toxicological information of the mixture:

Ammonia Solution 25-35% - CAS: 1336-21-6

a) acute toxicity:

Test: LD50 - Route: Oral - Species: Rat = 350 mg/kg

Toxicological information of the main substances found in the mixture:

N.A.

If not differently specified, the information required in Regulation 453/2010/EC listed below must be considered as N.A.:

a) acute toxicity;

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- b) skin corrosion/irritation;
- c) serious eye damage/irritation;
- d) respiratory or skin sensitisation;
- e) germ cell mutagenicity;
- f) carcinogenicity;
- g) reproductive toxicity;
- h) STOT-single exposure;
- i) STOT-repeated exposure;
- j) aspiration hazard.

SECTION 12: Ecological information

- 12.1. Toxicity
Adopt good working practices, so that the product is not released into the environment.
Very toxic to aquatic organisms.
Ammonia Solution 25-35% - CAS: 1336-21-6
Endpoint: EC50 - Species: Daphnia - Duration h: 48
- 12.2. Persistence and degradability
None
N.A.
- 12.3. Bioaccumulative potential
N.A.
- 12.4. Mobility in soil
1 Mobile
N.A.
- 12.5. Results of PBT and vPvB assessment
vPvB Substances: None - PBT Substances: None
- 12.6. Other adverse effects
None

SECTION 13: Disposal considerations

- 13.1. Waste treatment methods
Recover, if possible. Send to authorised disposal plants or for incineration under controlled conditions. In so doing, comply with the local and national regulations currently in force.

SECTION 14: Transport information



- 14.1. UN number
ADR-UN Number: 2672
IATA-UN Number: 2672
IMDG-UN Number: 2672
- 14.2. UN proper shipping name
ADR-Shipping Name: AMMONIA SOLUTION, relative density between 0.880 and 0.957 at 15 °C in water, with more than 10% but not more than 35% ammonia
IATA-Shipping Name: AMMONIA SOLUTION, relative density between 0.880 and 0.957 at 15 °C in water, with more than 10% but not more than 35% ammonia

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- IMDG-Shipping Name: AMMONIA SOLUTION, relative density between 0.880 and 0.957 at 15 °C in water, with more than 10% but not more than 35% ammonia
- 14.3. Transport hazard class(es)
 ADR-Class: 8
 ADR - Hazard identification number: 80
 IATA-Class: 8
 IATA-Label: 8
 IMDG-Class: 8
- 14.4. Packing group
 ADR-Packing Group: III
 IATA-Packing group: III
 IMDG-Packing group: III
- 14.5. Environmental hazards
 ADR-Environmental Pollutant: Yes
 IMDG-Marine pollutant: Marine Pollutant
- 14.6. Special precautions for user
 ADR-Subsidiary risks: -
 ADR-S.P.: 543
 ADR-Tunnel Restriction Code: (E)
 IATA-Passenger Aircraft: 852
 IATA-Subsidiary risks: -
 IATA-Cargo Aircraft: 615
 IATA-S.P.: -
 IATA-ERG: 8L
 IMDG-EmS: F-A , S-B
 IMDG-Subsidiary risks: -
 IMDG-Storage category: Category A
 IMDG-Storage notes: "Separated from" acids. "Away from" ammonium salts.
- 14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
 N.A.

SECTION 15: Regulatory information

- 15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture
 Dir. 67/548/EEC (Classification, packaging and labelling of dangerous substances)
 Dir. 99/45/EC (Classification, packaging and labelling of dangerous preparations)
 Dir. 98/24/EC (Risks related to chemical agents at work)
 Dir. 2000/39/EC (Occupational exposure limit values)
 Dir. 2006/8/EC
 Regulation (EC) n. 1907/2006 (REACH)
 Regulation (EC) n. 1272/2008 (CLP)
 Regulation (EC) n. 790/2009 (ATP 1 CLP)
 Regulation (EU) n. 453/2010 (Annex I)
 Restrictions related to the product or the substances contained according to Annex XVII Regulation (EC) 1907/2006 (REACH) and subsequent modifications:
 Restriction 3
 Where applicable, refer to the following regulatory provisions :
 Directive 82/501/EEC ('Activities linked to risks of serious accidents') and subsequent amendments.
 Regulation (EC) nr 648/2004 (detergents).
 1999/13/EC (VOC directive)
- 15.2. Chemical safety assessment
 No

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SECTION 16: Other information

Full text of phrases referred to in Section 3:

R10 Flammable.
R23 Toxic by inhalation.
R34 Causes burns.
R50 Very toxic to aquatic organisms.

H221 Flammable gas.
H280 Contains gas under pressure; may explode if heated.
H331 Toxic if inhaled.
H314 Causes severe skin burns and eye damage.
H400 Very toxic to aquatic life.

This document was prepared by a competent person who has received appropriate training.

Main bibliographic sources:

ECDIN - Environmental Chemicals Data and Information Network - Joint Research Centre,
Commission of the European Communities
SAX's DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS - Eight Edition - Van
Nostrand Reinold
CCNL - Appendix 1

Insert further consulted bibliography

The information contained herein is based on our state of knowledge at the above-specified date.
It refers solely to the product indicated and constitutes no guarantee of particular quality.
It is the duty of the user to ensure that this information is appropriate and complete with respect to
the specific use intended.

This MSDS cancels and replaces any preceding release.

| | |
|-------------|--|
| ADR: | European Agreement concerning the International Carriage of Dangerous Goods by Road. |
| CAS: | Chemical Abstracts Service (division of the American Chemical Society). |
| CLP: | Classification, Labeling, Packaging. |
| DNEL: | Derived No Effect Level. |
| EINECS: | European Inventory of Existing Commercial Chemical Substances. |
| GefStoffVO: | Ordinance on Hazardous Substances, Germany. |
| GHS: | Globally Harmonized System of Classification and Labeling of Chemicals. |
| IATA: | International Air Transport Association. |
| IATA-DGR: | Dangerous Goods Regulation by the "International Air Transport Association" (IATA). |
| ICAO: | International Civil Aviation Organization. |
| ICAO-TI: | Technical Instructions by the "International Civil Aviation Organization" (ICAO). |
| IMDG: | International Maritime Code for Dangerous Goods. |
| INCI: | International Nomenclature of Cosmetic Ingredients. |
| KSt: | Explosion coefficient. |
| LC50: | Lethal concentration, for 50 percent of test population. |
| LD50: | Lethal dose, for 50 percent of test population. |
| LTE: | Long-term exposure. |
| PNEC: | Predicted No Effect Concentration. |
| RID: | Regulation Concerning the International Transport of Dangerous Goods by Rail. |
| STE: | Short-term exposure. |
| STEL: | Short Term Exposure limit. |
| STOT: | Specific Target Organ Toxicity. |
| TLV: | Threshold Limiting Value. |



Safety Data Sheet

Ammonia Solution 25-35%

| | |
|---------|--|
| TWATLV: | Threshold Limit Value for the Time Weighted Average 8 hour day. (ACGIH Standard). |
| WGK: | German Water Hazard Class. |
| N.A.: | N.A. |
| N.D.: | |

**MATERIAL SAFETY DATA SHEET****Trisodium Phosphate****Section 01 - Chemical And Product And Company Information**

Product Identifier Trisodium phosphate

Product Use Industrial chemical, textiles, water treatment

Supplier Name ClearTech Industries Inc.
2302 Hanselman Avenue
Saskatoon, SK. Canada
S7L 5Z3

Prepared By ClearTech Industries Inc. Technical Department
Phone: (306)664-2522

Preparation Date February 3, 2011

24-Hour Emergency Phone 306-664-2522

**Section 02 - Composition / Information on Ingredients**

Hazardous Ingredients Trisodium phosphate dodecahydrate 60-100%

CAS Number Trisodium phosphate dodecahydrate 10101-89-0

Synonym (s) Sodium orthophosphate dodecahydrate

Section 03 - Hazard Identification

Inhalation Material is irritating to mucous membranes and upper respiratory tract.
Exposure can cause coughing, chest pains and difficulty breathing.



- Skin Contact / Absorption**..... May cause moderate skin burns. May cause severe irritation, especially if skin is moist or wet.
- Eye Contact**..... May cause eye burns. May cause permanent corneal injury. May cause severe eye irritation.
- Ingestion**..... May cause burns of the mouth, throat and stomach. Aspiration in to the lungs may occur during ingestion or vomiting, resulting in lung injury.
- Exposure Limits**..... Not available

Section 04 - First Aid Measures

- Inhalation**..... Remove victim to fresh air. Give artificial respiration only if breathing has stopped. If breathing is difficult, give oxygen. Seek medical attention if difficulties persist.
- Skin Contact / Absorption**..... Remove contaminated clothing. Wash affected area with soap and water. Seek medical attention if irritation occurs or persists.
- Eye Contact**..... Flush immediately with water for at least 20 minutes. Forcibly hold eyelids apart to ensure complete irrigation of eye tissue. Seek immediate medical attention if symptoms persist.
- Ingestion**..... Do not induce vomiting. Do not give anything by mouth to an unconscious person. Have conscious person drink several glasses of water or milk. Seek immediate medical attention.



Additional Information..... Treat symptomatically. Ingestion of large quantities of phosphate salts (over 1.0 grams for an adult) may cause an osmotic catharsis resulting in diarrhea and probable abdominal cramps. Larger doses such as 4-8 grams will almost certainly cause these effects in everyone. In healthy individuals most of the ingested salt will be excreted in the feces with the diarrhea and, thus, not cause any systemic toxicity. Doses greater than 10 grams hypothetically may cause systemic toxicity. Treatment should take into consideration both anionic and cationic portion of the molecule. The following treatments should be considered for the specific group(s) of phosphate salts found in this product:

-All phosphate salts, except calcium salts, have a hypothetical risk of hypocalcemia, so calcium levels should be monitored.

-Ammonium salts have a hypothetical risk of ammonia toxicity. In addition to calcium levels, ammonia and phosphate levels should be monitored.

-Potassium salts have a hypothetical risk of hyperkalemia which can cause cardiac arrhythmia. In addition to calcium levels, potassium and phosphate levels should be monitored. Also consider continuous EKG monitoring to detect hyperkalemia.

-Sodium salts have a hypothetical risk of hypernatremia. In addition to calcium levels, sodium and phosphate levels should be monitored.

Section 05 - Fire Fighting

Conditions of Flammability..... Product does not burn

Means of Extinction..... Does not burn, use appropriate extinguishing media for surrounding fire.

Flash Point..... Not applicable

Auto-ignition Temperature..... Not applicable

Upper Flammable Limit Not applicable

Lower Flammable Limit..... Not applicable

Hazardous Combustible Products... Under fire conditions, oxides of sodium and phosphorus.

Special Fire Fighting Procedures..... Wear NIOSH-approved self-contained breathing apparatus and protective clothing.

Explosion Hazards..... Not available



Section 06 - Accidental Release Measures

- Leak / Spill**..... Wear appropriate personal protective equipment. Scoop up or vacuum spilled material and place in appropriate closed container. Flush area with water to remove any trace residue. Prevent material from entering sewers.
- Deactivating Materials**..... Not available

Section 07 - Handling and Storage

- Handling Procedures**..... Avoid contact with eyes, skin and clothing. Avoid breathing in dust. Use with adequate ventilation. Wash thoroughly after handling. Potentially deadly carbon monoxide gas can form in enclosed area or tanks when alkaline products contain materials that contain sugars. Do not enter such areas until they have been well ventilated and carbon monoxide and oxygen levels have been determined safe. Continue to monitor atmosphere while personnel are in enclosure. Empty containers may contain hazardous product residues.
- Storage Requirements**..... Store in a cool, dry, well-ventilated area. Keep containers tightly closed.

Section 08 - Personal Protection and Exposure Controls

Protective Equipment

- Eyes**..... Chemical goggles, full-face shield, or a full-face respirator is to be worn at all times when product is handled. Contact lenses should not be worn; they may contribute to severe eye injury.
- Respiratory**..... NIOSH-approved respirator for dust should be worn, if needed.
- Gloves**..... Impervious gloves of chemically resistant material (rubber or PVC) should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.
- Clothing**..... Body suits, aprons, and/or coveralls of chemical resistant material should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.
- Footwear**..... No special footwear is required other than what is mandated at place of work.

Engineering Controls



Ventilation Requirements..... Mechanical ventilation (dilution or local exhaust), process or personnel enclosure and control of process conditions should be provided. Supply sufficient replacement air to make up for air removed by exhaust systems.

Other..... Emergency shower and eyewash should be in close proximity.

Section 09 - Physical and Chemical Properties

Physical State..... Solid

Odor and Appearance..... Odorless, white granular powder

Odor Threshold..... Not applicable

Specific Gravity (Water=1)..... Not available

Vapor Pressure (mm Hg, 20C)..... Not available

Vapor Density (Air=1)..... Not available

Evaporation Rate..... Not available

Boiling Point..... Not available

Freeze/Melting Point..... 75°C

pH..... 11.8 (1% Solution @ 25°C)

Water/Oil Distribution Coefficient.... Not available

Bulk Density..... Not available

% Volatiles by Volume..... Not available

Solubility in Water..... Soluble

Molecular Formula..... $\text{Na}_3\text{PO}_4 \cdot 12\text{H}_2\text{O}$

Molecular Weight..... 380.13

Section 10 - Stability and Reactivity

Stability..... Stable

Incompatibility..... Strong acids, magnesium metal



Hazardous Products of Decomposition.. Oxides of phosphorus and sodium

Polymerization..... Will not occur

Section 11 - Toxicological Information

Irritancy..... Irritating to skin & respiratory area, extremely irritating to eyes.

Sensitization..... Not available

Chronic/Acute Effects..... Inhalation of product may aggravate existing chronic respiratory problems such as asthma, emphysema or bronchitis. Skin contact may aggravate existing skin disease.

Synergistic Materials..... Not available

Animal Toxicity Data..... LD₅₀(Oral, Rat): 7400mg/kg

Carcinogenicity..... Not listed with IARC, NTP, ACGIH, or OSHA as a carcinogen.

Reproductive Toxicity..... Not available

Teratogenicity..... Not available

Mutagenicity..... Not available

Section 12 - Ecological Information

Fish Toxicity..... EC₅₀(96hr, Mosquitofish): 151mg/L

Biodegradability..... The resulting phosphate may persist indefinitely or incorporate into biological systems.

Environmental Effects..... Not available

Section 13 - Disposal Consideration

Waste Disposal..... Dispose in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act.

Section 14 - Transportation Information

TDG Classification

Class..... 9

Group..... III

PIN Number..... UN3077

Other..... Secure containers (full and/or empty) with suitable hold down devices during shipment.

Section 15 - Regulatory Information

WHMIS Classification.....E

NOTE: THE PRODUCT LISTED ON THIS MSDS HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CANADIAN CONTROLLED PRODUCTS REGULATIONS. THIS MSDS CONTAINS ALL INFORMATION REQUIRED BY THOSE REGULATIONS

Section 16 - Other Information

Note: The responsibility to provide a safe workplace remains with the user. The user should consider the health hazards and safety information contained herein as a guide and should take those precautions required in an individual operation to instruct employees and develop work practice procedures for a safe work environment. The information contained herein is, to the best of our knowledge and belief, accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by the use of this material. It is the responsibility of the user to comply with all applicable laws and regulations.

Attention: Receiver of the chemical goods / MSDS coordinator

As part of our commitment to the Canadian Association of Chemical Distributors (CACD) Responsible Distribution® initiative, ClearTech Industries Inc. and its associated companies require, as a condition of sale, that you forward the attached Material Safety Data Sheet(s) to all affected employees, customers, and end-users. ClearTech will send any available supplementary handling, health, and safety information to you at your request.

If you have any questions or concerns please call our customer service or technical service department.



ClearTech Industries Inc. - Locations

Corporate Head Office: 2302 Hanselman Avenue, Saskatoon, SK, S7L 5Z3

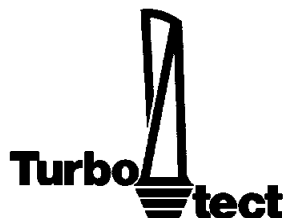
Phone: 306-664-2522

Fax: 306-665-6216

www.ClearTech.ca

| Location | Address | Postal Code | Phone Number | Fax Number |
|------------------|-----------------------------------|--------------------|---------------------|-------------------|
| Richmond, B.C. | 12431 Horseshoe Way | V7A 4X6 | 604-272-4000 | 604-272-4596 |
| Calgary, AB. | 5516E - 40 th St. S.E. | T2C 2A1 | 403-279-1096 | 403-236-0989 |
| Edmonton, AB. | 11750 - 180 th Street | T5S 1N7 | 780-452-6000 | 780-452-4600 |
| Saskatoon, SK. | 2302 Hanselman Avenue | S7L 5Z3 | 306-933-0177 | 306-933-3282 |
| Regina, SK. | 555 Henderson Drive | S42 5X2 | 306-721-7737 | 306-721-8611 |
| Winnipeg, MB. | 340 Saulteaux Crescent | R3J 3T2 | 204-987-9777 | 204-987-9770 |
| Mississauga, ON. | 7480 Bath Road | L4T 1L2 | 905-612-0566 | 905-612-0575 |

24 Hour Emergency Number - All Locations - 306-664-2522



SAFETY DATA SHEET


in accordance with EU Reg.1907/2006/ANNEX II –REACH
as amended by (EU) No 453/2010)

TURBOTECT 950

1 IDENTIFICATION OF SUBSTANCE / PREPARATION AND OF THE COMPANY/UNDERTAKING

- 1.1 Product identifier: **TURBOTECT 950**
- 1.2 Use: Gas turbine compressor washing detergent, industrial use only.
- 1.3 Supplier: Turbotect Limited
CH-5401 Baden
Switzerland
- Tel: 41(0)56 200 50 20; Fax: 41(0)56 200 50 22
e-mail/Web: turbotect@turbotect.com; www.turbotect.com
- 1.4 Emergency Tel: 41(0)56 200 50 20 (office hours) Originator of the SDS: johncopepcm@btinternet.com
-

2 HAZARDS IDENTIFICATION

- 2.1 Classification of the mixture: This preparation is classified as dangerous according to Directive 1999/45/EC.
Harmful: Harmful if swallowed. **Irritant:** Risk of serious damage to eyes.
- 2.2 Label elements: **Xn Harmful** (contains ethoxylated C₉₋₁₁ alcohols) **Danger Symbols:** 
- Risk phrases: R22. Harmful if swallowed.
R41. Risk of serious damage to eyes.
- Safety phrases: S26. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S36/37/39. Wear suitable protective clothing, gloves and eye / face protection.
- 2.3 Other hazards: none known.
-

3 COMPOSITION / INFORMATION ON INGREDIENTS

3.2 Proprietary mixture of non-ionic surfactant and emulsifier in deionised water solution.

| Hazardous ingredient | CAS No. | EINECS No. | Conc. % | Symbols | R Phrases |
|----------------------------------|-------------|------------|---------|---------|-----------|
| Ethoxylated branched oxoalcohols | 068439-46-3 | polymer | 20-40 | Xn | R22, R41 |
| 2-(2-butoxyethoxy)ethanol | 000112-34-5 | 203-961-6 | 1-15 | Xi | R36 |

4 FIRST-AID MEASURES

4.1 Description of first aid measures:

- Contact with skin: Remove contaminated clothing. Wash skin immediately with plenty of soap and water. If symptoms develop, get medical attention.
- Contact with eyes: Wash immediately with eyewash solution or clean water, holding eyelids apart, for at least 10 minutes. Get immediate medical attention.
-

Ingestion: Rinse mouth with clean water. Get immediate medical attention.

Inhalation: Not expected to present a significant inhalation hazard under conditions of normal use.

4.2 Most important symptoms and effects, both acute and delayed: Risk of serious damage to eyes. May cause eye damage if untreated.

4.3 Indication of any immediate medical attention and special treatment needed: Treat symptomatically.

5 FIRE-FIGHTING MEASURES

5.1 Extinguishing media: In case of fire use water, foam, carbon dioxide or dry agent.

5.2 Special hazards arising from the mixture: Product has no flash-point, but if heated sufficiently, it will produce flammable vapours.

5.3 Advice for firefighters: Use water spray to cool containers exposed to fire and to protect personnel. Firefighters should wear full protective gear including S.C.B.A. sets with full face shields.

6 ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures: Wear protective clothing as described in Section 8 of this safety data sheet.

6.2 Environmental precautions: Dispose of in accordance with local regulations. The appropriate regulatory body must be alerted to spillages or uncontrolled discharges to watercourses

6.3 Methods and material for containment and cleaning up: Dike and contain spill. Do not allow spill to enter drains, sewers or waterways, ground, plants and vegetation. Recover free liquid if possible. Absorb spillage with inert material, floor absorbent, earth or sand and collect into appropriate containers.

7 HANDLING AND STORAGE

7.1 Precautions for safe handling: Avoid contact with skin or eyes. Otherwise, no particular precautions are required in normal use. Practice normal industrial hygiene. Provide adequate ventilation. May present slip hazard if spilt.

7.2 Conditions for safe storage, including any incompatibilities: Keep containers closed to prevent contamination when not in use. Do not store near heat, open flames or strong oxidants. Store containers in an adequately ventilated area, protected against the sun (under a roof) and direct exposure to the weather (rain, storms, etc.). Do not store the product at temperatures below its freezing point.

7.3 Specific end uses: Industrial uses (SU3); Use in closed, continuous process with occasional controlled exposure (PROC2); Industrial use of substances in closed systems (ERC7); Washing and cleaning products, including solvent based products (PC35). No Exposure Scenario is available for this mixture.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters: Component substances with Workplace Exposure Limits

| Component substance | LTEL, 8hr.TWA | | STEL | | Time | Authority |
|---------------------------|---------------|-------------------|------|-------------------|----------|--------------------|
| | ppm | mg/m ³ | ppm | mg/m ³ | | |
| 2-(2-butoxyethoxy)ethanol | 10 | 67.5 | 15 | 101.2 | 15 mins. | UKHSE EH40/2005 |

2-(2-butoxyethoxy)ethanol (EC No. 203-961-6):

Derived No Effect Level (DNEL) -Industry Dermal Long Term 20 mg/kg/day

DNEL -Industry Inhalation Long Term 67.5 mg/m³

8.2 Exposure controls:

Wear suitable protective clothing, including eye/face protection and gloves.

Protective gloves must be used if there is a risk of direct contact or splash. Nitrile rubber offers best long-term protection, be aware that the liquid may penetrate the gloves. Frequent change is advisable. Manufactured/tested in accordance with EN 374.

If ventilation is insufficient, adequate respiratory protection must be provided. At work in confined or poorly ventilated spaces, respiratory protection with air supply must be used. Where air-filtering respirators are appropriate, select a mask & filter combination suitable for aerosols and vapours such as Type-A or Type A-2, ABEK-2 in accordance with EN 141. Check that mask fits tight and change filter regularly.

9 PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties:

| | | |
|---|---|------------------------|
| Appearance: | Clear, blue, low viscosity liquid at 20°C | |
| Odour: | Characteristic, sweet. | |
| Change in physical state: | Boiling point: | approx. 100 °C (212°F) |
| | Pour point: | -1°C (30°F) |
| Flash point: | >100°C (212°F) (Closed Cup) | |
| Auto-ignition temperature: | not determined | |
| Flammability limits in air: (% vol. in air) | LEL: | not applicable |
| | UEL: | not applicable |
| Vapour pressure at 20°C (68°F) (non-water fraction) | <0.01 kPa | |
| Solubility in water: | Complete | |
| pH Value | 7-8 | |
| Relative density at 15°C (59°F): | 1.007 g/cm ³ (8.41 lb/US Gal) | |
| Viscosity (ASTM D 445) @ 27°C (80°F): | 12 mm ² /s | |

9.2 Other information: The above data are typical values and do not constitute a specification.

10 STABILITY AND REACTIVITY

10.1 Reactivity: Reacts with oxidising agents.

10.2 Chemical stability: Stable in normal use and under recommended storage conditions.

10.3 Possibility of hazardous reactions: Other than 10.1, none known.

10.4 Conditions to avoid: Avoid excessive heat for prolonged periods of time. Avoid exposure to high temperatures or direct sunlight. Avoid freezing conditions.

10.5 Incompatible materials: Strong oxidising agents.

10.6 Hazardous decomposition products: Product stable under normal conditions of storage, handling and use.

11 TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects:

Acute effects:

Inhalation: No significant signs or symptoms indicative of any health hazard are expected.

Ingestion: May cause nausea, vomiting and diarrhoea.

Skin contact: May cause drying of the skin and contact dermatitis.

Eye contact: May cause serious eye irritation.

Chronic effects: No experimental data are available on this preparation. Based on chronic toxicological information on its components it is unlikely to pose a carcinogenic, mutagenic or reproductive toxicity risk to humans if exposure is maintained at or below occupational limits.

12 ECOLOGICAL INFORMATION

12.1 Toxicity: The product has a low order of acute toxicity to aquatic species:

Acute toxicity of effluents and receiving waters to freshwater and marine organisms according to EPA/600/4-90/027 "Methods for measuring" :

Cladoceran (*Ceriodaphnia dubia*) : 48 hours LC₅₀ : 10 ppm

Fathead Minnows (*Pimephales promelas*) : 96 hours LC₅₀ : 15 ppm

12.2 Persistence and degradability: The product is expected to degrade rapidly in the aquatic environment. Product tested according to OECD-302B "Inherent biodegradability, modified Zahn-Wellens Test", exposed to activated sludge of a municipal biological sewage waste water treatment plant under aerobic static conditions. Based on individual dissolved organic carbon (DOC) determinations TURBOTECT 950 reached a biodegradation of 99 % after 7 days, and at the end of this 28 day test, 88% of the organic carbon had been transformed into CO₂. TURBOTECT 950 showed no significant toxic effects to the activated sludge, indicating no inhibition of the nitrifying micro-organisms.

Total organic carbon (TOC): 221 mg C /g TURBOTECT 950;

Chemical oxygen demand (COD): 747 mg O₂/g TURBOTECT 950.

TURBOTECT 950 is therefore classified as easily biodegradable under the strict terms and conditions of the OECD Guideline No. 302B. A copy of the relevant test report is available on request.

12.3 Bio-accumulative potential: The product has low potential for bioaccumulation.

12.4 Mobility in soil: no data available.

12.5 Results of PBT and vPvB assessment: Not Classified as PBT/vPvB by current EU criteria

12.6 Other adverse effects: The product is not a "VOC" (Volatile Organic Compound), the vapor pressure (calculated) for the non-water components is <0.075 mm Hg / 20°C (<0.01 kPa).

13 DISPOSAL CONSIDERATIONS

Waste is classified as hazardous waste. Disposal to licensed waste disposal site in accordance with the local waste disposal authority.

13.1 Waste treatment methods: The product and effluent resulting from its use should not be released into the environment. Dispose of in accordance with the European Directives on waste and hazardous waste. Dispose of in accordance with local regulations.

Empty containers may contain flammable or explosive vapours. Do not burn, or use a cutting torch on, the empty drum. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14 TRANSPORT INFORMATION

14.1 UN Number: none

14.2 Not Dangerous Goods according to international transport regulations

14.3 Transport hazard class(es): none

14.4 Packaging group:

14.5 Environmental hazards: Not a Marine Pollutant

14.6 Special precautions for user: none

14.7 Transport in bulk according to Annex II of Marpol 73/78 and the IBC code: not available

15 REGULATORY INFORMATION

15.1 Safety, health and environmental regulations / legislation specific for the mixture: none applicable.

15.2 Chemical safety assessment: No Chemical Safety Assessment has been carried out for this mixture by the supplier.

16 OTHER INFORMATION

This revision replaces previous versions of the Safety Data Sheet for the mixture, which were produced according to the original EU Reg.1907/2006/ANNEX II. There are changes to all Sections.

Risk & Safety Phrase text in full (if not shown Section 2): R36 Irritating to eyes.

Regulatory inventory compliance: AUSTRALIAN INVENTORY (AICS), CANADA INVENTORY (DSL), CHINA INVENTORY (IECS), EC INVENTORY (EINECS/ELINCS), JAPAN INVENTORY (ENCS), KOREA INVENTORY (ECL), PHILIPPINE INVENTORY (PICCS), US INVENTORY (TSCA)

The information and recommendations contained herein are, to the best of Turbotect's knowledge and belief, accurate and reliable. Turbotect does not warrant or guarantee their accuracy or reliability and Turbotect shall not be liable for special incidental and consequential damages, and for any loss or damage arising out of the use thereof. No warranties of merchantability, fitness for use or otherwise are expressed or implied.

MATERIAL SAFETY DATA SHEET

READ AND UNDERSTAND MATERIAL SAFETY DATA SHEET BEFORE
HANDLING OR DISPOSING OF PRODUCT

29371 GASOIL, DIESEL AND HEATING

1. PRODUCT AND COMPANY NAME

PRODUCT CODE AND NAME

29371 GASOIL, DIESEL AND HEATING

DESCRIPTION

Gas Oils

COMPANY

Consols Oils
Plots 3 – 6 United Road
St Day
REDRUTH
Cornwall
TR16 5HY
Tel : 01209 820274
Fax : 01209 820919
Emergency Phone Number : 07720455322

2. COMPOSITION/INFORMATION ON INGREDIENTS

| <u>Name</u> | <u>% Wt</u> | <u>CAS No.</u> | <u>EC No.</u> |
|---|-------------|----------------|---------------|
| Fuels, diesel | 95 - 99,99 | 68334-30-5 | 269-822-7 |
| Xn R 40 Limited evidence of a carcinogenic effect. | | | |
| Xn R 65 Harmful: may cause lung damage if swallowed. | | | |
| R 66 Repeated exposure may cause skin dryness or cracking | | | |
| N R 51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. | | | |

Product contains small amounts of additives.

3. HAZARDS IDENTIFICATION

Product classification

CARCINOGENIC CATEGORY 3
HARMFUL
DANGEROUS FOR THE ENVIRONMENT

Acute effects of exposure to man

Inhalation

Vapours or mist may cause irritation of the nose and throat, headache, nausea, vomiting, dizziness, drowsiness, euphoria, loss of coordination, and disorientation. In poorly ventilated areas or confined spaces, unconsciousness and asphyxiation may result.

Inhalation of vapours or mist may result in the absorption of potentially harmful amounts of material.

Skin contact

Brief contact may cause slight irritation. Prolonged contact, as with clothing wetted with material, may cause more severe irritation and discomfort, seen as local redness and swelling.

Believed not to be a skin sensitiser.

Eye contact

May cause irritation, experienced as mild discomfort and seen as slight excess redness of the eye.

Ingestion

If more than several mouthfuls are swallowed, abdominal discomfort, nausea and diarrhoea may occur.

Aspiration may occur during swallowing or vomiting, resulting in lung damage.

Chronic effects of exposure to man

Medical conditions aggravated by exposure

Because of its irritating properties, repeated skin contact may aggravate an existing dermatitis (skin condition).

| | |
|--|---|
| Other remarks | Possible risk of irreversible effects. |
| Effects of exposure to the environment | Some short-term toxicity to aquatic and marine organisms. |

4. FIRST AID MEASURES

Route of exposure

Inhalation

Remove to fresh air. If not breathing.

Skin contact

Wash skin with plenty of soap and water

Eye contact

Immediately flush eyes with plenty of

Ingestion

Do not induce vomiting. Get medical

Other recommendations

Aspiration of this product during induced intubation.

Remove and dry-clean or launder clothing with handling contaminated clothing.

with handling contaminated clothing.

5. FIRE-FIGHTING MEASURES

| | |
|------------------------------|--|
| Suitable extinguishing media | Use water fog, dry powder, foam or carbon dioxide. Use water to cool fire-exposed containers. If a leak or spill has not ignited, use water fog to disperse the vapours and to provide protection for personnel attempting to stop the leak. |
|------------------------------|--|

| | |
|---|-----------|
| Extinguishing media which must not be used for safety reasons | Water jet |
|---|-----------|

Special exposure hazards arising from the substance or preparation itself,

combustion products, resulting gases

Hydrogen sulphide (H₂S) may be released when heated.

In case of fire - Always call the fire brigade. Small fires, such as those capable of being fought with a hand-held extinguisher, can normally be fought by a person who has received instruction on the hazards of flammable liquid fires. Fires that are

beyond that stage should only be tackled by people who have received hands-on training.

Ensure escape path is available.

Special protective equipment for firefighters

The nature of special protective equipment required will depend upon the size of the fire, the degree of confinement of the fire and the natural ventilation available. Fire-resistant clothing and self-contained breathing apparatus is recommended for

fires in confined spaces and poorly-ventilated areas. Full fire-proof clothing is recommended for any large fires involving this product.

6. ACCIDENTAL RELEASE MEASURES

Procedures in case of accidental release or leakage

Ventilate area. Avoid breathing vapour. Use self-contained breathing apparatus or supplied air mask for large spills or

| | |
|---|--|
| | <p>Wipe up or absorb on suitable material and shovel up. Prevent entry into sewers and</p> <p>waterways. Avoid contact with skin, eyes or clothing.</p> |
| 7. HANDLING AND STORAGE | |
| Handling | <p>Local exhaust ventilation recommended if generating vapour, dust, or mist. If exhaust ventilation is not available or inadequate, use approved respirator as appropriate.</p> <p>This product may contain volatile hydrocarbons which may accumulate in the container headspace, thereby creating a flammable or explosive atmosphere.</p> <p>Hydrogen sulphide (H₂S) may be released when heated.</p> |
| Storage | <p>Transport, handle and store in accordance with applicable local regulations and only in labelled containers designed for this product. Ground and bond shipping container, transfer line, and receiving container. Keep away from sparks, flame and other</p> <p>sources of ignition. Protect containers against static electricity, lightning and physical damage. Hot work (eg cutting or welding) must not be carried out on or near any container used for storage of this product unless it has been made safe by purging or other suitable means.</p> <p>Empty product containers may contain product residue. Do not reuse empty containers without commercial cleaning or reconditioning.</p> |
| Specific use (s) | On road transportation and Heating |
| 8. EXPOSURE CONTROLS/PERSONAL PROTECTION | |
| Respiratory protection | <p>Airborne concentrations should be kept to lowest levels possible. If vapour, mist or</p> <p>cleaning large spills or upon entry into tanks, vessels, or other confined spaces.</p> |

| | |
|--------------------------------|---|
| | <p>cleaning large spills or upon entry into tanks, vessels, or other confined spaces.</p> <p>Oxygen levels should be at least 19.5 % in confined spaces or other work areas.</p> |
| Hand and skin protection | <p>Protective clothing such as Flame retardant uniforms, coveralls or lab coats should be worn. Launder or dry-clean when soiled. North Red PVC gloves (Ref. 725), Nitrile Rubber or Viton gloves and lace up safety boots with steel toecaps resistant to</p> <p>chemicals and petroleum distillates required.</p> |
| Eye protection | <p>Safety glasses, chemical type goggles or full face shield recommended to prevent eye contact.</p> |
| Exposure limit for the product | <p>None established for product.</p> <p>Hydrogen sulphide : ACGIH TLV-TWA 10 ppm STEL 15 ppm. UK : EH40 : OEL : TWA : 10 ppm ; STEL : 15 ppm</p> |

9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|----------------------------|---------------------------------|
| Appearance | Clear liquid |
| Odour | Petroleum odour |
| Flash point (ASTM D93), °C | 56 min |
| Relative density | 0.82 - 0.86 @ 15°C |
| Viscosity | 2 - 5 mm ² /s @ 40°C |
| Boiling point/range, °C | 160 - 385 |

10. STABILITY AND REACTIVITY

| | |
|----------------------------------|---|
| Conditions to avoid | Sources of ignition such as flames, sparks, hot surfaces. |
| Materials to avoid | Avoid contact with strong oxidising agents. |
| Hazardous decomposition products | <p>Oxides of carbon, nitrogen and sulphur, aldehydes and ketones.</p> <p>Hydrogen sulphide (H₂S) may be released on heating and may accumulate in confined spaces.</p> |

11. TOXICOLOGICAL INFORMATION

Acute

| | |
|--------------|--|
| Inhalation | <p>Likely to be irritating to the respiratory tract if high concentrations of mists or vapour are inhaled.</p> <p>May cause nausea, dizziness, headaches and drowsiness if high concentrations of vapour are inhaled.</p> <p>May be toxic when hydrogen sulphide is present in the vapour.</p> |
| Skin contact | <p>Repeated exposure may cause skin dryness or cracking</p> <p>Believed not to be a skin sensitiser.</p> |
| Eye contact | <p>Slightly irritating to the eyes.</p> |
| Ingestion | <p>Unlikely to cause harm if accidentally swallowed in small doses, though larger quantities may cause nausea and diarrhoea. Will injure the lungs if aspiration occurs, eg. during vomiting.</p> |
| Chronic | <p>This product, or a component of this product, has caused skin cancer when repeatedly applied to the skin of laboratory animals without any effort to remove the material between applications.</p> |

12. ECOLOGICAL INFORMATION

| | |
|-------------------------------|---|
| Mobility | <p>Spillages may penetrate the soil causing ground water contamination.</p> |
| Persistence and degradability | <p>According to EC criteria : Not readily biodegradable</p> |
| Potential to bioaccumulate | <p>This product is expected to bioaccumulate.</p> |
| Aquatic toxicity | <p>Some short-term toxicity to aquatic and marine organisms.</p> |

| |
|-------|
| WGK=2 |
|-------|

13. DISPOSAL CONSIDERATIONS

| | |
|----------|---|
| Disposal | Dispose in a safe manner in accordance with local/national regulations. |
|----------|---|

| | |
|----------|---|
| Disposal | Dispose in a safe manner in accordance with local/national regulations. |
|----------|---|

EWC-No : 13 07 01

14. TRANSPORT INFORMATION

| | |
|---------------|--|
| Sea transport | |
|---------------|--|

| | |
|-------|------|
| UN No | 1202 |
|-------|------|

| | |
|----------------------|---------|
| Proper shipping name | GAS OIL |
|----------------------|---------|

| | |
|-------------------------------|---------|
| IMO, IMDG Class/Packing group | 3 / III |
|-------------------------------|---------|

| | |
|------------------|----|
| Marine pollutant | No |
|------------------|----|

| | |
|--------|------|
| EmS No | 3-07 |
|--------|------|

Road/rail transport

| | |
|-------|------|
| UN No | 1202 |
|-------|------|

| | |
|----------------------|---------|
| Proper shipping name | GAS OIL |
|----------------------|---------|

ADR/RID Class/Packing group 3 / III

| | |
|--------------------------|----|
| Hazard identification No | 30 |
|--------------------------|----|

| | |
|-------------------|-----------|
| CEFIC Tremcard No | 30GF1-III |
|-------------------|-----------|

| | |
|--------------------------|----|
| UK Emergency action code | 3Z |
|--------------------------|----|

environment

| | |
|------------------|--|
| Inland waterways | |
|------------------|--|

| | |
|------------|---------|
| ADNR Class | 3 / III |
|------------|---------|

| | |
|---------------|--|
| Air transport | |
|---------------|--|

| | |
|-------|------|
| UN No | 1202 |
|-------|------|

| | |
|-------------------------|---------|
| Proper shipping name | GAS OIL |
| IATA/ICAO Class/Packing | 3 / III |

| | |
|-------------------------------|---------|
| IATA/ICAO Class/Packing group | 3 / III |
|-------------------------------|---------|

15. REGULATORY INFORMATION

| | |
|---------------------------------------|---|
| Classification/ Labelling information | Under the criteria of Directive EEC/67/548 (dangerous substances) |
|---------------------------------------|---|

| | |
|---------------------------------------|---|
| Classification/ Labelling information | Under the criteria of Directive EEC/67/548 (dangerous substances) |
|---------------------------------------|---|

and EEC/1999/45 (dangerous preparations) :

Symbol (letter notation) +
Indication of danger

Xn HARMFUL

N DANGEROUS FOR THE ENVIRONMENT

Risk phrases

Xn R 40 Limited evidence of a carcinogenic effect.

Xn R 65 Harmful: may cause lung damage if swallowed.

R 66 Repeated exposure may cause skin dryness or cracking

N R 51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety phrases

S 2 Keep out of the reach of children.

S 24 Avoid contact with skin.

S 36/37 Wear suitable protective clothing and gloves.

S 43 In case of fire, use CO₂, dry chemical or foam. Never use water.

S 61 Avoid release to the environment. Refer to special instructions/Safety data sheets.

S 62 If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

Hazardous ingredients

Fuels, diesel

Additional information

Refer to any national measures that may be relevant.

16. OTHER INFORMATION

| | |
|---|---|
| | <p>Hazardous concentrations of hydrogen sulphide (H₂S) gas can accumulate in storage and rundown tanks, marine vessel compartments, sump pits or other confined spaces. When opening valves, hatches and dome covers, stand upwind, keep face as far from the</p> <p>opening as possible and avoid breathing any gases or vapours. When exposure concentrations are unknown and respiratory protection is not used, personal H₂S warning devices should be worn. These devices should not be relied on to warn of life</p> <p>threatening concentrations. H₂S fatigues the sense of smell rapidly. The rotten egg odour of H₂S disappears quickly, even though high concentrations are still present. The ACGIH TLV/TWA for H₂S is 10 ppm, the STEL 15 ppm. UK : EH40 : OEL : TWA : 10</p> <p>ppm ; STEL : 15 ppm</p> <p>The company recommends that all exposures to this product be minimized by strictly adhering to recommended occupational control procedures to avoid any potential adverse health effects.</p> |
| Full text of risk phrases | <p>Xn R 40 Limited evidence of a carcinogenic effect.</p> <p>Xn R 65 Harmful: may cause lung damage if swallowed.</p> <p>R 66 Repeated exposure may cause skin dryness or cracking</p> <p>N R 51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.</p> |
| Changes were made in sections : | 3, 5,7, 8,10, 11, 12, 13, 14, 15, 16 |
| MSDS: 29371 | |
| DATE ISSUED 20/5/2003 | Supersedes 24/10/2002 |
| <p>All information contained in this Material Safety Data Sheet and, in particular, the health and safety and environmental information is accurate to the best of our knowledge and belief as at the date of issue specified. However, the Company makes no warranty or representation, express or implied, as to the accuracy or completeness of such information.</p> <p>The provision of this Material Safety Data Sheet is not intended, of itself, to</p> | |

obviate the need for all users to satisfy themselves that the product described is suitable for their individual purposes and that the safety precautions and environmental advice are adequate for their individual purposes and situation. Further, it is the user's obligation to use this product safely and to comply with all applicable laws and regulations concerning the use of the product.

The company accepts no responsibility for any injury, loss or damage, consequent upon any failure to follow the safety and other recommendations contained in this Material Safety Data Sheet, nor from any hazards inherent in the nature of the material, nor from any abnormal use of the material.

MATERIAL SAFETY DATA SHEET

MSDS No. 01-05
According to REACH Regulation no.1907/2006



HYDROCHLORIC ACID, SOLUTION min. 32%

Revision: 6

Last up date: July 17, 2008

Date issued: July 21,1999

Page 1/10



**Class 8
Corrosive substances**

C



Corrosive

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

1.1. Identification of the substance/preparation

| | |
|-----------------|--|
| Trade Name | Hydrochloric acid |
| Chemical Name | Hydrochloric acid 32%, aqueous |
| Common Synonyms | Muriatic Acid, Hydrogen chloride,. aqueous |

1.2. Uses of the substance/preparation

Hydrochloric acid is used in the production of chlorides, for refining ore in the production of tin and tantalum, for pickling and cleaning of metal products, in electroplating, in removing scale from boilers, for the neutralization of basic systems, as a laboratory reagent, as a catalyst and solvent in organic syntheses, in the manufacture of fertilizers and dyes, for hydrolyzing starch and proteins in the preparation of various food products, and in the textile and rubber industries.

1.3. Company/undertaking identification

OLTCHIM S.A.

| | |
|-----------|---|
| Address | 1 Uzinei Street, 240050 - Ramnicu Valcea, Romania |
| Telephone | +40/250/701200 |
| Fax | +40/250/735446 |
| e-mail | oltchim @oltchim.ro |

1.4. Emergency telephone number **+40 / (0)250/738141**

2. HAZARD IDENTIFICATION

EC Classification according to Directive 67/548/CEE, Annex I **C; R35**

Corrosive, fuming liquid.

Causes burns.irritating to respiratory system.

Health effects: CORROSIVE! Contact can cause severe skin and eye burns, leading to permanent damage with loss of sight. Breathing the vapors can irritate the mouth, nose, and throat. High levels may irritate the lungs, causing coughing and/or shortness of breath. Higher exposure can cause a buildup of fluid of the lungs (pulmonary edema), a medical emergency. Overexposure may cause erosion of the teeth.

Environmental effects: Considering its high water solubility, hydrochloric acid is not expected to bioaccumulate in organism. Hydrochloric acid is slightly toxic in the aquatic environment. The toxic effect on aquatic organism is due pH decreasing. When released into the soil this material may leach into groundwater. During movement through soil, the carbonates will be decomposed and neutralized by hydrochloric acid. Hydrochloric acid is not classified as dangerous for environmental as specified in Directive 67/548/EEC, Annex I.

Emergency Overview: Colorless or slight yellow liquid with sharp, pungent odor, fume in air, very corrosive. Reacts with most metals in a corrosive manner liberating flammable hydrogen gas, (explosive limits in air: 4 - 75%). Will not burn in fire, but may generate chlorine fume.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

| Hazardous components /constituents | Concentration % (v/v) | CAS No. | EC No. | Annex I Index No. | Hazard Symbol | Risk phrases |
|------------------------------------|-----------------------|---------|-----------|-------------------|---------------|--------------|
| Hydrogen Chloride | Min. 32 | - | 231-595-7 | 017-002-01-X | C | R 34 R 37 |

4. FIRST - AID MEASURES

Seek medical attention immediately in all cases of exposure!

Inhalation: Inhalation of hydrochloric acid at irritating concentrations causes coughing, pain, inflammation, and edema of the upper respiratory tract. At high concentration, the gas causes necrosis of the bronchial epithelium, constriction of the larynx and bronchi, and closure of the glottis. Concentrations of the 1000 to 2000 ppm and higher are immediately dangerous.

Remove from exposure area to fresh air. If not breathing, clear airway and start artificial resuscitation. Get immediate medical attention. If victim is having trouble breathing, transport to medical care and, if available, give supplemental oxygen. Keep the patient under medical observation for a least 24 hours.

Skin contact: Corrosive. Exposure to hydrochloric acid can produce burns on the skin and mucous membranes, the severity of which is related to the concentration of the solution. Subsequently, ulceration may occur, followed by keloid and retractile scarring.

Immediately flush skin with plenty of water for at least 15 minutes, while removing contaminated clothing and shoes. Get immediate medical attention. Wash clothing and contaminated shoes before reuse.

Eyes contact: Contact of conc acid with the eye can cause extensive necrosis of the conjunctiva and corneal epithelium, resulting in perforation or opaque scarring. Frequent contact with aqueous solutions of hydrochloric acid may lead to dermatitis. Flush contaminated eye(s) with plenty of water for at least 15 minutes. Remove any contact lenses. Hold eyelids apart to ensure rinsing of the entire surface of the eyes and lids with water. If physician is not available, flush for an additional 15 minutes. Get immediate medical attention.

Ingestion: Corrosive. Symptoms after ingestion include immediate pain and ulceration of all membranes and tissues which come in contact with the acid. Ingestion may be associated with nausea, vomiting and intense thirst; corrosion of the stomach may lead within a few hours or a few days to gastric perforation and peritonitis. Late esophageal, gastric and pyloric strictures and stenoses should be anticipated. If any acid is swallowed, it should be neutralized by gastric lavage with 5% Na_2CO_3 solution, followed by a drop of aluminum hydroxide. **DO NOT INDUCE VOMITING!** Do not give anything by mouth to an unconscious or convulsing person. Get immediate medical attention.

General advice: Hydrochloric acid it is very corrosive and irritating and may cause severe burns and may be fatal if swallowed or inhaled. Do not get in eyes, or skin, on clothing! Do not breathe vapor! Keep in tightly closed containers.

5. FIRE - FIGHTING MEASURES

Extinguishing media: For small fires, use water spray, foam, carbon dioxide or dry chemical. For large fires, use water spray, fog or alcohol foam.

Protection of fire fighting: Fire fighters should wear full protective clothing and self-contained breathing apparatus with face-piece operate in positive pressure mode. Stay away from ends of tanks. Cool tanks with water spray. Do not get water inside containers.

Hazardous combustion products: None.

Other information: Hydrochloric acid is nonflammable, has not sensibility to mechanical shock and to static discharge. Contact with metals produces hydrogen gas, which may form explosive mixtures with air. Thermal decomposition can produce poisoning chlorine. Hydrochloric acid reacts also with many organic materials with liberation of heat.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Wear appropriate protective equipment. Do not touch or walk through spilled material. Stop leak if it can be done without risk. Evacuate all unnecessary personnel from affected area. Ventilate and isolate the hazard area.

Environmental precautions: Prevent from contamination the ground and the surface water by isolating the work area. Contain and recover liquid when possible. Keep closed containers and dispose according to all applicable federal state or local environment regulations.

Methods of cleaning up: For small spills, use vermiculite, fuller's earth or sand to absorb the liquid. Neutralize with lime stone, slaked lime or soda ash. Shovel up and place in a non-metal waste container for disposal. Neutralize spill area and wash with plenty of water. For large spills, dike spill area with soil or sandbags to contain it and to prevent it spread. Prevent liquid from entering sewers waterways; water spray can be used to knock down vapors. Remove bulk of liquid, for example with vacuum truck, for recovery or disposal. Then flush area with water and neutralize washings with lime stone, slaked lime, soda ash or caustic. If permitted, flush neutralized washing to a waste treatment plant. Dispose of all contaminants according to federal, state and local regulations.

7. HANDLING AND STORAGE

Handling: Protect containers against physical damage. Wear appropriate protective equipment. Keep containers closed. Use with sufficient ventilation to keep area below established exposure levels. Wash thoroughly after handling. When handle hydrochloric acid avoid contact with metals and organic matters. When diluting, the acid should always be added slowly to water and in small amounts. Never use hot water and never add water to the acid! Water added to the acid can cause uncontrolled boiling and splashing. If opening metal containers, use non-sparking tools because of the possibility of hydrogen gas being present. Containers of this material may be hazardous when empty since they retain product residue (vapors, liquid); observe all warnings and precautions listed for the product

Storage: Store in a cool, dry, ventilated area with acid resistant floors and good drainage. Keep out of direct sunlight and away from heat, water and incompatible materials. Keep the containers tightly closed. Containers for hydrochloric acid must be made from corrosion resistant materials: glass, polyethylene, polypropylene, polyvinyl chloride, carbon steel lined with rubber or ebonite.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure limit:

Long-term exposure limit (8-hour TWA reference period) for aerosol mist: 1 ppm (2 mg/m³)

Short-term exposure limit (15-minute reference period): 5 ppm (8 mg/m³)

Engineering control: Use local exhaust or general dilution ventilation system to keep employee exposure as low as possible. In plant operations should employ negative pressure (vacuum) techniques to keep vapor inside processing equipment.

Personal protective equipment

Respiratory protection: If the exposure limit is exceeded (up to 50ppm) a full face-piece respirator with a chemical cartridge respirator with acid cartridge is recommended. Above this level, a self-contained breathing apparatus is advised.

Hand protection: Wear natural rubber, neoprene, chlorinated polyethylene or polyvinyl chloride gloves.

Eye / Face protection: Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

Skin protection: Wear clothing (full suit) that will protect the skin from exposure to this chemical. During emergency or while making repairs, wear clothing that will not allow this chemical to penetrate. An additional protection including impervious boots, apron or coverall, is needed in areas of unusual exposure to prevent skin contact.

9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|--|--|
| Appearance | clear, colorless or slightly yellow fuming liquid |
| Odor | pungent odor |
| Boiling point | -84 ⁰ C |
| Melting point | -112 ⁰ C |
| Freezing point | -17.17 ⁰ C for 10.1% solution -46.2 ⁰ C for 31.4% solution |
| Density (water=1) | 1.19 |
| Vapor density (air=1) | 1.257 |
| Vapor pressure | 19 mmHg, at 25 ⁰ C |
| Solubility in water | 823 g/l at 0 ⁰ C; 721g/l at 20 ⁰ C; 561 g/l at 60 ⁰ C |
| Other solubility's | soluble in alcohol, benzene and ether, insoluble in hydrocarbons |
| pH | 1N(0.1); 0.1N(.,1); 0.01N(2.021); 0.001N(3.021) 0,0001N(4.01). |
| Odor threshold | 0.1 at 5ppm |
| Partition coefficient, log K _{ow} | 0.25 |
| Flash point | non applicable |
| Auto ignition temperature | non applicable |
| Explosive properties | not explosive |
| Oxidizing properties | no oxidizing properties |

10. STABILITY AND REACTIVITY

Chemical stability: Stable under ordinary condition of use and storage.

Conditions to avoid: Heat, direct sunlight, contact with common metals, alkali metals.

Materials to avoid: Reacts with water yielding dense, acrid hydrochloric acid fumes. Contact with common metals produces highly flammable hydrogen which may form an explosive mixture with air. Reacts with oxidizers generating toxic chlorine gas; with cyanides or sulfides, producing toxic hydrogen cyanide or hydrogen sulphide gas .

Hazardous decomposition products: When heated to decomposition, emits hydrogen chloride fumes and will react with water or steam to produce heat and toxic and corrosive fumes. Thermal oxidative decomposition produces toxic chlorine fumes and explosive hydrogen gas.

Hazardous polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Animal toxicity data

| | |
|------------------------------------|---------------------|
| LD ₅₀ /Oral rat | 700 mg/kg. |
| LD ₅₀ /Oral rabbit | 900 mg/kg. |
| LD ₅₀ /Dermal mouse | 1449 mg/kg |
| LD ₅₀ /Dermal rabbit | > 5010 mg/kg |
| LC ₅₀ /Inhalation rat | 3124 ppm/hour |
| LC ₅₀ /Inhalation mouse | 108 ppm/ 30 minutes |

Acute toxicity

Inhalation: Short term exposures have been reported to induce transitory obstruction in the respiratory tract, which diminishes with repeated exposure, suggesting adaption. Corrosive and irritating to the upper and lower respiratory tract and all mucosal tissue. Symptoms include cough, labored breathing and excessive salivary and sputum formation. Excessive irritation of the lungs causes acute pneumonia and pulmonary edema, which could be fatal. Chemical pneumonia and pulmonary edema may result from exposure to the lower respiratory tract and deep lung.

WARNING! Anhydrous fumes are more harmful than mists.

Skin contact: Corrosive and irritating to the skin and all living tissue. Exposure to hydrochloric acid can produce burns on the skin and mucous membranes, the severity of which is related to the concentration of the solution. Subsequently, ulceration may occur, followed by keloid and retractile scarring.

Eyes contact: Contact of conc acid with the eye can cause extensive necrosis of the conjunctiva and corneal epithelium, resulting in perforation or opaque scarring. Chemical pneumonitis can be

expected after respiratory exposure to acid vapors or after tracheobronchial aspiration of ingested acid.

Ingestion: Ingestion is harmful and may be fatal; may cause severe burning of mouth and stomach.

SYMPTOMATOLOGY (after ingestion) 1) Corrosion of mucous membranes of mouth, throat, and esophagus, with immediate pain and dysphagia. The necrotic areas are at first grayish white but soon acquire a blackish discoloration and sometimes a shrunken or wrinkled texture; the process is described as a "coagulation necrosis." 2) Epigastric pain, which may be associated with nausea and the vomiting of mucoïd and "coffee-ground" material. At times, gastric hemorrhage may be intense, and the vomitus then contains fresh blood. 3) Circulatory collapse with clammy skin, weak and rapid pulse, shallow respirations, and scanty urine. Circulatory shock is often the immediate cause of death. 4) Asphyxial death due to glottic edema. 5) Late esophageal, gastric and pyloric strictures and stenoses, which may require major surgical repair, should be anticipated.

Chronic effects: Chronic (long-term) occupational exposure to hydrochloric acid has been reported to cause gastritis, chronic bronchitis, dermatitis, and photosensitization in workers. Prolonged exposure to low concentrations may also cause dental discoloration and erosion.

Some experimental evidence indicates hydrochloric acid may cause mutagenic, teratogenic and reproductive effects.

CMR effects

Carcinogenicity: No carcinogenicity effects are reported (literature data).

Mutagenicity: No information

Teratogenicity and Embryotoxicity: There is no human or animal information available.

12. ECOTOXICOLOGICAL INFORMATION

Aquatic toxicity data:

| | | |
|---------|-------------------------|---------------------------------------|
| Fish | <i>Leuciscus idus</i> | LC ₅₀ =862 mg /l 48hours |
| | <i>Gambusia affinis</i> | LC ₅₀ =282 mg/l/96hours |
| Daphnia | <i>Daphnia magna</i> | LC ₅₀ =56mg/l/72hours///// |

Mobility: Complet miscible with water. Rapidly hydrolyzes when exposed to water. Will exhibit extensive evaporation from soil surface. Upon transport through the soil, hydrochloric acid will dissolve some of the soil materials (especially those with carbonate bases) and the acid will neutralize to some degree.

Persistence and degradability: It is not expected to persist in the environmet.

Bio accumulation potential: Hydrochloric acid is not expected to bioaccumulate.

Other adverse effects: Toxic for aquatic organisms. Toxic effect on fish or plankton. Harmful effect due to pH shift. Damage to plant growth. Do not cause biological oxygen deficit. Harmful effect begin at plant =6 mg/l

Lethal for fish as from 25 mg/l

PBT assessment: Not applicable.

13. DISPOSAL CONSIDERATIONS

Waste treatment: Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to an approved waste facility. Any disposal practice must be in compliance with all local and national law and regulations. Do not dump into any sewers, on the ground, or into any body of water.

Packaging treatment: The empty packaging must be disposal according with all local, regional and national regulations.

14. TRANSPORT INFORMATION

Hydrochloric acid solution can be shipped according to transport regulations for dangerous goods, hazard class 8, Corrosive substance.

Transport labeling



Class 8
Corrosive substances

RID/ADR

| | |
|----------------------|---|
| UN Number | 1789 |
| Proper shipping name | Hydrochloric acid , aqueous |
| Hazard class | 8 |
| Packing group | II |
| Classification code | C1 |
| <i>Danger panel</i> | <i>80/1789 (80 Hazard Identification No.) (1789 UN No.)</i> |

IMDG/IMO

| | |
|----------------------|------------------------------------|
| UN No. | 1789 |
| Hazard class | 8 |
| Packing group | II |
| Proper shipping name | Hydrochloric acid , aqueous |

EmS

F-A, S-B

IATA/IT-ICAO

| | |
|--------------------------|------------------------------------|
| Proper shipping name | Hydrochloric acid , aqueous |
| UN No. | 1789 |
| Hazard class | 8 |
| UN Packing Group | II |
| IATA Label | Corrosive |
| Packaging Note Passenger | 809 |
| Packaging Note Cargo | 813 |
| Max. Quantity Passenger | 11 |
| Max. Quantity Cargo | 30 l |

15. REGULATORY INFORMATION

Hydrochloric acid is classified and labelled under Directive 67/548/EEC, Annex I. This product is listed on EINCS.

| | |
|--------------------------|---------------------------|
| EC Classification | EC Index No. 017-002-01-X |
| | C; R34 |
| | Xi; R37 |

EC Labeling

| | |
|----------------------|----------------------|
| EC label name | Hydrochloric acid |
| EC Number | 231-595-7 |
| Hazard symbol | C - Corrosive |

| | | |
|-------------------|------|---|
| R- phrases | R 34 | Cause burns. |
| | R 37 | Irritating to respiratory system. |
| S- phrases | S 26 | In case of contact with eyes, rinse immediately with plenty of water and seek medical advise. |
| | S 45 | In case of accident or if you fell unwell, seek medical advice immediately (show the label whenever possible) |

16. OTHER INFORMATION**List of relevant R-phrases (see chapter 3)**

| | |
|------|-----------------------------------|
| R34 | Cause burns. |
| R 37 | Irritating to respiratory system. |

Precautions to be taken in handling and storing: Keep well ventilated the areas where hydrochloric acid is stored and handled.

HYDROCHLORIC ACID, SOLUTION min. 32%

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Work hygienic practices: Avoid direct contact of substance with skin/eyes. Avoid the exposure of personnel with dermatological and respiratory affections.

Interdictions: **Do not drink or eat** in working area.

Do not smoke in or near working area.

The use of open flame in working areas is prohibited.

Uses and Restrictions: Advice in this document relates only to product as originally supplied. Other derivative chemicals will have different properties and hazard.

Chemical intermediate for inorganic and organic synthesis.

Hazardous reaction: Heat generated upon dilution with water. Dilute only by adding to water with agitation. Do not add water to hydrochloric acid.

MSDS Revisions: This Material Safety Data Sheet is made in accordance to European Directive 91 and will replace the previous version 5 dated January 10, 2008.

Revised information:

TÜV mark for Quality-Environmental Integrated System was replaced with the new one, remited by TÜV Management GmbH.

Sources of key data uses to compile the data sheet:

EC Directive 67/548/EC resp. 99/45/EC as amended in each case.

EC Directive 2001/58/EC as amended in each case.

EC Directive 2000/39/EC as amended in each case.

National Threshold Limit Values of corresponding countries as amended in each case.

Transport regulations according to ADR, RID, IMDG, IATA as amended in each case.

This MSDS has been elaborated in accordance with Regulation (EC) No. 1907/2006 REACH. The information contained here in is based on the present state of our knowledge. It characterizes the product with regard to the appropriate safety precautions. It does not represent a guarantee of the properties of the product. This MSDS cannot cover all possible situations which the user may experience during handling and processing. Each aspect of the user's operation should be examined to determine if, or where, additional precautions may be necessary. All health and safety information contained within this MSDS should be provided to the user's employees or customers.

Material Safety Data Sheet

Sodium hydroxide, solid, pellets or beads

Section 1 - Chemical Product and Company Identification

MSDS Name: Sodium hydroxide, solid, pellets or beads

Catalog Numbers: NAOH-1, NAOH-2.5, NAOH-5, NAOH-10, NAOH-25, NAOH-50, Sodium Hydroxide Bulk

Synonyms: Caustic soda; Soda lye; Sodium hydrate; Lye.

Company Identification:

Essential Depot, Inc. 4210 Lafayette Ave, Sebring, FL 33875.

For information, call: 863-658-4230

For CHEMTREC assistance, call: 800-424-9300

For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

| CAS# | Chemical Name | Percent | EINECS/ELINCS |
|-----------|------------------|---------|---------------|
| 497-19-8 | Sodium carbonate | <3 | 207-838-8 |
| 1310-73-2 | Sodium hydroxide | 95-100 | 215-185-5 |

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white. **Danger!** Corrosive. Causes eye and skin burns. Hygroscopic. May cause severe respiratory tract irritation with possible burns. May cause severe digestive tract irritation with possible burns.

Target Organs: Eyes, skin, mucous membranes.

Potential Health Effects

Eye: Causes eye burns. May cause chemical conjunctivitis and corneal damage.

Skin: Causes skin burns. May cause deep, penetrating ulcers of the skin. May cause skin rash (in milder cases), and cold and clammy skin with cyanosis or pale color.

Ingestion: May cause severe and permanent damage to the digestive tract. Causes gastrointestinal tract burns. May cause perforation of the digestive tract. Causes severe pain, nausea, vomiting, diarrhea, and shock. May cause corrosion and permanent tissue destruction of the esophagus and digestive tract. May cause systemic effects.

Inhalation: Irritation may lead to chemical pneumonitis and pulmonary edema. Causes severe irritation of upper respiratory tract with coughing, burns, breathing difficulty, and possible coma. Causes chemical burns to the respiratory tract.

Chronic: Prolonged or repeated skin contact may cause dermatitis. Effects may be delayed.

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid immediately.

Skin: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid immediately. Wash clothing before reuse.

Ingestion: If swallowed, do NOT induce vomiting. Get medical aid immediately. If victim is fully conscious, give a cupful of water. Never give anything by mouth to an unconscious person.

Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Use water spray to keep fire-exposed containers cool. Use water with caution and in flooding amounts. Contact with moisture or water may generate sufficient heat to ignite nearby combustible materials. Contact with metals may evolve flammable hydrogen gas.

Extinguishing Media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire. Do NOT get water inside containers.

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation. Do not get water on spilled substances or inside containers.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Do not allow water to get into the container because of violent reaction. Minimize dust generation and accumulation. Do not get in eyes, on skin, or on clothing. Keep container tightly closed. Avoid ingestion and inhalation. Discard contaminated shoes. Use only with adequate ventilation.

Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from metals. Corrosives area. Keep away from acids. Store protected from moisture. Containers must be tightly closed to prevent the conversion of NaOH to sodium carbonate by the CO₂ in air.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

| Chemical Name | ACGIH | NIOSH | OSHA - Final PELs |
|------------------|-----------------------|---------------------------|-------------------------|
| Sodium carbonate | none listed | none listed | none listed |
| Sodium hydroxide | C 2 mg/m ³ | 10 mg/m ³ IDLH | 2 mg/m ³ TWA |

OSHA Vacated PELs: Sodium carbonate: No OSHA Vacated PELs are listed for this chemical. Sodium hydroxide: C 2 mg/m³

Personal Protective Equipment

Eyes: Wear chemical goggles.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: A respiratory protection program that meets OSHA's 29 CFR §1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

Section 9 - Physical and Chemical Properties

Physical State: Solid

Appearance: white

Odor: Odorless

pH: 14 (5% aq soln)

Vapor Pressure: 1 mm Hg @739 deg C

Vapor Density: Not available.

Evaporation Rate:Not available.

Viscosity: Not available.

Boiling Point: 1390 deg C @ 760 mm Hg

Freezing/Melting Point:318 deg C

Autoignition Temperature: Not applicable.

Flash Point: Not applicable.

Decomposition Temperature:Not available.

NFPA Rating: (estimated) Health: 3; Flammability: 0; Reactivity: 1

Explosion Limits, Lower:Not available.

Upper: Not available.

Solubility: Soluble.

Specific Gravity/Density:2.13 g/cm³

Molecular Formula: NaOH

Molecular Weight: 40.00

Section 10 - Stability and Reactivity

Chemical Stability: Stable at room temperature in closed containers under normal storage and handling conditions.

Conditions to Avoid: Moisture, contact with water, exposure to moist air or water, prolonged exposure to air.

Incompatibilities with Other Materials: Acids, water, flammable liquids, organic halogens, metals, aluminum, zinc, tin, leather, wool, nitromethane.

Hazardous Decomposition Products: Toxic fumes of sodium oxide.

Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:

CAS# 497-19-8: VZ4050000

CAS# 1310-73-2: WB4900000

LD50/LC50:

CAS# 497-19-8:

Draize test, rabbit, eye: 100 mg/24H Moderate;

Draize test, rabbit, eye: 50 mg Severe;

Draize test, rabbit, skin: 500 mg/24H Mild;

Inhalation, mouse: LC50 = 1200 mg/m³/2H;

Inhalation, rat: LC50 = 2300 mg/m³/2H;

Oral, mouse: LD50 = 6600 mg/kg;

Oral, rat: LD50 = 4090 mg/kg; <BR.

CAS# 1310-73-2:

Draize test, rabbit, eye: 400 ug Mild;

Draize test, rabbit, eye: 1% Severe;

Draize test, rabbit, eye: 50 ug/24H Severe;

Draize test, rabbit, eye: 1 mg/24H Severe;

Draize test, rabbit, skin: 500 mg/24H Severe; <BR.

Carcinogenicity:

CAS# 497-19-8: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA. **CAS#** 1310-73-2: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.

Epidemiology: No information available.

Teratogenicity: No information available.

Reproductive Effects: No information available.

Neurotoxicity: No information available.

Mutagenicity: No information available.

Other Studies: See actual entry in RTECS for complete information.

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series: None listed.

Section 14 - Transport Information

| | US DOT | IATA | RID/ADR | IMO | Canada TDG |
|-----------------------|-------------------------|------|---------|-----|------------------|
| Shipping Name: | SODIUM HYDROXIDE, SOLID | | | | SODIUM HYDROXIDE |
| Hazard Class: | 8 | | | | 8(9.2) |
| UN Number: | UN1823 | | | | UN1823 |
| Packing Group: | II | | | | II |

Section 15 - Regulatory Information

US FEDERAL**TSCA**

CAS# 497-19-8 is listed on the TSCA inventory.

CAS# 1310-73-2 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

SARA**Section 302 (RQ)**

CAS# 1310-73-2: final RQ = 1000 pounds (454 kg)

Section 302 (TPQ)

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 497-19-8: acute. CAS # 1310-73-2: acute, reactive.

Section 313

No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants. This material does not contain any Class 1 Ozone depleters. This material does not contain any Class 2 Ozone depleters.

Clean Water Act:

CAS# 1310-73-2 is listed as a Hazardous Substance under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 497-19-8 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

CAS# 1310-73-2 can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

California No Significant Risk Level: None of the chemicals in this product are listed.

Section 16 - Additional Information

MSDS Creation Date: 12/12/1997

Revision #4 Date: 8/01/2001

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Essential Depot, Inc. be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Essential Depot, Inc. has been advised of the possibility of such damages.