

MATERIAL SAFETY DATA SHEET (MSDS) CLASS 8 – CORROSIVE SUBSTANCES

1. CHEMICAL PRODUCT IDENTIFICATION

1.1 PRODUCT IDENTIFIER:

This data sheet is about substances and mixtures that are characterized as corrosive substances which are included in Class 8, according UNITED NATIONS Committee of Experts on the Transport of Dangerous Goods (UN). Class 8 substances (corrosive substances) means substances which, by chemical action, will cause severe damage when in contact with living tissue or, in the case of leakage, will materially damage, or even destroy, other goods or the means of transport
The following products have been recorded in the present MSDS: Sulfuric Acid

1.2 RELEVANT IDENTIFIED USES:

Industrial and professional. Perform risk assessment prior to use.

Emergency telephone number:



National Emergency Centre: 166
National Poison Centre: (+30) 2107793777

2. HAZARDS IDENTIFICATION

2.1 CLASSIFICATION OF HAZARDS

2.1.1 According to GHS (EC Regulation 1272/2008)



_ **Skin Corrosion/Irritation (Skin Corr.):** H314

H314: Causes severe skin burns and eye damage

(May be): _ **Skin Irritation (Skin Irrit.):** H315

H315: Causes skin irritation.

_ **Eye Irritation (Eye Irrit.):** H319

H319: Causes serious eye irritation.

2.1.2 According to DSD-DPD (Directive 67/548/EEC)



_ **Corrosive:** R35

R35: Causes severe burns

R36/38: Irritating to eyes and skin

2.2 LABELLING:

- According to GHS (EC Regulation 1272/2008)

Signal word: **D a n g e r**

Hazard pictograms (at least a subset): GHS05

Hazard statements (H) (at least a subset): H214. (May be): H315, H319 (For full text of H-statements: see SECTION 2.1)

Precautionary statements (P) (at least a subset): P260: Do not breathe fumes/gas/mist/vapours/spray.
P264: Wash thoroughly after handling.
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.
P363: Wash contaminated clothing before reuse.
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.
P310: Immediately call a POISON CENTER or doctor/physician.
P321: Specific treatment (see P310).
P405: Store locked up.
P501: Dispose of contents/container according to federal, regional and local government requirements.

Supplemental Hazard Information (EU) may be: Not available

- According to DSD-DPD (Directive 67/548/EEC)

Symbol(s) and indication(s) of danger (at least a subset): C Corrosive
Xi Irritant

Risk Phrases (R) (at least a subset): R35, R36/38 (For full text of R-phrases: see SECTION 2.1)

Safety phrases (S) (at least a subset): S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S30: Never add water to this product.
S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

Particular hazards to man and environment: -

2.3 OTHER HAZARDS (may be):

PBT and vPvB assessment: -

3. COMPOSITION / INFORMATION ON INGREDIENTS

3.1 MIXTURE:

[Composition is referred to ANNEX-ADDITIONAL INFORMATION.xlsx](#)

Hazardous ingredients may be: -

4. FIRST AID MEASURES

4.1 DESCRIPTION OF FIRST AID MEASURES:

WARNING BEFORE PREVENTION: -

FOLLOWING INHALATION: This chemical is very toxic. Get medical aid immediately. Remove patient from exposure to fresh air immediately. Administer approved oxygen supply if breathing is difficult. Administer artificial respiration or CPR if breathing has ceased. Call a physician. Symptoms of pulmonary oedema can be delayed up to 48 hours after exposure.

FOLLOWING SKIN CONTACT: Get medical aid immediately. Immediately flush skin with copious quantities of soap and water for at least 30 minutes while removing contaminated clothing and shoes. SPEEDY ACTION IS CRITICAL! Call a physician.

FOLLOWING EYE CONTACT: Immediately flush eyes with copious amounts of water for at least 30 minutes, holding lids apart to ensure flushing of the entire surface. Do NOT allow victim to rub eyes or keep eyes closed. Get medical aid immediately.

FOLLOWING INGESTION: Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Consult a physician immediately. Never give anything by mouth to an unconscious person.

NOTES FOR THE DOCTOR: Treat symptomatically and supportively. Consult a doctor and/or the nearest Poison Control Centre for all exposures.

4.2 MOST IMPORTANT SYMPTOMS AND EFFECT, BOTH ACUTE AND DELAYED:

Eye Contact: Causes severe eye burns. May cause permanent eye injury, including blindness. Sulfuric acid mists and aerosols are expected to be irritating.
Skin Contact: Causes severe skin burns, blisters, ulcers, and permanent scarring. Extensive burns may result in death. High mist or aerosol concentrations may cause redness, irritation and burns to the skin if contact is prolonged.
Ingestion: May be fatal if swallowed. Causes burns to the lips, tongue, throat, esophagus, and stomach; symptoms may include difficulty swallowing, intense thirst, nausea, vomiting, diarrhoea, and in severe cases collapse and death. Aspiration during ingestion or vomiting may cause serious lung injury and death.
Inhalation: May be fatal if inhaled. Causes severe irritation and burns to the respiratory system. May cause pulmonary oedema with symptoms including coughing, chest pain and shortness of breath. Symptoms can be delayed for 24-48 hours after exposure and are aggravated by physical exertion.
Effects of Chronic Exposure: Although sulfuric acid is widely used, there is little information on the effects of long-term exposure. Long-term exposure to corrosive materials like sulfuric acid can cause chronic respiratory irritation. Repeated exposure to sulfuric acid aerosols has caused dental erosion. Repeated skin contact with low concentrations can cause dry, red, cracked skin (dermatitis).

4.3 INDICATION OF ANY IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED:

5. FIRE-FIGHTING MEASURES

5.1 EXTINGUISHING MEDIA:

Fire fighters must be fully trained and wear full protective clothing including an approved, self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask. For fires close to a spill or where vapours are present, use acid-resistant personal protective equipment.

Suitable extinguishing media: Use dry chemical or carbon dioxide extinguishers. Use water spray to cool fire-exposed containers. Use water only if absolutely necessary.

DO NOT USE WATER DIRECTLY ON ACID as a violent reaction may occur resulting in spattering of the acid.

Unsuitable extinguishing media: DO NOT USE WATER DIRECTLY ON ACID as a violent reaction may occur resulting in spattering of the acid.

5.2 SPECIAL HAZARDS ARISING FROM THE SUBSTANCE OR MIXTURE:

Specific hazards arising from the chemical: Sulfuric acid is not flammable or combustible. However, fires may result from the heat generated by contact of concentrated sulfuric acid with combustible materials. Sulfuric acid reacts with most metals, especially when diluted with water, to produce hydrogen gas which can accumulate to explosive concentrations inside confined spaces. It reacts violently with water and organic materials evolving a considerable amount of heat and is very hazardous when in contact with carbides, cyanides, and sulfides.

Hazardous combustion products: -

6. ACCIDENTAL RELEASE MEASURES

6.1 PERSONAL PRECAUTION, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES:

6.1.1 For non-emergency personnel:

Do not touch spilled material. Prevent material from entering confined spaces, sewers or waterways. Keep materials which can burn away from spilled material. Stop or reduce leak if safe to do so.

6.1.2 For emergency responders:

Acid resistant protective clothing and gloves. Sleeves and pant legs should be worn outside, not tucked into gloves and rubber boots. Use close-fitting safety goggles or a combination of safety goggles and a face shield where splashing is a possibility. Respiratory protection equipment should be worn where exposure to hazardous levels of mist or fume is possible.

6.2 ENVIRONMENTAL PRECAUTIONS AND METHODS FOR CONTAINMENT AND CLEANING UP:

Land spillage: According to all applicable regulations. - This product can pose a threat to the environment. Contamination of soil and water should be prevented. Keep spillage from entering ground, streams or sewers.

Spillages in water or at sea: According to all applicable regulations. - This product can pose a threat to the environment. Contamination of soil and water should be prevented. Keep spillage from entering ground, streams or sewers.

6.3 METHODS AND MATERIAL FOR CONTAINMENT AND CLEANING UP:

6.3.1 For containment:

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6.3.2 For cleaning up:

Control source of release if possible to do safely. Contain spill, isolate hazard area, and deny entry to unauthorized personnel. Dike area around spill and pump uncontaminated acid back to process if possible. Neutralize spilled material with alkali such as sodium carbonate or sodium bicarbonate, soda ash, lime or limestone granules. If neutralized with lime rock or soda ash, good ventilation is required during neutralization because of the release of carbon dioxide gas. Allow to stand for 1-2 hours to complete neutralization, then absorb any liquid in solid absorbent such as vermiculite or clay absorbents. Place spilled material in suitable labelled containers for final disposal. Treat or dispose of waste spilled material and/or contaminated absorbent material in accordance with all local, regional and national regulations.

6.3.3 Other information: -

7. HANDLING AND STORAGE

7.1 PRECAUTIONS FOR SAFE HANDLING:

7.1.1 Protective measures:

Information on safe handling and measures to prevent fire/explosion: This material is a CORROSIVE and VERY TOXIC liquid. Avoid generating vapours or mists. Do not use with incompatible materials such as alkali solutions, carbides, chlorates and nitrates. See Section 10 for more information. Never return contaminated material to its original container. Never add water to a corrosive. Always add corrosives to COLD water. When mixing with water, stir small amounts in slowly. Assume that empty containers contain residues that are hazardous. Use with adequate ventilation.

Measures to protect the environment: Prevent the release of vapours or mists into the air. Highly reactive. Prevent accidental contact with water.

7.1.2 Advice on general occupational hygiene:

Do not allow smoking and food consumption while handling. Thoroughly wash hands before eating, drinking, or smoking.

7.2 CONDITIONS FOR SAFE STORAGE:

Technical measures and storage conditions: Store in a cool, dry, well-ventilated area away from combustible substances. Keep container tightly closed when not in use. Do not store near alkaline or organic substances. Do not add any other material to the container. Do not store in a damp atmosphere. Do not get in eyes, on skin or on clothing. Handle in accordance with good storage and handling practices. Do not store near flammable substances. Wash thoroughly after handling.

Packaging materials: -

Requirements for storage rooms and vessels: Store in a cool place away from heated areas, sparks and flame.

Storage class: 8

7.3. SPECIFIC END USE(S): -

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 CONTROL PARAMETERS:

8.1.1 Occupational Exposure/Biological Limit Values:

[Occupational Exposure/Biological Limit Values are referred to ANNEX-ADDITIONAL INFORMATION.xlsx](#)

8.1.2 Information on currently recommended monitoring procedures:

OSHA -Occupational Safety and Health Administration; ACGIH -American Conference of Governmental Industrial Hygienists; NIOSH -National Institute for Occupational Safety and Health.

8.1.3 Applicable occupational exposure limit values and/or biological limit values for air contaminants (if formed when using the substance/mixture as intended):

[Applicable occupational exposure limit values and/or biological limit values for air contaminants are referred to ANNEX-ADDITIONAL INFORMATION.xlsx](#)

8.1.4 DNEL / PNEC values: -

8.2 EXPOSURE CONTROLS:

8.2.1 Appropriate engineering controls / Technical measures to prevent exposure:

Appropriate engineering controls: Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels. - Use adequate local or general ventilation to maintain the concentration of sulfuric acid a aerosol mists below recommended occupational exposure limits.

Organisational measures to prevent exposure: -

8.2.2 Personal protection equipment:

Make eye bath and emergency shower available.

Respiratory protection:



Use of full face masks with combined filters in case of small leakages. In incidents of great release, use self-contained breathing apparatus and full suit (impermeable uniform, boots, gloves). - Follow the OSHA respirator regulations found in 29CFR 1910.134. Always use a NIOSH-approved respirator when necessary.

EN 136 - Respiratory protective devices - Full face masks - Requirements, testing, marking.

DIN EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.

BS EN 141:2000 - Respiratory protective devices. Gas filters and combined filters. Requirements, testing, marking

Eye protection:



Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133.

- CSN EN 166 - Personal eye-protection – Specifications. - CR13464 - Guide to selection, use and maintenance of occupational eye and face protectors.

Hand protection:

Wear appropriate protective neoprene or polyethylene gloves to prevent skin exposure.

Protective gloves against chemicals and micro-organisms.

- DIN EN 388 Protective gloves against mechanical risks. - DIN EN 407 Protective gloves against thermal risks (heat and/or fire).

- DIN EN 420 Protective gloves - General requirements and test methods (includes Amendment A1:2009).

Choose the glove material taking into consideration the penetration times, rates of diffusion and the degradation. Check if the gloves are in good condition before each use.

Skin and body (including hands) protection:

Wear appropriate protective clothing to prevent skin exposure. Apron or clothing to protect skin. Rubber boots. Sufficient to protect skin.

- CSN EN 340 Protective clothing - General requirements.

- BS EN 465:1995 - Protective clothing. Protection against liquid chemicals. Performance requirements for chemical protective clothing with spray-tight connections between different parts of the clothing (type 4 equipment).

- BS EN 466-1:1995 - Protective clothing. Protection against liquid chemicals. Performance requirements for chemical protective clothing with liquid-tight connections between different parts of the clothing (type 3 equipment).

- BS EN 467:1995 - Protective clothing. Protection against liquid chemicals. Performance requirements for garments providing protection to parts of the body.

- CSN EN 345 Use safety footwear

8.2.3 Environmental exposure controls:

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9. PHYSICAL AND CHEMICAL PROPERTIES**9.1 INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES:**

[Physical and chemical properties are referred to ANNEX-ADDITIONAL INFORMATION.xlsx](#)

10. STABILITY AND REACTIVITY**10.1 REACTIVITY:**

Extremely reactive with metals, alkalis and many other organic and inorganic chemicals. Hazardous gases such as hydrogen cyanide, hydrogen sulfide and acetylene are evolved on contact with chemicals such as cyanides, sulfides and carbides.

10.2 CHEMICAL STABILITY:

Stable under normal temperatures and pressures.

10.3 POSSIBILITY OF HAZARDOUS REACTIONS:

Hydrogen is generated by the action of the acid on most metals.

10.4 CONDITIONS TO AVOID:

Incompatible materials, contact with water, metals, excess heat, combustible materials, organic materials, oxidizers, amines, bases

10.5 INCOMPATIBLE MATERIALS:

Acetic anhydride, Acetone cyanhydrin, Acetone + Nitric acid, Acetone + Potassium dichromate, Acetonitrile + sulfurtrioxide, Acrolein, Acrylonitrile, Alcohols + Hydrogen peroxide, Allyl alcohol, Allyl and Aldehyde compounds, Allyl chloride, 2-Aminoethanol, Ammonium hydroxide, Ammonium iron(III) sulfate dodecahydrate, Ammonium triperchromate, Aniline + Glycerol + Nitrobenzene, Benzyl alcohol, Bromates + Metals, tert-Butyl-m-xylene + Nitric acid, 1-Chloro-2,3-epoxypropane, Bromine pentafluoride, n-Butylaldehyde, Cesium acetylene carbide, 4-Chloronitrobenzene + sulfur trioxide, Copper, Dichloromethane + Ethanol + Nitrate/nitrite, 2-Cyano-4-nitrobenzenediazonium hydrogen sulphate, 2-Cyano-2-propanol, Chlorine trifluoride, Chlorosulfonic acid (Cyanides), Cyclopentadiene, Cyclopentanone oxime, 1,3-Diazidobenzene, Diethylamine, Cuprous nitride, Diisobutylene, Ephchlorohydrin, Ethylene cyanohydrin, Ethylene diamine, Ethylene glycol, Dimethoxydinitroanthraquinone, 4 Dimethylaminobenzaldehyde, 2,5-Dinitro-3-methylbenzoic acid+ Sodium azide, 1,5-Dinitronaphthalene + sulfur, Ethoxylated nonylphenol, Fulminates, Halides, Hexalithium disilicide, Ethylenimine, Other acids, Iodine heptafluoride, Metals, Isoprene, Hydrofluoric acid, Hydrogen peroxide, Metal acetylides or carbides, Metal chlorates, Metal perchlorates, 4-Methylpyridine, Nitramide, Nitric acid + Organic materials, Nitric acid + Toluene, Nitrites, Nitroaryl bases and derivatives, Nitrobenzene, 3-Nitrobenzenesulfonic acid, Nitromethane, N-Nitromethylamine, 4-Nitrotoluene, Permanganates, Phosphorus, Phosphorus(III) oxide, Poly(silylene), Mercuric nitride, Mesityl oxide, P-Nitrotoluene, Pentasilver trihydroxydiaminophosphate, Perchlorates, Permanganates + Benzene, Phosphorus isocyanate, Picrates, Potassium t-butoxide, Potassium, 3-Propynol, Potassium chlorate, beta-Propiolactone, Propylene oxide, Pyridine, Rubidium acetylene carbide and Sodium, Silver permanganates, Silver peroxochromate, Sodium, Sodium carbonate, Sodium tetrahydroborate, Sodium thiocyanate, Sucrose, Tetramethylbenzenes, 1,2,4,5-Tetrazine, Thallium(I) azidodithiocarbonate, 1,3,5-Trinitrosocyclohexane-1,3,5-triazine, Water, Zinc Iodide. Carbonates, sulfides, sulphites, carbides, chlorates.

Oxides of sulfur.

11. TOXICOLOGICAL INFORMATION

11.1 INFORMATION ON TOXICOLOGICAL EFFECTS:

[Toxicological information is referred to ANNEX-ADDITIONAL INFORMATION.xlsx](#)

Concentrated sulfuric acid exerts a strong corrosive action on all tissues due to its severe dehydration action (removing water from tissues). The severity of the chemical burn produced by the concentrated acid is proportional to the strength of the acid and the duration of contact. Burns are deep but typically not severely painful. Prolonged exposure to dilute solutions or acid mists may lead to irritation of the eyes and skin causing chronic conjunctivitis and dermatitis. Inhalation of sulfuric acid mist or fumes may result in irritation of the respiratory tract possibly leading to laryngeal spasm. Asthmatics may be more sensitive to inhaling sulfuric acid mists. IARC and the ACGIH have concluded there is sufficient evidence that occupational exposure to strong inorganic acid mists containing sulfuric acid is carcinogenic or potentially carcinogenic to humans.

Acute toxicity: Splashes can cause severe eye burns and may cause irreversible eye injury and possible blindness. Skin contact results in severe burns and may result in permanent scarring. High levels of sulfuric acid mists and aerosols are also irritating to the eyes and skin

Skin corrosion/irritation: Prolonged exposure to dilute solutions or mists may produce skin dermatitis. - Exposure to high concentrations of acid mist has caused erosion and discoloration of the anterior teeth.

Serious eye damage /irritation: Prolonged exposure to dilute solutions or mists may result in eye irritation (chronic conjunctivitis).

Respiratory or skin sensitisation: Inhalation may cause severe irritation of the respiratory tract with sore throat, coughing, shortness of breath, laryngeal spasm and delayed lung oedema. These symptoms may be aggravated by physical exertion.

Germ cell mutagenicity: Cytogenetic analysis

Carcinogenicity: Sulfuric acid is not listed as a carcinogen by OSHA, National Toxicology Program (NTP), International Agency for Research on Cancer (IARC), ACGIH or the EU. IARC has concluded that there is sufficient evidence that occupational exposure to strong inorganic acid mists containing sulfuric acid is carcinogenic to humans, resulting in an increased incidence of primarily laryngeal cancers. The ACGIH lists strong inorganic acid mists containing sulfuric acid as a suspect human carcinogen (A2) and the NTP have recently re-classified strong inorganic acid mists containing sulfuric acid to a known human carcinogen. OSHA and the EU do not list sulfuric acid mist as a carcinogen. - Workers exposed to industrial sulfuric acid mist showed a statistical increase in laryngeal, nasal, sinus, and lung cancer. These data suggest a possible relationship between carcinogenesis and inhalation of sulfuric acid mist.

Toxicity to reproduction: Specific developmental abnormalities

STOT - single exposure: No information available

STOT - repeated exposure: No information available

Aspiration hazard: Ingestion is unlikely in industrial use but will result in severe burns to the mouth, throat, esophagus and stomach which could lead to permanent damage to the digestive tract. Small amounts of acid can also enter the lungs during ingestion or subsequent vomiting and cause serious lung injury.

12. ECOLOGICAL INFORMATION

12.1 TOXICITY:

12.1.1 Aquatic toxicity:

sulfuric acid is harmful to aquatic life in very low concentrations. It may be dangerous if it enters water intakes. Sulfuric acid is very corrosive and is highly toxic to aquatic life at low concentrations.

12.1.2 Sediment toxicity:

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12.1.3 Terrestrial Toxicity:

Sulfuric acid is very corrosive and is highly toxic to terrestrial life at low concentrations.

Toxicity to birds: -

12.2 PERSISTENCE AND DEGRADABILITY:

12.2.1 Persistence Assessment:

-

12.2.2 Stability:

Hydrolysis: -

Phototransformation in air: -

Phototransformation in water and soil: -

12.2.3 Biodegradation:

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12.3 BIOACCUMULATIVE POTENTIAL:

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12.4 MOBILITY IN SOIL:

-

12.5 RESULTS OF PBT AND vPvB ASSESSMENT:

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13. DISPOSAL CONSIDERATIONS

13.1 WASTE TREATMENT METHODS:

13.1.1 Product / Packaging disposal:

If neutralized with lime rock or soda ash, good ventilation is required during neutralization because of the release of carbon dioxide gas.

13.1.2 Waste treatment - relevant information:

Dispose of neutralized waste consistent with regulatory requirements.

13.1.3 Sewage disposal - relevant information:

Do not wash down drain or allow to reach natural watercourses.

13.1.4 Other disposal recommendations:

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13.2 ADDITIONAL INFORMATION:

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14. TRANSPORT INFORMATION

Pictogram(s):



LAND TRANSPORT (Road/Rail) according to ADR/RID 2003, ΠΔ 104/99 and its amendments (ΦΕΚ 509B/2000 and 1232B/2001), Directives 94/55/EEC and 96/49/EEC and their amendments:

Transport Hazard Class(es): 8

Packing group: II

INLAND WATERWAY TRANSPORT (AND(R)):

Transport Hazard Class(es): 8

Packing group: II

MARINE TRANSPORT according to IMDG – IMO Code 2002 and ΠΔ 405/96:

Transport Hazard Class(es): 8

Packing group: II

Marine pollutant: No

AIR TRANSPORT (ICAO-TI/IATA-DRG):

Transport Hazard Class(es): 8

Packing group: II

[More details such as environmental hazards \(UN Model Regulations/2009\), limited quantities, packaging and IBCs, portable tanks and bulk containers, special precautions for users about transport information are referred to ANNEX-ADDITIONAL INFORMATION.xls](#)

15. REGULATORY INFORMATION

15.1 SAFETY, HEALTH AND ENVIRONMENTAL REGULATIONS/LEGISLATION SPECIFIC FOR THE SUBSTANCE OR MIXTURE:

National Regulations: -

EU Regulations: Listed on the European Inventory of Existing Commercial Chemical Substances (EINECS), European Economic Community, Commission Directives 91/155/EEC, 93/21/EEC, and 67/548/EEC.

15.2 CHEMICAL SAFETY ASSESSMENT:

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16. OTHER INFORMATION

KEY LITERATURE REFERENCES AND SOURCE OF DATA:

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RELEVANT R-PHRASES AND/OR H-STATEMENTS MAY BE:

None

TRAINING ADVICE:

The information of the present generalized Material Safety Data Sheet can be used for training purposes. - Ensure operators understand the hazard of oxygen enrichment.