

### SECTION 1: Identification

#### 1.1. Identification

|                |  |
|----------------|--|
| Product form   | : Substance  |
| Substance name | : 1,10-Phenanthroline, Monohydrate, ACS  |
| CAS-No.        | : 5144-89-8  |
| Product code   | : LC18140  |
| Formula        | : C12H8N2.H2O  |
| Synonyms       | : 4,5-phenanthroline monohydrate / o-phenanthroline monohydrate / ortho-phenanthroline monohydrate |

#### 1.2. Recommended use and restrictions on use

Use of the substance/mixture : Laboratory chemical

#### 1.3. Supplier

LabChem, Inc.  
Jackson's Pointe Commerce Park Building 1000, 1010 Jackson's Pointe Court  
Zelienople, PA 16063 - USA  
T 412-826-5230 - F 724-473-0647

#### 1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300 or +1-703-741-5970

### SECTION 2: Hazard(s) identification

#### 2.1. Classification of the substance or mixture

##### GHS-US classification

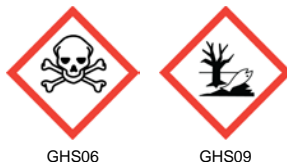
|  |      |  |
|--|------|--|
| Acute toxicity (oral) Category 3                                 | H301 | Toxic if swallowed                                   |
| Hazardous to the aquatic environment - Acute Hazard Category 1   | H400 | Very toxic to aquatic life                           |
| Hazardous to the aquatic environment - Chronic Hazard Category 1 | H410 | Very toxic to aquatic life with long lasting effects |

Full text of H statements : see section 16

#### 2.2. GHS Label elements, including precautionary statements

##### GHS US labeling

Hazard pictograms (GHS US) :



|                                   |   |
|-----------------------------------|---|
| Signal word (GHS US)              | : Danger  |
| Hazard statements (GHS US)        | : H301 - Toxic if swallowed<br>H410 - Very toxic to aquatic life with long lasting effects  |
| Precautionary statements (GHS US) | : P264 - Wash exposed skin thoroughly after handling.<br>P270 - Do not eat, drink or smoke when using this product.<br>P273 - Avoid release to the environment.<br>P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.<br>P330 - If swallowed, rinse mouth<br>P391 - Collect spillage.<br>P405 - Store locked up.<br>P501 - Dispose of contents/container to comply with local, state and federal regulations |

#### 2.3. Other hazards which do not result in classification

Other hazards not contributing to the classification : None.

# 1,10-Phenanthroline, Monohydrate, ACS

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

### 2.4. Unknown acute toxicity (GHS US)

Not applicable

## SECTION 3: Composition/Information on ingredients

### 3.1. Substances

Substance type : Mono-constituent

| Name  | Product identifier  | %   | GHS-US classification   |
|---|---------------------|-----|---|
| 1,10-Phenanthroline, Monohydrate, ACS<br>(Main constituent) | (CAS-No.) 5144-89-8 | 100 | Acute Tox. 3 (Oral), H301<br>Aquatic Acute 1, H400<br>Aquatic Chronic 1, H410 |

Full text of hazard classes and H-statements : see section 16

### 3.2. Mixtures

Not applicable

## SECTION 4: First-aid measures

### 4.1. Description of first aid measures

- First-aid measures general : Check the vital functions. Unconscious: maintain adequate airway and respiration. Respiratory arrest: artificial respiration or oxygen. Cardiac arrest: perform resuscitation. Victim conscious with labored breathing: half-seated. Victim in shock: on his back with legs slightly raised. Vomiting: prevent asphyxia/aspiration pneumonia. Prevent cooling by covering the victim (no warming up). Keep watching the victim. Give psychological aid. Keep the victim calm, avoid physical strain. Depending on the victim's condition: doctor/hospital.
- First-aid measures after inhalation : Remove the victim into fresh air. Respiratory problems: consult a doctor/medical service.
- First-aid measures after skin contact : Rinse with water. Soap may be used. Take victim to a doctor if irritation persists.
- First-aid measures after eye contact : Rinse with water. Remove contact lenses, if present and easy to do. Continue rinsing. Do not apply neutralizing agents. Take victim to an ophthalmologist if irritation persists.
- First-aid measures after ingestion : Rinse mouth with water. Give nothing to drink. Victim is fully conscious: immediately induce vomiting. Induce vomiting by giving a 0.9 % saline solution. Call Poison Information Centre ([www.big.be/antigif.htm](http://www.big.be/antigif.htm)). Immediately consult a doctor/medical service. Ingestion of large quantities: immediately to hospital. Take the container/vomit to the doctor/hospital. Doctor: administration of chemical antidote. Doctor: gastric lavage.

### 4.2. Most important symptoms and effects (acute and delayed)

- Symptoms/effects after inhalation : Slight irritation.
- Symptoms/effects after skin contact : Slight irritation.
- Symptoms/effects after eye contact : Slight irritation.
- Symptoms/effects after ingestion : Nausea. Abdominal pain. Diarrhoea. AFTER ABSORPTION OF LARGE QUANTITIES: Methemoglobinemia. Blue/grey discoloration of the skin. Respiratory difficulties.

### 4.3. Immediate medical attention and special treatment, if necessary

Obtain medical assistance.

## SECTION 5: Fire-fighting measures

### 5.1. Suitable (and unsuitable) extinguishing media

- Suitable extinguishing media : Quick-acting ABC powder extinguisher. Class A foam extinguisher. Water (quick-acting extinguisher, reel). Water. Class A foam.
- Unsuitable extinguishing media : Quick-acting BC powder extinguisher. Quick-acting CO2 extinguisher.

### 5.2. Specific hazards arising from the chemical

- Fire hazard : DIRECT FIRE HAZARD. Not easily combustible. In finely divided state: increased fire hazard. INDIRECT FIRE HAZARD. Heating increases the fire hazard.
- Explosion hazard : DIRECT EXPLOSION HAZARD. Fine dust is explosive with air. INDIRECT EXPLOSION HAZARD. Dust cloud can be ignited by a spark.

### 5.3. Special protective equipment and precautions for fire-fighters

- Precautionary measures fire : Exposure to fire/heat: keep upwind. Exposure to fire/heat: consider evacuation. Exposure to fire/heat: have neighbourhood close doors and windows.
- Firefighting instructions : Dilute toxic gases with water spray. Take account of toxic fire-fighting water. Use water moderately and if possible collect or contain it.
- Protection during firefighting : Heat/fire exposure: compressed air/oxygen apparatus.

# 1,10-Phenanthroline, Monohydrate, ACS

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

##### 6.1.1. For non-emergency personnel

- Protective equipment : Gloves. Protective clothing. Dust cloud production: compressed air/oxygen apparatus.
- Emergency procedures : Mark the danger area. Prevent dust cloud formation, e.g. by wetting. No naked flames. Wash contaminated clothes.
- Measures in case of dust release : In case of dust production: keep upwind. In case of dust production: consider evacuation. Dust production: have neighbourhood close doors and windows. In case of dust production: stop engines and no smoking. In case of dust production: no naked flames or sparks. Dust: spark-/explosionproof appliances/lighting equipment.

##### 6.1.2. For emergency responders

- Protective equipment : Do not breathe dust. Equip cleanup crew with proper protection.
- Emergency procedures : Stop release. Ventilate area.

#### 6.2. Environmental precautions

Prevent soil and water pollution. Prevent spreading in sewers.

#### 6.3. Methods and material for containment and cleaning up

- For containment : Contain released substance, pump into suitable containers. Plug the leak, cut off the supply. Dam up the solid spill. Knock down/dilute dust cloud with water spray. Take account of toxic/corrosive precipitation water. Powdered form: no compressed air for pumping over spills.
- Methods for cleaning up : Stop dust cloud by humidifying. Scoop solid spill into closing containers. Powdered: do not use compressed air for pumping over spills. Carefully collect the spill/leftovers. Take collected spill to manufacturer/competent authority. Clean contaminated surfaces with an excess of water. Wash clothing and equipment after handling.

#### 6.4. Reference to other sections

No additional information available

### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

- Additional hazards when processed : Pulverization rapidly increases toxic concentration.
- Precautions for safe handling : Avoid raising dust. Keep away from naked flames/heat. In finely divided state: use spark-/explosionproof appliances. Finely divided: keep away from ignition sources/sparks. Carry operations in the open/under local exhaust/ventilation or with respiratory protection. Comply with the legal requirements. Remove contaminated clothing immediately. Clean contaminated clothing. Do not discharge the waste into the drain. Powdered form: no compressed air for pumping over. Keep container tightly closed.
- Hygiene measures : Do not eat, drink or smoke when using this product. Wash contaminated clothing before reuse. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work.

#### 7.2. Conditions for safe storage, including any incompatibilities

- Incompatible products : Strong acids. Strong oxidizers.
- Incompatible materials : Generation of airborne dust. Moisture. Heat sources.
- Heat-ignition : KEEP SUBSTANCE AWAY FROM: heat sources. ignition sources.
- Prohibitions on mixed storage : KEEP SUBSTANCE AWAY FROM: oxidizing agents. strong acids. metals.
- Storage area : Store in a dry area. Store at ambient temperature. Keep container in a well-ventilated place. Keep locked up. Meet the legal requirements.
- Special rules on packaging : SPECIAL REQUIREMENTS: hermetical. correctly labelled. meet the legal requirements. Secure fragile packagings in solid containers.
- Packaging materials : SUITABLE MATERIAL: plastics. glass. MATERIAL TO AVOID: iron.

### SECTION 8: Exposure controls/personal protection

#### 8.1. Control parameters

No additional information available

#### 8.2. Appropriate engineering controls

- Appropriate engineering controls : Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Provide adequate general and local exhaust ventilation.

# 1,10-Phenanthroline, Monohydrate, ACS

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

### 8.3. Individual protection measures/Personal protective equipment

#### Personal protective equipment:

Safety glasses. Gloves. Dust formation: dust mask.



#### Materials for protective clothing:

GIVE GOOD RESISTANCE: synthetic material. rubber

#### Hand protection:

Gloves

#### Eye protection:

Safety glasses. In case of dust production: protective goggles

#### Skin and body protection:

Protective clothing. In case of dust production: dustproof clothing

#### Respiratory protection:

Dust production: dust mask with filter type P3.

High dust production: self-contained breathing apparatus

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

|   |   |
|---|---|
| Physical state                              | : Solid   |
| Appearance                                  | : Crystalline solid. Crystalline powder. Needles.<br>: White On exposure to air: turns dark<br>: Mild odour |
| Odor threshold                              | : No data available   |
| pH  | : No data available   |
| Melting point                               | : 93 °C   |
| Freezing point                              | : No data available   |
| Boiling point                               | : No data available   |
| Flash point                                 | : No data available   |
| Relative evaporation rate (butyl acetate=1) | : 0   |
| Flammability (solid, gas)                   | : No data available   |
| Vapor pressure                              | : No data available   |
| Relative vapor density at 20 °C             | : 6.2   |
| Relative density                            | : 1.1   |
| Specific gravity / density                  | : 1100 kg/m <sup>3</sup>  |
| Molecular mass                              | : 198.22 g/mol  |
| Solubility                                  | : Moderately soluble in water. Soluble in ethanol. Soluble in acetone.<br>Water: 3 g/100ml                  |
| Log Pow                                     | : No data available   |
| Auto-ignition temperature                   | : No data available   |
| Decomposition temperature                   | : No data available   |
| Viscosity, kinematic                        | : No data available   |
| Viscosity, dynamic                          | : No data available   |
| Explosion limits                            | : No data available   |
| Explosive properties                        | : No data available   |
| Oxidizing properties                        | : No data available   |

# 1,10-Phenanthroline, Monohydrate, ACS

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

### 9.2. Other information

VOC content : 0 %

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

No additional information available

### 10.2. Chemical stability

Discolours on exposure to air.

### 10.3. Possibility of hazardous reactions

Not established.

### 10.4. Conditions to avoid

Incompatible materials. High temperature. Moisture.

### 10.5. Incompatible materials

Strong oxidizers. Strong acids.

### 10.6. Hazardous decomposition products

Carbon dioxide. Carbon monoxide. Nitrogen oxides.

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

Likely routes of exposure : Inhalation; Skin and eye contact

Acute toxicity : Not classified

#### 1,10-Phenanthroline, Monohydrate, ACS (5144-89-8)

|               |                       |
|---------------|-----------------------|
| LD50 oral rat | 132 mg/kg (Rat, Oral) |
| ATE US (oral) | 132 mg/kg body weight |

Skin corrosion/irritation : Not classified

Serious eye damage/irritation : Not classified

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

Specific target organ toxicity – single exposure : Not classified

Specific target organ toxicity – repeated exposure : Not classified

Aspiration hazard : Not classified

Potential Adverse human health effects and symptoms : Toxic if swallowed. Slightly irritant to skin. Slightly irritant to respiratory organs. Slightly irritant to eyes. Caution! Substance is absorbed through the skin.

Symptoms/effects after inhalation : Slight irritation.

Symptoms/effects after skin contact : Slight irritation.

Symptoms/effects after eye contact : Slight irritation.

Symptoms/effects after ingestion : Nausea. Abdominal pain. Diarrhoea. AFTER ABSORPTION OF LARGE QUANTITIES: Methemoglobinemia. Blue/grey discoloration of the skin. Respiratory difficulties.

## SECTION 12: Ecological information

### 12.1. Toxicity

Ecology - general : Dangerous for the environment.

Ecology - air : Not classified as dangerous for the ozone layer (Regulation (EC) No 1005/2009).

Ecology - water : Very toxic to aquatic organisms. Severe water pollutant (surface water). Nitrification of activated sludge is inhibited.

### 12.2. Persistence and degradability

No additional information available

# 1,10-Phenanthroline, Monohydrate, ACS

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

### 12.3. Bioaccumulative potential

#### 1,10-Phenanthroline, Monohydrate, ACS (5144-89-8)

|                           |                      |
|---------------------------|----------------------|
| Bioaccumulative potential | Not bioaccumulative. |
|---------------------------|----------------------|

### 12.4. Mobility in soil

No additional information available

### 12.5. Other adverse effects

No additional information available

## SECTION 13: Disposal considerations

### 13.1. Disposal methods

Waste disposal recommendations : Remove waste in accordance with local and/or national regulations. Hazardous waste shall not be mixed together with other waste. Different types of hazardous waste shall not be mixed together if this may entail a risk of pollution or create problems for the further management of the waste. Hazardous waste shall be managed responsibly. All entities that store, transport or handle hazardous waste shall take the necessary measures to prevent risks of pollution or damage to people or animals. Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber with energy recovery. Dissolve or mix with a combustible solvent.

Additional information : Hazardous waste according to Directive 2008/98/EC, as amended by Regulation (EU) No 1357/2014 and Regulation (EU) No 2017/997.

Ecology - waste materials : Avoid release to the environment.

## SECTION 14: Transport information

### Department of Transportation (DOT)

In accordance with DOT

Transport document description : UN2811 Toxic solids, organic, n.o.s., 6.1, III

UN-No.(DOT) : UN2811

Proper Shipping Name (DOT) : Toxic solids, organic, n.o.s.

Transport hazard class(es) (DOT) : 6.1 - Class 6.1 - Poisonous materials 49 CFR 173.132

Packing group (DOT) : III - Minor Danger

Hazard labels (DOT) : 6.1 - Poison



Dangerous for the environment : Yes

Marine pollutant : Yes



DOT Packaging Non Bulk (49 CFR 173.xxx) : 213

DOT Packaging Bulk (49 CFR 173.xxx) : 240

DOT Symbols : G - Identifies PSN requiring a technical name

# 1,10-Phenanthroline, Monohydrate, ACS

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

|  |  |
|--|--|
| DOT Special Provisions (49 CFR 172.102)                          | : IB8 - Authorized IBCs: Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2, 31HZ1 and 31HZ2); Fiberboard (11G); Wooden (11C, 11D and 11F); Flexible (13H1, 13H2, 13H3, 13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1 or 13M2).<br>IP3 - Flexible IBCs must be sift-proof and water-resistant or must be fitted with a sift-proof and water-resistant liner.<br>T1 - 1.5 178.274(d)(2) Normal..... 178.275(d)(2)<br>TP33 - The portable tank instruction assigned for this substance applies for granular and powdered solids and for solids which are filled and discharged at temperatures above their melting point which are cooled and transported as a solid mass. Solid substances transported or offered for transport above their melting point are authorized for transportation in portable tanks conforming to the provisions of portable tank instruction T4 for solid substances of packing group III or T7 for solid substances of packing group II, unless a tank with more stringent requirements for minimum shell thickness, maximum allowable working pressure, pressure-relief devices or bottom outlets are assigned in which case the more stringent tank instruction and special provisions shall apply. Filling limits must be in accordance with portable tank special provision TP3. Solids meeting the definition of an elevated temperature material must be transported in accordance with the applicable requirements of this subchapter. |
| DOT Packaging Exceptions (49 CFR 173.xxx)                        | : 153  |
| DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) | : 100 kg   |
| DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)     | : 200 kg   |
| DOT Vessel Stowage Location                                      | : A - The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel.  |
| Other information  | : No supplementary information available.  |

### Transportation of Dangerous Goods

|   |   |
|---|---|
| Transport document description  | : UN2811 TOXIC SOLID, ORGANIC, N.O.S. (1,10-Phenanthroline), 6.1, II  |
| UN-No. (TDG)  | : UN2811  |
| Proper Shipping Name (Transportation of Dangerous Goods)                    | : TOXIC SOLID, ORGANIC, N.O.S.  |
| TDG Primary Hazard Classes  | : 6.1 - Class 6.1 - Toxic Substances  |
| Packing group   | : II - Medium Danger  |
| TDG Special Provisions  | : 16 - (1) The technical name of at least one of the most dangerous substances that predominantly contributes to the hazard or hazards posed by the dangerous goods must be shown, in parentheses, on the shipping document following the shipping name in accordance with clause 3.5(1)(c)(ii)(A) of Part 3 (Documentation). The technical name must also be shown, in parentheses, on a small means of containment or on a tag following the shipping name in accordance with subsections 4.11(2) and (3) of Part 4 (Dangerous Goods Safety Marks). (2) Despite subsection (1), the technical name for the following dangerous goods is not required to be shown on a shipping document or on a small means of containment when Canadian law for domestic transport or an international convention for international transport prohibits the disclosure of the technical name: (a)UN1544, ALKALOID SALTS, SOLID, N.O.S. or ALKALOIDS, SOLID, N.O.S.; (b)UN1851, MEDICINE, LIQUID, TOXIC, N.O.S.; (c)UN3140, ALKALOID SALTS, LIQUID, N.O.S. or ALKALOIDS, LIQUID, N.O.S.; (d)UN3248, MEDICINE, LIQUID, FLAMMABLE, TOXIC, N.O.S.; or (e)UN3249, MEDICINE, SOLID, TOXIC, N.O.S. An example in Canada is the "Food and Drugs Act". (3) Despite subsection (1), the technical name for the following dangerous goods is not required to be shown on a small means of containment: (a)UN2814, INFECTIOUS SUBSTANCE, AFFECTING HUMANS; or (b)UN2900, INFECTIOUS SUBSTANCE, AFFECTING ANIMALS. SOR/2014-306 |
| Explosive Limit and Limited Quantity Index                                  | : 0.5 kg  |
| Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index | : 25 kg   |

### Transport by sea

|                                       |  |
|---------------------------------------|--|
| Transport document description (IMDG) | : UN 2811 toxic solid, organic, n.o.s. (1,10-Phenanthroline), 6.1, III, MARINE POLLUTANT/ENVIRONMENTALLY HAZARDOUS |
| UN-No. (IMDG)                         | : 2811   |
| Proper Shipping Name (IMDG)           | : toxic solid, organic, n.o.s.   |
| Class (IMDG)                          | : 6.1 - Toxic substances   |
| Packing group (IMDG)                  | : III - substances presenting low danger   |
| EmS-No. (1)                           | : F-A  |

# 1,10-Phenanthroline, Monohydrate, ACS

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

EmS-No. (2) : S-A  
Marine pollutant : Yes



### Air transport

Transport document description (IATA) : UN 2811 Toxic solid, organic, n.o.s. (1,10-Phenanthroline), 6.1, III, ENVIRONMENTALLY HAZARDOUS  
UN-No. (IATA) : 2811  
Proper Shipping Name (IATA) : Toxic solid, organic, n.o.s.  
Class (IATA) : 6.1 - Toxic Substances  
Packing group (IATA) : III - Minor Danger

## SECTION 15: Regulatory information

### 15.1. US Federal regulations

|   |  |
|---|--|
| <b>1,10-Phenanthroline, Monohydrate, ACS (5144-89-8)</b>                      |  |
| Not listed on the United States TSCA (Toxic Substances Control Act) inventory |  |
| SARA Section 311/312 Hazard Classes   | Health hazard - Acute toxicity (any route of exposure) |

### 15.2. International regulations

#### CANADA

No additional information available

#### EU-Regulations

No additional information available

#### National regulations

No additional information available

### 15.3. US State regulations

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

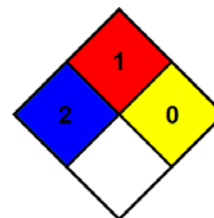
## SECTION 16: Other information

Revision date : 03/12/2019

Full text of H-phrases: see section 16:

|      |  |
|------|--|
| H301 | Toxic if swallowed                                   |
| H400 | Very toxic to aquatic life                           |
| H410 | Very toxic to aquatic life with long lasting effects |

NFPA health hazard : 2 - Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.  
NFPA fire hazard : 1 - Materials that must be preheated before ignition can occur.  
NFPA reactivity : 0 - Material that in themselves are normally stable, even under fire conditions.





# 1,10-Phenanthroline, Monohydrate, ACS

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

---

### Hazard Rating

Health : 2 Moderate Hazard - Temporary or minor injury may occur

Flammability : 1 Slight Hazard - Materials that must be preheated before ignition will occur. Includes liquids, solids and semi solids having a flash point above 200 F. (Class IIIB)

Physical : 1 Slight Hazard - Materials that are normally stable but can become unstable (self-react) at high temperatures and pressures. Materials may react non-violently with water or undergo hazardous polymerization in the absence of inhibitors.

Personal protection : E

E - Safety glasses, Gloves, Dust respirator

SDS US LabChem

*Information in this SDS is from available published sources and is believed to be accurate. No warranty, express or implied, is made and LabChem Inc assumes no liability resulting from the use of this SDS. The user must determine suitability of this information for his application.*