



# SELENIUM-77 METAL (77Se)

## Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830 and according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 11/04/2011

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Version: 2.1

SELM-2445

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

### 1.1. Product identifier

Product form : Substance  
Substance name : SELENIUM-77 METAL (77Se)  
EC Index-No. : 034-001-00-2 (Unlabeled)  
EC-No. : 231-957-4 (Unlabeled)  
CAS-No. : 7782-49-2 (Unlabeled)  
Product code : SELM-2445  
Formula : \*Se

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

#### 1.2.1. Relevant identified uses

Main use category : Professional use  
Industrial/Professional use spec : For professional use only

#### 1.2.2. Uses advised against

No additional information available

### 1.3. Details of the supplier of the safety data sheet

Cambridge Isotope Laboratories, Inc.  
50 Frontage Road  
Andover, MA 01810  
USA

USA: 1-800-322-1174 Int: 1-978-749-8000  
[cilsales@isotope.com](mailto:cilsales@isotope.com) [www.isotope.com](http://www.isotope.com)

### Emergency telephone number

Emergency numbers:

Chemtrec: 1-800-424-9300 (24 hours)  
International: 1-703-741-5970 (24 hours)

## SECTION 2: Hazards identification

### 2.1. Classification of the substance or mixture

#### Classification according to Regulation (EC) No. 1272/2008 [CLP]

Acute Tox. 3 (Oral) H301  
Acute Tox. 3 (Inhalation) H331  
STOT RE 2 H373  
Aquatic Chronic 4 H413

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

#### Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]

T; R23  
T; R25  
N; R50/53  
Xn; R48/20

Full text of R-phrases: see section 16

#### GHS-US classification

Acute Tox. 3 (Oral) H301  
Acute Tox. 3 (Inhalation) H331  
STOT RE 2 H373  
Aquatic Chronic 4 H413

Full text of H statements : see section 16

#### Adverse physicochemical, human health and environmental effects

No additional information available

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### 2.2. Label elements

#### Labeling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :



Signal word (CLP) :

Danger

Hazard statements (CLP) :

H301+H331 - Toxic if swallowed or if inhaled  
H373 - May cause damage to organs (central nervous system, Skin, gastro-intestinal tract) through prolonged or repeated exposure (in contact with skin, inhalation, oral)  
H413 - May cause long lasting harmful effects to aquatic life

Precautionary statements (CLP) :

P260 - Do not breathe dust, fume, gas, mist, spray, vapors.  
P264 - Wash hands, forearms and face thoroughly after handling.  
P270 - Do not eat, drink or smoke when using this product.  
P271 - Use only outdoors or in a well-ventilated area.  
P273 - Avoid release to the environment.  
P301+P310 - IF SWALLOWED: Immediately call a doctor.  
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.  
P311 - Call a doctor.

#### GHS-US labeling

Hazard pictograms (GHS-US) :



Signal word (GHS-US) :

Danger

Hazard statements (GHS-US) :

H301+H331 - Toxic if swallowed or if inhaled  
H373 - May cause damage to organs (central nervous system, Skin, gastro-intestinal tract) through prolonged or repeated exposure (Dermal, Inhalation, oral)  
H413 - May cause long lasting harmful effects to aquatic life

Precautionary statements (GHS-US) :

P260 - Do not breathe dust, fume, gas, mist, spray, vapors.  
P261 - Avoid breathing dust, fume, gas, mist, spray, vapors.  
P264 - Wash hands, forearms and face thoroughly after handling.  
P270 - Do not eat, drink or smoke when using this product.  
P271 - Use only outdoors or in a well-ventilated area.  
P273 - Avoid release to the environment.  
P301+P310 - If swallowed: Immediately call a doctor  
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing  
P311 - Call a doctor  
P314 - Get medical advice/attention if you feel unwell.  
P321 - Specific treatment (see Hazardous component(s) for labeling on this label)  
P330 - Rinse mouth.  
P403+P233 - Store in a well-ventilated place. Keep container tightly closed.  
P405 - Store locked up.  
P501 - Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation

### 2.3. Other hazards

No additional information available

## SECTION 3: Composition/Information on ingredients

### 3.1. Substances

Name	Product identifier	%	Classification according to Directive 67/548/EEC
SELENIUM-77 METAL (77Se)	(CAS-No.) 7782-49-2 (Unlabeled) (EC-No.) 231-957-4 (Unlabeled) (EC Index-No.) 034-001-00-2 (Unlabeled)	100	T; R23 T; R25 N; R50/53 Xn; R48/20

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Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
SELENIUM-77 METAL (77Se)	(CAS-No.) 7782-49-2 (Unlabeled) (EC-No.) 231-957-4 (Unlabeled) (EC Index-No.) 034-001-00-2 (Unlabeled)	100	Acute Tox. 3 (Oral), H301 Acute Tox. 3 (Inhalation), H331 STOT RE 2, H373 Aquatic Chronic 4, H413

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

Name	Product identifier	%	GHS-US classification
SELENIUM-77 METAL (77Se) (Main constituent)	(CAS-No.) 7782-49-2 (Unlabeled)	100	Acute Tox. 3 (Oral), H301 Acute Tox. 3 (Inhalation), H331 STOT RE 2, H373 Aquatic Chronic 4, H413

Full text of H-phrases: see section 16

### 3.2. Mixtures

Not applicable

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

First-aid measures general	: If you feel unwell, seek medical advice (show the label where possible). Evacuate danger area.
First-aid measures after inhalation	: When symptoms occur: go into open air and ventilate suspected area. If not breathing, give artificial respiration. Get medical advice/attention.
First-aid measures after skin contact	: Wash with plenty of soap and water. Get immediate medical advice/attention.
First-aid measures after eye contact	: Rinse cautiously with water for several minutes.
First-aid measures after ingestion	: Never give anything by mouth to an unconscious person. Rinse mouth out with water. Get medical advice/attention. Specific treatment (see Hazard pictograms (CLP) on this label).

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

Symptoms/effects after inhalation	: Toxic if inhaled. May cause respiratory irritation.
Symptoms/effects after skin contact	: May be harmful in contact with skin. May cause moderate irritation.
Symptoms/effects after eye contact	: May cause eye irritation.
Symptoms/effects after ingestion	: Toxic if swallowed. Swallowing a small quantity of this material will result in serious health hazard.

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

No additional information available

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

Suitable extinguishing media : Water spray. Dry chemical powder, alcohol-resistant foam, carbon dioxide (CO<sub>2</sub>).

### 5.2. Special hazards arising from the substance or mixture

No additional information available

### 5.3. Advice for firefighters

Firefighting instructions	: Fight fire with normal precautions from a reasonable distance. Wear a self contained breathing apparatus. Do not enter fire area without proper protective equipment, including respiratory protection.
Protection during firefighting	: Do not enter fire area without proper protective equipment, including respiratory protection. Wear recommended personal protective equipment.

## SECTION 6: Accidental release measures

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

#### 6.1.1. For non-emergency personnel

Emergency procedures : Avoid breathing vapors, mist, gas. Avoid dust formation. Wear respiratory protection. Ensure adequate air ventilation. Evacuate unnecessary personnel. Evacuate danger area.

#### 6.1.2. For emergency responders

No additional information available

### 6.2. Environmental precautions

Prevent entry to sewers and public waters. Do not allow to enter drains or water courses. Avoid release to the environment.

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

For containment : Take up mechanically (sweeping, shoveling) and collect in suitable container for disposal.

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Methods for cleaning up : This material and its container must be disposed of in a safe way, and as per local legislation.

### 6.4. Reference to other sections

No additional information available

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

Precautions for safe handling : Provide adequate ventilation to minimize dust and/or vapor concentrations.  
Hygiene measures : Do not eat, drink or smoke when using this product. Wash hands, forearms and face thoroughly after handling.

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

Technical measures : Store in a well-ventilated place. Keep container tightly closed.  
Storage conditions : Store at room temperature away from light and moisture.

### 7.3. Specific end use(s)

No additional information available

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

SELENIUM-77 METAL (77Se) (7782-49-2 (Unlabeled))		
Italy - Portugal - USA ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup> USA. ACGIH Threshold Limit Values (TLV)
Italy - Portugal - USA ACGIH	Remark (ACGIH)	Eye & Upper Respiratory Tract irritation
USA NIOSH	NIOSH REL (TWA) (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup> USA. NIOSH Recommended Exposure Limits
USA OSHA	OSHA PEL (TWA) (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup> USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
USA OSHA	OSHA PEL (STEL) (mg/m <sup>3</sup> )	0.2 mg/m <sup>3</sup> California permissible exposure limits for chemical contaminants (Title 8, Article 107)

### 8.2. Exposure controls

Appropriate engineering controls : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work.  
Personal protective equipment : Gloves. Protective clothing. Protective goggles. Self-contained breathing apparatus.



Materials for protective clothing : Wear suitable protective clothing and gloves.  
Hand protection : Wear suitable protective clothing and gloves.  
Eye protection : Wear eye protection. Chemical goggles or face shield with safety glasses.  
Skin and body protection : Wear suitable protective clothing, gloves and eye/face protection.  
Respiratory protection : In case of inadequate ventilation wear respiratory protection. Approved supplied air respirator.  
Environmental exposure controls : Avoid release to the environment.

## SECTION 9: Physical and chemical properties

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

Physical state : Solid  
Appearance : Pellets.  
Molecular mass : 76.92 g/mol (Labeled)  
Color : Light gray.  
Odor : No data available.  
Odor threshold : No data available  
pH : No data available  
Relative evaporation rate (butyl acetate=1) : No data available  
Melting point : 217 °C (423 °F) - lit.  
Freezing point : No data available  
Boiling point : 684.9 °C (1,264.8 °F) - lit.  
Flash point : No data available  
Auto-ignition temperature : No data available  
Decomposition temperature : No data available

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Flammability (solid, gas)	: No data available
Vapor pressure	: No data available
Relative vapor density at 20 °C	: No data available
Relative density	: 4.81 g/cm <sup>3</sup> at 25 °C (77 °F)
Solubility	: Water: Insoluble
Log Pow	: 5
Log Kow	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: No data available
Oxidizing properties	: No data available
Explosion limits	: No data available

### 9.2. Other information

No additional information available

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

No additional information available

### 10.2. Chemical stability

Stable if stored under recommended conditions.

### 10.3. Possibility of hazardous reactions

No additional information available

### 10.4. Conditions to avoid

No additional information available

### 10.5. Incompatible materials

Strong oxidizing agents. Do not store near acids. Alkali Metal Amides. Carbides. Metals. Nickel (Ni). Nitric acid. Nitrogen trichloride. Oxygen. potassium. zinc.

### 10.6. Hazardous decomposition products

Selenium and its oxides.

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

Acute toxicity : Oral: Toxic if swallowed. Inhalation: Toxic if inhaled.

SELENIUM-77 METAL (77Se) (7782-49-2 (Unlabeled))	
LD50 oral rat	6700 mg/kg Remarks: Behavioral:Somnolence (general depressed activity). Lungs, Thorax, or Respiration:Dyspnea. Nutritional and Gross Metabolic:Changes in:Other changes.
ATE CLP (oral)	100.000 mg/kg body weight
ATE CLP (gases)	700.000 ppmV/4h
ATE CLP (vapors)	3.000 mg/l/4h
ATE CLP (dust, mist)	0.500 mg/l/4h

Skin corrosion/irritation	: Not classified
Serious eye damage/irritation	: Not classified
Respiratory or skin sensitization	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

SELENIUM-77 METAL (77Se) (7782-49-2 (Unlabeled))	
Additional information	Carcinogenicity - Mouse - Oral Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Skin and Appendages: Other: Tumors

Reproductive toxicity	: Not classified Reproductive toxicity Developmental Toxicity - Mouse - Oral Effects on Embryo or Fetus: Fetotoxicity (except death, e.g, stunted fetus). Effects on Embryo or Fetus: Fetal death.
Specific target organ toxicity – single exposure	: Not classified
Specific target organ toxicity – repeated exposure	: May cause damage to organs through prolonged or repeated exposure.
Aspiration hazard	: Not classified

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Potential Adverse human health effects and symptoms	: Toxic if swallowed. Anemia. Vomiting. Diarrhea. Coughing. Shortness of breath. Central Nervous System. Damage to central nervous system. Convulsions. Drowsiness. Skin contact : Gastrointestinal complaints. Lassitude. Discolored or decayed teeth. This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product. Garlic-like breath odor and garlic-like perspiration. Partial loss of hair and nails. Chronic effects. Pallor. Coating of the tongue. Irritation of the gastric/intestinal mucosa. Lumbar pain. Liver and Spleen damage. Stomach - Irregularities - Based on Human Evidence.
Symptoms/effects after inhalation	: Toxic if inhaled. May cause respiratory irritation.
Symptoms/effects after skin contact	: May be harmful in contact with skin. May cause moderate irritation.
Symptoms/effects after eye contact	: May cause eye irritation.
Symptoms/effects after ingestion	: Toxic if swallowed. Swallowing a small quantity of this material will result in serious health hazard.

## SECTION 12: Ecological information

### 12.1. Toxicity

Ecology - water : May cause long lasting harmful effects to aquatic life.

SELENIUM-77 METAL (77Se) (7782-49-2 (Unlabeled))	
LC50 fish 1	0.43 mg/l - Daphnia magna (Water flea) - 48 h
ErC50 (algae)	99 mg/l - Pseudokirchneriella subcapitata - 72 h
LOEC (acute)	7.8 mg/l mortality LOEC - Oncorhynchus mykiss (rainbow trout) - 96.0 h
NOEC (acute)	2 mg/l mortality NOEC - Cyprinodon variegatus (sheepshead minnow) - 96.0 h

### 12.2. Persistence and degradability

SELENIUM-77 METAL (77Se) (7782-49-2 (Unlabeled))	
Persistence and degradability	May cause long-term adverse effects in the environment.

### 12.3. Bioaccumulative potential

SELENIUM-77 METAL (77Se) (7782-49-2 (Unlabeled))	
BCF fish 1	640 µg/l. Lepomis macrochirus - 60 d
Bioconcentration factor (BCF REACH)	7.7
Log Pow	5

### 12.4. Mobility in soil

No additional information available

### 12.5. Results of PBT and vPvB assessment

No additional information available

### 12.6. Other adverse effects

Other adverse effects : May cause long lasting harmful effects to aquatic life. Avoid release to the environment. Disposal must be done according to official regulations.

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

Regional legislation (waste)	: Waste materials should be disposed of under conditions which meet Federal, State, and local environmental control regulations.
Product/Packaging disposal recommendations	: Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.
Ecology - waste materials	: Dispose of as unused product.

## SECTION 14: Transport information

In accordance with ADR / RID / IMDG / IATA / ADN

### 14.1. UN number

UN-No.(DOT)	: 3288
DOT NA no.	UN3288

### 14.2. UN proper shipping name

Proper Shipping Name (DOT)	: Toxic solid, inorganic, n.o.s.
Class (DOT)	: 6.1 - Class 6.1 - Poisonous materials 49 CFR 173.132

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Hazard labels (DOT) : 6.1 - Poison



DOT Symbols : G - Identifies PSN requiring a technical name

Packing group (DOT) : III - Minor Danger

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).  
IP3 - Flexible IBCs must be sift-proof and water-resistant or must be fitted with a sift-proof and water-resistant liner.  
T1 - 1.5 178.274(d)(2) Normal..... 178.275(d)(2)  
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 Packaging Non Bulk (49 CFR 173.xxx) : 213

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

### 14.3. Additional information

Emergency Response Guide (ERG) Number : 151

Other information : No supplementary information available.

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

### Overland transport

Packing group (ADR) : III

Class (ADR) : 6.1 - Toxic substances

Hazard identification number (Kemler No.) : 60

Classification code (ADR) : T5

Hazard labels (ADR) : 6.1 - Toxic substances



Orange plates : An orange rectangular plate with a black border. The number "60" is written in black in the top half, and the number "3288" is written in black in the bottom half.

Tunnel restriction code (ADR) : E

Limited quantities (ADR) : 5kg

EAC : 2X

Excepted quantities (ADR) : E1

### Transport by sea

DOT Vessel Stowage Location : A - The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel.

DOT Vessel Stowage Other : 40 - Stow "clear of living quarters"

MFAG-No : 151



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### Air transport

DOT Quantity Limitations Passenger aircraft/rail : 100 kg  
(49 CFR 173.27)

DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 200 kg

Civil Aeronautics Law : Toxic and infectious substances/Toxic substances

### 14.4. Environmental hazards

Other information : No supplementary information available.

### 14.5. Special precautions for user

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

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

Not applicable

## SECTION 15: Regulatory information

### 15.1. US Federal regulations

SELENIUM-77 METAL (77Se) (7782-49-2 (Unlabeled))	
SARA Section 302 Threshold Planning Quantity (TPQ)	Not subject to reporting requirements of the United States SARA Section 302
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard Delayed (chronic) health hazard
SARA Section 313 - Emission Reporting	Subject to reporting requirements of United States SARA Section 313

### 15.2. International regulations

#### CANADA

SELENIUM-77 METAL (77Se) (7782-49-2 (Unlabeled))
Listed on the Canadian DSL (Domestic Substances List)

#### 15.2.1. National regulations

No additional information available

### 15.3. US State regulations

SELENIUM-77 METAL (77Se)(7782-49-2 (Unlabeled))	
U.S. - California - Proposition 65 - Carcinogens List	No
U.S. - California - Proposition 65 - Developmental Toxicity	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No
State or local regulations	U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List

## SECTION 16: Other information

Other information : This product is not radioactive. The data given for this product are those of the corresponding unlabeled compound, unless specifically indicated otherwise. Health and safety data for labeled compounds are generally not available, but are assumed to be similar or identical to the corresponding unlabeled compound.

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

Acute Tox. 3 (Inhalation)	Acute toxicity (inhalation) Category 3
Acute Tox. 3 (Oral)	Acute toxicity (oral) Category 3
Aquatic Chronic 4	Hazardous to the aquatic environment - Chronic Hazard Category 4
STOT RE 2	Specific target organ toxicity (repeated exposure) Category 2



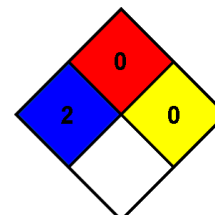
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H301	Toxic if swallowed
H331	Toxic if inhaled
H373	May cause damage to organs through prolonged or repeated exposure
H413	May cause long lasting harmful effects to aquatic life
R23	Toxic by inhalation
R25	Toxic if swallowed
R48/20	Harmful: danger of serious damage to health by prolonged exposure through inhalation
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment
N	Dangerous for the environment
T	Toxic
Xn	Harmful

- NFPA health hazard : 2 - Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.
- NFPA fire hazard : 0 - Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand.
- NFPA reactivity : 0 - Material that in themselves are normally stable, even under fire conditions.



### Hazard Rating

- Health : 2 Moderate Hazard - Temporary or minor injury may occur
- Flammability : 0 Minimal Hazard
- Physical : 0 Minimal Hazard

### CIL Substance SDS

*This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product*