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

<table>
<thead>
<tr>
<th>Product Identifier</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product name</strong></td>
<td>SELENIUM DIOXIDE</td>
</tr>
<tr>
<td><strong>Chemical Name</strong></td>
<td>selenium dioxide</td>
</tr>
<tr>
<td><strong>Synonyms</strong></td>
<td>O2-Se; SeO2; selenious anhydride; selenium oxide; selenium (IV) dioxide (1:2)</td>
</tr>
<tr>
<td><strong>Proper shipping name</strong></td>
<td>SELENIUM COMPOUND, SOLID, N.O.S. (contains Selenium Dioxide)</td>
</tr>
<tr>
<td><strong>Chemical formula</strong></td>
<td>O2Se</td>
</tr>
<tr>
<td><strong>Other means of identification</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>CAS number</strong></td>
<td>7446-08-4</td>
</tr>
</tbody>
</table>

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

- **Relevant identified uses**: Dangerous POISON. Available ONLY for industrial and manufacturing purposes. To be used by or in accordance with directions of accredited pest control officers. Operators to be trained in procedures for safe use of material. Analysis (testing for alkaloids), oxidizing agent, catalyst, colourant. [-Surfactant -]

Details of the supplier of the safety data sheet

- **Registered company name**: ALPHA CHEMICALS PTY LTD
- **Address**: 4 ALLEN PLACE WETHERILL PARK NSW 2099 Australia
- **Telephone**: 61 (0)2 9982 4622
- **Fax**: Not Available
- **Website**: ~
- **Email**: shane@alphachem.com.au

Emergency telephone number

- **Association / Organisation**: ALPHA CHEMICALS PTY LTD
- **Emergency telephone number**: 61 (0)418 237 771
- **Emergency telephone number**: +61 1800 951 288
- **Other emergency telephone numbers**: Not Available
- **Other emergency telephone numbers**: +61 2 9186 1132

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

- **HAZARDOUS CHEMICAL. DANGEROUS GOODS. According to the WHS Regulations and the ADG Code.**

<table>
<thead>
<tr>
<th>CHEMWATCH HAZARD RATINGS</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Toxicity</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Body Contact</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Reactivity</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Chronic</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

- **Poisons Schedule**: S7
- **Classification [1]**: Acute Toxicity (Oral) Category 3, Acute Toxicity (Inhalation) Category 3, Chronic Aquatic Hazard Category 1, Acute Aquatic Hazard Category 1, Specific target organ toxicity - repeated exposure Category 2

**Legend:** 1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI

Label elements

**Continued...**
Hazard pictogram(s)

SIGNAL WORD DANGER

Hazard statement(s)

H301 Toxic if swallowed.
H331 Toxic if inhaled.
H410 Very toxic to aquatic life with long lasting effects.
H373 May cause damage to organs through prolonged or repeated exposure.

Precautionary statement(s) Prevention

P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P264 Wash all exposed external body areas 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.

Precautionary statement(s) Response

P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P330 Rinse mouth.
P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P311 Call a POISON CENTER or doctor/physician.
P391 Collect spillage.

Precautionary statement(s) Storage

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

Precautionary statement(s) Disposal

P501 Dispose of contents/container in accordance with local regulations.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

<table>
<thead>
<tr>
<th>CAS No</th>
<th>% [weight]</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>7446-08-4</td>
<td>&gt;99.5</td>
<td>Selenium Dioxide</td>
</tr>
</tbody>
</table>

Mixtures

See section above for composition of Substances

SECTION 4 FIRST AID MEASURES

Description of first aid measures

Eye Contact

- If this product comes in contact with the eyes:
  - Immediately hold eyelids apart and flush the eye continuously with running water.
  - Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
  - Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
  - Transport to hospital or doctor without delay.
  - Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact

- If skin contact occurs:
  - 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

- 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

- IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.
  - For advice, contact a Poisons Information Centre or a doctor.
  - Urgent hospital treatment is likely to be needed.
  - In the mean time, qualified first aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient’s condition.
If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the SDS should be provided. Further action will be the responsibility of the medical specialist. If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the SDS. Where medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:

- INDUCE vomiting with fingers down the back of the throat, ONLY IF CONSCIOUS. Lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

NOTE: Wear a protective glove when inducing vomiting by mechanical means.

Indication of any immediate medical attention and special treatment needed

- Selenium dusts produce respiratory tract irritation, manifested by nasal discharge, loss of smell, epistaxis, and cough. Consumption of selenites and to a lesser degree, selenates causes nausea, vomiting, abdominal pain and tremor which resolves in 24 hrs. Muscle tenderness, tremor, light-headedness and facial flushing are observed in selenite poisoning.
- Both the acid and elemental forms are well absorbed through the lungs and gastro-intestinal tract. Elimination (mostly in the urine) results in a biological half-life of around 1.2 days.
- Chronic selenium poisoning resembles arsenic poisoning. Management of chronic intoxication is supportive with elimination of the selenium source. BAL and CaNa2EDTA may enhance toxicity.
- High dose vitamin C (several grams daily) has produced equivocal results. This is probably reasonable as in-vitro results indicate selenium salts are then reduced to poorly absorbed elemental selenium.

Management of chronic selenium intoxication is supportive with elimination of the selenium source. BAL (dimercapro, 2,3-dimercaptopropanol) and CaNa2EDTA may enhance toxicity. There are no antidotes to selenious acid toxicity; treatment is expectant (cardiopulmonary monitoring in an intensive care setting) and supportive (intravenous infusion, supplemental oxygen and ventilation as needed).

For inhalation, consider oxygen. Avoid gastric lavage or emesis. Avoid calcium sodium edetate, dimercaprol as antidotes. [MDLOHS]

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

- Water spray or fog.
- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

Special hazards arising from the substrate or mixture

| Fire Incompatibility | None known. |

Advice for firefighters

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- 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:
- metal oxides
- May emit clouds of acid smoke
- May emit poisonous fumes.

HAZCHEM 2X

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

| Minor Spills |
| Clean up waste regularly and abnormal spills immediately. |
| Avoid breathing dust and contact with skin and eyes. |
| Wear protective clothing, gloves, safety glasses and dust respirator. |
| Use dry clean up procedures and avoid generating dust. |
| Vacuum up or sweep up. NOTE: Vacuum cleaner must be fitted with an exhaust micro filter (HEPA type) (consider explosion-proof machines designed to be grounded during storage and use). |
| Dampen with water to prevent dusting before sweeping. |
| Place in suitable containers for disposal. |

| Major Spills |
| Clear area of personnel and move upward. |
| Alert Fire Brigade and tell them location and nature of hazard. |
| Wear full body protective clothing with breathing apparatus. |
| Prevent, by any means available, spillage from entering drains or water course. |
| Stop leak if safe to do so. |
| Contain spill with sand, earth or vermiculite. |
| Collect recoverable product into labelled containers for recycling. |
| Neutralise/decontaminate residue (see Section 13 for specific agent). |
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. |

**Other information**

- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- 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 SDS.

Conditions for safe storage, including any incompatibilities

**Suitable container**

- Lined metal can, lined metal pail/can.
- Plastic pail.
- Polyliner drum.
- Packing as recommended by manufacturer.
- Check all containers are clearly labelled and free from leaks.

For low viscosity materials:

- Drums and jerricans must be of the non-removable head type.
- Where a can is to be used as an inner package, the can must have a screwed enclosure.

For materials with a viscosity of at least 2680 cSt (23 deg. C) and solids (between 15 C deg. and 40 deg C.):

- Removable head packaging;
- Cans with friction closures and high pressure tubes and cartridges may be used.
- Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages.

- In addition, where inner packagings are glass and contain liquids of packing group I and II there must be sufficient inert absorbent to absorb any spillage.
- Unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic.

- All inner and sole packagings for substances that have been assigned to Packaging Groups I or II on the basis of inhalation toxicity criteria, must be hermetically sealed.

**Storage incompatibility**

Selenious anhydride:

- Reacts with many substances, including reducing agents, strong acids, combustible materials, organic substances, 1,3-bis(trichloromethyl)benzene, phosphorus trichloride
- Attacks most metals
- 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.
- Avoid strong acids, acid chlorides, acid anhydrides and chlorofluoromethanes.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

**Control parameters**

**OCCUPATIONAL EXPOSURE LIMITS (OEL)**

<table>
<thead>
<tr>
<th>INGREDIENT DATA</th>
<th>Source</th>
<th>Ingredient</th>
<th>Material name</th>
<th>TWA</th>
<th>STEL</th>
<th>Peak</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia Exposure Standards</td>
<td>selenium dioxide</td>
<td>Selenium compounds (as Se) excluding hydrogen selenide</td>
<td>0.1 mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
<td></td>
</tr>
</tbody>
</table>

**EMERGENCY LIMITS**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Material name</th>
<th>TEEL-1</th>
<th>TEEL-2</th>
<th>TEEL-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selenium Dioxide</td>
<td>Selenium dioxide</td>
<td>0.84 mg/m³</td>
<td>1.6 mg/m³</td>
<td>9.5 mg/m³</td>
</tr>
<tr>
<td>Original IDLH</td>
<td>Revised IDLH</td>
<td>Not Available</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Selenium Dioxide | 1 mg/m³ | Not Available**

**Exposure controls**

Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.

**Appropriate engineering controls**

- Process controls which involve changing the way a job activity or process is done to reduce the risk.
- 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.
- Employers may need to use multiple types of controls to prevent employee overexposure.
SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Physical state</th>
<th>Odour</th>
<th>Odour threshold</th>
<th>pH (as supplied)</th>
<th>Melting point / freezing point (°C)</th>
<th>Initial boiling point and boiling range (°C)</th>
<th>Flash point (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White or yellowish-white to slightly reddish, crystalline powder. Soluble in water and alcohol. For regulatory purposes considered as the anhydride of selenious acid SeO₂.H₂O and may ship as UN 2630.</td>
<td>Divided Solid</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Applicable</td>
<td>340-350</td>
<td>315 (sublimes)</td>
<td>Not Applicable</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Required Minimum Protection Factor | Half-Face Respirator | Full-Face Respirator | Powered Air Respirator |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 10 x ES</td>
<td>P1</td>
<td>-</td>
<td>PAPR-P1</td>
</tr>
<tr>
<td>up to 50 x ES</td>
<td>Air-line*</td>
<td>P2</td>
<td>PAPR-P2</td>
</tr>
<tr>
<td>up to 100 x ES</td>
<td>Air-line**</td>
<td>P3</td>
<td>-</td>
</tr>
<tr>
<td>100+ x ES</td>
<td>-</td>
<td>Air-line*</td>
<td>-</td>
</tr>
</tbody>
</table>

- Negative pressure demand ** - Continuous Flow

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

Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.

The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).

Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory protection. These may be government mandated or vendor recommended.

Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.

Use approved positive flow mask if significant quantities of dust becomes airborne.

Try to avoid creating dust conditions.

Continued...
SECTION 10 STABILITY AND REACTIVITY

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explosive properties</td>
<td>Not Available</td>
</tr>
<tr>
<td>Oxidising properties</td>
<td>Not Available</td>
</tr>
<tr>
<td>Flammability</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Upper Explosive Limit</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Lower Explosive Limit</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Vapour pressure (kPa)</td>
<td>1.66 @ 70C</td>
</tr>
<tr>
<td>Solubility in water</td>
<td>Miscible</td>
</tr>
<tr>
<td>Vapour density (Air = 1)</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

SECTION 11 TOXICOLOGICAL INFORMATION

### Inhaled

Inhalation of dusts, generated by the material, during the course of normal handling, may produce toxic effects. The material is not thought to produce respiratory irritation (as classified by EC Directives using animal models). Nevertheless inhalation of dusts, or fumes, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress. 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. 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.

The inhalation of small particles of metal oxide results in sudden thirst, a sweet, metallic foul taste, throat irritation, cough, dry mucous membranes, tiredness and general unwellness. Headache, nausea and vomiting, fever or chills, restlessness, sweating, diarrhoea, excessive urination and prostration may also occur.

### Ingestion

Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.

Acute effects of selenium poisoning include nervousness, convulsions, drowsiness, frontal headaches, and in extreme cases, death from respiratory depression. There may also be skin eruptions, tiredness, stomach upset, discoloration of teeth, an odorous garlic breath and loss of hair and nails.

Repeated or prolonged exposure to selenium oxide may result in a metallic taste in the mouth followed by a garlic odour of the breath and sweat.

### Skin Contact

The material is not thought to be a skin irritant (as classified by EC Directives using animal models). Abrasive damage however, may result from prolonged exposures. Skin contact with the material may damage the health of the individual; systemic effects may result following absorption. Open cuts, abraded or irritated skin should not be exposed to this material.

Entry into the bloodstream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

### Eye

Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may cause transient discomfort characterised by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result.

### Chronic

Repeated or long-term occupational exposure is likely to produce cumulative health effects involving organs or biochemical systems.

Long term exposure to high dust concentrations may produce changes in lung function i.e. pneumoconiosis, caused by particles less than 0.5 micron penetrating and remaining in the lung. Chronic exposure to selenium and its compounds irritate the bronchi, cause gastrointestinal problems, irritation of the nasopharynx and a persistent foul garlic breath. There is often a metallic taste, pallor, irritability, extreme tiredness after years of exposure.

Repeated or prolonged exposure to selenium oxide may result in a metallic taste in the mouth followed by a garlic odour of the breath and sweat.

### Selenium Dioxide

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Toxicity</th>
<th>Irritation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral (rat) LD50</td>
<td>68.1 mg/kg&lt;sup&gt;[2]&lt;/sup&gt;</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

**Legend:**

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

### SELENIUM DIOXIDE

**Acute Toxicity**

- IARC Group 3 [MDL OHS] Bacterial cell mutagen Reproductive effector in rats.

**Skin Irritation/Corrosion**

- X

**Serious Eye Damage/Irritation**

- X

**STOT - Single Exposure**

- X

- X
SECTION 12 ECOLOGICAL INFORMATION

Toxicity

<table>
<thead>
<tr>
<th>ENDPOINT</th>
<th>TEST DURATION (HR)</th>
<th>SPECIES</th>
<th>VALUE</th>
<th>SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50</td>
<td>96</td>
<td>Fish</td>
<td>0.002-0.06mg/L</td>
<td>2</td>
</tr>
<tr>
<td>EC50</td>
<td>48</td>
<td>Crustacea</td>
<td>0.001-0.12mg/L</td>
<td>2</td>
</tr>
<tr>
<td>EC50</td>
<td>96</td>
<td>Algae or other aquatic plants</td>
<td>0.006-0.32mg/L</td>
<td>2</td>
</tr>
<tr>
<td>BCF</td>
<td>336</td>
<td>Algae or other aquatic plants</td>
<td>2.75mg/L</td>
<td>4</td>
</tr>
<tr>
<td>NOEC</td>
<td>240</td>
<td>Algae or other aquatic plants</td>
<td>0.001-0.03mg/L</td>
<td>2</td>
</tr>
</tbody>
</table>

Legend: Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash waters.
Wastes resulting from use of the product must be disposed of on site or at approved waste sites.
For Metal:
- Atmospheric Fate - Metal-containing inorganic substances generally have negligible vapour pressure and are not expected to partition to air.
- Environmental Fate: Environmental processes, such as oxidation, the presence of acids or bases and microbiological processes, may transform insoluble metals to more soluble ionic forms.
- Environmental processes may enhance bioavailability and may also be important in changing solubilities.
- Aquatic/Terrestrial Fate: When released to dry soil, most metals will exhibit limited mobility and remain in the upper layer; some will leach locally into ground water and/ or surface water ecosystems when soaked by rain or melt ice. A metal ion is considered infinitely persistent because it cannot degrade further. Once released to surface waters and moist soils their fate depends on solubility and dissolution in water. A significant proportion of dissolved/ sorbed metals will end up in sediments through the settling of suspended particles. The remaining metal ions can then be taken up by aquatic organisms. Ionic species may bind to dissolved ligands or sorb to solid particles in water.
- Feeding of plants from ferous rocks containing selenium has caused toxic effects in livestock. Environmental redistribution of selenium due to man's activity include copper smelting; lead, zinc, phosphate, and uranium mining; manufacture of glass ceramics and pigments; and burning of fuels. Early concerns about selenium toxicity have given way to recognition of certain beneficial properties, such as anti-carcinogenic properties, and offering protection against the toxicity of heavy metals such as cadmium, mercury and silver. Sediment micro-organisms produce dimethyl selenide and dimethyl diselenide from both inorganic and organic sources and contribute to its biogeochemical cycling. Bacteria and cyanobacteria have two possible mechanisms for the uptake and transformation of selenium. Selenates are reduced to elemental selenium during uptake, and soluble selenium is transformed into volatile alkyl selenium compounds. Aquatic organisms can convert selenium to both inert and soluble forms. Benthic bacteria and fungi are capable of methylating elemental and inorganic selenium salts. DO NOT discharge into sewer or waterways.

Ecotoxicity data: Fish toxicity LC50 (96 h): fathead minnow (Pimephales promelas): 2.9 mg/L; Invertebrate toxicity (96 h): Green mussel Perna viridis: 10.0 mg/L, 8.0 mg/L;

Persistence and degradability

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Persistence: Water/Soil</th>
<th>Persistence: Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selenium Dioxide</td>
<td>HIGH</td>
<td>HIGH</td>
</tr>
</tbody>
</table>

Bioaccumulative potential

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Bioaccumulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selenium Dioxide</td>
<td>LOW (LogKOW = -0.771)</td>
</tr>
</tbody>
</table>

Mobility in soil

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selenium Dioxide</td>
<td>LOW (KOC = 23.74)</td>
</tr>
</tbody>
</table>

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal
- Containers may still present a chemical hazard/ danger when empty.
- Return to supplier for reuse/ recycling if possible.
- If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.
- Where possible retain label warnings and SDS and observe all notices pertaining to the product.
- 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.
- A Hierarchy of Controls seems to be common - the user should investigate:
  - Reduction
  - Reuse
  - Recycling
  - Disposal (if all else fails)
  - 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.
  - DO NOT allow wash water from cleaning or process equipment to enter drains.

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 whenever 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**
- **HAZCHEM 2X**

#### Land transport (ADG)

<table>
<thead>
<tr>
<th>UN number</th>
<th>3283</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN proper shipping name</td>
<td>SELENIUM COMPOUND, SOLID, N.O.S. (contains Selenium Dioxide)</td>
</tr>
<tr>
<td>Transport hazard class(es)</td>
<td>Class: 6.1 Subrisk: Not Applicable</td>
</tr>
<tr>
<td>Packing group</td>
<td>II</td>
</tr>
<tr>
<td>Environmental hazard</td>
<td>Environmentally hazardous</td>
</tr>
</tbody>
</table>

**Special precautions for user**

- Special provisions: 274
- Limited quantity: 500 g

#### Air transport (ICAO-IATA / DGR)

<table>
<thead>
<tr>
<th>UN number</th>
<th>3283</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN proper shipping name</td>
<td>Selenium compound, solid, n.o.s. * (contains Selenium Dioxide)</td>
</tr>
<tr>
<td>Transport hazard class(es)</td>
<td>ICAO/IATA Class: 6.1 ICAO / IATA Subrisk: Not Applicable ERG Code: 6L</td>
</tr>
<tr>
<td>Packing group</td>
<td>II</td>
</tr>
<tr>
<td>Environmental hazard</td>
<td>Environmentally hazardous</td>
</tr>
</tbody>
</table>

**Special precautions for user**

- Special provisions: A3 A5
- Cargo Only Packing Instructions: 676
- Cargo Only Maximum Qty / Pack: 100 kg
- Passenger and Cargo Packing Instructions: 669
- Passenger and Cargo Maximum Qty / Pack: 25 kg
- Passenger and Cargo Limited Quantity Packing Instructions: Y644
- Passenger and Cargo Limited Maximum Qty / Pack: 1 kg

#### Sea transport (IMDG-Code / GGSee)

<table>
<thead>
<tr>
<th>UN number</th>
<th>3283</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN proper shipping name</td>
<td>SELENIUM COMPOUND, SOLID, N.O.S. (contains Selenium Dioxide)</td>
</tr>
<tr>
<td>Transport hazard class(es)</td>
<td>IMDG Class: 6.1 IMDG Subrisk: Not Applicable</td>
</tr>
<tr>
<td>Packing group</td>
<td>II</td>
</tr>
<tr>
<td>Environmental hazard</td>
<td>Marine Pollutant</td>
</tr>
</tbody>
</table>

**Special precautions for user**

- EMS Number: F-A , S-A
- Special provisions: 274
- Limited Quantities: 500 g

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**Continued...**
Transport in bulk according to Annex II of MARPOL and the IBC code
Not Applicable

SECTION 15 REGULATORY INFORMATION

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

**SELENIUM DIOXIDE (7446-08-4) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

- Australia Dangerous Goods Code (ADG Code) - Dangerous Goods List
- Australia Dangerous Goods Code (ADG Code) - List of Emergency Action Codes
- Australia Exposure Standards
- Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
- Australia Inventory of Chemical Substances (AICS)
- Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix E (Part 2)
- Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix F (Part 3)
- Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Part 2, Section Seven - Appendix I
- International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
- International Air Transport Association (IATA) Dangerous Goods Regulations
- International Maritime Dangerous Goods Requirements (IMDG Code)
- United Nations Recommendations on the Transport of Dangerous Goods Model Regulations

**National Inventory Status**

<table>
<thead>
<tr>
<th>National Inventory</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia - AICS</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada - DSL</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada - NDSL</td>
<td>No (Selenium Dioxide)</td>
</tr>
<tr>
<td>China - IECSC</td>
<td>No (Selenium Dioxide)</td>
</tr>
<tr>
<td>Europe - EINEC / ELINCS / NLP</td>
<td>Yes</td>
</tr>
<tr>
<td>Japan - ENCS</td>
<td>Yes</td>
</tr>
<tr>
<td>Korea - KECI</td>
<td>Yes</td>
</tr>
<tr>
<td>New Zealand - NZIoC</td>
<td>Yes</td>
</tr>
<tr>
<td>Philippines - PICCS</td>
<td>Yes</td>
</tr>
<tr>
<td>USA - TSCA</td>
<td>Yes</td>
</tr>
<tr>
<td>Taiwan - TCSI</td>
<td>Yes</td>
</tr>
<tr>
<td>Mexico - INSO</td>
<td>Yes</td>
</tr>
<tr>
<td>Vietnam - NCi</td>
<td>Yes</td>
</tr>
<tr>
<td>Russia - ARIPS</td>
<td>Yes</td>
</tr>
<tr>
<td>Thailand - TECI</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Legend:**
Yes = All declared ingredients are on the inventory
No = Not determined or one or more ingredients are not on the inventory and are not exempt from listing (see specific ingredients in brackets)

SECTION 16 OTHER INFORMATION

**Revision Date:** 27/06/2017  
**Initial Date:** Not Available

**SDS Version Summary**

<table>
<thead>
<tr>
<th>Version</th>
<th>Issue Date</th>
<th>Sections Updated</th>
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</thead>
<tbody>
<tr>
<td>4.1.1.1</td>
<td>12/01/2008</td>
<td>Acute Health (eye), Acute Health (inhaled), Acute Health (skin), Acute Health (swallowed), Advice to Doctor, Chronic Health, Classification, Disposal, Engineering Control, Environmental, Exposure Standard, Fire fighter (extinguishing media), Fire fighter (fire/explosion hazard), Fire fighter (fire incompatibility), First Aid (skin), First Aid (swallowed), Personal Protection (other), Personal Protection (eye), Personal Protection (hands/feet), Physical Properties, Spills (major), Spills (minor), Storage (storage incompatibility), Storage (suitable container), Toxicity and Irritation (Toxicity Figure), Use</td>
</tr>
</tbody>
</table>

**Other information**

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

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

**Definitions and abbreviations**

- PC – TWA: Permissible Concentration-Time Weighted Average
- PC – STEL: Permissible Concentration-Short Term Exposure Limit
- IARC: International Agency for Research on Cancer
- ACGIH: American Conference of Governmental Industrial Hygienists
- STEL: Short Term Exposure Limit
- TEEL: Temporary Emergency Exposure Limit,
- IDLH: Immediately Dangerous to Life or Health Concentrations
- OIS: Odour Safety Factor
- NOAEL: No Observed Adverse Effect Level
- LOAEL: Lowest Observed Adverse Effect Level
- TLV: Threshold Limit Value

[Continued...]