SODIUM THIOSULFATE

ALPHA CHEMICALS PTY LTD

SODIUM THIOSULFATE

Chemwatch: 21894
Version No: 4.1.1.1
Safety Data Sheet according to WHS and ADG requirements

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

Product Identifier

<table>
<thead>
<tr>
<th>Product name</th>
<th>SODIUM THIOSULFATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Name</td>
<td>sodium thiosulfate</td>
</tr>
<tr>
<td>Synonyms</td>
<td>Na2S2-O3; thiosulfuric acid, disodium salt; thiosulphuric acid, disodium salt; sodium thiosulfate pentahydrate (CAS RN: 10102-17-7); Chlorine Control Chlorine Cure Dechlor-It disodium thiosulfate; disodium thiosulfate S-Hydrl sodium hyposulfite hyposulphite; sodium oxide sulfide sulphide sodium thiosulfate, anhydrous; sodium thiosulphate, anhydrous Sodothiol; Cat. No. 22937; sodium thiosulfate; sodium thiosulphate; Cristal Clair Chlor Out</td>
</tr>
<tr>
<td>Proper shipping name</td>
<td>ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (contains sodium thiosulfate)</td>
</tr>
<tr>
<td>Chemical formula</td>
<td>O3S2·2Na·5H2O</td>
</tr>
<tr>
<td>Other means of identification</td>
<td>Not Available</td>
</tr>
<tr>
<td>CAS number</td>
<td>7772-98-7</td>
</tr>
</tbody>
</table>

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

Relevant identified uses

Used widely as bleaching agent, an ingredient in photographic fixer solutions, for extraction of silver from ores, as a mordant in dyeing and printing textiles, reducers in chrome dyeing, in leather manufacture and a reagent in analytical and organic chemistry. Antidote for cyanide poisoning.

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) 9982 4622
Fax: Not Available
Website: ~
Email: shane@alphachem.com.au

Emergency telephone number

Association / Organisation: ALPHA CHEMICALS PTY LTD
Emergency telephone numbers: 61 (0) 418 237 771
Other emergency telephone numbers: Not Available

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>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability</td>
</tr>
<tr>
<td>Toxicity</td>
</tr>
<tr>
<td>Body Contact</td>
</tr>
<tr>
<td>Reactivity</td>
</tr>
<tr>
<td>Chronic</td>
</tr>
</tbody>
</table>

Poisons Schedule
Not Applicable

Classification [1]
Skin Corrosion/Irritation Category 2, Acute Aquatic Hazard Category 1, Specific target organ toxicity - single exposure Category 3 (respiratory tract irritation), Eye Irritation Category 2A


Label elements

Continued...
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>7772-98-7</td>
<td>&gt;98</td>
<td>sodium thiosulfate</td>
</tr>
<tr>
<td>Not Available</td>
<td></td>
<td>may decompose in water/ moist air to produce</td>
</tr>
<tr>
<td>7783-06-4</td>
<td></td>
<td>hydrogen sulfide</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:
  - Wash out immediately with fresh running water.
  - Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
  - Seek medical attention without delay; if pain persists or recurs seek medical attention.
  - Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact

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

Treat symptomatically.

For exposures involving sulfides and hydrogen sulfide (including gastric acid decomposition products of alkaline sulfides):
- Hydrogen sulfide anion produces its major toxic effect through inhibition of cytochrome oxidases.
- Symptoms include profuse salivation, nausea, vomiting and diarrhoea. Central nervous effects may include giddiness, headache, vertigo, amnesia, confusion and unconsciousness. Tachypnoea, palpitations, tachycardia, arrhythmia, sweating, weakness and muscle cramps may also indicate overdose.

Treatment involves:
- If respirations are depressed, application of artificial respiration, administration of oxygen (continue after spontaneous breathing is established).
- For severe poisonings administer amyl nitrite and sodium nitrite (as for cyanide poisoning) but omit sodium thiosulfate injection.
- Atropine sulfate (0.6 mg intramuscularly) may contribute symptomatic relief.
- Conjunctivitis may be relieved by installation of 1 drop of olive-oil in each eye and sometimes by 3 drops of epinephrine solution (1:1000) at frequent intervals. Occasionally local anesthetics and hot and cold compresses are necessary to control pain.
- Antibiotics at first hint of pulmonary infection.

Hydrogen sulfide is metabolised by oxidation to sulfate, methylation and reaction with metallic ion- or disulfide containing proteins (principally cytochrome c oxidase). This latter reaction is associated with aerobic, cellular respiration and is largely responsible for the toxic effects.

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

**Fire Fighting**
- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves in the event of a fire.
- Prevent, by any means available, spillage from entering drains or water courses.
- Use fire fighting procedures suitable for surrounding area.
- **DO NOT** approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

**Fire/Explosion Hazard**
- Non combustible.
- Not considered a significant fire risk, however containers may burn.
- Decomposition may produce toxic fumes of:
  - sulfur oxides (SOx)
  - sulfur dioxide (SO2)
  - hydrogen sulfide (H2S)
  - metal oxides

**HAZCHEM 2Z**

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

**Major Spills**
- Environmental hazard - contain spillage.
  - Moderate hazard.
    - **CAUTION:** Advise personnel in area.
    - Alert Emergency Services and tell them location and nature of hazard.
    - Control personal contact by wearing protective clothing.
    - Prevent, by any means available, spillage from entering drains or water courses.
    - Recover product wherever possible.
    - **IF DRY:** Use dry clean up procedures and avoid generating dust. Collect residues and place in sealed plastic bags or other containers for disposal.

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

- DO NOT store near acids, or oxidising agents
- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry area protected from environmental extremes.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer’s storage and handling recommendations contained within this SDS.

For major quantities:
- Consider storage in bunded areas - ensure storage areas are isolated from sources of community water (including stormwater, ground water, lakes and streams).
- Ensure that accidental discharge to air or water is the subject of a contingency disaster management plan; this may require consultation with local authorities.

Conditions for safe storage, including any incompatibilities

Suitable container

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

Storage incompatibility

- For inorganic thiosulfates
  - Avoid storage with acids, metal nitrates, sodium nitrite, halogens and oxidizing agents.
  - Forms explosive product with potassium nitrate, sodium nitrate
  - Reacts with acids, forming sulfur dioxide
  - Incompatible with halogens, lead, silver and mercury salts, iodine
  - Hydrogen sulfide (H2S):
    - is a highly flammable and reactive gas
    - reacts violently with strong oxidisers, metal oxides, metal dusts and powders, bromine pentfluoride, chlorine trifluoride, chromium trioxide, chromyl chloride, dichlorine oxide, nitrogen trichloride, nitryl hypofluorite, oxygen difluoride, perchloryl fluoride, phosphorus pentasulfide, silver fulminate, soda-lime, sulphur dioxide
    - is incompatible with acetaldehyde, chlorine monoxide, chromic anhydride, copper, nitric acid, phenylalanine, sodium perchlorate
    - forms explosive material with benzylidenazolium salts
    - attacks many metals
    - Flow or agitation of hydrogen sulfide may generate electrostatic charges due to low conductivity

- Contact with acids produces toxic fumes
- Metals and their oxides or salts may react violently with chlorine trifluoride and bromine trifluoride.
- These trifluorides are hypereic 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.
- Sulfides are incompatible with acids, diazo and azo compounds, halocarbons, isocyanates, aldehydes, alkali metals, nitriles, hydrides, and other strong reducing agents.
- Many reactions of sulfides with these materials generate heat and in many cases hydrogen gas.
- Many sulfide compounds may liberate hydrogen sulfide upon reaction with an acid.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

| INGREDIENT DATA |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Source          | Ingredient      | Material name   | TWA             | STEL            | Peak            | Notes           |
| Australia Exposure Standards | hydrogen sulfide | Hydrogen sulphide | 10 ppm / 14 mg/m³ | 21 mg/m³ / 15 ppm | Not Available   | Not Available   |

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>sodium thiosulfate</td>
<td>Sodium thiosulfate pentahydrate</td>
<td>2.4 mg/m³</td>
<td>26 mg/m³</td>
<td>1,200 mg/m³</td>
</tr>
<tr>
<td>sodium thiosulfate</td>
<td>Sodium thiosulfate</td>
<td>38 mg/m³</td>
<td>410 mg/m³</td>
<td>2,500 mg/m³</td>
</tr>
<tr>
<td>hydrogen sulfide</td>
<td>Hydrogen sulfide</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

Exposure controls

Appropriate engineering 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. The basic types of engineering controls are:
Personal protection

- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lenses should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly.

Eye and face protection

- Neoprene rubber gloves

Skin protection

The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact breakthrough time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.

- Neoprene rubber gloves

Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present.

- polyvinyl chloride.
- nitrile rubber.
- butyl rubber.
- fluorocautchouc.
- polychloroprene.
- polyvinyl chloride.

The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact breakthrough time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.

- Neoprene rubber gloves

Gloves should be examined for wear and/or degradation constantly.

- Neoprene rubber gloves

Hands/feet protection

Suitability and durability of glove type is dependent on usage.

Body protection

See Other protection below

Recommended material(s)

<table>
<thead>
<tr>
<th>Material</th>
<th>CPI</th>
</tr>
</thead>
<tbody>
<tr>
<td>NATURAL RUBBER</td>
<td>A</td>
</tr>
<tr>
<td>NEOPRENE</td>
<td>A</td>
</tr>
<tr>
<td>NITRILE</td>
<td>A</td>
</tr>
<tr>
<td>NITRILE-PVC</td>
<td>A</td>
</tr>
<tr>
<td>PVC</td>
<td>A</td>
</tr>
</tbody>
</table>

* CPI - Chemwatch Performance Index
A: Best Selection
B: Satisfactorily may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. - * Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

Particulate: (AS/NZS 1716 & 1715, EN 143:2000 & 149:001, ANSI Z88 or national equivalent)

<table>
<thead>
<tr>
<th>Required Minimum Protection Factor</th>
<th>Half-Face Respirator</th>
<th>Full-Face Respirator</th>
<th>Powered Air Respirator</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>-</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(ANC), B3 = Acid gas or hydrogen cyanide(ANC), 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.

For concentrations exceeding 10 ppm hydrogen sulfide or for unknown concentrations:

- Respirators should be equipped with pressure demand regulators and operated in pressure demand mode only. If airline units are used, a 5-minute egress bottle must also be carried.
Gas masks or other air-purifying respirators must never be used for H2S, due to the poor warning properties of the gas.

When exposure concentrations are unknown and respiratory protection is not used, personal H2S warning devices should be worn.

These devices should not be relied on to warn of life-threatening concentrations.

H2S rapidly fatigues the sense of smell; the rotten egg odour disappears quickly even where high concentrations are present.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical state</strong></td>
<td>Divided Solid</td>
</tr>
<tr>
<td><strong>Odour</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>Odour threshold</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>pH (as supplied)</strong></td>
<td>Not Applicable</td>
</tr>
<tr>
<td><strong>Melting point / freezing point</strong></td>
<td>48 °C</td>
</tr>
<tr>
<td><strong>Initial boiling point and boiling range</strong></td>
<td>&gt;100 decomposes</td>
</tr>
<tr>
<td><strong>Flash point</strong></td>
<td>Not Applicable</td>
</tr>
<tr>
<td><strong>Evaporation rate</strong></td>
<td>Not Applicable</td>
</tr>
<tr>
<td><strong>Flammability</strong></td>
<td>Not Applicable</td>
</tr>
<tr>
<td><strong>Upper Explosive Limit (%)</strong></td>
<td>Not Applicable</td>
</tr>
<tr>
<td><strong>Lower Explosive Limit (%)</strong></td>
<td>Not Applicable</td>
</tr>
<tr>
<td><strong>Vapour pressure (kPa)</strong></td>
<td>Not Applicable</td>
</tr>
<tr>
<td><strong>Solubility in water</strong></td>
<td>Miscible</td>
</tr>
<tr>
<td><strong>Vapour density (Air = 1)</strong></td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

**Partition coefficient n-octanol / water** Not Available

**Relative density (Water = 1)** Not Available

**Viscosity (cSt)** Not Available

**Auto-Ignition temperature (°C)** Not Applicable

**Decomposition temperature** >100 °C

**Molecular weight (g/mol)** 158.10

**pH as a solution (1%)** Not Applicable

**VOC g/L** Not Available

SECTION 10 STABILITY AND REACTIVITY

**Reactivity** See section 7

**Chemical stability**

- Unstable in the presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

**Possibility of hazardous reactions** See section 7

**Conditions to avoid** See section 7

**Incompatible materials** See section 7

**Hazardous decomposition products** See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

**Inhaled**

The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage. Inhalation of vapours, aerosols (mists, fumes) or dusts, generated by the material during the course of normal handling, may be damaging to the health of the individual.

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.

Hydrogen sulfide poisoning can cause increased secretion of saliva, nausea, vomiting, diarrhoea, giddiness, headache, vertigo, memory loss, palpitations, heartbeat irregularities, weakness, muscle cramps, confusion, sudden collapse, unconsciousness and death due to paralysis of breathing (at levels above 300 parts per million). The "rotten egg" odour is not a good indicator of exposure since odour fatigue occurs and odour is lost at over 200 ppm. Decomposition may produce hydrogen sulfate.

**Ingestion**

Thiosulfate salts are poorly absorbed and stimulate the emptying of the bowel.

The material has NOT been classified by EC Directives or other classification systems as 'harmful by ingestion'. This is because of the lack of corroborating animal or human evidence.

Ingestion can cause irritation of the gastrointestinal tract and purging. Diarrhoea may occur from ingestion of large quantities. In treatment of cyanide poisoning, 12.5 gm. has been injected intravenously without ill-effect.

**Skin Contact**

This material can cause inflammation of the skin on contact in some persons. The material may accentuate any pre-existing dermatitis condition.

Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.

Open cuts, abraded or irritated skin should not be exposed to this material.

Solution of material in moisture on the skin, or perspiration, may increase irritant effects. Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the
SODIUM THIOSULFATE

Use of the material and ensure that any external damage is suitably protected.

### Eye
This material can cause eye irritation and damage in some persons. Exposure to H2S may produce pain, blurred vision, and reaction to eyes which may be permanent in severe cases. There is usually redness of the eyes, discomfort on exposure to light, pain, and at higher concentrations blurred vision and injury to the eyes.

### Chronic
Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems. Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure. Long-term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis, caused by particles less than 0.5 micron penetrating and remaining in the lung. Long term low level exposure to hydrogen sulfide may produce headache, fatigue, dizziness, irritability and loss of sexual desire. These symptoms may also result when exposed to hydrogen sulfide at high concentration for a short period of time.

<table>
<thead>
<tr>
<th>sodium thiosulfate</th>
<th>TOXICITY</th>
<th>IRRITATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dermal (rabbit) LD50: &gt;2000 mg/kg</td>
<td>Not Available</td>
<td></td>
</tr>
<tr>
<td>Oral (rat) LD50: &gt;2000 mg/kg</td>
<td>Not Available</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>hydrogen sulfide</th>
<th>TOXICITY</th>
<th>IRRITATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation (rat) LC50: 0.7 mg/14H</td>
<td>Not Available</td>
<td></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

### Toxicity

**Acute Toxicity**

<table>
<thead>
<tr>
<th>Skin Irritation/Corrosion</th>
<th>Carcinogenicity</th>
<th>Reproductivity</th>
<th>Aspiration Hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

**SODIUM THIOSULFATE**

Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. On the other hand, industrial bronchitis is a disorder that occurs as a result of exposure due to high concentrations of irritating substance (often particles) and is completely reversible after exposure ceases. The disorder is characterized by difficulty breathing, cough and mucus production.

**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>7316.709mg/L</td>
<td>3</td>
</tr>
<tr>
<td>EC50</td>
<td>48</td>
<td>Crustacea</td>
<td>230mg/L</td>
<td>2</td>
</tr>
<tr>
<td>EC50</td>
<td>72</td>
<td>Algae or other aquatic plants</td>
<td>&gt;100mg/L</td>
<td>2</td>
</tr>
<tr>
<td>NOEC</td>
<td>504</td>
<td>Crustacea</td>
<td>&gt;10mg/L</td>
<td>2</td>
</tr>
</tbody>
</table>

**Legend:**

<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>0.00143mg/L</td>
<td>2</td>
</tr>
<tr>
<td>EC50</td>
<td>48</td>
<td>Crustacea</td>
<td>0.082mg/L</td>
<td>4</td>
</tr>
<tr>
<td>EC50</td>
<td>96</td>
<td>Algae or other aquatic plants</td>
<td>623.589mg/L</td>
<td>3</td>
</tr>
<tr>
<td>NOEC</td>
<td>3960</td>
<td>Fish</td>
<td>0.0004mg/L</td>
<td>5</td>
</tr>
</tbody>
</table>

**Legend:**

- Data either not available or does not fill the criteria for classification
- Data available to make classification

Very toxic to aquatic organisms.

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 thiosulfates:**

In water absent of oxygen, thiosulfate is fairly stable, with half lives greater than 600 days at 20 C and 60 days at 35 C. Oxygen promoted decomposition of thiosulfate. In open systems under shaking, the life of thiosulfate at 20 C decreased to 55 days. In soil, thiosulfate decomposes rapidly, with half lives less than 24 hours. Medium acidity does not influence thiosulfate decomposition rate. Degradation products of thiosulfate are mainly thionate and sulfate. No sulfide was detected.

Sulfide ion is very toxic to aquatic life, threshold concentration for fresh or saltwater fish is 0.5ppm. The product therefore is very toxic to aquatic life. The major decomposition product, hydrogen sulfide, is damaging to vegetation at 5ppm for 24 hours

**For hydrogen sulfide:**

Environmental Fate: Since hydrogen sulfide exists as a gas at atmospheric pressure, partitioning to the air is likely to occur after environmental release, where it may adhere to soil and plant foliage. The compound is also soluble in oil and water, and thus may also partition to surface water, groundwater, or moist soil. Hydrogen sulfide's solubility in pure water decreases as water temperature increases.
temperature increases. Once hydrogen sulfide is dissolved in water, it will dissociate into bisulfide and sulfide ions; the ratio and concentrations of these ions will depend on the pH of the solution. Hydrogen sulfide can also form insoluble sulfide salts with various metals (i.e., copper, zinc, nickel, and iron) that may be present in soils or environmental waters. Hydrogen sulfide evaporates easily from water, and the rate of evaporation depends on factors such as temperature, humidity, pH, and the concentration of certain metal ions. The rate of gaseous exchange of hydrogen sulfide across the air-water interface is similar to other unreactive gases, such as oxygen (O2), nitrogen (N2), and carbon dioxide (CO2), at pHs <= 6. As pH increases, such as in seawater (pH >= 8), hydrogen sulfide escape increases due to an ionic species gradient in the surface waters. Complexation of bisulfide and sulfide ions to trace metal ions (i.e., Zn2+, Co2+, and Ni2+) found in seawater also affects the transport of hydrogen sulfide across the air-water interface.

**DO NOT** discharge into sewer or waterways.

### Persistence and degradability

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Persistence: Water/Soil</th>
<th>Persistence: Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>sodium thiosulfate</td>
<td>HIGH</td>
<td>HIGH</td>
</tr>
<tr>
<td>hydrogen sulfide</td>
<td>LOW</td>
<td>LOW</td>
</tr>
</tbody>
</table>

### Bioaccumulative potential

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Bioaccumulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>sodium thiosulfate</td>
<td>LOW (LogKOW = -1.529)</td>
</tr>
<tr>
<td>hydrogen sulfide</td>
<td>LOW (LogKOW = 0.229)</td>
</tr>
</tbody>
</table>

### Mobility in soil

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>sodium thiosulfate</td>
<td>LOW (KOC = 6.124)</td>
</tr>
<tr>
<td>hydrogen sulfide</td>
<td>LOW (KOC = 14.3)</td>
</tr>
</tbody>
</table>

### SECTION 13 DISPOSAL CONSIDERATIONS

#### Waste treatment methods

- **Product / Packaging disposal**
  - 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.
    - It may be necessary to collect all wash water for treatment before disposal.
    - In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
    - Where in doubt contact the responsible authority.
    - Recycle wherever possible or consult manufacturer for recycling options.
    - Consult State Land Waste Management Authority for disposal.
    - Bury residue in an authorised landfill.
    - Recycle containers if possible, or dispose of in an authorised landfill.

### SECTION 14 TRANSPORT INFORMATION

#### Labels Required

- **Marine Pollutant**
  - HAZCHEM 2Z

### Land transport (ADG)

<table>
<thead>
<tr>
<th>UN number</th>
<th>ENVIROMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (contains sodium thiosulfate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN proper shipping name</td>
<td>CLASS 9</td>
</tr>
<tr>
<td>Transport hazard class(es)</td>
<td>Subrisk : Not Applicable</td>
</tr>
<tr>
<td>Packing group</td>
<td>III</td>
</tr>
<tr>
<td>Environmental hazard</td>
<td>Environmentally hazardous</td>
</tr>
</tbody>
</table>
### Special Precautions for User

**Special Provisions:**
- 274 331 335 375 AU01

**Limited Quantity:** 
- 5 kg

Environmentally Hazardous Substances meeting the descriptions of UN 3077 or UN 3082 are not subject to this Code when transported by road or rail in:
- (a) packagings;
- (b) IBCs;
- (c) any other receptacle not exceeding 500 kg (L).

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

<table>
<thead>
<tr>
<th>UN number</th>
<th>3077</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UN proper shipping name</strong></td>
<td>Environmentally hazardous substance, solid, n.o.s. * (contains sodium thiosulfate)</td>
</tr>
<tr>
<td><strong>Transport hazard class(es)</strong></td>
<td>ICAO/IATA Class: 9; ICAO / IATA Subrisk: Not Applicable; ERG Code: 9L</td>
</tr>
<tr>
<td><strong>Packing group</strong></td>
<td>III</td>
</tr>
<tr>
<td><strong>Environmental hazard</strong></td>
<td>Environmentally hazardous</td>
</tr>
</tbody>
</table>

### Cargo Only Packing Instructions

- **Special provisions:** A97 A158 A179 A197
- **Cargo Only Maximum Qty / Pack:** 400 kg
- **Passenger and Cargo Packing Instructions:** 966
- **Passenger and Cargo Maximum Qty / Pack:** 400 kg
- **Passenger and Cargo Limited Quantity Packing Instructions:** Y956
- **Passenger and Cargo Limited Maximum Qty / Pack:** 30 kg

### Sea transport (IMDG-Code / GG VS ee)

<table>
<thead>
<tr>
<th>UN number</th>
<th>3077</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UN proper shipping name</strong></td>
<td>ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (contains sodium thiosulfate)</td>
</tr>
<tr>
<td><strong>Transport hazard class(es)</strong></td>
<td>IMDG Class: 9; IMDG Subrisk: Not Applicable</td>
</tr>
<tr>
<td><strong>Packing group</strong></td>
<td>III</td>
</tr>
<tr>
<td><strong>Environmental hazard</strong></td>
<td>Marine Pollutant</td>
</tr>
</tbody>
</table>

### Special Precautions for User

- **Special provisions:** A97 A158 A179 A197
- **Cargo Only Packing Instructions:** 966
- **Cargo Only Maximum Qty / Pack:** 400 kg
- **Passenger and Cargo Packing Instructions:** 966
- **Passenger and Cargo Maximum Qty / Pack:** 400 kg
- **Passenger and Cargo Limited Quantity Packing Instructions:** Y956
- **Passenger and Cargo Limited Maximum Qty / Pack:** 30 kg

### 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

<table>
<thead>
<tr>
<th>SODIUM THIOSULFATE (7772-98-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia Dangerous Goods Code (ADG Code) - Dangerous Goods List</td>
</tr>
<tr>
<td>Australia Dangerous Goods Code (ADG Code) - List of Emergency Action Codes</td>
</tr>
<tr>
<td>Australia Inventory of Chemical Substances (AICS)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HYDROGEN SULFIDE (7783-06-4) IS FOUND ON THE FOLLOWING REGULATORY LISTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia Dangerous Goods Code (ADG Code) - Dangerous Goods List</td>
</tr>
<tr>
<td>Australia Dangerous Goods Code (ADG Code) - List of Emergency Action Codes</td>
</tr>
<tr>
<td>Australia Dangerous Goods Code (ADG Code) - Packing Instruction - Liquefied and Dissolved Gases</td>
</tr>
<tr>
<td>Australia Exposure Standards</td>
</tr>
<tr>
<td>Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals</td>
</tr>
<tr>
<td>Australia Inventory of Chemical Substances (AICS)</td>
</tr>
</tbody>
</table>

| 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 |

| Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Index |
| Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 7 |
| International Air Transport Association (IATA) Dangerous Goods Regulations |
| International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List |
| International Maritime Dangerous Goods Requirements (IMDG Code) |

### 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>
</tbody>
</table>
Canada - NDSL  No (sodium thiosulfate; hydrogen sulfide)
China - IECSC  Yes
Europe - EINEC / ELINCS / NLP  Yes
Japan - ENCS  Yes
Korea - KECI  Yes
New Zealand - NZIoC  Yes
Philippines - PICCS  Yes
USA - TSCA  Yes
Taiwan - TCSI  Yes
Mexico - INSQ  Yes
Vietnam - NCI  Yes
Russia - ARIPS  Yes
Thailand - TECI  Yes

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

<table>
<thead>
<tr>
<th>Other Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ingredients with multiple cas numbers</strong></td>
</tr>
<tr>
<td>Name</td>
</tr>
<tr>
<td>sodium thiosulfate</td>
</tr>
</tbody>
</table>

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
OSF: Odour Safety Factor
NOAEL: No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

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