Safety Data Sheet

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product Name: SODIUM ETHYL XANTHATE

Other name(s): SEX; Carbonodithioic acid, O-ethyl ester, sodium salt; Sodium xanthogenate; Sodium ethyl dithiocarbonate.

Recommended Use of the Chemical and Restrictions on Use

Mineral floatation.

Supplier: Ixom Operations Pty Ltd
ABN: 51 600 546 512
Street Address: Level 8, 1 Nicholson Street
East Melbourne Victoria 3002 Australia

Telephone Number: +61 3 9906 3000
Emergency Telephone: 1 800 033 111 (ALL HOURS)

Please ensure you refer to the limitations of this Safety Data Sheet as set out in the “Other Information” section at the end of this Data Sheet.

2. HAZARDS IDENTIFICATION

Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail; DANGEROUS GOODS.

This material is hazardous according to Safe Work Australia; HAZARDOUS CHEMICAL.

Classification of the chemical:
Self-heating substances and mixtures - Category 1
Acute Oral Toxicity - Category 4
Acute Dermal Toxicity - Category 4
Skin Irritation - Category 2
Eye Irritation - Category 2A

SIGNAL WORD: DANGER

Hazard Statement(s):
H251 Self-heating; may catch fire.
H302+H312 Harmful if swallowed or in contact with skin.
H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary Statement(s):

Prevention:
P235+P410 Keep cool. Protect from sunlight.
P264 Wash hands thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves / protective clothing / eye protection / face protection.
Response:
P302+P352 IF ON SKIN: Wash with plenty of soap and water.
P321 Specific treatment (see First Aid Measures on Safety Data Sheet).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P363 Wash contaminated clothing before re-use.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313 If eye irritation persists: Get medical advice/attention.
P301+P312 IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P330 Rinse mouth.
P322 Specific measures (see First Aid Measures on Safety Data Sheet).
P337+P313 If eye irritation persists: Get medical advice/attention.
P330 Rinse mouth.
P322 Specific measures (see First Aid Measures on Safety Data Sheet).
P370+P378 In case of fire: Use extinguishing media as outlined in Section 5 of this Safety Data Sheet to extinguish.

Storage:
P407 Maintain air gap between stacks/pallets.
P420 Store away from other materials.

Disposal:
P501 Dispose of contents and container in accordance with local, regional, national, international regulations.

Other Hazards:
AUH029 Contact with water liberates toxic gas.

Poisons Schedule (SUSMP): None allocated.

3. COMPOSITION AND INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS Number</th>
<th>Proportion</th>
<th>Hazard Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium ethyl xanthate</td>
<td>140-90-9</td>
<td>&gt;=90%</td>
<td>H251 H261 H302 H312 H315 H319</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Ethyl alcohol</td>
<td>64-17-5</td>
<td>1%</td>
<td>H225</td>
</tr>
<tr>
<td>Sodium hydroxide</td>
<td>1310-73-2</td>
<td>&lt;1%</td>
<td>H290 H314 H318</td>
</tr>
<tr>
<td>Sodium carbonate</td>
<td>497-19-8</td>
<td>&lt;1%</td>
<td>H319</td>
</tr>
<tr>
<td>Impurities</td>
<td></td>
<td>&lt;1%</td>
<td></td>
</tr>
<tr>
<td>Carbon disulphide</td>
<td>75-15-0</td>
<td>Trace</td>
<td>H225 H361fd H372 H319 H315</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

For advice, contact a Poisons Information Centre (e.g. phone Australia 131 126; New Zealand 0800 764 766) or a doctor.

Inhalation:
Remove victim from area of exposure - avoid becoming a casualty. Remove contaminated clothing and loosen remaining clothing. Allow patient to assume most comfortable position and keep warm. Keep at rest until fully recovered. If patient finds breathing difficult and develops a bluish discolouration of the skin (which suggests a lack of oxygen in the blood - cyanosis), ensure airways are clear of any obstruction and have a qualified person give oxygen through a face mask. Apply artificial respiration if patient is not breathing. Seek immediate medical advice.

Skin Contact:
If skin or hair contact occurs, immediately remove any contaminated clothing and wash skin and hair thoroughly with running water. If swelling, redness, blistering or irritation occurs seek medical assistance.
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Eye Contact:
If in eyes, hold eyelids apart and flush the eye continuously with running water. Continue flushing until advised to stop by a Poisons Information Centre or a doctor, or for at least 15 minutes.

Ingestion:
Rinse mouth with water. If swallowed, give a glass of water to drink. If vomiting occurs give further water. Seek immediate medical assistance.

Indication of immediate medical attention and special treatment needed:
Treat symptomatically.

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media:
Coarse water spray, fine water spray, normal foam, dry agent (carbon dioxide, dry chemical powder).

Hazchem or Emergency Action Code: 1Y

Specific hazards arising from the chemical:
Substance liable to spontaneous combustion. Avoid all ignition sources.

Special protective equipment and precautions for fire-fighters:
Heating can cause expansion or decomposition of the material, which can lead to the containers exploding. If safe to do so, remove containers from the path of fire. Decomposes on heating emitting toxic fumes, including those of oxides of sulfur. Fire fighters to wear self-contained breathing apparatus and suitable protective clothing if risk of exposure to products of decomposition.

6. ACCIDENTAL RELEASE MEASURES

Emergency procedures/Environmental precautions:
Shut off all possible sources of ignition. Clear area of all unprotected personnel. If contamination of sewers or waterways has occurred advise local emergency services.

Personal precautions/Protective equipment/Methods and materials for containment and cleaning up:
Wear protective equipment to prevent skin and eye contact and breathing in vapours/dust. DO NOT allow material to get wet. Air-supplied masks are recommended to avoid inhalation of toxic material. Vacuum solid spills instead of sweeping. Collect and seal in properly labelled containers or drums for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling:
Avoid skin and eye contact and breathing in dust. In common with many organic chemicals, may form flammable dust clouds in air. For precautions necessary refer to Safety Data Sheet "Dust Explosion Hazards".

Conditions for safe storage, including any incompatibilities:
Store in a cool, dry, well ventilated place and out of direct sunlight. Store away from sources of heat or ignition. Store away from incompatible materials described in Section 10. Keep dry - reacts with water, may lead to drum rupture. Keep containers closed when not in use - check regularly for spills.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters: No value assigned for this specific material by Safe Work Australia. However, Workplace Exposure Standard(s) for decomposition product(s):
Carbon disulfide: 8hr TWA = 31 mg/m³ (10 ppm), Sk

As published by Safe Work Australia Workplace Exposure Standards for Airborne Contaminants.

TWA - The time-weighted average airborne concentration of a particular substance when calculated over an eight-hour working day, for a five-day working week.

`Sk' (skin) Notice - absorption through the skin may be a significant source of exposure. The exposure standard is invalidated if such contact should occur.

These Workplace Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These workplace exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.

Appropriate engineering controls:
Ensure ventilation is adequate and that air concentrations of decomposition product(s) is/are controlled below quoted Exposure Standards. Avoid generating and breathing in dusts. Use with local exhaust ventilation or while wearing dust mask. Keep containers closed when not in use.

Individual protection measures, such as Personal Protective Equipment (PPE):
The selection of PPE is dependent on a detailed risk assessment. The risk assessment should consider the work situation, the physical form of the chemical, the handling methods, and environmental factors.

OVERALLS, SAFETY SHOES, CHEMICAL GOGGLES, GLOVES, DUST MASK.

Wear overalls, chemical goggles and impervious gloves. Avoid generating and inhaling dusts. If determined by a risk assessment an inhalation risk exists, wear a dust mask/respirator meeting the requirements of AS/NZS 1715 and AS/NZS 1716. Always wash hands before smoking, eating, drinking or using the toilet. Wash contaminated clothing and other protective equipment before storage or re-use.

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Physical state:</th>
<th>Powder or Pellets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour:</td>
<td>Yellow</td>
</tr>
<tr>
<td>Odour:</td>
<td>Disagreeable</td>
</tr>
<tr>
<td>Molecular Formula:</td>
<td>CH₃CH₂-O-(C=S)S.Na</td>
</tr>
<tr>
<td>Solubility:</td>
<td>Soluble in water.</td>
</tr>
<tr>
<td>Specific Gravity:</td>
<td>1.263</td>
</tr>
<tr>
<td>Relative Vapour Density (air=1):</td>
<td>Not available</td>
</tr>
<tr>
<td>Vapour Pressure (20 °C):</td>
<td>Not available</td>
</tr>
<tr>
<td>Flash Point (°C):</td>
<td>Not available</td>
</tr>
<tr>
<td>Flammability Limits (%):</td>
<td>Not available</td>
</tr>
<tr>
<td>Autoignition Temperature (°C):</td>
<td>Not available</td>
</tr>
<tr>
<td>Melting Point/Range (°C):</td>
<td>182-256</td>
</tr>
<tr>
<td>pH:</td>
<td>Not available</td>
</tr>
</tbody>
</table>

Product Name: SODIUM ETHYL XANTHATE
Substance No: 000032311101

Issued: 21/02/2013
Version: 4
10. STABILITY AND REACTIVITY

Reactivity: Hygroscopic: absorbs moisture or water from surrounding air.
Chemical stability: Stable.
Possibility of hazardous reactions: Contact with water may liberate extremely flammable gases.
Conditions to avoid: Avoid dust generation. Avoid exposure to moisture. Avoid exposure to heat. Avoid contact with water.
Incompatible materials: Incompatible with oxidising agents, acids, and alkalis.

11. TOXICOLOGICAL INFORMATION

No adverse health effects expected if the product is handled in accordance with this Safety Data Sheet and the product label. Symptoms or effects that may arise if the product is mishandled and overexposure occurs are:

Ingestion: Swallowing may result in irritation of the gastrointestinal tract.
Eye contact: An eye irritant.
Skin contact: Contact with skin will result in irritation. Will liberate carbon disulfide upon contact with moist skin. Carbon disulfide can be absorbed through the skin with resultant adverse effects.
Inhalation: Breathing in dust may result in respiratory irritation.

Acute toxicity:
Oral LD50 (mice): 730 mg/kg (for 10% aqueous solution)
Dermal LD50 (rabbit): <1000 mg/kg.

Chronic effects: Chronic overexposure leads to cardiovascular disease.

12. ECOLOGICAL INFORMATION

Ecotoxicity: Avoid contaminating waterways.

13. DISPOSAL CONSIDERATIONS

Disposal methods: Refer to Waste Management Authority. Dispose of material through a licensed waste contractor. Advise flammable nature.

14. TRANSPORT INFORMATION
Road and Rail Transport

Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail; DANGEROUS GOODS.

UN No: 3342
Transport Hazard Class: 4.2 Spontaneously Combustible
Packing Group: II
Proper Shipping Name or Technical Name: XANTHATES
Hazchem or Emergency Action Code: 1Y

Marine Transport

Classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea; DANGEROUS GOODS.

UN No: 3342
Transport Hazard Class: 4.2 Spontaneously Combustible
Packing Group: II
Proper Shipping Name or Technical Name: XANTHATES
IMDG EMS Fire: F-A
IMDG EMS Spill: S-J

Air Transport

Classified as Dangerous Goods by the criteria of the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air; DANGEROUS GOODS. TRANSPORT PROHIBITED under the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air in Passenger and Cargo Aircraft; may be transported by Cargo Aircraft Only.

UN No: 3342
Transport Hazard Class: 4.2 Spontaneously Combustible
Packing Group: II
Proper Shipping Name or Technical Name: XANTHATES

15. REGULATORY INFORMATION

Classification:
This material is hazardous according to Safe Work Australia; HAZARDOUS CHEMICAL.

Classification of the chemical:
Self-heating substances and mixtures - Category 1
Acute Oral Toxicity - Category 4
Acute Dermal Toxicity - Category 4
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Hazard Statement(s):
H251 Self-heating; may catch fire.
H302+H312 Harmful if swallowed or in contact with skin.
H315 Causes skin irritation.
H319 Causes serious eye irritation.

Poisons Schedule (SUSMP): None allocated.

This material is listed on the Australian Inventory of Chemical Substances (AICS).

16. OTHER INFORMATION

This safety data sheet has been prepared by Ixom Operations Pty Ltd Toxicology & SDS Services.

Reason(s) for Issue:
5 Yearly Revised Primary SDS

This SDS summarises to our best knowledge at the date of issue, the chemical health and safety hazards of the material and general guidance on how to safely handle the material in the workplace. Since Ixom Operations Pty Ltd cannot anticipate or control the conditions under which the product may be used, each user must, prior to usage, assess and control the risks arising from its use of the material.

If clarification or further information is needed, the user should contact their Ixom representative or Ixom Operations Pty Ltd at the contact details on page 1.

Ixom Operations Pty Ltd's responsibility for the material as sold is subject to the terms and conditions of sale, a copy of which is available upon request.