1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Sodium Isopropyl Xanthate
SYNONYMS: Sodium isopropyl xanthate
CHEMICAL FAMILY: Xanthate
MOLECULAR FORMULA: C4H8OS2Na
MOLECULAR WGT: 158.2

XIAMEN JOYFORCE CHEMICAL INDUSTRIAL CO., LTD
NO. 5 BUILDING, SHUANGLI INDUSTRIAL PARK, HULI DISTRICT, XIAMEN 361009, CHINA.
TEL: +86-592-586-4569
FAX: +86-592-511-7592
E-MAIL: Joyforce@cnjoyforce.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

OSHA REGULATED COMPONENTS

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>CAS. NO.</th>
<th>% T</th>
<th>WA/CEILING</th>
<th>REFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbonodithioic acid, O-Isopropyl ester, sodium salt</td>
<td>000140-93-2</td>
<td>87-89</td>
<td>not established</td>
<td></td>
</tr>
<tr>
<td>Sodium hydroxide</td>
<td>001310-73-2</td>
<td>0-1</td>
<td>2 mg/m3</td>
<td>OSHA</td>
</tr>
<tr>
<td>Sodium sulfide</td>
<td>001313-82-2</td>
<td>0-1</td>
<td>2 mg/m3 ceiling</td>
<td>ACGIH</td>
</tr>
<tr>
<td>Isopropanol</td>
<td>000067-63-0</td>
<td>0-1</td>
<td>not established</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>400 ppm</td>
<td>OSHA/ACGIH</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>500 ppm STEL</td>
<td>ACGIH</td>
</tr>
</tbody>
</table>

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

APPEARANCE AND ODOR: Pellets or powder, pale yellow to green, slight disagreeable odor.

STATEMENTS OF HAZARD:

WARNING! SELF-HEATING MATERIAL
MAY BE SPONTANEOUSLY COMBUSTIBLE
MAY FORM EXPLOSIVE DUST - AIR MIXTURES
DUST IRRITATING
CAUSES EYE IRRITATION
MAY CAUSE ALLERGIC SKIN REACTION

POTENTIAL HEALTH EFFECTS

EFFECTS OF OVEREXPOSURE:

The acute oral (rat) LD50 and acute dermal (rabbit) LD50 value for this material are estimated to be >800 mg/kg and >1000 mg/kg, respectively. Airborne dust may cause significant eye, skin or respiratory tract irritation.

Skin or eye contact with solutions of this product may cause moderate eye and skin irritation.
Repeated or prolonged dermal contact with this material may cause allergic skin reactions.
Refer to Section 11 for toxicology information on the OSHA regulated components of this product.
4. FIRST AID MEASURES

If swallowed, call a physician immediately. ONLY induce vomiting at the instructions of a physician. Never give anything by mouth to an unconscious person.

In case of skin contact, immediately wash affected areas with soap and plenty of water. Remove contaminated clothing and shoes. Obtain medical attention. Destroy or thoroughly clean shoes before reuse. Do not reuse contaminated clothing without laundering.

In case of eye contact, immediately irrigate with plenty of water for 15 minutes. Obtain medical attention if irritation persists or if otherwise necessary.

If vapor or dust of this material is inhaled, remove from exposure. Administer oxygen if there is difficulty in breathing. Obtain medical attention immediately if necessary.

5. FIRE FIGHTING MEASURES

FLASH POINT: Not applicable
FLAMMABLE LIMITS (% BY VOL): Not applicable
AUTOIGNITION TEMP: Not available
DECOMPOSITION TEMP: >428 F; 220C

EXTINGUISHING MEDIA AND FIRE FIGHTING INSTRUCTIONS

Use carbon dioxide, dry chemical or large quantities of water to extinguish fires. Heat causes decomposition to vapor of carbon disulfide. Wear self-contained, positive pressure breathing apparatus and full firefighting protective clothing. Solid xanthates are stable when kept cool and dry. However, exposure to heat and moisture can cause decomposition to flammable and explosive vapor of carbon disulfide. Since xanthates decompose in solution, even at room temperature, fire and explosion hazards can develop with aging. The moisture precautions do not apply to the product when diluted according to the Cytec Product Bulletin.

6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Where exposure level is not known, wear NIOSH approved, positive pressure, self-contained respirator.
Where exposure level is known, wear NIOSH approved respirator suitable for level of exposure. Wear same protective clothing/equipment as in Section 8 (Exposure Controls/Personal Protection). Sweep up spills and place in a waste disposal container. Flush area with water.

7. HANDLING AND STORAGE

Avoid excessive heat or moisture. May contain finely divided material. Dust suspended in air may ignite with static discharge, sparks or flame. Equipment, including venting systems, should be grounded. Provide adequate ventilation in areas of use to remove dust. Avoid breathing dust. Keep container closed. Use non-sparking tools and do not smoke when opening drum. Avoid contact with eyes. Avoid prolonged or repeated contact with skin. Wash thoroughly after handling.

Heating or overexposure to moisture of solid xanthates or heating or aging of xanthate solutions causes some decomposition to poisonous and flammable carbon disulfide. Maintain good housekeeping to control dust accumulations. Special precautions against fire and explosion must be observed in (1) pumping xanthate solutions, (2) draining mobile tanks, (3) cleaning mobile tanks, and (4) performing maintenance work on storage tanks and pipelines leading to and from tanks. Storage tanks should have certain design features for maximum safety, and the vapor space should be free of sources of ignition. Use nonsparking tools and do not smoke when opening drums of xanthate. Do not use xanthate products until you have read the "Safety Discussion" in the AERO Xanthate Handbook from this Company.
DUST EXPLOSION HAZARD CLASS -1 Handling of material should be in accordance with NFPA-68. If handled with flammable or combustible materials the explosion hazard may increase.

8. EXPOSURE CONTROLS/ PERSONAL PROTECTION
ENGINEERING CONTROLS AND PERSONAL PROTECTIVE EQUIPMENT (PPE)
Where this material is not used in a closed system, good enclosure and local exhaust ventilation should be provided to control exposure. Food, beverages, and tobacco products should not be carried, stored, or consumed where this material is in use. Before eating, drinking, or smoking, wash face and hands with soap and water. Avoid skin contact. Protective clothing such as impervious gloves, apron, workpants, long sleeve work shirt, or disposable coveralls are recommended to prevent skin contact. For operations where eye or face contact can occur, wear eye protection such as chemical splash proof goggles or face shield. Eyewash equipment and safety shower should be provided in areas of potential exposure. Where exposures are below the Permissible Exposure Limit (PEL), no respiratory protection is required. Where exposures exceed the PEL, use respirator approved by NIOSH for the material and level of exposure. See "GUIDE TO INDUSTRIAL RESPIRATORY PROTECTION" (NIOSH).

9. PHYSICAL AND CHEMICAL PROPERTIES
APPEARANCE AND ODOR: Pellets or powder, pale yellow to green, slight disagreeable odor.
BOILING POINT: Not applicable
MELTING POINT: Not available
VAPOR PRESSURE: Not applicable
SPECIFIC GRAVITY: 1.35 @ 20 C
VAPOR DENSITY: Not applicable
% VOLATILE (BY WT): Not available
pH: Not applicable
SATURATION IN AIR (% BY VOL): Not applicable
EVAPORATION RATE: Negligible
SOLUBILITY IN WATER: 37 g/100 g @ 20 C
VOLATILE ORGANIC CONTENT: Not available

10. STABILITY AND REACTIVITY
STABILITY: Stable
CONDITIONS TO AVOID: See Section 7 (Handling and Storage).
POLYMERIZATION: Will Not Occur
CONDITIONS TO AVOID: None known
INCOMPATIBLE MATERIALS: Strong oxidizing agents, acidic material and high temperatures.
HAZARDOUS DECOMPOSITION PRODUCTS: carbon disulfide; carbon monoxide; carbon dioxide; oxides of sulfur (includes sulfur di and tri oxides)

11. TOXICOLOGICAL INFORMATION
Toxicological information for the product is found under Section 3. HAZARDS IDENTIFICATION.
Toxicological information on the OSHA regulated components of this product is as follows:
Sodium isopropyl xanthate has an acute oral (rat) and acute dermal (rabbit) LD50 values of >800 mg/kg and >1,000 mg/kg, respectively. Direct contact with this material may cause irritation to skin, eyes, mucous membrane and respiratory tract. It has been reported direct contact may cause moderate skin sensitation. Sodium isopropyl xanthate tested negative for Ames test.
Acute overexposure to sodium hydroxide mists or dusts causes severe respiratory irritation. A solution of sodium hydroxide can produce irreversible damage to eyes and skin. Sodium sulfide has an acute oral (rat) LD50 value of 208 mg/kg. Sodium sulfide severely irritates the skin and eyes, as well as, mucous membranes. This material liberates hydrogen sulfide upon contact with acids. Isopropanol has acute oral (rat) and dermal (rabbit) LD50 values of 5.0 g/kg and 12.8 g/kg, respectively. The 4-hour inhalation LC50 (rat) for isopropanol is >16,000 ppm (40.86 mg/L). Acute overexposure to isopropanol vapor may cause mild irritation of the eyes and respiratory tract. Chronic overexposure to isopropanol vapors may cause central nervous system depression, headaches, dizziness, nausea, and staggered gait. Liquid isopropanol is a severe eye irritant.

12. ECOLOGICAL INFORMATION
This material is not readily biodegradable.

**LC50**
TROUT 96 HOUR: 595 mg/L

**BOD**
28 Day: 1.9 %

**OCTANOL/H₂O PARTITION COEF.**: Not applicable

13. DISPOSAL CONSIDERATIONS
The information on RCRA waste classification and disposal methodology provided below applies only to the Cytec product, as supplied. If the material has been altered or contaminated, or it has exceeded its recommended shelf life, the guidance may be inapplicable. Hazardous waste classification under federal regulations (40 CFR Part 261 et seq) is dependent upon whether a material is a RCRA "listed hazardous waste" or has any of the four RCRA "hazardous waste characteristics." Refer to 40 CFR Part 261.33 to determine if a given material to be disposed of is a RCRA "listed hazardous waste"; information contained in Section 15 of this MSDS is not intended to indicate if the product is a "listed hazardous waste." RCRA Hazardous Waste Characteristics: There are four characteristics defined in 40 CFR Section 261.21-61.24: Ignitability, Corrosivity, Reactivity, and Toxicity. To determine Ignitability, see Section 5 of this MSDS (flash point). For Corrosivity, see Sections 9 and 14 (pH and DOT corrosivity). For Reactivity, see Section 10 (incompatible materials). For Toxicity, see Section 2 (composition). Federal regulations are subject to change. State and local requirements, which may differ from or be more stringent than the federal regulations, may also apply to the classification of the material if it is to be disposed. Cytec encourages the recycle, recovery and reuse of materials, where permitted, as an alternate to disposal as a waste. Cytec recommends that organic materials classified as RCRA hazardous wastes be disposed of by thermal treatment or incineration at EPA approved facilities. Cytec has provided the foregoing for information only; the person generating the waste is responsible for determining the waste classification and disposal method.

14. TRANSPORT INFORMATION
This section provides basic shipping classification information. Refer to appropriate transportation regulations for specific requirements.

<table>
<thead>
<tr>
<th>D.O.T.</th>
<th>IMO</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHIPPING INFORMATION</td>
<td>SHIPPING INFORMATION</td>
</tr>
<tr>
<td>NAME: XANTHATES</td>
<td>XANTHATES</td>
</tr>
<tr>
<td>HAZARD DIVISION 4.2</td>
<td>4.2</td>
</tr>
<tr>
<td>CLASS/I</td>
<td>II</td>
</tr>
<tr>
<td>PACKING</td>
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<td>GROUP:</td>
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<tr>
<td>UN NUMBER: UN3342</td>
<td>3342</td>
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<tr>
<td>IMDG PAGE: Not Applicable</td>
<td>4266-2</td>
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</tbody>
</table>
D.O.T. HAZARDOUS SUBSTANCES: (PRODUCT REPORTABLE QUANTITY)
Not Applicable
Not Applicable

TRANSPORT LABEL REQUIRED:
Spontaneously
Combustible
Spontaneously
Combustible

ICAO/ IATA TRANSPORT CANADA
SHIPPING NAME: XANTHATES SELF-HEATING SUBSTANCES, SOLID, N.O.S.
HAZARD CLASS: 4.2 4.2
SUBSIDIARY CLASS: - -
UN / ID NUMBER: 3342 3088
PACKING GROUP: II II

TRANSPORT LABEL REQUIRED:
Spontaneously
Combustible
Spontaneously
Combustible

PACKING INSTR:
PASSENGER 415 Not Applicable
CARGO 417

MAX NET QTY:
PASSENGER 15kg Not Applicable
CARGO 50kg

ADDITIONAL TRANSPORT INFORMATION
TECHNICAL NAME (N.O.S.): (Contains sodium isopropyl xanthate)

15. REGULATORY INFORMATION

This product contains a chemical substance that is subject to export notification under Section 12 (b) of the Toxic Substances Control Act, 15 U. S. C. 2601 et. seq. (This requirement applies to exports from the United States only.)

CANADA DSL: Components of this product have been reported to Environment Canada in accordance with subsection 25 of the Canadian Environmental Protection Act and are included on the Domestic Substances List.


16. OTHER ENVIRONMENTAL INFORMATION
The following components of this product may be subject to reporting requirements pursuant to XIAMEN JOYFORCE CHEMICAL INDUSTRIAL CO., LTD See
Section 13 for information on waste classification and waste disposal of this product.

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>CAS. NO.</th>
<th>%</th>
<th>TPQ(lbs)</th>
<th>RQ(lbs)</th>
<th>S313</th>
<th>TSCA 12B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isopropanol</td>
<td>000067-63-0</td>
<td>0-1</td>
<td>NONE</td>
<td>NONE</td>
<td>NO</td>
<td>YES</td>
</tr>
</tbody>
</table>
16. OTHER INFORMATION

NFPA HAZARD RATING (National Fire Protection Association)
Fire 2
Health 2
Reactivity 2
Special —

FIRE: Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur.
HEALTH: Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.
REACTIVITY: Materials that readily undergo violent chemical change at elevated temperatures and pressures.

REASON FOR ISSUE:
Revised All Sections

Randy Deskin, Ph.D., DABT
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