Appendix A

Material Safety Data Sheets
Reagents
SODIUM SULFITE

1. Product Identification
   - Synonyms: Sodium sulfite anhydrous; disodium sulfite; sulfurous acid, disodium salt; oxidized sodium sulfite
   - CAS No.: 7757-82-7
   - Molecular Weight: 126.04
   - Chemical Formula: Na2S2O3
   - Product Code:
     - JT. Baker: 5888, 3922
     - Mallinckrodt: 0049, 0056, 0064

2. Composition/Information on Ingredients
<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS No.</th>
<th>Percent</th>
<th>Hazardous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Sulfite</td>
<td>7757-82-7</td>
<td>96 - 100%</td>
<td>Yes</td>
</tr>
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</table>

3. Hazards Identification
   - Emergency Overview
     - WARNING: HARMFUL IF SWALLOWED. MAY CAUSE ALLERGIC REACTION AND BREATHING DIFFICULTIES. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.
   - SAF-T-DATA® Ratings (Provided here for your convenience)
     - Health Rating: 2 - Moderate (Life)
     - Flammability Rating: 0 - None
     - Reactivity Rating: 1 - Slight
     - Contact Rating: 2 - Moderate
     - Lab Protective Equip.: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES
     - Storage: Codor Code: Green (General Storage)
   - Potential Health Effects
     - Although only moderately toxic in large amounts, sulfites can pose risk to some individuals producing central nervous system depression, bronchoconstriction, and sneezing.
     - Inhalation:
       - Inhalation of dust may cause irritation to the mucous membranes of the upper respiratory tract. Use of bronchodilators preserved with sulfites can cause allergic reactions.
     - Ingestion:
       - May cause gastric irritation by the liberation of sulfurous acid. Large doses may result in circulatory disturbances, diarrhea, and central nervous system depression. Estimated fatal dose is 0.5 to >5g/kg.
     - Skin Contact:
       - May cause irritation.
     - Eye Contact:
       - May cause irritation, redness and pain.
   - Chronic Exposure:
     - No information found.
   - Aggravation of Pre-existing Conditions:
     - Some individuals are said to be dangerously sensitive to minute amounts of sulfites in foods and some bronchodilator medicines preserved with sulfites. Symptoms may include broncho constriction, shock, gastrointestinal disturbances, angio edema, flushing, and tingling sensations.

4. First Aid Measures
   - Inhalation:
5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard. If involved in a fire, can emit toxic fumes and irritating and corrosive gases.

Explosions:
Not considered to be an explosion hazard.

Fire Extinguishing Media:
Use any means available for extinguishing surrounding fire.

Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spill: Sweep up and consolidate for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust disposal.

7. Handling and Storage

Keep in a tightly closed container. Protect from physical damage. Store in a cool, dry, ventilated area away from sources of heat, moisture and incompatibilities. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
- ACGIH Threshold Limit Value (TLV):
  - MDA (TWA) for sodium bisulfite & for sodium metabisulfite, A4 Not classifiable as a human carcinogen.

Ventilation System:
A system of local exhaust general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, Industrial Ventilation: A Manual of Recommended Practice, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half-facepiece particulate respirator (NIOSH type N95 or better filters) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece particulate respirator (NIOSH type P100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. If all particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or situations where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear protective gloves and clean body-covering clothing.

Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
White crystals.

Odor:
Odorless.

Solubility:
Soluble in ca. 3.2 parts water.

Specific Gravity:
2.6 @ 15.6°C (60°F)

pH:
ca. 9

% Volatiles by volume @ 21°C (70°F):
0

Boiling Point:
Not applicable.

Melting Point:
No information found.

Vapor Density (Air = 1):
No information found.

Vapor Pressure (mm Hg):
No information found.

Evaporation Rate (Bu/Ac = 1):
No information found.
10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Heat and moisture contribute to instability. May air-oxidize.

Hazardous Decomposition Product:
Burning may produce sulfur oxides.

Hazards to Polymerization:
Will not occur.

Incompatibilities:
Acids, strong oxidizers, high temperatures.

Conditions to Avoid:
Heat and moisture.

11. Toxicological Information

Oral route: LD50 820 mg/kg. Investigated as a tumorigen and mutagen.

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>IARC Category</th>
</tr>
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<tbody>
<tr>
<td>Sodium Sulfite (1572-83-7)</td>
<td>3</td>
</tr>
</tbody>
</table>

12. Ecological Information

Environmental Fate:
No information found.

Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>TSCA</th>
<th>EC</th>
<th>Japan</th>
<th>Australia</th>
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</table>

<table>
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<tr>
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<th>KOR</th>
<th>JPL</th>
<th>MEI</th>
<th>PHL</th>
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<tbody>
<tr>
<td>Sodium Sulfite (1572-83-7)</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
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</table>

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>EPA\39; SARA 302</th>
<th>EPA\39; SARA 311</th>
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<tbody>
<tr>
<td>Sodium Sulfite (1572-83-7)</td>
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<table>
<thead>
<tr>
<th>Ingredient</th>
<th>OPCRA \39; TSCA</th>
<th>OPCRA \39; TSCA</th>
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<tbody>
<tr>
<td>Sodium Sulfite (1572-83-7)</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>


Australia Hazard Code: None allocated.

Fugon Schedule: None allocated.

WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

http://bulkpharm.mallinckrodt.com/_attachments/msds/S5066.htm

4/25/2007
SODIUM SULFITE

NFPA Ratings: Health: 2 Flammability: 0 Reactivity: 0

Label Hazard Warning:
WARNING! HARMFUL IF SWALLOWED. MAY CAUSE ALLERGIC REACTION AND BREATHING DIFFICULTIES. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.

Label Precautions:
Avoid breathing dust.
Avoid contact with eyes, skin and clothing.
Wash thoroughly after handling.
Keep container closed.
Use with adequate ventilation.

For Reagent and Technical Grades: Not For Food Use: For TAC Grades: Do not use in meats or in foods recognized as a source of Vitamin B-1, nor in fruits or vegetables to be served or sold raw to consumers or to be processed to consumers as fresh.

Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. If inhaled, remove to fresh air. Get medical attention for any breathing difficulty. In all cases call a physician.

Product Use:
Laboratory Reagent.

Revision Information:
MEDS Section(s) changed since last revision of document include: 3.

Disclaimer:
******************************************************************************
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Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

Product name: Methyl isobutyl carbinol
MSDS number: 63
Material number: 80063
Published date: 07/28/2005(V1)

MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Product: Methyl isobutyl carbinol
MSDS number: 63
Material number: 80063

Manufacturer name and address:

Celanese Ltd.
1801 W. LBJ Freeway
P.O. Box 819005
Dallas, TX 75381-9005
United States
Phone: 972 443 4000
Internet: www.celanesechemicals.us

Transportation emergency phone numbers:
In USA, call 800 424 9300
Outside USA, call 703 527 3887, collect calls accepted

Product Use: Intermediate for lube oil additives, especially zinc dialkyl dithiophosphates; frothing agent for ore flotation, especially copper.

2. Composition/Information on Ingredients

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS Number</th>
<th>Percent</th>
<th>OSHA hazard category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methyl isobutyl carbinol</td>
<td>108-11-2</td>
<td>99</td>
<td>Hazardous</td>
</tr>
</tbody>
</table>

3. Hazards Identification

Emergency Overview:

WARNING!
- Flammable liquid and vapor.
- May cause respiratory tract and eye irritation.
- May cause skin irritation.
- Prolonged or repeated contact may dry skin and cause irritation.
- Material creates a special hazard because it floats on water.

Transportation emergency: 800 424 9300 CHEMTREC, 24 hrs/day
Outside USA, collect calls accepted, 24 hrs/day
Product information: 800 835 5235
Product name: Methyl isobutyl carbinol
MSDS number: 63
Material number: 80063
Published date: 07/28/2005(V1)

Product Description

Appearance: Clear, colorless mobile liquid.
Odor: Slightly irritating, alcohol odor.

Potential health effects

Routes of exposure: Skin, eyes, inhalation, ingestion.

Immediate effects:

Skin: May cause skin irritation. Prolonged or repeated contact may dry skin and cause irritation. May be harmful if absorbed through skin. Symptoms of exposure may include: Central nervous system depression with headache, stupor, uncoordinated or strange behavior or unconsciousness. Drying, cracking or inflammation of skin.

Eyes: Exposure to vapors and liquid Causes eye irritation. Symptoms of exposure may include: Eye irritation, burning sensation, pain, watering, and/or change of vision.

Inhalation: Causes respiratory tract irritation. Harmful if inhaled. Symptoms of exposure may include: Central nervous system depression with nausea, dizziness, headache, stupor, uncoordinated or strange behavior or unconsciousness. Nasal discharge, hoarseness, coughing, chest pain and breathing difficulty.

Ingestion: May be harmful if swallowed. Symptoms of exposure may include: Nausea, vomiting, loss of appetite, gastrointestinal irritation and/or diarrhea. Central nervous system depression with nausea, headache and mental sluggishness.

Mutagenic: Does not show mutagenic potential in most in vitro tests.

Target organ effects:

• Overexposure (prolonged or repeated exposure) may cause:
  Kidney damage
  Central nervous system depression
  Injury to the eyes
  Irritation of the respiratory tract
  Irritation of the digestive tract
  Drying of the skin

Medical conditions which may be aggravated by exposure: Significant exposure to this chemical may adversely affect people with acute or chronic disease of the:
  Respiratory Tract
  Skin
  Eyes
  Kidneys
  Central nervous system
  Digestive tract

Transportation emergency: 800 424 9300 CHEMTREC, 24 hrs/day
703 527 3887 Outside USA, collect calls accepted, 24 hrs/day

Product information: 800 835 5235
4. First Aid Measures

Skin: Immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Call a physician if irritation develops and persists. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes. If easy to do, remove contact lenses, if worn. Get medical attention immediately.

Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion: DO NOT induce vomiting. Get medical attention immediately. If victim is fully conscious, give a cupful of water. Never give anything by mouth to an unconscious person.

5. Fire Fighting Measures

NFPA: Health: 2 - Flammability: 2 - Reactivity: 0

Flammable properties

Flash point (last method): 42.4 °C (108 °F)

Flammable limits in air, % by volume:
Upper: 5.5%
Lower: 1%

Autoignition temperature: 360.3 °C (680 °F)

Products of combustion: Carbon Monoxide.

Extinguishing Media: Use CO₂ or dry chemical for small fires. Use aqueous film forming foam for large fires.

Transportation emergency: 800 424 9300 CHEMTREC, 24 hrs/day
703 527 3887 Outside USA, collect calls accepted, 24 hrs/day

Product information: 800 835 5235
Product name: Methyl isobutyl carbinol
MSDS number: 63
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Published date: 07/28/2005(V1)

Fire Fighting Instructions: Water spray should be used to cool fire-exposed structures and vessels. Keep personnel removed from and upwind of fire. If potential for exposure to vapors or products of combustion exists, wear full fire fighting turnout gear and NIOSH approved self-contained breathing apparatus. Oxidizing chemicals may accelerate the burning rate in a fire situation.

Fire Fighting Environmental Concerns: Thoroughly decontaminate bunker gear and other fire-fighting equipment before reuse.

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6. Accidental Release Measures

Spill or Leak Instructions: Eliminate ignition sources. See Section 8 for appropriate personal protective equipment. Contain spill with dikes of soil or nonflammable absorbent to minimize contaminated area. If fire potential exists, blanket spill with alcohol type aqueous film-forming foam or use water fog stream to disperse vapors. Avoid run-off into storm sewers and ditches leading to waterways. If required, notify state and local authorities. Place leading containers in well-ventilated area. Clean up small spills by using a nonflammable absorbent or flushing sparingly with water. Contain larger spills with nonflammable diking or absorbent. Clean up by vacuuming or sweeping.

Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind; keep out of low areas. Isolate for 800 meters or 0.5 miles in all directions if tank, railcar, or tank truck is involved in fire. Material creates a special hazard because it floats on water. Assess the spill situation, as the spill may not evolve large amounts of hazardous airborne contaminants in many outdoor spill situations. It may be advisable in some cases to simply monitor the situation until spilled product is removed.

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7. Handling and Storage

Handling: Use with adequate ventilation. Keep containers closed when not in use. Always open containers slowly to allow any excess pressure to vent. Avoid breathing vapor. Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Decontaminate soiled clothing thoroughly before re-use. Destroy contaminated leather clothing.

This product may generate a static charge. Ground/bond equipment when transferring material to prevent static accumulation. Electrical equipment and circuits in all storage and handling must conform to requirements of National Electric Code (Article 500 and 501) for hazardous location.

Storage: Keep all containers tightly closed when not in use. Store out of direct sunlight and on an impermeable floor. Do not store with incompatible materials. See Section 10. Stability and Reactivity.

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Transportation emergency: 800 424 9300 CHEMTREC, 24 hrs/day
703 627 3887 Outside USA, collect calls accepted, 24 hrs/day
Product information: 800 835 5235
Engineering Controls: General or dilution ventilation is frequently insufficient as the sole means of controlling employee exposure. Local ventilation is usually preferred.

Protective Equipment: A safety shower and eyewash should be readily available.

Skin protection: Wear impervious clothing and gloves to prevent contact. Butyl rubber is recommended. Other protective material may be used, depending on the situation, if adequate degradation and permeation data is available. If other chemicals are used in conjunction with this chemical, material selection should be based on protection for all chemicals present.

Eye/face protection: Wear chemical goggles when there is a reasonable chance of eye contact.

Respiratory protection: Based on workplace contaminant level and working limits of the respirator, use a respirator approved by NIOSH. The following is the minimum recommended equipment for an occupational exposure level. To estimate an occupational exposure level see Section 3, Section 8 and Section 11.

For concentrations > 1 and < 10 times the occupational exposure level: Use air-purifying respirator with full facepiece and organic vapor cartridge(s) or air-purifying full facepiece respirator with an organic vapor canister or a full facepiece powered air-purifying respirator fitted with organic vapor cartridge(s). The air purifying element must have an end of service life indicator, or a documented change out schedule must be established. Otherwise, use supplied air.

For concentrations more than 10 times the occupational exposure level and less than the lower of either 100 times the occupational exposure level or the IDLH: Use Type C full facepiece supplied-air respirator operated in positive-pressure or continuous-flow mode.

For concentrations > 100 times the occupational exposure level or greater than the IDLH level or unknown concentrations (such as in emergencies): Use self-contained breathing apparatus with full facepiece in positive-pressure mode or Type C positive-pressure full facepiece supplied-air respirator with an auxiliary positive-pressure self-contained breathing apparatus escape system.

For escape: Use self-contained breathing apparatus with full facepiece or any respirator specifically approved for escape.
Product name: Methyl isobutyl carbinol
MSDS number: 63
Material number: 80063
Published date: 07/28/2005(V1)

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS Number</th>
<th>Percent %</th>
<th>ACGIH TWA</th>
<th>ACGIH STEL</th>
<th>OSHA TWA</th>
<th>OSHA STEL</th>
<th>Celanese WEL</th>
<th>Mexico TWA</th>
<th>Mexico STEL</th>
<th>Mexico CEILING</th>
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<tbody>
<tr>
<td>METHYL ISOBUTYL CARBINOL</td>
<td>108-11-2</td>
<td>99</td>
<td>25 ppm</td>
<td>40 ppm</td>
<td>-</td>
<td>25 ppm</td>
<td></td>
<td>25 ppm</td>
<td>40 ppm</td>
<td>-</td>
</tr>
</tbody>
</table>

Comments: Celanese has adopted the ACGIH TLVs
* Workplace Exposure Limit

## 9. Physical and Chemical Properties

**Appearance:** Clear, colorless mobile liquid.

**Odor:** Slightly irritating, alcohol odor.

**Vapor Pressure:** 4.7 mm Hg at 20 deg C

**Vapor Density (Air=1 @ 20°C):** 3.53

**Boiling Point (760 mmHgA):** 132 C (269.6 F)

**Freezing Point:** < -50 C (< -68 F)

**Solubility in Water @ 20°C:** 1.82 grams per 100 grams H2O

**Specific Gravity:** 0.808 at 20 deg C

**Molecular Weight:** 102.2

**Evaporation Rate (n-Butyl acetate = 1):** 0.26

## 10. Stability and Reactivity

**Stability:** Stable.

**Conditions to Avoid:** Avoid heat, flames, sparks, and other sources of ignition.

**Incompatibility:** Keep away from sulfuric and other strong inorganic acids, aluminum or lead (including equipment made of these metals), and oxidizing agents such as peroxides, nitric acid, perchloric acid or chromium trioxide.

Transportation emergency: 800 424 9300 CHEMTREC, 24 hrs/day
703 527 3887 Outside USA, collect calls accepted, 24 hrs/day
Product Information: 800 835 5235 6 of 11
Component Toxicological Information

<table>
<thead>
<tr>
<th>Component</th>
<th>METHYL ISOBUTYL CARBINOL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acute Exposure:</strong></td>
<td>Excessive exposure leads to depression of the central nervous system which is generally reversible and is shown by headache, dizziness, drowsiness, loss of coordination and unconsciousness.</td>
</tr>
<tr>
<td>Oral LD50:</td>
<td>2.6g/kg (rats); Slightly toxic to animals. Nausea, vomiting, gastrointestinal irritation and diarrhea may occur.</td>
</tr>
<tr>
<td>Inhalation LC50:</td>
<td>&gt;3776 ppm (rats; vapor; 4hrs.); Slightly toxic to animals. Vapors are irritating to the respiratory tract.</td>
</tr>
<tr>
<td>Skin:</td>
<td>Repeated or prolonged contact may cause drying of the skin dermatitis. Moderately irritating to rabbit skin. Slightly toxic (dermal LD50, rabbit: 2.9g/kg).</td>
</tr>
<tr>
<td>Eyes:</td>
<td>Liquid causes moderate to severe irritation of rabbit eyes. Vapors are irritating to the eyes.</td>
</tr>
<tr>
<td>Mutagenicity:</td>
<td>Not mutagenic in bacterial, yeast and rat liver cell in vitro assays, including the Ames Test.</td>
</tr>
<tr>
<td>Carcinogenicity:</td>
<td>No information.</td>
</tr>
<tr>
<td>Reproductive/Developmental Effects:</td>
<td>No information.</td>
</tr>
<tr>
<td>Other:</td>
<td>Methyl isobutyl carbinol has potentiated the liver toxicity of halogenated solvents (e.g., chloroform and carbon tetrachloride) in experimental animals at oral doses of 570 mg/kg or higher.</td>
</tr>
</tbody>
</table>

Transportation emergency: 800 424 9300 CHEMTREC, 24 hrs/day
703 527 3887 Outside USA, collect calls accepted, 24 hrs/day
Product Information: 800 835 5235
Repeated Exposure: Male and female rats exposed for 6hr/day, 5 days/wk for 8 wks to 211.825 or 3698 mg/m² showed no overt signs of toxicity, effects on blood parameters or compound-related effects based on gross and microscopic examination of tissues. Increased kidney weight was observed in the males at the high dose. Effects on urine parameters were noted at all dose levels except for the low dose males. There are several other studies of limited quality and with limited details. In a 90-day inhalation study, kidney effects were reported in rats at 0.425 mg/l, but not in monkeys or dogs. The effect in rats was reversible on cessation of exposure. In mice exposed 12 times for 4 hours to vapor saturated air (approximately 20 mg/l), an anesthetic effect was reported, but no mortality. In rabbits exposed dermally 5 times over a period of 15-21 days at 2.5 g/kg, no systemic effects were observed.

12. Ecological Information

Component Ecological Information

<table>
<thead>
<tr>
<th>Component</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Ecotoxicity: Methyl isobutyl carbinol exhibits low acute toxicity to aquatic species. The 96-hour LC50 for fish (Pimephales promelas) was greater than 92.4 ppm. There was no mortality at this level. The 24-hour LC50 value for fish (Carassius auratus) is 360 ppm. The 24-hour LC50 value for shrimp (Artemia salina) is 370 ppm. The 48-hour LC50 value for the clawed toad (Xenopus laevis) is 656 ppm. The 3-hour EC50 for inhibition of bacteria was greater than 100 ppm in the Activated Sludge Respiration Inhibition Test.</td>
<td></td>
</tr>
</tbody>
</table>
13. Disposal Considerations

Dispose of spilled material in accordance with state and local regulations for hazardous waste. Recommended methods are incineration or biological treatment at a federally or state-permitted disposal facility. Note that this information applies to the material as manufactured; processing, use, or contamination may make this information inappropriate, inaccurate, or incomplete.

Note that this handling and disposal information may also apply to empty containers, liners and rinsate. State or local regulations or restrictions are complex and may differ from federal regulations. This information is intended as an aid to proper handling and disposal; the final responsibility for handling and disposal is with the owner of the waste. See Section 9 - Physical and Chemical Properties.

EPA Hazardous Waste Code(s): D001

14. Transport Information

US Department of Transportation:
UN/NA Number: UN 2053
Shipping name: METHYL ISOBUTYL CARBINOL
Hazard class: 3
Packing Group: PG III
Emergency Response Guide: 129

ICAO/IATA:
IATA UN Number: UN 2053
Proper Shipping Name: METHYL ISOBUTYL CARBINOL
Hazard Classification: III
Label: (Flammable Liquid)

IMDG:
International Marine UN Number: UN 2053
Proper Shipping Name: METHYL ISOBUTYL CARBINOL
Hazard Class: 3
Packing Group: III
Flash point (test method): 42.4 C (108 F)

Transportation emergency: 800 424 9300 CHEMTREC, 24 hrs/day
703 527 3887 Outside USA, collect calls accepted; 24 hrs/day
Product information: 800 835 6235
Product name: Methyl isobutyl carbinol
MSDS number: 63
Material number: 80063
Published date: 07/28/2005(V1)

Transport Canada

Trade Information
Schedule B Code (export): 2905.19.0020

15. Regulatory Information

U.S. STATE REGULATIONS
Chemicals associated with the product which are subject to the state right-to-know regulations are listed along with the applicable state(s):

METHYL ISOBUTYL CARBINOL 108-11-2
Pennsylvania Listed
New Jersey Listed
Illinois Listed
Massachusetts Listed

U.S. FEDERAL REGULATIONS
TSCA inventory: We certify that all components are either on the TSCA inventory or qualify for an exemption.

Environmental Regulations:

SARA 311:
Acute health: Yes
Chronic health: No
Fire: Yes
Sudden release of pressure: No
Reactive: No

INTERNATIONAL REGULATIONS
International Chemical Inventory
Listed on the chemical inventories of the following countries or qualifies for an exemption:
AUSTRALIA, CHINA, CANADA, EUROPE, KOREA, PHILIPPINES, JAPAN

Transportation emergency: 800 424 9300 CHEMTREC, 24 hrs/day
703 527 3837 Outside USA, collect calls accepted, 24 hrs/day
Product Information: 800 835 5235 10 of 11
Prepare by: Product Stewardship Department
            Celanese Ltd.

Hazard ratings

This information is intended solely for the use of individuals trained in the NFPA
and/or HMIS systems.

NFPA:
    Health: 2  Flammability: 2  Reactivity: 0

HMIS:
    Health: 2  Flammability: 2  Reactivity: 0

Revisions: The following sections have been revised since the last issue of this MSDS.

Footer: Product Information number

For industrial use only. The information contained herein is accurate to the best of our knowledge. We do not suggest or
 guarante that any hazards listed herein are the only ones which exist. Celanese makes no warranty of any kind, express or
 implied, concerning the safe use of this material in your process or in combination with other substances. Effects can be
 aggravated by other materials and/or this material may aggragate or add to the effects of other materials. This material may be
 released from gas, liquid, or solid materials made directly or indirectly from it. User has the sole responsibility to determine the
 suitability of the materials for any use and the manner of use contemplated. User must meet all applicable safety and health
 standards. Material safety data sheets are provided on the Internet by Celanese as a service to its customers. Possession of an
 Internet MSDS does not indicate that the possesor of the MSDS was a purchaser or user of the subject product.
KI - 11 Xanthate

Section 1: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

1.1 Product Name .................. KI - 11 Xanthate
Chemical Family .................. Xanthates; carbonodithioic acid salt
Synonyms .................. Sodium isopropyl xanthate; SIPX; carbonic acid, dithio-
0-isopropyl ester, sodium salt; carbonodithioic acid,
0-(1-methylxethyl) ester, sodium salt.
Formula .................. \( \text{C}_2\text{H}_7\text{NaOS}_2 \)

1.2 Manufacturer .................. ALKEMIN, S. de R.L. de C.V.
2480 W. Twin Buttes road
Sahuarita, Arizona 85629
Information .................. (520) 791-2940

1.3 Emergency Contact .................. (800) 877-1737 (ALKEMIN)
(800) 424-9300 (CHEMTREC)

Section 2: COMPOSITION INFORMATION ON INGREDIENTS

2.1 Chemical ingredients (% by wt.)

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS #:</th>
<th>% Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium isopropyl xanthate</td>
<td>140-93-2</td>
<td>87%</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>3% Max</td>
</tr>
<tr>
<td></td>
<td></td>
<td>72-92% Max</td>
</tr>
</tbody>
</table>

(See Section 8 for exposure guidelines)

Section 3: HAZARDS IDENTIFICATION

NFPA:

Health - 1  Flammability - 1  Reactivity - 1  (Solid)
Health - 2  Flammability - 2  Reactivity - 1  (Solution)

EMERGENCY OVERVIEW

Caution: Liquid solution is strongly alkaline. Eye contact will result in mild to severe eye
irritation. Contact with the skin will result in mild to severe burns of the skin. Ingestion of product
will irritate mouth, throat and gastrointestinal tract. Inhalation of product vapors, mist or dust
may cause irritation of respiratory airways.
3.1 POTENTIAL HEALTH EFFECTS

EYE: Contact with the eyes by product solution may cause mild to severe irritation and a burning sensation.

SKIN CONTACT: Skin contact with highly alkaline solution may result in mild to severe skin irritation.

SKIN ABSORPTION: Absorption is unlikely to occur.

INGESTION: Ingestion of product may cause mild to severe irritation of mouth, throat and gastrointestinal tract including nausea, vomiting and diarrhea. Xanthates have a low oral toxicity to humans.

INHALATION: Inhalation of product mist or dust may cause irritation of the nose, throat and respiratory tract.

CHRONIC EFFECTS/CARCINOGENICITY: Not listed as a carcinogen by NTP, IARC or OSHA. Xanthate salts may cause irritation of the respiratory tract.

4.1 EYES: Immediately flush with large quantities of water for 15 minutes. Hold eyelids apart during irrigation to insure thorough flushing of the entire area of the eye. Obtain immediate medical attention.

4.2 SKIN: Immediately flush with large quantities of water. Remove contaminated clothing under a safety shower. Obtain medical attention if any irritation occurs.

4.3 INGESTION: If victim is conscious, have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink a glass of water. If vomiting occurs naturally, have victim lean forward to avoid aspiration. Repeat administration of water. Obtain immediate medical attention.

4.4 INHALATION: Remove victim from contaminated atmosphere. If breathing is labored, administer oxygen. If breathing has ceased, clear airway and start mouth to mouth resuscitation. If heart has stopped beating, external heart massage should be applied. Obtain medical attention.

5.1 FLAMMABLE PROPERTIES

FLASH POINT: 125°F - 126°F (52°C)
FLASH POINT: -22°F (-30°C)

KI - 11 solution
Carbon disulfide

METHOD USED: Closed cup
METHOD USED: Closed cup

5.2 FLAMMABLE LIMITS (Carbon disulfide) LFL: 1.3% UFL: 50%

5.3 EXTINGUISHING MEDIA: Carbon dioxide, dry chemical or foam
5.4 FIRE & EXPLOSIVE HAZARDS: Xanthates upon aging, heating or exposure to moisture will generate carbon disulfide (CS$_2$) vapors and spontaneous combustion can occur. Heating of xanthate products will also form carbon disulfide vapors. Storage containers should be equipped with a forced exhaust to prevent buildup of these vapors. Storage containers should be carefully grounded.

Keep storage containers involved in a fire cooled with water spray. Heating will form CS$_2$ vapors.

5.5 FIRE FIGHTING EQUIPMENT: As in any fire, wear self-contained breathing apparatus, positive pressure, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

6.1 Small releases: The product is readily soluble in water but should not be flushed down drains or used to help clean up spills (evolution of CS$_2$ vapors). Sweep up small spills of solid product. Confinement and absorb small liquid releases on sand earth or other inert absorbent. Pick up contaminated soil in labeled containers for disposal in chemical waste landfills.

6.2 Large releases: Confine area to qualified personnel. Extinguish or remove all ignition sources. Shut off release if safe to do so. Dike spill area to prevent runoff into sewers, drainages or surface waterways (potential aquatic toxicity). Recover as much of the solution as possible. Treat remaining material as a small release.

7. HANDLING and STORAGE

7.1 Handling: Avoid contact with eyes. Use only in a well-ventilated area. Wash thoroughly after handling. Avoid prolonged or repeated breathing of vapors or dust. Avoid prolonged or repeated contact with the skin. Ground drums and transfer containers (grounding clips must contact bare metal). (See Section 5, for fire dangers) Use caution opening containers with xanthates of unknown age (CS$_2$ vapor accumulation).

7.2 Storage: Store in cool, dry, well-ventilated areas. Do not store combustibles in the area of storage vessels. Keep away from any sources of heat or flame. Store totes and smaller containers out of direct sunlight at moderate temperatures. Storage containers should be properly grounded. (See Section 10.4 for materials of construction)

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

8.1 RESPIRATORY PROTECTION: None generally required. If conditions exist where dust or mist may be generated, a NIOSH/MSHA approved mist respirator should be worn. If CS$_2$ vapors are present an appropriate respirator according to the concentration should be used.

8.2 SKIN PROTECTION: Neoprene rubber gloves, apron and boots (as appropriate) should be worn to prevent repeated or prolonged contact with the liquid. Wash any contaminated clothing prior to reuse.
8.3 **EYE PROTECTION:** Chemical goggles and preferably a full face shield. Maintain an eyewash/safety shower in immediate work areas.

8.4 **EXPOSURE GUIDELINES:**

<table>
<thead>
<tr>
<th></th>
<th>OSHA TWA</th>
<th>STEL</th>
<th>ACGIH TLV</th>
<th>STEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon disulfide</td>
<td>20 ppm</td>
<td>30 (ceiling)</td>
<td>10 ppm</td>
<td>NA</td>
</tr>
</tbody>
</table>

8.5 **ENGINEERING CONTROLS:** Engineering control methods to reduce hazardous vapor exposure are preferred. Methods include mechanical ventilation (dilution and local exhaust) and process control.

### Section 9: PHYSICAL and CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>9.1 APPEARANCE:</th>
<th>Solid</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Light green to beige pellets</td>
<td>Dark orange to amber liquid.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9.2 ODOR:</th>
<th>No noticeable odor</th>
<th>strong organic odor</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.3 BOILING POINT:</td>
<td>Not Applicable</td>
<td>233° F (112° C)</td>
</tr>
<tr>
<td>9.4 VAPOR PRESSURE:</td>
<td>Not Applicable</td>
<td>Not determined</td>
</tr>
<tr>
<td>9.5 VAPOR DENSITY:</td>
<td>Not Applicable</td>
<td>Not determined</td>
</tr>
<tr>
<td>9.6 SOLUBILITY IN WATER:</td>
<td>Complete</td>
<td>Complete</td>
</tr>
<tr>
<td>9.7 SPECIFIC GRAVITY:</td>
<td>1.08</td>
<td>1.00 - 1.14 (8.33 - 9.5 lbs/gal)</td>
</tr>
<tr>
<td>9.8 FREEZING POINT:</td>
<td>Not Applicable</td>
<td>Not determined</td>
</tr>
<tr>
<td>9.9 pH:</td>
<td>Not applicable</td>
<td>10 - 12.5</td>
</tr>
<tr>
<td>9.10 VOLATILE:</td>
<td>Not applicable</td>
<td>Not determined</td>
</tr>
</tbody>
</table>

### Section 10: STABILITY and REACTIVITY

10.1 **STABILITY:** This is a stable material

10.2 **HAZARDOUS POLYMERIZATION:** Will not occur

10.3 **HAZARDOUS DECOMPOSITION PRODUCTS:** Carbon disulfide, trithiocarbonate, isopropyl alcohol.

10.4 **INCOMPATIBILITY:** Strong oxidizers can cause fire or explosions. Acids will accelerate the hydrolysis of xanthates. Xanthates are not compatible with copper, or its alloys (i.e. bronze, brass, etc.). These materials should not be used in handling systems or storage containers. (SEE Section 7.2, Storage)
Section 11: TOXICOLOGICAL INFORMATION

11.1 ORAL: Parenteral-mouse LD$_{50}$: 600 mg/kg

11.2 DERMAL: Data not available

11.3 INHALATION: Data not available

11.4 CHRONIC/CARCINOGENICITY: No evidence available

11.5 TERATOLOGY: Data not available

11.6 REPRODUCTION: Data not available

11.7 MUTAGENICITY: Data not available

Section 12: ECOLOGICAL INFORMATION

Rainbow trout: FW: 96 hr: LC$_{50}$: 18-20 mg/L
Rainbow trout: toxicity range: 100-180 mg/L
Rainbow trout: lethality: 180 mg/L

Section 13: DISPOSAL CONSIDERATIONS

Solid xanthates do not meet the criteria for a hazardous waste as specified in 40 CFR 261. KI-11 solutions may have a pH of 12.5, which meets the criteria for a DOO2, corrosive waste and a flash point of 125°F which meets the criteria of a D001 characteristic waste. Consult state and local regulations for different or more restrictive disposal regulations.

Section 14: TRANSPORT INFORMATION

14.1 DOT Shipping Name:
Solid
Self heating, solid, organic, n.o.s.

Solution
Corrosive liquids, flammable, n.o.s.

14.2 DOT Hazard Class: 4.2 8

14.3 UN/NA Number: UN3089 UN 2920

14.4 Packing Group: III II

14.5 DOT Placard: Spontaneously combustible Corrosive

14.6 DOT Label(s): Spontaneously combustible Corrosive, flammable
14.7 IMO Shipping Name: Self heating, solid, organic, n.o.s. Corrosive liquids, flammable, n.o.s.

14.8 Reportable Quantity: NA NA

14.9 RR STCC Number: NA NA

15.1 OSHA: This product is listed as a hazardous material under criteria of the Federal OSHA Hazard Communication Standard, 29 CFR 1910.1200.

15.2 SARA TITLE III
   a. EHS (Extremely Hazardous Substance) List: No
   b. Section 311/312, (Tier I,II) Categories: Immediate (acute) Yes
      Fire Yes
      Sudden release No
      Reactivity Yes
      Delayed (chronic) No
   c. Section 313 (Toxic Release Reporting-Form R): No
   d. TPQ (Threshold Planning Quantity): No

15.3 CERCLA/SUPERFUND:
   RQ (Reportable Quantity) No

15.4 TSCA (Toxic Substance Control Act) Inventory List: Yes

15.5 RCRA (Resource Conservation and Recovery Act) Status: D001,
   D002,(solution)

15.6 WHMIS (Canada) Hazard Classification: B6 (solid), E, B3 (solution)

15.6A. Canadian DSL/NDSL No

15.7 DOT Hazardous Material: (See Section 14) Yes

15.8 CAA Hazardous Air Pollutant (HAP) No

15.9 European EINECS/ELINCS No. 205-443-5
REVISIONS: The entire MSDS was reformatted to comply to ANSI Standard Z400.1-1993, by Technical Services-Tessenderlo Kerley, Inc.

Revised 5/2/02. Revised Section 8.3, Eye Protection

THE INFORMATION PUBLISHED IN THIS MATERIAL SAFETY DATA SHEET HAS BEEN COMPiled FROM OUR EXPERIENCE AND OSHA, ANSI, NFPA, DOT, ERG, AND CHRS. IT IS THE USER'S RESPONSIBILITY TO DETERMINE THE SUITABILITY OF THIS INFORMATION FOR THE ADOPTION OF NECESSARY SAFETY PRECAUTIONS. WE RESERVE THE RIGHT TO REVISE MATERIAL SAFETY DATA SHEETS PERIODICALLY AS NEW INFORMATION BECOMES AVAILABLE.
1. Product Identification

System Name: Calcium hydroxide; slaked lime
CAS No: 1305-62-0
Molecular Weight: 56.09
Chemical Formulas: Ca(OH)2
Product Code:
J.T. Baker: 1372, 1374, 1375, 5143
Mallinckrodt: 2630, 2288, 4188, 4195, 4201, 4315, 6005, 8526

2. Composition/Information on Ingredients

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS No</th>
<th>Percent</th>
<th>Hazardous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Hydroxide</td>
<td>1305-62-0</td>
<td>99 - 100%</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3. Hazards Identification

Emergency Overview
DANGER! HARMFUL IF SWALLOWED OR INHALED. CAUSES BURNS TO SKIN AND EYES. CAUSES SEVERE IRRITATION TO RESPIRATORY TRACT.

SAFETY DATA SHEET (SDS) Ratings (Provided here for your convenience)
- Health Rating: 2 - Moderate
- Flammability Rating: 0 - None
- Reactivity Rating: 2 - Moderate
- Contact Rating: 3 - Severe
- Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
- Storage Color Code: Green (General Storage)

Potential Health Effects

- Inhalation: Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath. Can cause chemical bronchitis.
- Inhalation: Gastric irritant. Ingestion may be followed by severe pain, vomiting, diarrhea, and collapse. If death does not occur in 24 hours, esophageal perforation may occur, as evidenced by fall in blood pressure and severe pain. A narrowing of the esophagus may occur weeks, months, or years after ingestion, making swallowing difficult.
- Inhalation: Corrosive. May cause severe burns and blistering, depending on duration of contact.
- Inhalation: Corrosive. May produce severe irritation and pain. May induce ulcerations of the oral epithelium. Can cause blindness.
- Inhalation: Chronic Exposure: Prolonged or repeated skin contact may produce severe irritation or dermatitis.
- Inhalation: Aggravation of Pre-existing Conditions: Persons with pre-existing skin problems or impaired respiratory function may be more susceptible to the effects of this substance.

4. First Aid Measures

- Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician immediately.
- Inhalation: DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Call a physician immediately.
- Skin Contact:
5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.

Explosion:
Not considered to be an explosion hazard.

Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.

Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Keep unnecessary and unprotected people away from area of spill. Wear appropriate personal protective equipment as specified in Section 8.

Spills: Pick up and place in a suitable container for reclamation or disposal, using a vessel that does not generate dust. Do not flush contents to the sewer. Do not neutralize spilled material with water, neutralized with dilute acid such as acetic, hydrochloric or sulfuric. Absorb neutralized caustic residue on clay, vermiculite or other inert substance and package in a suitable container for disposal.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

- OSHA Permissible Exposure Limit (PEL):
  15 mg/m³ (total dust), 5 mg/m³ (respirable fraction)
- ACGIH Threshold Limit Value (TLV):
  5 mg/m³

Ventilation Systems:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred to control the emissions of the contaminant at its source, preventing dispersal of it into the general work area. Please refer to the ACGIH document, Industrial Ventilation: A Manual of Recommended Practice, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a full facepiece particulate respirator (NIOSH type N100 filters) may be worn for up to 20 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lower. If oil particles (e.g., lubricants, cutting fluids, glycercine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear impermeable protective clothing, including boots, gloves, lab coat, aprons or coveralls, as appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
White crystals or powder.

Odor:
Odorless.

Solubility:
0.185 g/100 cc water @ 20°C.

Specific Gravity:
2.54

pH:
12.0 (diluted solution)

% Volatiles by volume @ 21°C (70°F):
0

Boiling Point:
Decomposes.

Melting Point:
580°C (1036°F)

Vapor Density (Air=1):
No information found.

Vapor Pressure (mm Hg):
No information found.

Evaporation Rate (StnAev=1):
No information found.
10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Readily absorbs carbon dioxide from air to form calcium carbonate.

Hazardous Decomposition Products:
Caustic fumes of calcium oxide form when heated to decomposition (580°C; 1076°F).

Hazardous Polymerization:
Will not occur.

Incompatibilities:
Violent reactions with organic anhydrides, nitrocompounds, nitramines, nitrosamines, peroxides, phosphates. As a strongly alkaline material, it is incompatible with acids.

Conditions to Avoid:
Air, dusting, and incompatibilities.

11. Toxicological Information

Oral Rat: LD50: 7340 mg/kg; eye irritation; standard Draize, 10 mg, severe, investigated as a mucous

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>IARC</th>
<th>NTP</th>
<th>TSCA Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Hydroxide</td>
<td>No</td>
<td>No</td>
<td>None</td>
</tr>
</tbody>
</table>

12. Ecological Information

Environmental Fate:
This material is not expected to significantly bioaccumulate.

Environmental Toxiciy:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Chemical Inventory Status - Part 1:</th>
<th>Chemical Inventory Status - Part 2:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Hydroxide</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Federal, State &amp; International Regulations - Part I:</th>
<th>Federal, State &amp; International Regulations - Part II:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Hydroxide</td>
<td>No TSCA 12(D) No CERCLA No EPA 313/312</td>
<td>No CERCLA No TSCA</td>
</tr>
</tbody>
</table>

Chemical Weapons Convention: No
TSCA 12(D): No
CERCLA: No
EPA 313/312: Acute: Yes Chronic: Yes
Reactivity: No

Australian Hazchem Code: None allocated.
Pesticide Scheduler Code: None allocated.

WEMDS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.
16. Other Information

NFPA Ratings:
Health: 3
Flammability: 0
Reactivity: 0

Label Hazard Warning:
DANGEROUS IF SWALLOWED OR INHALED. CAUSES BURNS TO SKIN AND EYES. CAUSES SEVERE IRRITATION TO RESPIRATORY TRACT.

Label Precautions:
Do not get in eyes, on skin, or on clothing.
Wash thoroughly after handling.
Do not breathe dust.
Keep container closed.
Use only with adequate ventilation.

Label First Aid:
In case of contact, wipe off excess material from skin then immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. In all cases call a physician immediately.

Product Use:
Laboratory Reagent.

Revision Information:
MSDS Section(s) changed since last revision of document include: 3.

Disclaimer:
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Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1800 (U.S.A.)

http://www.jtbaker.com/msds/englishhtml/C0407.htm
SODIUM CARBONATE ANHYDROUS

MSDS Numbers: S3242 — Effective Date: 06/30/98

1. Product Identification

Synonyms: Carbonic acid, disodium salt; disodium carbonate; soda ash
CAS No.: 497-19-8
Molecular Weight: 105.99
Chemical Formula: Na₂CO₃
Product Codes:
J.T. Baker: 3602, 3604, 3605, 4502, 4923, 5198, 5834
Mallinkrodt: 1338, 7468, 7521, 7527, 7528, 7698

2. Composition/Information on Ingredients

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS No.</th>
<th>Percent</th>
<th>Hazardous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Carbonate</td>
<td>497-19-8</td>
<td>99 - 100%</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3. Hazards Identification

Emergency Overview

DANGER: MAY CAUSE EYE BURNS, HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT.

J.T. Baker SAF-T-DATA® Ratings (Provided here for your convenience)

Health Rating: 1 - Slight
Flammability Rating: 0 - None
Reactivity Rating: 1 - Slight
Contact Rating: 2 - Moderate
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES
Storage Color Code: Orange (General Storage)

Potential Health Effects

Inhalation:
Inhalation of dust may cause irritation of the respiratory tract. Symptoms from excessive inhalation of dust may include coughing and difficult breathing. Excessive contact is known to cause damage to the nasal septum.

Ingestion:
Sodium carbonate is only slightly toxic, but large doses may be corrosive to the gastro-intestinal tract where symptoms may include severe abdominal pain, vomiting, diarrhea, collapse and death.

Skin Contact:
Excessive contact may cause irritation with blistering and redness. Solutions may cause severe irritation or burns.

Eye Contact:
Contact may be corrosive to eyes and cause conjunctival edema and corneal destruction. Risk of serious injury increases if eyes are kept tightly closed. Other symptoms may appear from absorption of sodium carbonate into the bloodstream via the eyes.

Chronic Exposure:
Prolonged or repeated skin exposure may cause sensitization.

Aggravation of Pre-existing Conditions:
No information found.

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Skin Contact:
Immediately flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention immediately.
attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:
Consider endoscopy in all suspected cases of sodium carbonate poisoning. Perform blood analysis to determine if dehydration, acidosis, or other electrolyte imbalances occurred.

5. Fire Fighting Measures
Fire:
Not considered to be a fire hazard.
Explosion:
Not considered an explosion hazard, but sodium carbonate may explode when applied to red-hot aluminum.

Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.

Special Information:
Use protective clothing and breathing equipment appropriate for the surrounding fire.

6. Accidental Release Measures
Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal.

7. Handling and Storage
Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection
Airborne Exposure Limits:
None established.

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, Industrial Ventilation: A Manual of Recommended Practices, most recent edition, for details.

Personal Respirators (NIOSH Approved):
For conditions of use where exposure to the dust or mist is apparent, a half-face dust/mist respirator may be worn. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear protective gloves and clean body-covering clothing.

Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties
Appearance:
White powder or granules.
Odor:
Odorless.

Solubility:
45.5 g/100 ml water @ 100°C (212°F)

Specific Gravity:
2.53

pH:
11.6 Aqueous solution

% Volatiles by volume @ 21°C (70°F):
0
10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Hygroscopic. Readily absorbs moisture from the air. Solutions are strong bases.

Hazardous Decomposition Products:
Oxides of carbon and sodium oxide.

Hazardous Polymerization:
Will not occur.

Incompatibilities:
Fluorine, aluminum, phosphorous pentoxide, sulfuric acid, zinc, lithium, moisture, calcium hydroxide and 2,4,6-trinitrotoluene.

Reacts violently with acids to form carbon dioxide.

Conditions to Avoid:
Moisture, heat, dusting and incompatibles.

11. Toxicological Information

For Sodium Carbonate:
Oral rat LD50: 4090 mg/kg; inhalation rat LC50: 2300 mg/m3/2H; irritation eye rabbit: 50 mg severe; investigated as a mutagen, reproductive effector.

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Known</th>
<th>Anticipated</th>
<th>LARC Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Carbonate</td>
<td>No</td>
<td>No</td>
<td>None</td>
</tr>
</tbody>
</table>

12. Ecological Information

Environmental Fate:
No information found.

Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility.
Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>TSCA</th>
<th>RC</th>
<th>Japan</th>
<th>Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Carbonate</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

http://www.chem.tamu.edu/class/majors/msdsfiles/msdssodiumcarb.htm

4/25/2007
16. Other Information

NFPA Ratings: Health: 2 Flammability: 0 Reactivity: 0

Label Warning:
DANGER! MAY CAUSE EYE BURNS. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT.

Label Precautions:
Do not get in eyes, on skin, or on clothing.
Avoid breathing dust.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.

Label First Aid:
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. Get medical attention. In all cases, get medical attention.

Product Use: Laboratory Reagent.

Revision Information:
MSDS Section(s) changed since last revision of document include: 3, 8, 16.

Disclaimer:
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Prepared by: Strategic Services Division
Phone Number: (314) 539-1600 (U.S.A.)
Material Safety Data Sheet
WHMIS / ANSI Z400.1-2004 Compliant

Date / Revised: 01-25-2008
Product: MAGNAFLOC 155

1. Identification of the Substance/Preparation and of the Company/Undertaking

Company Information
Company: Ciba Canada Ltd.
2626 Argentia Road
Mississauga, Ontario L5N 5N2
Canada
Customer Service / Product Information: 1-866-679-2422

Emergency Information
Emergency 24-Hour Health/Environmental Phone: 24h: +1-800-873-1138
CANUTEC: (613) 996-6666 (24hrs)

Product Information
Product: MAGNAFLOC 155
Use: flocculation agent

2. Hazards Identification

Emergency overview
Colour: off-white
Appearance: powder
State of matter: solid
Odour: odourless
Health: This product has no known adverse effect on human health.
Physical/Chemical hazards: Organic powders may be capable of generating static discharges and creating explosive mixtures in air. Handle with caution, Refer to MSDS Section 7 for Dust Explosion information., Slip hazard when wet.

Potential health effects
Primary routes of entry:
Inhalation, Ingestion, Eyes, Skin

Chronic exposure:
Eye contact may cause slight irritation and/or redness. Repeated or prolonged exposure may cause slight skin irritation.
Inhaled dust may cause respiratory irritation.

Potential environmental effects
Releases to the environment are to be avoided.
3. Composition/Information on Ingredients
   This material does not contain any hazardous components that are reportable according to WHMIS criteria.

4. First-aid Measures
   Inhalation:
   Remove to fresh air, if not breathing give artificial respiration. If breathing is difficult, give oxygen and get immediate medical attention.

   Skin:
   After contact with skin, wash immediately with plenty of water and soap.
   Get medical attention if irritation occurs.
   If clothing is contaminated, remove and launder before reuse.

   Eyes:
   Immediately flush the eye(s) with lukewarm, gently flowing water for 15 minutes or until the chemical is removed.
   Get immediate medical attention if irritation persists.

   Ingestion:
   Do not induce vomiting. If vomiting occurs naturally, have casually lean forward to reduce the risk of aspiration.
   Seek medical attention immediately.

5. Fire-fighting Measures
   Suitable extinguishing media:
   carbon dioxide, dry powder, foam

   Unsuitable Extinguishing Media:
   If water is used, restrict pedestrian and vehicular traffic in areas where slip hazard may exist.

   Hazardous combustion products:
   Carbon and nitrogen oxides.

   Hazards during fire-fighting:
   Standard procedure for chemical fires.
   The product becomes slippery when wet. Restrict pedestrian and vehicular traffic in areas where slip hazard may exist.
   Dust in sufficient concentration can result in an explosive mixture in air. Handle to minimize dusting and eliminate open flame and other sources of ignition.

   Protective equipment for fire-fighting:
   Wear self-contained breathing apparatus and chemical-protective clothing.

6. Accidental Release Measures
   Cleanup:
   Sweep up and shovel into suitable containers for disposal.
   Avoid raising dust.
   Wear suitable protective equipment.
   Should not be released into the environment.

7. Handling and Storage
   Handling
   General advice:
   As with all industrial chemicals, use good industrial practices when handling. Avoid eye, skin, and clothing contact.
   Do not inhale. Do not taste or swallow. Use only with adequate ventilation.

   Protection against fire and explosion:
   Avoid creating dusty conditions. Risk of explosion if an air-dust mixture forms.
Material Safety Data Sheet
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Date / Revised: 01-25-2008
Product: MAGNAFLOC 155

Storage
General advice:
Keep container tightly closed in a dry, cool and well-ventilated place.

> for industrial use only <

8. Exposure Controls and Personal Protection

Exposure Guidelines

<table>
<thead>
<tr>
<th>DUST</th>
<th>ACGIH</th>
<th>TWA: 10 mg/m³ Inhalable particles</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>TWA: 3 mg/m³ Respirable particles</td>
</tr>
<tr>
<td>OSHA</td>
<td>PEL: 5 mg/m³ Respirable fraction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PEL: 16 mg/m³ Total dust</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Respirable fraction Listed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total dust Listed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TWA: 15 millions of particles per cubic foot of air Respirable fraction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TWA: 50 millions of particles per cubic foot of air Total dust</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TWA: 5 mg/m³ Respirable fraction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TWA: 15 mg/m³ Total dust</td>
<td></td>
</tr>
</tbody>
</table>

Engineering Controls:
Work in well ventilated areas. Do not breathe dust.
Ensure good ventilation and local exhaust.

Personal protective equipment
Respiratory protection:
Use NIOSH approved respirator as needed to mitigate exposure.

Eye protection:
Wear safety goggles (chemical goggles) if there is potential for airborne dust exposures.

Body protection:
Wear chemical resistant gloves and protective clothing.

General safety and hygiene measures:
There are no OSHA or ACGIH exposure guidelines available for component(s) in this product.

9. Physical and Chemical Properties

| Colour: | off-white |
| Form:   | powder   |
| State of matter: | solid |
| Odour:  | odourless |
| pH value: | Not tested |
| Evaporation rate: | Not tested |
| Flash point: | not determined |
| Melting point: | Not applicable |
| Boiling point: | Not applicable |
Material Safety Data Sheet
WHMIS / ANSI Z400.1-2004 Compliant

Product: MAGNAFLOC 155

Vapour pressure: Not tested
Bulk density: approx. 750 kg/m3
Vapour density: Not tested
Partitioning coefficient n-octanol/water (log Pow): Not applicable
Viscosity, dynamic: Not tested
% Volatiles: not determined
Solubility in water: Forms a viscous solution
Solubility in other solvents: Not tested

10. Stability and Reactivity
Stability:
Stable
Conditions to avoid: Avoid temperature extremes. Avoid humidity.
Substances to avoid: Strong oxidizing agents, (may degrade polymer)
Possibility of Hazardous Reactions: No hazardous reactions known.
Hazardous decomposition products: No decomposition expected under normal storage conditions.

11. Toxicological Information
Acute oral toxicity:
Not determined.
Acute inhalation toxicity:
Not determined.
Acute dermal toxicity:
Not determined.
Skin irritation:
not determined
Eye irritation:
not determined
Skin Sensitization:
not determined
Subacute toxicity:
not determined
Chronic toxicity:
not determined
Subchronic Toxicity:
not determined
Genetic toxicity:
Not determined.
Carcinogenicity:
None of the components in this product at concentrations greater than 0.1% are listed by IARC; NTP, OSHA or ACGIH as a carcinogen.
Reproductive toxicity:
not determined

Developmental toxicity/teratogenicity:
not determined

Neurotoxicity:
Not determined

12. Ecological Information

Toxicity to fish:
Brachydanio rerio/96 h/LC50: 357 mg/l (OECD 203/EC C.1)
From tests on a product range

Toxicity to aquatic invertebrates:
Daphnia magna/48 h/EC50: 212 mg/l (OECD 202/EC C.2)
From tests on a product range

Toxicity to aquatic plants:
Chlorella vulgaris/72 h/EC50: > 1,000 mg/l (OECD 201/EC C. 3)
From tests on a product range

Toxicity to microorganisms:
Pseudomonas putida/24 h/EC50: 892 mg/l
From tests on a product range

Biodegradation:
Not tested

13. Disposal Considerations

Waste disposal of substance:
Dispose of in accordance with national, state and local regulations.

14. Transport Information

TDG (Canada) Road transport
Special shipping information: Not classified as a dangerous good under transport regulations.

International Air Transport Association (IATA)
Special shipping information: Not classified as a dangerous good under transport regulations.

International Maritime Dangerous Goods Code (IMDG)
Special shipping information: Not classified as a dangerous good under transport regulations.

15. Regulatory Information

US: Toxic Substances Control Act (TSCA):
All component(s) comprising this product are either exempt or listed on the TSCA inventory

Canada: Domestic Substances List (DSL):
All components either exempt or listed on the DSL

Canada Regulations

Workplace Hazardous Materials Information System (WHMIS Classification):
This product is not WHMIS controlled.
Material Safety Data Sheet
WHMIS / ANSI Z400.1-2004 Compliant

Date / Revised: 01-25-2008
Product: MAGNAFLOC 155

Significant New Activity Conditions (SNAC):
This product does not contain any components subject to a SNAC Notice.

International Regulations
Chemical Weapons Convention:
This product does not contain any component(s) listed under the Chemical Weapons Convention Schedule of Chemicals.

16. Other Information
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Disclaimer:
The information contained herein is based upon data believed to be correct. However, no guarantee or warranty of any kind, expressed or implied, is made with respect to such data or information. The user is responsible for determining whether the product is suitable for its intended conditions of use.

END OF DATA SHEET