1. PRODUCT AND COMPANY IDENTIFICATION

Company

Arkema Inc.
2000 Market Street
Philadelphia, Pennsylvania  19103

Thio and Fine Chemicals

Customer Service Telephone Number:  (800) 628-4453
(Monday through Friday, 8:30 AM to 5:30 PM EST)

Emergency Information

Transportation: CHEMTREC: (800) 424-9300
(24 hrs., 7 days a week)

Medical: Rocky Mountain Poison Center: (303) 623-5716
(24 hrs., 7 days a week)

Product Information

Product name: METHANE SULFONYL CHLORIDE
Synonyms: MSC
Molecular formula: CH3SO2Cl
Chemical family: acid chlorides
Molecular weight: 114.55 g/mol
Product use: Reagent for synthesis

2. HAZARDS IDENTIFICATION

Emergency Overview

Color: light yellow
Physical state: liquid
Odor: irritating

DANGER!
MAY BE FATAL IF INHALED.
CAUSES EYE AND SKIN BURNS.
MAY CAUSE BLINDNESS.
HARMFUL IF SWALLOWED.
HARMFUL IF ABSORBED THROUGH SKIN.
CAUSES RESPIRATORY TRACT IRRITATION.
MAY CAUSE ALLERGIC SKIN REACTION.
VAPOR REDUCES OXYGEN AVAILABLE FOR BREATHING.

Potential Health Effects

Primary routes of exposure:
Inhalation and skin contact.

Signs and symptoms of acute exposure:
Liquid: Corrosive to skin and eyes. Causes burns. If swallowed, may cause severe irritation and injury to the mouth, throat and digestive tract. Prolonged or repeated exposure may cause: Allergic skin reaction: redness, rash. Vapor:
Irritating to eyes and respiratory system. Vapor is heavier than air and can cause suffocation by reducing oxygen available for breathing. May cause: tearing, coughing, breathing difficulties, accumulation of fluid in the lungs which may be delayed for several hours.

**Skin:**
Slightly toxic to moderately toxic. Corrosive. (based on animal studies) Repeated or prolonged skin contact may cause allergic reactions in some individuals.

**Inhalation:**
Highly toxic. (based on animal studies) Severely irritating. (vapor)

**Eyes:**
Corrosive. (based on animal studies)

**Ingestion:**
Moderately toxic. (based on animal studies)

**Medical conditions aggravated by overexposure:**
Respiratory disease or diminished respiratory capacity.

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No.</th>
<th>Wt/Wt</th>
<th>OSHA Hazardous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methanesulfonyl chloride</td>
<td>124-63-0</td>
<td>&gt; 99 %</td>
<td>Y</td>
</tr>
</tbody>
</table>

The substance(s) marked with a "Y" in the Hazard column above, are those identified as hazardous chemicals under the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

This material is classified as hazardous under Federal OSHA regulation.

### 4. FIRST AID MEASURES

**General advice:**
POISON! Get medical attention immediately. Call a Poison Control Center immediately.

**Inhalation:**
If inhaled, remove victim to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

**Skin:**
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse.

**Eyes:**
In case of contact, immediately flush eyes with plenty of water for at least 15 minutes.

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

**Notes to physician:**
Exposure to material may cause delayed lung injury resulting in pulmonary edema and pneumonitis. Exposed individuals should be monitored for 72 hours after exposure for the onset of delayed respiratory symptoms.

### 5. FIRE-FIGHTING MEASURES

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash point</td>
<td>230 °F (110 °C) (Cleveland open cup)</td>
</tr>
<tr>
<td>Auto-ignition temperature:</td>
<td>no data available</td>
</tr>
<tr>
<td>Lower flammable limit (LFL):</td>
<td>no data available</td>
</tr>
<tr>
<td>Upper flammable limit (UFL):</td>
<td>no data available</td>
</tr>
<tr>
<td>Extinguishing media (suitable):</td>
<td>Dry chemical, carbon dioxide, foam</td>
</tr>
<tr>
<td>Extinguishing media (unsuitable):</td>
<td>Water spray</td>
</tr>
</tbody>
</table>

**Protective equipment:**
Fire fighters and others who may be exposed to products of combustion should wear full fire fighting turn out gear (full Bunker Gear) and self-contained breathing apparatus (pressure demand / NIOSH approved or equivalent).

**Further firefighting advice:**
In case of fire, use water spray.
Do not use a solid water stream as it may scatter and spread fire.
Fire fighting equipment should be thoroughly decontaminated after use.

**Fire and explosion hazards:**
When burned, the following hazardous products of combustion can occur:
- sulfur oxides
- carbon dioxide
- carbon monoxide
- hydrogen chloride

### 6. ACCIDENTAL RELEASE MEASURES

**In case of spill or leak:**
Prevent further leakage or spillage if you can do so without risk. Evacuate area of all unnecessary personnel.
Ventilate the area. Avoid generation of vapors. Contain and collect spillage with non-combustible absorbent material such as clean sand, earth, diatomaceous earth or non-acidic clay and place into suitable properly labeled containers for prompt disposal. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits.
7. HANDLING AND STORAGE

Handling

General information on handling:
Do not taste or swallow.
Do not breath vapor or mist.
Do not get in eyes, on skin, or on clothing.
Keep container tightly closed.
Use only with adequate ventilation.
Do not enter confined spaces unless adequately ventilated.
Wash thoroughly after handling.
Emptied container retains vapor and product residue.
Observe all labeled safeguards until container is cleaned, reconditioned or destroyed.

Storage

General information on storage conditions:
Keep containers tightly closed in a dry, cool and well-ventilated place. Store protected from moisture and heat.

Storage incompatibility – General:
Strong bases
Strong oxidizing agents
Water
Alcohols
Diethylhydroxylamine

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Airborne Exposure Guidelines:

Engineering controls:
Investigate engineering techniques to reduce exposures below airborne exposure limits or to otherwise reduce exposures. Provide ventilation if necessary to minimize exposures or to control exposure levels to below airborne exposure limits (if applicable see above). If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment. Monitor carbon monoxide and oxygen levels in tanks and enclosed spaces.

Respiratory protection:
Avoid breathing vapor or mist. Where airborne exposure is likely or airborne exposure limits are exceeded (if applicable, see above), use NIOSH approved respiratory protection equipment appropriate to the material and/or its components. Full facepiece equipment is recommended and, if used, replaces need for face shield and/or chemical goggles. Consult respirator manufacturer to determine appropriate type equipment for a given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where there may be a potential for significant exposure or where exposure limit may be significantly exceeded, use an approved full face positive-pressure, self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. Respiratory protection programs must comply with 29 CFR § 1910.134.
Material Safety Data Sheet
METHANE SULFONYL CHLORIDE

Skin protection:
Wear appropriate chemical resistant protective clothing and chemical resistant gloves to prevent skin contact.
When handling this material, gloves of the following type(s) should be worn:

PVC disposable gloves
Neoprene gloves

Wear chemical goggles, a face shield, and chemical resistant clothing such as a rubber apron when splashing may occur. Rinse immediately if skin is contaminated. Remove contaminated clothing immediately and wash before reuse. Clean protective equipment before reuse. Provide a safety shower at any location where skin contact can occur. Wash thoroughly after handling.

Eye protection:
Where there is potential for eye contact, wear a face shield, chemical goggles, and have eye flushing equipment immediately available.

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>light yellow</td>
</tr>
<tr>
<td>Physical state</td>
<td>liquid</td>
</tr>
<tr>
<td>Odor</td>
<td>irritating</td>
</tr>
<tr>
<td>pH</td>
<td>no data available</td>
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<tr>
<td>Density</td>
<td>1,478 kg/m³</td>
</tr>
<tr>
<td>Specific Gravity (Relative density):</td>
<td>1.475 - 1.480 (68 °F (20 °C))</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>2.100 mmHg (68 °F (20 °C))</td>
</tr>
<tr>
<td></td>
<td>12 mmHg (127 °F (53 °C))</td>
</tr>
<tr>
<td>Relative vapor density</td>
<td>3.9</td>
</tr>
<tr>
<td>Vapor density</td>
<td>not determined</td>
</tr>
<tr>
<td>Boiling point/boiling range</td>
<td>&gt; 320 °F (&gt; 160 °C)</td>
</tr>
<tr>
<td>Freezing point</td>
<td>-27 °F (-33 °C)</td>
</tr>
<tr>
<td>Melting point/range</td>
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</tr>
<tr>
<td>Solubility in water</td>
<td>hydrolyzes slowly</td>
</tr>
<tr>
<td>Solubility in other solvents:</td>
<td>Soluble in: Acetone</td>
</tr>
<tr>
<td>[qualitative and</td>
<td>Ethyl ether</td>
</tr>
<tr>
<td>quantitative]</td>
<td></td>
</tr>
</tbody>
</table>
Refractive index: 1.452 68 °F (20 °C)
Viscosity, dynamic: 1.97 mPa.s 77 °F (25 °C)
Molecular weight: 114.55 g/mol

10. STABILITY AND REACTIVITY

Stability:
This material is chemically stable under normal and anticipated storage, handling and processing conditions.

Materials to avoid:
Strong bases
Strong oxidizing agents
Water
Alcohols
Diethylhydroxylamine

Conditions / hazards to avoid:
Avoid moisture. Heat.

Hazardous decomposition products:
Thermal decomposition giving flammable and toxic products:
Methanesulphonic acid
sulfur oxides
Carbon oxides
Hydrogen chloride gas

11. TOXICOLOGICAL INFORMATION

Data on this material and/or its components are summarized below.

Data for METHANE SULFONYL CHLORIDE

Acute toxicity

Oral:
Moderately toxic. (rat) LD50 = 255 mg/kg.

Dermal:
Slightly to moderately toxic. (rabbit) LD50 between 200 - 2,000 mg/kg.

Inhalation:
Highly toxic. (rat) 4 h LC50 = 0.117 mg/l (= 25 ppm).
Highly toxic. (rat) 1 h LC50 = 0.938 mg/l (approx 200 ppm).

Skin Irritation:
Corrosive. (mouse) (anhydrous)

Eye Irritation:
Corrosive. (rabbit)

**Skin Sensitization:**
Repeated skin exposure. (guinea pig) Skin allergy was observed.

**Repeated dose toxicity**
Repeated inhalation administration to rat / affected organ(s): eye, lung / signs: severe irritation, changes in organ structure or function

**Genotoxicity**

**Assessment in Vitro:**
Genetic changes were observed in laboratory tests using: human cells

**Assessment in Vivo:**
No genetic changes were observed in a laboratory test using: mice

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### 12. ECOLOGICAL INFORMATION

**Chemical Fate and Pathway**
No data are available.

**Ecotoxicology**
Data on this material and/or its components are summarized below.

**Data for METHANE SULFONYL CHLORIDE**

**Aquatic toxicity data:**
- Practically nontoxic. Poecilia reticulata (guppy) 96 h LC50 > 1,200 mg/l
- Slightly toxic. Silverside, tidewater 96 h LC50 = 15 mg/l
- Slightly toxic. Lepomis macrochirus (Bluegill sunfish) 96 h LC50 = 11 mg/l

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### 13. DISPOSAL CONSIDERATIONS

**Waste disposal:**
Disposal via incineration is recommended. Dispose of in accordance with federal, state and local regulations. Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits. Note: Chemical additions to, processing of, or otherwise altering this material may make this waste management information incomplete, inaccurate, or otherwise inappropriate. Furthermore, state and local waste disposal requirements may be more restrictive or otherwise different from federal laws and regulations.

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### 14. TRANSPORT INFORMATION

**US Department of Transportation (DOT)**

<table>
<thead>
<tr>
<th>UN Number</th>
<th>3246</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper shipping name</td>
<td>Methanesulfonyl chloride</td>
</tr>
<tr>
<td>Class</td>
<td>6.1</td>
</tr>
<tr>
<td>Subsidiary hazard class</td>
<td>(8)</td>
</tr>
<tr>
<td>Packaging group</td>
<td>I</td>
</tr>
</tbody>
</table>
Marine pollutant : no

Special Shipping Information: Poison-Inhalation Hazard Zone B

International Maritime Dangerous Goods Code (IMDG)

UN Number : 3246
Proper shipping name : METHANESULPHONYL CHLORIDE
Class : 6.1
Subsidiary hazard class : (8)
Packaging group : I
Marine pollutant : no
Flash point : 230 °F (110 °C) Cleveland open cup

15. REGULATORY INFORMATION

Chemical Inventory Status

EU. EINECS EINECS Conforms to
US. Toxic Substances Control Act TSCA The components of this product are all on the TSCA Inventory.
Australia. Industrial Chemical (Notification and Assessment) Act AICS Conforms to
Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL). (Can. Gaz. Part II, Vol. 133) DSL All components of this product are on the Canadian DSL list.
Japan. Kashin-Hou Law List ENCS (JP) Conforms to
Korea. Toxic Chemical Control Law (TCCL) List KECI (KR) Conforms to
Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act PICCS (PH) Conforms to
China. Inventory of Existing Chemical Substances IECSC (CN) Conforms to
New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New Zealand NZIOC Conforms to

United States – Federal Regulations

SARA Title III – Section 302 Extremely Hazardous Chemicals:
The components in this product are either not SARA Section 302 regulated or regulated but present in negligible concentrations.

SARA Title III - Section 311/312 Hazard Categories:
Acute Health Hazard
SARA Title III – Section 313 Toxic Chemicals:
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) - Reportable Quantity (RQ):

The components in this product are either not CERCLA regulated, regulated but present in negligible concentrations, or regulated with no assigned reportable quantity.

OSHA Regulated Carcinogens (NTP, IARC, OSHA Listed):

NTP:
No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

IARC:
No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA:
No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

United States – State Regulations

New Jersey Right to Know
No components are subject to the New Jersey Right to Know Act.

Pennsylvania Right to Know

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methanesulfonyl chloride</td>
<td>124-63-0</td>
</tr>
</tbody>
</table>

California Prop. 65
This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive defects.

16. OTHER INFORMATION

Latest Revision(s):
- Revised Section(s): Initial Entry
- Reference number: 000000035680
- Date of Revision: 08/06/2010
- Date Printed: 08/06/2010
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