IDENTIFICATION

MSDS Record Number: 5618663
Product Name(s): THIONYL CHLORIDE
Product Identification: MSDS NUMBER: T2938
PRODUCT CODE: 8660, 8522, 8523
C.A.S. NUMBER: 7719-09-7
Date of MSDS: 2007-07-26
Currency Note: This MSDS was acquired from the supplier on 2007-09-06.

MANUFACTURER/SUPPLIER INFORMATION

Company: MALLINCKRODT BAKER INC

MATERIAL SAFETY DATA

Effective Date: 07/26/07
Supercedes: 05/07/07

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MSDS MATERIAL SAFETY DATA SHEET

CHEMTREC: 800-424-9300 (USA)
703-527-3887
(Outside USA & CANADA)
CANUTEC: 613-996-6666

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

NOTE: Use CHEMTREC and CANUTEC phone numbers only in the event of a chemical emergency.

Emergency Telephone Number: 908-859-2151

All non-emergency questions should be directed to Customer Service
(1-800-582-2537) for assistance.

MALLINCKRODT J. T. BAKER

THIONYL CHLORIDE

1. Product Identification
Synonyms: Sulfinyl chloride; Sulfurous oxychloride; Thionyl dichloride; Sulfur chloride oxide
CAS No: 7719-09-7
Molecular Weight: 118.98
Chemical Formula: SOCl2
Product Codes: J.T. Baker:
8660
Mallinckrodt:
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>Thionyl Chloride</td>
<td>7719-09-7</td>
<td>90 - 100%</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3. Hazards Identification

Emergency Overview

DANGER! CORROSIVE. CAUSES BURNS TO ANY AREA OF CONTACT. MAY BE FATAL IF INHALED. HARMFUL IF SWALLOWED. VAPORS CAUSE SEVERE IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. WATER REACTIVE.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

<table>
<thead>
<tr>
<th>Health Rating:</th>
<th>Flammability Rating:</th>
<th>Reactivity Rating:</th>
<th>Contact Rating:</th>
<th>Lab Protective Equip:</th>
<th>Storage Color Code:</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 - Extreme</td>
<td>0 - None</td>
<td>3 - Severe (Water Reactive)</td>
<td>4 - Extreme (Corrosive)</td>
<td>GOGGLES &amp; SHIELD; LAB COAT &amp; APRON; VENT HOOD; PROPER GLOVES</td>
<td>White (Corrosive)</td>
</tr>
</tbody>
</table>

Potential Health Effects

Inhalation:
Corrosive. Extremely destructive to tissues of the mucous membranes and upper respiratory tract. Symptoms may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea and vomiting. Inhalation may be fatal as a result of spasm inflammation and edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema.

Ingestion:
Corrosive. May cause burning pain in throat, abdominal pain, nausea, and vomiting.

Skin Contact:
Corrosive. Liquid contact may cause blistering burns, irritation, and pain. Vapors may be severely irritating to the skin.

Eye Contact:
Corrosive! Vapors are irritating and may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.

Chronic Exposure:
Prolonged or repeated exposure may cause conjunctivitis, dermatitis, rhinitis, and pneumonitis.

Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or impaired respiratory function may be more susceptible to the effects of the substance.

4. First Aid Measures

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

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:
Wipe off excess material from skin then immediately flush skin with plenty of water for at least 15 minutes while removing contaminated
clothing and shoes. Get medical attention immediately. 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.

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard. May react violently with water or moist air.
Can liberate flammable hydrogen gas when in contact with metal and moisture.

Explosion:
Sealed containers may rupture when heated.

Fire Extinguishing Media:
Carbon dioxide or dry chemical. Do not use water or foam.

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. Water spray may be used to keep fire exposed containers cool. Keep water from getting inside containers. Structural firefighter's protective clothing is ineffective for fires involving this material. Stay away from sealed containers.

6. Accidental Release Measures

Do not contact with water. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8.

Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e.g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer!

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. Use air-drying vent tube or inert gas for partial withdrawals from containers or drums. Keep away from water. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
- ACGIH Threshold Limit Value (TLV):
  1 ppm Ceiling

Ventilation System:
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 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):
If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. Breathing air
quality must meet the requirements of the OSHA respiratory protection standard (29CFR1910.134).

Skin Protection:
Rubber or neoprene gloves and additional protection including impervious boots, apron, or coveralls, as needed in areas of unusual exposure.

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

9. Physical and Chemical Properties

Boiling Point:
76°C (169°F) @ 760 mmHg; Decomposes @ 140°C (284°F)

Melting Point:
-105°C (-157°F)

Vapor Density (Air=1):
4.1

Vapor Pressure (mm Hg):
100 @ 21°C (70°F)

Evaporation Rate (BuAc=1):
No information found.

9. Physical and Chemical Properties

Appearance:
Clear, pale yellow to red liquid.

Odor:
Characteristic, pungent odor.

Solubility:
Decomposes in water.

Specific Gravity:
1.64 @ 20°C/4°C

pH:
No information found.

% Volatiles by volume @ 21°C (70°F):
100

10. Stability and Reactivity

Stability:
Stable at room temperature in sealed containers. Fumes on exposure to moist air. Hydrolyzes in presence of moisture to sulfur dioxide and hydrogen chloride gas.

Hazardous Decomposition Products:
Decomposes when heated above 140°C (284°F) forming chlorine, sulfur dioxide, and sulfur monochloride and giving a suffocating odor.

Hazardous Polymerization:
Will not occur.

Incompatibilities:
Water, ammonia, chloryl perchlorate, dimethyl sulfoxide, linseed oil, quinoline, sodium, 1,6-hexadiyn-1-6-diol, o-nitrobenzoyl acetic acid, and o-nitrophenylacetic acid.

Conditions to Avoid:
Heat, moisture, incompatibles.

11. Toxicological Information

Inhalation rat LC50: 500 ppm/1-hour.

---NTP Carcinogen---

 Ingredient | Known | Anticipated | IARC Category
Thionyl Chloride (7719-09-7) | No | No | None

12. Ecological Information

Environmental Fate:
When released to moist soil or water, this material is expected to hydrolyze.

Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as
hazardous waste and sent to a RCRA approved waste 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
Domestic (Land, D.O.T.)

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Proper Shipping Name: THIONYL CHLORIDE
Hazard Class: 8
UN/NA: UN1836 Packing Group: I
Information reported for product/size: 500ML
International (Water, I.M.O.)

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Proper Shipping Name: THIONYL CHLORIDE
Hazard Class: 8
UN/NA: UN1836 Packing Group: I
Information reported for product/size: 500ML

15. Regulatory Information
--------\Chemical Inventory Status - Part 1\------------------------
Ingredient TSCA EC Japan Australia
Thionyl Chloride (7719-09-7) Yes Yes Yes Yes
--------\Chemical Inventory Status - Part 2\------------------------
Ingredient Korea DSL NDSL Phil.
Thionyl Chloride (7719-09-7) Yes Yes No Yes
--------\Federal, State & International Regulations - Part 1\--------
Ingredient RQ TPQ List Chemical Ctg.
Thionyl Chloride (7719-09-7) No No No No
--------\Federal, State & International Regulations - Part 2\--------
Ingredient CERCLA
Thionyl Chloride (7719-09-7) No No No
Chemical Weapons Convention: Yes Yes No No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: Yes (Pure / Liquid)

Australian Hazchem Code: 4WE
Australian Poison 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
NEPA Ratings:
Health: 4 Flammability: 0 Reactivity: 2 Other: Water reactive
Label Hazard Warning:
DANGER! CORROSIVE. CAUSES BURNS TO ANY AREA OF CONTACT. MAY BE FATAL IF
INHALED. HARMFUL IF SWALLOWED. VAPORS CAUSE SEVERE IRRITATION TO SKIN,
EYES AND RESPIRATORY TRACT. WATER REACTIVE.
Label Precautions:

http://ccinfoweb2.ccohs.ca/msds/Action.lasso?-database=msds-&-layout=Display-&-respo...
11/26/2007
Do not get in eyes, on skin, or on clothing.
Wash thoroughly after handling.
Do not breathe vapor or mist.
Keep container closed.
Use only with adequate ventilation.
Do not contact with water.
Label First Aid:
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. If not breathing, give artificial respiration. If breathing
is difficult, give oxygen. 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 while removing contaminated clothing and shoes. Wash
clothing before reuse. In all cases get medical attention immediately.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 3.
Disclaimer:

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