Section 1 - Product and Company Information

Product Name                  TOLYLENE 2,4-DIISOCYANATE, 95%
Product Number                T39853
Brand                         ALDRICH
Company                       Sigma-Aldrich Canada, Ltd
Address                       2149 Winston Park Drive
                              Oakville ON L6H 6J8 CA
Technical Phone:              9058299500
Fax:                          9058299292
Emergency Phone:             800-424-9300

Section 2 - Composition/Information on Ingredient

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>CAS #</th>
<th>SARA 313</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOLYLENE 2,4-DIISOCYANATE</td>
<td>584-84-9</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Formula       C9H6N2O2
Synonyms      Cresorcinol diisocyanate * Desmodur T80 *
               Di-isocyanate de toluylene (French) *
               Di-iso-cyanatoluene *
               2,4-Diisocyanato-1-methylbenzene (9CI) *
               2,4-Diisocyanatotoluene * Diisocyanat-toluol (German) *
               4-methyl-m-phenylene ester * 4-Methyl-phenylene diisocyanate *
               Isocyanic acid, 4-Methyl-phenylene isocyanate *
               Mondur TD * Mondur TD-80 * Mondur TDS * Nacconate IOO * NCI-C50533 * RCRA waste number U223 * TDI *
               2,4-TDI * TDI-80 * TDI (OSHA) *
               Toluene-diisocyanate (Dutch) * Toluen-diisocyanato (Italian) *
               2,4-Diisocyanate *
               Toluene-diisocyanate *
               2,4-Toluenediisocyanate *
               Toluene-2,4-diisocyanate (ACGIH:OSHA) *
               Toluilenodwuizocyjanian (Polish) *
               Toluylenodiisocyanat (German) *
               Toluylene-2,4-diisocyanate * Tolyene
               2,4-diisocyanate * Tolyene-2,4-diisocyanate *
               2,4-Toluyenediisocyanate

RTECS Number:  CZ6300000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Highly Toxic (USA) Very Toxic (EU).
Very toxic by inhalation. Irritating to eyes, respiratory system and skin. Limited evidence of a carcinogenic effect. May cause sensitization by inhalation and skin contact. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Possible Carcinogen (US). Lachrymator. Target organ(s): Lungs. Nerves.
HMIS RATING
HEALTH: 3*
FLAMMABILITY: 0
REACTIVITY: 1

NFPA RATING
HEALTH: 3
FLAMMABILITY: 0
REACTIVITY: 1

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE
If swallowed, wash out mouth with water provided person is conscious. Call a physician immediately.

INHALATION EXPOSURE
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE
In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

EYE EXPOSURE
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT
269.6 °F   132 °C   Method: closed cup

EXPLOSION LIMITS
Lower: 0.9 %   Upper: 9.5 %

AUTOIGNITION TEMP
> 620 °C

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Carbon dioxide. Dry chemical powder.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area.
PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves. Wear disposable coveralls and discard them after use.

METHODS FOR CLEANING UP
Cover with an activated carbon adsorbent, take up and place in closed containers. Transport outdoors. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure. Do not breathe vapor.

STORAGE
Suitable: Keep tightly closed. Store under nitrogen.
Store at 2-8°C

SPECIAL REQUIREMENTS
Store under inert gas. Light and moisture sensitive.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Use only in a chemical fume hood.

PERSONAL PROTECTIVE EQUIPMENT
Other: Wear appropriate government approved respirator, chemical-resistant gloves, safety goggles, other protective clothing. Faceshield (8-inch minimum).

GENERAL HYGIENE MEASURES
Wash thoroughly after handling. Wash contaminated clothing before reuse.

EXPOSURE LIMITS, RTECS

<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>ACGIH</td>
<td>STEL</td>
<td>0.02 PPM</td>
</tr>
<tr>
<td>USA</td>
<td>ACGIH</td>
<td>TWA</td>
<td>0.005 PPM</td>
</tr>
<tr>
<td>USA</td>
<td>MSHA Standard</td>
<td>Ceiling</td>
<td>0.02 PPM  (0.14 MG/M3)</td>
</tr>
<tr>
<td>USA</td>
<td>OSHA.</td>
<td>PEL</td>
<td>CL 0.02 PPM (0.14 MG/M3)</td>
</tr>
<tr>
<td>New Zealand</td>
<td>OEL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remarks: check ACGIH TLV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>NIOSH</td>
<td></td>
<td>LOWEST FEASIBLE CONC</td>
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</table>

EXPOSURE LIMITS

<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland</td>
<td>NDS</td>
<td></td>
<td>0.035 MG/M3</td>
</tr>
<tr>
<td>Poland</td>
<td>NDSCh</td>
<td></td>
<td>0.07 MG/M3</td>
</tr>
<tr>
<td>Poland</td>
<td>NDSP</td>
<td></td>
<td>-</td>
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</tbody>
</table>

Section 9 - Physical/Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>At Temperature or Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Physical State: Clear liquid</td>
<td></td>
</tr>
<tr>
<td>Color: Colorless</td>
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<td></td>
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<tr>
<td>Molecular Weight</td>
<td>174.16 AMU</td>
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</tr>
<tr>
<td>pH</td>
<td>N/A</td>
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</tr>
</tbody>
</table>

ALDRICH - T39853   www.sigma-aldrich.com   Page  3
BP/BP Range 124.0 - 126.0 °C 18 mmHg
MP/MP Range 20 °C
Freezing Point N/A
Vapor Pressure 0.03 mmHg 25 °C
Vapor Density 6 g/l
Saturated Vapor Conc. N/A
SG/Density 1.21 g/cm³
Bulk Density N/A
Odor Threshold N/A
Volatile% N/A
VOC Content N/A
Water Content N/A
Solvent Content N/A
Evaporation Rate N/A
Viscosity N/A
Surface Tension 25 mN/m 25 °C
Partition Coefficient N/A
Decomposition Temp. N/A
Flash Point 269.6 °F 132 °C Method: closed cup
Explosion Limits Lower: 0.9 %
Upper: 9.5 %
Flammability N/A
Autoignition Temp > 620 °C
Refractive Index 1.5689
Optical Rotation N/A
Miscellaneous Data N/A
Solubility Other Solvents: ETHYL ACETATE

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Conditions of Instability: Light sensitive. Moisture sensitive.
Conditions to Avoid: Heat.
Materials to Avoid: Alcohols, Strong bases, Amines, Acids, Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide, Nitrogen oxides, Hydrogen cyanide.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: Causes skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: Causes eye irritation. Lachrymator.
Inhalation: Vapor or mist is irritating to the mucous membranes and upper respiratory tract. May be fatal if inhaled.
Ingestion: May be harmful if swallowed.

SENSITIZATION
Sensitization: May cause allergic respiratory and skin reactions Causes dermatitis.

TARGET ORGAN(S) OR SYSTEM(S)
Lungs. Nerves.
SIGN AND SYMPTOMS OF EXPOSURE
Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Inhalation may result in spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema. Repeated exposure may cause asthma.

CONDITIONS AGGRAVATED BY EXPOSURE
Acts as a mild acetyl cholinesterase inhibitor.

TOXICITY DATA

Oral
Rat
5800 mg/kg
LD50
Remarks: Gastrointestinal:Other changes.

Inhalation
Rat
14 ppm
LC50

Inhalation
Mouse
10 ppm
LC50
Remarks: Lungs, Thorax, or Respiration:Structural or functional change in trachea or bronchi. Lungs, Thorax, or Respiration:Changes in pulmonary vascular resistance.

Intravenous
Mouse
56 MG/KG
LD50

Inhalation
Rabbit
11 ppm
LC50

Skin
Rabbit
>16 ML/KG
LD50

Inhalation
Guinea pig
13 ppm
LC50
Remarks: Lungs, Thorax, or Respiration:Changes in pulmonary vascular resistance. Lungs, Thorax, or Respiration:Structural or functional change in trachea or bronchi. Lungs, Thorax, or Respiration:Pleural effusion.
Oral
Bird (wild)
100 mg/kg
LD50

IRRITATION DATA

Skin
Rabbit
500 mg
Remarks: Open irritation test

Skin
Rabbit
500 mg
24H
Remarks: Moderate irritation effect

Eyes
Rabbit
100 mg
Remarks: Severe irritation effect

CHRONIC EXPOSURE - CARCINOGEN
Result: This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

IARC CARCINOGEN LIST
Rating: Group 2B

ACGIH CARCINOGEN LIST
Rating: A4

CHRONIC EXPOSURE - MUTAGEN

Species: Mouse
Dose: 75 MG/L
Cell Type: lymphocyte
Mutation test: specific locus test

Species: Hamster
Dose: 300 MG/L
Cell Type: ovary
Mutation test: Sister chromatid exchange

Section 12 - Ecological Information
No data available.

ACUTE ECOTOXICITY TESTS
Test Type: LC50 Fish
Species: Pimephales promelas (Fathead minnow)
Time: 96 h
Value: 108.8 - 240.4 mg/l

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose
of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
- Proper Shipping Name: Toluene diisocyanate
- UN#: 2078
- Class: 6.1
- Packing Group: Packing Group II
- Hazard Label: Toxic substances.
- PIH: Not PIH

IATA
- Proper Shipping Name: Toluene diisocyanate
- IATA UN Number: 2078
- Hazard Class: 6.1
- Packing Group: II

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION
- Symbol of Danger: T+
- Indication of Danger: Very toxic.
- R: 26-36/37/38-40-42/43-52/53
- Risk Statements: Very toxic by inhalation. Irritating to eyes, respiratory system and skin. Limited evidence of a carcinogenic effect. May cause sensitization by inhalation and skin contact. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
- S: 23-36/37-45-61
- Safety Statements: Do not breathe vapor. Wear suitable protective clothing and gloves. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Avoid release to the environment. Refer to special instructions/safety data sheets.

US CLASSIFICATION AND LABEL TEXT
- Risk Statements: Very toxic by inhalation. Irritating to eyes, respiratory system and skin. Limited evidence of a carcinogenic effect. May cause sensitization by inhalation and skin contact. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
- Safety Statements: Do not breathe vapor. Wear suitable protective clothing and gloves. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Avoid release to the environment. Refer to special instructions/safety data sheets.

UNITED STATES REGULATORY INFORMATION
- SARA LISTED: Yes
- DEMINIMIS: 0.1 %
- NOTES: This product is subject to SARA section 313 reporting requirements.
- TSCA INVENTORY ITEM: Yes

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

DSL: Yes
NDSL: No

Section 16 – Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

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