1. Supplier and Substance Identification

Product Information
Product name: Toluene Diisocyanate
Description: Polyurethane component, industrial chemicals

Recommended use of the chemical and restrictions on use
Recommended use: Plasticizer
Uses advised against: None known

Supplier:
The Chemical Company
44 Southwest Avenue
Jamestown, RI 02835 USA
Phone: 401.423.3100
Fax: 401.423.3102
Email: info@thechemco.com
Web: www.thechemco.com

For Chemical Emergency
Spill, Leak, Fire, Exposure, or Accident
Call CHEMTREC Day or Night

Within USA and Canada: 1-800-424-9300
Outside USA and Canada: +1 703-527-3887 (collect calls accepted)

2. Hazards Identification

GHS-US classification
Acute toxicity (inhal.), Category 1 H330 Fatal if inhaled
Skin corrosion/irritation, Category 2 H315 Causes skin irritation Serious eye damage/eye irritation,
Category 2A H319 Causes serious eye irritation
Sensitization — Respiratory, Category 1 H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled Sensitization — Skin, Category 1 H317 May cause an allergic skin reaction Carcinogenicity, Category 2 H351 Suspected of causing cancer

Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation
Full text of H statements: see section 16

H335 May cause respiratory irritation

Hazard pictograms (GHS-US):

GHS08

GHS08

Signal word (GHS-US) : Danger

Hazard statements (GHS-US) : H315 - Causes skin irritation
H317 - May cause an allergic skin reaction
H319 - Causes serious eye irritation
H330 - Fatal if inhaled
H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled H335 - May cause respiratory irritation
H351 - Suspected of causing cancer

Precautionary statements (GHS-US) : P201 - Obtain special instructions before use
P202 - Do not handle until all safety precautions have been read and understood
P260 - Do not breathe fume, mist, spray, vapors
P264 - Wash hands thoroughly after handling
P271 - Use only outdoors or in a well-ventilated area
P272 - Contaminated work clothing must not be allowed out of the workplace
P280 - Wear protective clothing, protective gloves, eye protection,
Respiratory protection P302+P352 - If on skin: Wash with plenty of water
P304+P341 - If inhaled: If breathing is difficult, remove person to fresh air and keep comfortable for breathing
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes.
Remove contact lenses, if present and easy to do. Continue rinsing
P308+P313 - If exposed or concerned: Get medical advice/attention
P312 - Call a doctor, a POISON CENTER if you feel unwell
P332+P313 - If skin irritation occurs: Get medical advice/attention.
According to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

February 10, 2017 EN (English) 2/8
P337+P313 - If eye irritation persists: Get medical advice/attention
P342+P311 - If experiencing respiratory symptoms: Call a POISON CENTER P362+P364 - Take off contaminated clothing and wash it before reuse
P363 - Wash contaminated clothing before reuse
P403+P233 - Store in a well-ventilated place. Keep container tightly closed
P405 - Store locked up
P501 - Dis local, national and international

3. Composition/Information on Ingredients

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene Diisocyanate</td>
<td>(CAS No) 2647-1-62-6</td>
<td>100</td>
</tr>
<tr>
<td>Benzene, 2,4-diisocyanato-1-methyl- (constituent)</td>
<td>(CAS No) 584-84-9</td>
<td>80</td>
</tr>
<tr>
<td>2-methyl-1-phenylene diisocyanate, toluene-2,6-diisocyanate (constituent)</td>
<td>(CAS No) 91-03-7</td>
<td>20</td>
</tr>
</tbody>
</table>

4. First Aid Measures

First-aid measures after inhalation: Immediately call a POISON CENTER or doctor/physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. If experiencing respiratory symptoms:

Call a POISON CENTER or doctor/physician.

First-aid measures after skin contact : Wash with plenty of soap and water. Wash contaminated clothing before reuse. If skin irritation occurs: Get medical advice/attention.

First-aid measures after eye contact : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

First-aid measures after ingestion : Rinse mouth. Do NOT induce vomiting. Get medical advice/attention if you feel unwell.

Symptoms/injuries after inhalation : Fatal if inhaled. May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause respiratory irritation.

Symptoms/injuries after skin contact : Causes skin irritation. May cause an allergic skin reaction. Symptoms/injuries after eye contact : Causes serious eye irritation.

Symptoms/injuries after ingestion : May be harmful if swallowed. May cause stomach pain or discomfort. Chronic symptoms : Suspected of causing cancer.

5. Fire Fighting Measures


Fire hazard : Slight fire hazard when heated. Thermal decomposition products may include highly toxic hydrogen cyanide, and toxic and hazardous carbon oxides and nitrogen.

Explosion hazard : May form flammable vapor-air mixture. Containers may explode and rupture when heated.
Reactivity: Stable, but reacts exothermically with water yielding carbon dioxide and an organic base. May brown on exposure to sunlight. Toxic gas may accumulate in a closed space. Frozen at less than 15°C, and can produce dimer at high temps.

Firefighting instructions: Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering the environment.
Protective equipment for firefighters: Do not enter fire area without proper protective equipment, including respiratory protection.

6. Accidental Release Measures

Emergency procedures
Evacuate unnecessary personnel.
Protective equipment: Equip cleanup crew with proper protection.
Emergency procedures: Ventilate area.
Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.
Methods for cleaning up: lids, such as clay or diatomaceous earth as soon as possible. Collect spillage. Store away from other materials.

7. Handling and Storage

Precautions for safe handling: Provide good ventilation in process area to prevent formation of vapor. Do not breathe fume, mist, spray, vapors. Use only outdoors or in a well-ventilated area. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wash hands thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse. Handle in accordance with good industrial hygiene and safety practice.
Storage conditions: Keep only in the original container in a cool, well-ventilated place away from incompatible materials and sources of heat. Keep container tightly closed.
Incompatible materials: Water, acid, acyl chloride, alcohol, aluminum, amines, ammonia, aniline, strong bases, copper and copper alloys, activated hydrogen, metal, oxidizing agents, plastics, rubber coating, polyurethane, surface active agents, zinc alloy.

8. Exposure Controls/Personal Protection

Appropriate engineering controls
Provide adequate ventilation. Provide local exhaust or general room ventilation to minimize vapor concentrations. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

**Hand protection:**
Insulating or Impermeable protective gloves.

**Eye protection:**
Chemical goggles or safety glasses

**Skin and body protection:**
Chemical resistant safety shoes. Chemical resistant apron

**Respiratory protection:**
In case of inadequate ventilation wear respiratory protection. NIOSH/MSHA approved air purifying respirator should be used if operating conditions produce airborne concentrations that exceed exposure limits for any individual components. If conditions immediately dangerous to life or health exist, use NIOSH/MSHA self-contained breathing apparatus (SCBA).

**Other information:**
Do not eat, drink or smoke during use.

### 9. Physical and Chemical Properties

- **Physical state:** Liquid
- **Color:** Colorless to yellow
- **Odor:** Characteristic, pungent
- **Odor threshold:** 0.05 ppm
- **pH:** No data available
- **Melting point:** No data available
- **Freezing point:** 11.5 - 13.5 °C
- **Boiling point:** 251 °C (1013 hPa)
- **Flash point:** 135 °C
- **Relative evaporation rate (butylacetate=1):** No data available
- **Flammability (solid, gas):** Non flammable.
- **Vapor pressure:** 0.03 mm Hg (at 25 C)
- **Relative vapor density at 20 °C:** 6 (Air = 1)
- **Relative density:** No data available
- **Solubility:** No data available
- **Log Pow:** No data available
- **Auto-ignition temperature:** > 600 °C
- **Decomposition temperature:** No data available
- **Viscosity, kinematic:** No data available
- **Viscosity, dynamic:** 3.1 cP (at 25 C)
- **Explosive limits:** Lower explosive limit (LEL): 0.5 vol %
  Upper explosive limit (UEL): 9.5 vol %
- **Explosive properties:** No data available
- **Oxidizing properties:** No data available

### 10. Stability and Reactivity

**Reactivity**
Stable, but reacts exothermically with water yielding carbon dioxide and an organic base. May brown on exposure to sunlight. Toxic gas may accumulate
in a closed space. Frozen at less than 15°C, and can produce dimer at high temps.

**Chemical stability**
Stable under normal conditions.

**Possibility of Hazardous Reactions**
Hazardous polymerization will not occur.

**Conditions to Avoid**
Extremely low or high temperatures.,. Keep away from heat/sparks/openflame/hot surfaces void overheating to minimize fume production. - No smoking

**Incompatible Materials**
Water, acid, acyl chloride, alcohol, aluminum, amines, ammonia, aniline, strong bases, copper and copper alloys, activated hydrogen, metal, oxidizing agents, plastics, rubber coating, polyurethane, surface active agents, zinc alloy

**Possible Hazardous Reactions**
Hazardous polymerization will not occur.

**Hazardous Decomposition Products**
Thermal decomposition can lead to release of irritating and toxic gases and vapors

11. **Toxicological Information**

Likely routes of exposure: Ingestion; Inhalation; Skin and eyes contact
Acute toxicity: Inhalation: Fatal if inhaled.

<table>
<thead>
<tr>
<th>Toluene Diisocyanate</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ATE US (gases)</td>
<td>10.000 ppm/4h</td>
</tr>
<tr>
<td>ATE US (vapors)</td>
<td>0.050 mg/l/4h</td>
</tr>
<tr>
<td>ATE US (dust,mist)</td>
<td>0.005 mg/l/4h</td>
</tr>
</tbody>
</table>

Skin corrosion/irritation: Causes skin irritation.
Serious eye damage/irritation: Causes serious eye irritation.
Respiratory or skin sensitisation: May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause an allergic skin reaction.
Germ cell mutagenicity: Not classified
Carcinogenicity: Suspected of causing cancer.

<table>
<thead>
<tr>
<th>Benzene, 2,4-diisocyanato-1-methyl-(584.84.g)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>IARC group</td>
<td></td>
</tr>
<tr>
<td>2B - Possibly carcinogenic to humans</td>
<td></td>
</tr>
<tr>
<td>In OSHA Hazard Communication Carcinogen list</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

Reproductive toxicity: Not classified
Specific target organ toxicity (single exposure): May cause respiratory irritation.
Specific target organ toxicity (repeated exposure): Not classified
Aspiration hazard: Not classified
Symptoms/injuries after inhalation: Fatal if inhaled. May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause respiratory irritation.
Symptoms/injuries after skin contact: Causes skin irritation. May cause an allergic skin reaction.
Symptoms/injuries after eye contact: Causes serious eye irritation.
Symptoms/injuries after ingestion: May be harmful if swallowed. May cause stomach pain or discomfort.

12. Ecological Information

Ecology - general: The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

<table>
<thead>
<tr>
<th>Toluene Diisocyanate</th>
<th>Persistence and degradability</th>
<th>Persistence: Low persistency (log Kow is more than 4 estimated.) (LogKow=3.43 (22°C, pH ca. 7)) Degradability: Half lifecycle: 0.5 min (calculated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene Diisocyanate</td>
<td>Bioaccumulative potential</td>
<td>Bioaccumulation: bioaccumulation is expected to be low according to the BCF=500 (BCF=136.4L/kg wet-wt (estimated)) Biodegradation: as not well-biodegraded, it is expected to have high accumulation potential in living organisms (0% biodegradation was observed after 28 days) (OECD TG 302C)</td>
</tr>
</tbody>
</table>

High potency of mobility in soil (Koc=1760 (estimated))
Effect on global warming: No known effects from this product.
GWPmix comment: No known effects from this product.
Other information: Avoid release to the environment

13. Disposal Consideration

Product/Packaging disposal recommendations: Dispose of contents/container to comply with applicable local, national and international regulation.
Ecology - waste materials: Hazardous waste due to toxicity. Avoid release to the environment.

14. Transport Information

Department of Transportation (DOT)
In accordance with DOT
Transport document description: UN2078 Toluene diisocyanate, 6.1, II

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UN-No.(DOT): UN2078
Proper Shipping Name (DOT): Toluene diisocyanate
Class (DOT) : 6.1 - Poisonous materials 49 CFR 173.132
Packing group (DOT) : II - Medium Danger
Hazard labels (DOT) : 6.1 - Poison
DOT Packaging Non Bulk
(49 CFR 173.xxx) : 202 DOT
Packaging Bulk (49 CFR 173.xxx) : 243
DOT Symbols : + - Fixes (cannot be altered) proper shipping name, hazard class, and packing group
DOT Special Provisions (49 CFR 172.102) : IB2 - Authorized IBCs: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1). Additional Requirement: Only liquids with a vapor pressure less than or equal to 110 kPa at 50 C (1.1 bar at 122 F), or 130 kPa at 55 C (1.3 bar at 131 F) are authorized.
T7 - 4 178.274(d)(2) Normal......... 178.275(d)(3)
TP2 - a. The maximum degree of filling must not exceed the degree of filling determined by the following: (image) Where: tr is the maximum mean bulk temperature during transport, tf is the temperature in degrees celsius of the liquid during filling, and a is the mean coefficient of cubical expansion of the liquid between the temperature of the liquid during filling (tf) and the maximum mean bulk temperature during transportation (tr) both in degrees celsius. b. For liquids transported under ambient conditions may be calculated using the formula: (image) Where: d15 and d50 are the densities (in units of mass per unit volume) of the liquid at 15 C (59 F) and 50 C (122 F), respectively.
TP13 - Self-contained breathing apparatus must be provided when this hazardous material is transported by sea.
DOT Packaging Exceptions (49 CFR 173.xxx) : 153

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 5 L

DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 60 L

DOT Vessel Stowage Location : D - The material must be stowed “on deck only” on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers or one passenger per each 3 m of overall vessel length, but the material is prohibited on passenger vessels in which the limiting number of passengers is exceeded.

DOT Vessel Stowage Other : 25 - Shade from radiant heat,40 - Stow “clear of living quarters” Emergency Response Guide (ERG) Number : 156

Other information : No supplementary information available.

Transportation of Dangerous Goods
Not applicable
Transport by sea
Transport document description (IMDG) : UN 2078
TOLUENE DIISOCYANATE, 6.1, II UN-No. (IMDG) : 2078
Proper Shipping Name (IMDG) : TOLUENE DIISOCYANATE
Packing group (IMDG) : II - substances presenting medium danger
Limited quantities (IMDG) : 100 ml

Air transport
Transport document description (IATA) : UN 2078 Toluene diisocyanate, 6.1, II
UN-No. (IATA) : 2078
Proper Shipping Name (IATA) : Toluene diisocyanate
Class (IATA) : 6.1 - Toxic Substances
Packing group (IATA) : II - Medium Danger

15. Regulatory Information
All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory except for:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS No</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-methyl-m-phenylene disocyanate, toluene-2,6-diisocyanate</td>
<td>91-08-7</td>
<td>20%</td>
</tr>
<tr>
<td>Benzene, 2,4-diisocyanato-1-methyl-</td>
<td>504-84-9</td>
<td>80%</td>
</tr>
</tbody>
</table>

Chemical(s) subject to the reporting requirements of Section 313 or Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986 and 40 CFR Part 372.

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<td>20%</td>
</tr>
</tbody>
</table>

Listed on the United States SARA Section 302
CERCLA RQ 100 lb listed under Benzene, 1,3-diisocyanatomethyl-
Section 302 EPCRA Reportable Quantity (RQ) 100 lb
SARA Section 302 Threshold Planning Quantity (TPQ) 500 lb

CANADA

Listed on the Canadian DSL (Domestic Substances List)

EU-REGULATIONS

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

National Regulations

Listed on the AICS (Australian Inventory of Chemical Substances)
Listed on IECS (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the Japanese ENC (Existing & New Chemical Substances) inventory
Listed on the Korean ECL (Existing Chemicals List)
Listed on the Nicaraguan NCL (New Zealand Inventory of Chemicals)
Listed on the NICCS (Philippines Inventory of Chemicals and Chemical Substances)
Listed on the Malaysian Pollutant Release and Transfer Register (PRTR Law)
Listed on the Canadian IDL (Ingredient Disclosure List)
Listed on the INSP (Mexican National Inventory of Chemical Substances)
Listed on the TCSI (Taiwan Chemical Substance Inventory)

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm.
### 16. Other Information

**Full text of H-statements:**

<table>
<thead>
<tr>
<th>H315</th>
<th>Causes skin irritation</th>
</tr>
</thead>
<tbody>
<tr>
<td>H317</td>
<td>May cause an allergic skin reaction</td>
</tr>
<tr>
<td>H319</td>
<td>Causes serious eye irritation</td>
</tr>
<tr>
<td>H330</td>
<td>Fatal if inhaled</td>
</tr>
<tr>
<td>H334</td>
<td>May cause allergy or asthma symptoms or breathing difficulties if inhaled</td>
</tr>
<tr>
<td>H335</td>
<td>May cause respiratory irritation</td>
</tr>
<tr>
<td>H351</td>
<td>Suspected of causing cancer</td>
</tr>
</tbody>
</table>

**NFPA health hazard**

- 1 - Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.
- 2 - Materials that, under emergency conditions, can cause respiratory or eye irritation.

**NFPA fire hazard**

- 0 - Materials that must be preheated before ignition can occur.
- 1 - Materials that in themselves are normally stable, even under fire conditions.

**NFPA reactivity**

0 - Material that in themselves are normally stable, even under fire conditions.

**Revision Date**: 06-June-2017

**Disclaimer:**
The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall The Chemical Company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if The Chemical Company has been advised of the possibility of such damages.