PRODUCT AND COMPANY IDENTIFICATION

Manufacturer
Advanced Polymer Technology
P O, Box 160
109 Conica Lane
Harmony, PA 16037

Contact: Senior Chemist
Telephone Number: 724-452-1330
FAX Number: 724-452-1703
E-Mail: info@advpolytech.com
Web: www.advpolytech.com

Product Name: QUALIPUR 3480
Revision Date: 1/09/09
MSDS Number: 7259
Chemical Family: Aliphatic Diisocyanate Prepolymer

This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200
Transportation emergency phone number: Chemtel 800-255-3924

HAZARDS IDENTIFICATION

Route of Entry:
Skin and eye contact from liquid and aerosols. Inhalation - although this product is low in volatility, an inhaling hazard can exist from the aerosols or vapors formed during application.

Target Organs:
Inhalation:
ACUTE EXPOSURE: Vapors or mist at concentrations above the TLV can irritate (burning sensation) the mucous membranes in the respiratory tract (nose, throat & lungs) causing runny nose, sore throat, coughing, chest discomfort, shortness of breath and reduced lung function (breathing obstruction). Individuals with a pre-existing, non-specific bronchial hyperreactivity can respond to concentrations below the TLV with similar symptoms as well as asthma attack. Exposure well above the TLV may lead to bronchitis, bronchial spasm and pulmonary edema (fluid in the lungs). These effects are usually reversible. Chemical or hypersensitive pneumonitis, with flu like symptoms (e.g. fever, chills) have also been reported. These symptoms can be delayed up to several hours after exposure.

CHRONIC EXPOSURE: As a result of previous repeated overexposures or a single large dose, certain individuals develop isocyanate sensitization (chemical asthma) which will cause them to react to a later exposure to isocyanate at levels well below the TLV. These symptoms which can include chest tightness, wheezing, coughing, shortness of breath or asthma attack, could be immediate or delayed (up to several hours after exposure). Similar to many non-specific asthmatic responses, there are reports that once sensitized, an individual can experience these symptoms upon exposure to dust, cold air or other irritants. This increased lung sensitivity can persist for weeks and in severe cases for several years. Overexposure to isocyanates has also been reported to cause lung damage (including decrease in lung function) which may be permanent. Sensitization can either be temporary or permanent.

Skin Contact:
ACUTE EXPOSURE: Isocyanates react with skin protein and moisture and can cause irritation which may include the following symptoms: reddening, swelling, rash, scaling or blistering. Cured material is difficult to remove.

CHRONIC EXPOSURE: Prolonged contact can cause reddening, swelling, rash, scaling, blistering, and in some cases, skin sensitization. Individuals who have developed a skin sensitization can
Eye Contact:

**ACUTE EXPOSURE**: Liquid, aerosols or vapors are irritating and can cause tearing, reddening and swelling. If left untreated, corneal damage can occur and injury is slow to heal. However, damage is usually reversible.

**CHRONIC EXPOSURE**: None found.

Ingestion:

**ACUTE EXPOSURE**: Can result in irritation and corrosive action in the mouth, stomach tissue and digestive tract. Symptoms can include sore throat, abdominal pain, nausea, vomiting and diarrhea. Product is moderately toxic and may be harmful if swallowed; may produce central nervous system depression. Ingestion may result in vomiting.

**CHRONIC EXPOSURE**: None found.

### COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Cas #</th>
<th>Chemical Name</th>
<th>Perc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>25322694</td>
<td>Poly(oxy(methyl-1,2-ethanediyl))alphaCyclohexane, 1,1'-methylenebis[4-isocyanato(1-oxododecyl)oxy]-</td>
<td>60-70%</td>
</tr>
<tr>
<td>5124301</td>
<td>Cyclohexane, 1,1'-methylenebis[4-isocyanato(1-oxododecyl)oxy]-</td>
<td>36-46%</td>
</tr>
<tr>
<td>77587</td>
<td>Stannane, dibutyldi[(1-oxododecyl)oxy]-</td>
<td>1-3%</td>
</tr>
<tr>
<td>6425394</td>
<td>Morpholine, 4,4'-(oxydi-2,1-ethanediyl)b</td>
<td>1-3%</td>
</tr>
</tbody>
</table>

**OSHA Regulatory Status**: This MSDS Contains valuable information critical to the safe handling and proper use of this product. This MSDS should be retained and available for employees and other users of this product.

### FIRST AID MEASURES

**Inhalation**: Move to an area free from risk of further exposure. Administer oxygen or artificial respiration as needed. Obtain medical attention. Asthmatic-type symptoms may develop and may be immediate or delayed up to several hours. Consult physician should this occur.

**Skin Contact**: Remove contaminated clothing. Wash affected skin thoroughly with soap and water. Wash contaminated clothing thoroughly before reuse. For severe exposures get under safety shower after removing clothing, then get medical attention. For lesser exposure, seek medical attention if irritation develops or persists after the area is washed.

**Eye Contact**: Flush with copious amounts of lukewarm water for at least 15 minutes, holding eyelids open at all times. Refer individual to physician or ophthalmologist for immediate follow-up.

**Ingestion**: DO NOT INDUCE VOMITING. Give 1 to 2 cups of milk or water to drink. DO NOT GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. Get prompt, qualified medical attention. Ingestion may result in vomiting. If vomiting occurs spontaneously, do not allow vomitus to be breathed into the lungs as even a small quantity in the lungs may result in aspiration pneumonitis.

**NOTE TO PHYSICIAN**

- **SKIN**: This compound is a known skin sensitizer. Treat symptomatically as for contact dermatitis or thermal burns. If burned, treat as thermal burn.
- **EYES**: Stain for evidence of corneal injury. If cornea is burned, instill antibiotic steroid preparation frequently. Workplace vapors may
produce reversible corneal epithelial edema impairing vision.

RESPIRATORY: This compound is a known pulmonary sensitizer. Treatment is essentially symptomatic. An individual having a skin or pulmonary sensitization reaction to this material should be removed from exposure to any isocyanate. INGESTION: Treat symptomatically. There is no specific antidote. Inducing vomiting is contraindicated because of the irritating nature of this compound.

5  FIRE FIGHTING MEASURES

Flash Point: Not established

Dry chemical (e.g. monoammonium phosphate, potassium sulfate, and potassium chloride), carbon dioxide, high expansion (proteinic) chemical foam, water spray for large fires. Full emergency equipment with self-contained breathing apparatus and full protective clothing should be worn by fire fighters. During a fire, vapors and other irritating, highly toxic gases may be generated by thermal decomposition or combustion. At temperatures greater than 400 DEG F (204 DEG C), this product can be polymerized and decompose which can cause pressure build-up in closed containers. Explosive rupture is possible. Therefore, use cold water to cool fire-exposed containers.

Unusual Fire or Explosion Hazards:

Large fires can be extinguished with large volumes of water applied from a safe distance, since reaction between water and hot disocyanate can be vigorous.

6  ACCIDENTAL RELEASE MEASURES

Cover the spill with sawdust, vermiculite, Fuller’s earth or other absorbent material. Pour decontamination solution over spill area and allow to react for at least 10 minutes. Collect material in open containers and add further amounts of decontamination solution. Remove containers to safe place, cover loosely, and allow to stand for 24 to 48 hours. Wash down area with decontamination solutions. Decontamination solutions: non-ionic surfactant Union Carbide’s Tergitol TMN-10 (20%) and water (80%); concentrated ammonia (3-8%); detergent (2%) and water (90-95%). Respiratory protection is recommended during spill clean-up.

7  HANDLING AND STORAGE

Handling Precautions: Avoid breathing vapors or mist; Avoid contact with eyes, skin, or clothing; Do not expose containers to open flame, excessive heat or direct sunlight.

Storage Requirements: Storage temperature Minimum 40 DEG F (5 DEG C) / Maximum 150 DEG F (66 DEG C)

Store in tightly closed containers to prevent moisture contamination. This product reacts slowly with water to form CO2 gas. This gas can cause sealed containers to expand and possibly rupture. Do not reseal if contamination is suspected. Store in cool/dry area.

8  EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Educate and train employees in safe use of this product. Follow all label instruction. Local exhaust should be used to maintain levels below the TLV whenever this product is processed, heated or spray applied. For spray applications, an air-supplied respirator must be worn. All ventilation should be designed in accordance with OSHA standard (29 CFR 1910.94).
Protective Equipment:

An air-supplied respirator must be worn during spray applications, during long-term (over 1 hour) exposures when the product is heated or in environments of high concentrations near the TLV, an air-purifying respirator equipped with organic cartridges or canisters and dust filters can be used. However, due to the poor warning properties of this product, proper fit and timely replacement of filter elements must be ensured. Observe OSHA regulations for respirator use (29 CFR 1910.134).

Chemical resistant gloves (butyl rubber, nitrile rubber). Cover as much of the exposed area as possible with appropriate clothing. If skin creams are used, keep the area covered only by the cream to a minimum.

Liquid chemical goggles or full-face shield. Contact lenses should not be worn.

Exposure Guidelines/Other:

* OSHA PEL

The Occupational Safety and Health Administration (OSHA) does not currently regulate methylene bis(4-cyclohexylisocyanate).

* NIOSH REL

The National Institute for Occupational Safety and Health (NIOSH) has established a recommended exposure limit (REL) of 0.01 part per million (ppm) parts of air (0.11 milligram per cubic meter (mg/m(3))) as a ceiling for methylene bis(4-cyclohexylisocyanate). A worker’s exposure to methylene bis(4-cyclohexylisocyanate) shall at no time exceed this ceiling level [NIOSH 1992].

* ACGIH TLV

The American Conference of Governmental Industrial Hygienists (ACGIH) has assigned methylene bis(4-cyclohexylisocyanate) a threshold limit value (TLV) of 0.005 ppm (0.054 mg/m(3)) as a TWA for a normal 8-hour workday and a 40-hour workweek [ACGIH 1994, p. 26].

* Rationale for Limits

The NIOSH limit is based on the risk of pulmonary irritation, respiratory effects and sensitization [NIOSH 1992]. The ACGIH limit is based on the risk of pulmonary irritation [ACGIH 1991, p. 996].

The Occupational Safety and Health Administration (OSHA) does not currently regulate methylene bis(4-cyclohexylisocyanate).

* NIOSH REL

The National Institute for Occupational Safety and Health (NIOSH) has established a recommended exposure limit (REL) of 0.01 part per million (ppm) parts of air (0.11 milligram per cubic meter (mg/m(3))) as a ceiling for methylene bis(4-cyclohexylisocyanate). A worker’s exposure to methylene bis(4-cyclohexylisocyanate) shall at no time exceed this ceiling level [NIOSH 1992].

* ACGIH TLV

The American Conference of Governmental Industrial Hygienists (ACGIH) has assigned methylene bis(4-cyclohexylisocyanate) a threshold limit value (TLV) of 0.005 ppm (0.054 mg/m(3)) as a TWA for a normal 8-hour workday and a 40-hour workweek [ACGIH 1994, p. 26].

* Rationale for Limits

The NIOSH limit is based on the risk of pulmonary irritation, respiratory effects and sensitization [NIOSH 1992]. The ACGIH limit is based on the risk of pulmonary irritation [ACGIH 1991, p. 996].
**9 PHYSICAL AND CHEMICAL PROPERTIES**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Clear</td>
</tr>
<tr>
<td>Physical State</td>
<td>Liquid</td>
</tr>
<tr>
<td>Odor</td>
<td>Slightly musty</td>
</tr>
<tr>
<td>pH</td>
<td>N.A</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>Not established</td>
</tr>
<tr>
<td>Freezing/Melting Pt.</td>
<td>Not established</td>
</tr>
<tr>
<td>Solubility</td>
<td>Reacts slowly with water to liberate CO₂ gas</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>Not established</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>Not established</td>
</tr>
<tr>
<td>VOC</td>
<td>0 g/L</td>
</tr>
</tbody>
</table>

**10 STABILITY AND REACTIVITY**

- **Stability:** Product is stable under normal conditions.
- **Conditions to avoid:** Oxidation promoting conditions (Heat, Sunlight and Air).
- **Materials to avoid (incompatibility):** Water, amines, strong bases, alcohols.
- **Hazardous Decomposition products:** By Fire and High Heat: hydrogen cyanide; Carbon dioxide (CO₂). carbon monoxide (CO), oxides of nitrogen (NOₓ), dense black smoke, Isocyanate, Isocyanic Acid, Other undetermined compounds.
- **Hazardous Polymerization:** May occur if in contact with moisture or other materials which react with isocyanates. May occur at temperatures over 400 DEG F (204 DEG C).

**11 TOXICOLOGICAL INFORMATION**

- **ACUTE INHALATION LC₅₀:** 434 mg/cu.m. (rat), 295 mg/cu.m./28 ppm (male rat), 307 mg/cu.m./29 ppm (female rat) (4 hours). High toxicity.
- **ACUTE DERMAL LD₅₀:** 10,000 mg/kg. (rabbit) Slight to very low toxicity.
- **SKIN IRRITATION:** Irritating.
- **EYE IRRITATION:** Very mildly to mildly irritating.
- **ACUTE ORAL LD₅₀:** 1065 mg/kg (rat) Moderate toxicity.
- **SKIN SENSITIZATION:** Sensitizer.
- **CARCINOGENICITY STATUS:** This product is NOT listed as a carcinogen or suspected carcinogen by NTP, IARC, ACGIH, or OSHA.
- **MEDICAL CONDITIONS AGGRAVATED:** Skin allergies, asthma, other respiratory disorders, eczema.
- **ACUTE INHALATION LC₅₀:** 434 mg/cu.m. (rat), 295 mg/cu.m./28 ppm (male rat), 307 mg/cu.m./29 ppm (female rat) (4 hours). High toxicity.
- **ACUTE DERMAL LD₅₀:** 10,000 mg/kg (rabbit) Slight to very low toxicity.
SKIN IRRITATION: Irritating.

EYE IRRITATION: Very mildly to mildly irritating.

ACUTE ORAL LD50: 1065 mg/kg (rat) Moderate toxicity

SKIN SENSITIZATION: Sensitizer

CARCINOGENICITY STATUS: This product is NOT listed as a carcinogen or suspected carcinogen by NTP, IARC, ACGIH, or OSHA

MEDICAL CONDITIONS AGGRAVATED: Skin allergies, asthma, other respiratory disorders, eczema.

ECOLOGICAL INFORMATION

Bioaccumulative potential: Not established

Ecotoxicity: Not established

Elimination ( persistence and degradability): Not established

DISPOSAL CONSIDERATIONS

Waste and container disposal must be in accordance with federal, state, and local environmental control regulations. Incineration is the preferred method. Empty containers must be handled with care due to product residue. Decontaminate prior to disposal. DO NOT HEAT OR CUT EMPTY CONTAINERS WITH ELECTRIC OR GAS TORCH

TRANSPORT INFORMATION

DOT (HM-181, DOMESTIC SURFACE)

UN/NA NUMBER: NA 3082
D.O.T. SHIPPING NAME: Other Regulated Substances, Liquid, N.O.S. (Dicyclohexylmethane Diisocyanate)
D.O.T. HAZARD CLASS: 9
PACKAGING GROUP: PG III
D.O.T. LABEL: Miscellaneous
D.O.T. PLACARD: Miscellaneous Dangerous Goods

ICAO/IATA (AIR)

UN NUMBER: UN 3334
PROPER SHIPPING NAME: Aviation Regulated Liquid, NOS (Dicyclohexylmethane Diisocyanate)
HAZARD CLASS DIVISION NUMBER: 9
SUBSIDIARY RISK: none
PACKING GROUP: PG III
HAZARD LABEL(S): Miscellaneous
RADIOACTIVE?: Non-radioactive
PASSENGER AIR - MAXIMUM QUANTITY: 100 L
PACKING INSTRUCTION NUMBER: 906
CARGO AIR - MAXIMUM QUANTITY: 220 L
PACKING INSTRUCTION NUMBER: 906

HAZARD CLASS DIVISION NUMBER:
HAZARD PLACARD(S):

UN NUMBER:
PROPER SHIPPING NAME: Aliphatic Diisocyanate
PACKING GROUP:
HAZARD LABEL(S):

IM/IMDG CODE (OCEAN):

Cyclohexane, 1,1'-methylenebis[4-isocyanato-(5124301 20-30 %) MASS, OSHAWAC, PA, SARA313, TXAIR.

REGULATORY INFORMATION
COMPONENT / (CAS/PERC) / CODES

REGULATORY KEY DESCRIPTIONS

DISCLAIMER:
Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user’s intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

OTHER INFORMATION
This information is given in good faith and based on our current knowledge of the product.

END OF MSDS DOCUMENT