

MSDS **Material Safety Data Sheet**

Advanced Polymer Technology



QUALIPUR 3401

MSDS Number: 7221

Revision Date: 02/12/2010

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1 PRODUCT AND COMPANY IDENTIFICATION

Manufacturer

Advanced Polymer Technology
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Product Name: QUALIPUR 3401
Revision Date: 02/12/2010
MSDS Number: 7221
Chemical Family: Aromatic Isocyanate 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

2 HAZARDS IDENTIFICATION

Route of Entry: Inhalation, eye and skin contact.

Target Organs: Eyes; Respiratory System; Skin;

Inhalation: ACUTE EXPOSURE: MDI 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 lungs). These effects are usually reversible. Chemical or hypersensitive pneumonitis, with flu-like symptoms (e.g., fever, chills) has 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 isocyanate exposure at levels well below the TLV. These symptoms, which can include chest tightness, wheezing, cough, 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 develop these symptoms as a result of contact with very small amounts of liquid



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material or as a result of exposure to vapor.

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.
CHRONIC EXPOSURE: None found.

3 COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients:

| Cas # | Chemical Name | Perc. |
|----------|---|--------|
| 25322694 | Polypropylene glycols | 40-60% |
| 26447405 | Benzene, 1,1'-methylenebis[isocyanato- | 15-25% |
| 101688 | 4,4'-Methylenediphenyl diisocyanate | 10-20% |
| 8001227 | Soybean oil | 1-2% |
| 64742467 | Distillates, petroleum, hydrotreated midd | 4-10% |

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.

4 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.

5 FIRE FIGHTING MEASURES

Flash Point: 388 DEG F (198 DEG C)
Flash Point Method: DIN 51758

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.

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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: During long-term (over 1 hour) exposures when the product is applied by a paver, and is heated or in environments of high concentrations above the Threshold Limit Value (TLV), an air-purifying respirator equipped with organic cartridges or a canister and dust filters is required. During spray applications an air-supplied respirator must be worn. However, due to the poor warning properties of this product, proper fit 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. ADDITIONAL PROTECTIVE MEASURES: Clean, fresh running water should be available.

Exposure Guidelines/Other:

Exposure Limits:

| | |
|------------------------------------|----------------------|
| USA OSHA (TWA ₅)/PEL): | 0.02 ppm |
| NIOSH (TWA): | 0.005 ppm |
| IDLH: | 75 mg/m ³ |
| NIOSH (C 10 min): | 0.02 ppm |

9 PHYSICAL AND CHEMICAL PROPERTIES

| | | | |
|------------------------|---------------------------|------------------------------|-----------------|
| Appearance: | Clear Brown/ Amber Liquid | Boiling Point: | Not established |
| Physical State: | Liquid | Freezing/Melting Pt.: | Not established |
| Odor: | Slightly musty | | |

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| | | | |
|------------------------|---|----------------------------|--|
| pH: | N.A. | Solubility: | Reacts slowly with water to liberate CO ₂ gas |
| Vapor Pressure: | Less than 10-5 mmHg @ 77 DEG F (25 DEG C) for MDI | Spec Grav./Density: | 1.08 @ 68 DEG F (20 DEG C) |
| Vapor Density: | 8.5 (MDI) | | |
| VOC: | 0 g/L | | |
| Bulk Density: | 9.0 lbs/gal | | |

10 STABILITY AND REACTIVITY

| | |
|--|---|
| Stability: | Product is stable under normal conditions. |
| Conditions to avoid: | Temperatures over 400 DEG F (204 DEG C). |
| Materials to avoid (incompatibility): | Water, amines, strong bases, alcohols. |
| Hazardous Decomposition products: | By Fire and High Heat: hydrogen cyanide; Carbon dioxide (CO ₂), carbon monoxide (CO), oxides of nitrogen (NO _x), 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 Eye Effects: Liquid, aerosols or vapors are irritating and can cause tearing, reddening and swelling. If left untreated, cornea damage can occur and injury is slow to heal. However, damage is usually reversible. (See Section VI for treatment)

Acute Skin Effects: 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

Acute Inhalation Effects: 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.

Acute Ingestion Effects: 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.

Chronic Eye Effects: None found

Chronic Skin Effects: Prolonged contact can cause reddening, swelling, rash, scaling, blistering, and in some cases, skin sensitization. Individuals who have developed a skin sensitization can develop these symptoms as a result of contact with very small amounts of liquid material or as a result of exposure to vapor.

Chronic Inhalation Effects: 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.

Chronic Ingestion Effects: None found

Polymeric MDI:

Acute Oral Toxicity

LD50: > 2,000 mg/kg (rat, Male/Female)

Acute Inhalation Toxicity

LC50: 490 mg/m³, vapor, 4 h (rat)

Repeated Dose Toxicity

90 Days, inhalation: NOAEL: 1 mg/m³, (rat, Male/Female, 6 hrs/day 5 days/week)
Irritation to lungs and nasal cavity.

2 years, inhalation: NOAEL: 0.2 mg/m³, (rat, Male/Female, 6 hrs/day 5 days/week)
Irritation to lungs and nasal cavity.

Mutagenicity

Genetic Toxicity in Vitro:

Bacterial - gene mutation assay: negative (Salmonella typhimurium, Metabolic Activation: with/without)

Carcinogenicity

rat, Male/Female, inhalation, 2 Years, 6 hrs/day 5 days/week

Exposure to a level of 6 mg/m³ polymeric MDI was related to the occurrence of lung tumors. This level is significantly over the TLV for MDI.

Developmental Toxicity/Teratogenicity

rat, female, inhalation, gestation days 6-15, 6 hrs/day, NOAEL (teratogenicity): 12 mg/m³, NOAEL (maternal): 4 mg/m³

No Teratogenic effects observed at doses tested. Fetotoxicity seen only with maternal toxicity.

4,4'-MDI:

Acute Inhalation Toxicity

LC50: 369 mg/m³, 4 hrs (rat, Male/Female)

LC50: > 2240 mg/m³, aerosol, 1 h (rat)

Acute dermal toxicity

LD50: > 10,000 mg/kg (rabbit)

Skin Irritation



rabbit, Draize Test, Slightly irritating

Eye Irritation

rabbit, Draize Test, Slightly irritating

Sensitization

dermal: sensitizer (guinea pig, Maximisation Test (GPMT))

inhalation: sensitizer (Guinea pig)

Repeated Dose Toxicity

90 Days, inhalation: NOAEL: 0.3 mg/m³, (rat, Male/Female, 18 hrs/day, 5 days/week)

Irritation to lungs and nasal cavity.

Mutagenicity

Genetic Toxicity in Vitro:

Ames: (Salmonella typhimurium, Metabolic Activation: with/without)

Positive and negative results were reported. The use of certain solvents which rapidly hydrolyze diisocyanates is suspected of producing the positive mutagenicity results.

Genetic Toxicity in Vivo:

Micronucleus Assay: negative (mouse)

Carcinogenicity

rat, Female, inhalation, 2 Years, 17 hrs/day, 5 days/week

negative

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ECOLOGICAL INFORMATION

Ecological Data for 2,4-MDI:

Biodegradation

0 %, Exposure time: 28 Days

Bioaccumulation

Rainbow trout, Exposure time: 112 d, < 1 BCF

Does not bioaccumulate.

Acute and Prolonged Toxicity to Fish

LC0: > 1,000 mg/l (Zebra fish (Brachydanio rerio), 96 hrs)

LC0: > 3,000 mg/l (Killifish (Oryzias latipes), 96 h)

Acute Toxicity to Aquatic Invertebrates

EC50: > 1,000 mg/l (Water flea (Daphnia magna), 24 hrs)

Toxicity to Aquatic Plants

NOEC: 1,640 mg/l, End Point: growth (Green algae (Scenedesmus subspicatus), 72 hrs)

Toxicity to Microorganisms

EC50: > 100 mg/l, (Activated sludge microorganisms, 3 hrs)



Additional Ecotoxicological Remarks

Ecotoxicity data based on polymeric MDI

Ecological Data for 4,4'-MDI:

Acute and Prolonged Toxicity to Fish

LC50: > 500 mg/l (Zebra fish (Brachydanio rerio), 24 hrs)

Acute Toxicity to Aquatic Invertebrates

EC50: > 500 mg/l (Water flea (Daphnia magna), 24 hrs)

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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.

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TRANSPORT INFORMATION

DOT (HM-181; DOMESTIC SURFACE)

| | |
|-----------------------|---------------------------------------|
| UN/NA NUMBER: | none |
| D.O.T. SHIPPING NAME: | Aromatic Isocyanate Prepolymer |
| D.O.T. HAZARD CLASS: | NON REGULATED |
| PACKAGING GROUP: | none |
| D.O.T. LABEL: | none |
| D.O.T. PLACARD: | none |

ICAO/IATA (AIR)

| | |
|-----------------------------------|---------------------------------------|
| UN NUMBER: | none |
| PROPER SHIPPING NAME: | Aromatic Isocyanate Prepolymer |
| HAZARD CLASS DIVISION NUMBER: | NON REGULATED |
| SUBSIDIARY RISK: | none |
| PACKING GROUP: | none |
| HAZARD LABEL(S): | none |
| RADIOACTIVE?: | Non-radioactive |
| PASSENGER AIR - MAXIMUM QUANTITY: | none |
| PACKING INSTRUCTION NUMBER: | none |
| CARGO AIR - MAXIMUM QUANTITY: | none |
| PACKING INSTRUCTION NUMBER: | none |

IMO/IMDG CODE (OCEAN)

| | |
|-------------------------------|---------------------------------------|
| UN NUMBER: | none |
| PROPER SHIPPING NAME: | Aromatic Isocyanate Prepolymer |
| HAZARD CLASS DIVISION NUMBER: | NON REGULATED |
| PACKING GROUP: | none |
| HAZARD LABEL(S): | none |

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HAZARD PLACARD(S): none

15 REGULATORY INFORMATION

COMPONENT / (CAS/PERC) / CODES

- *4,4'-Methylenediphenyl diisocyanate (101688 10-20%) CERCLA, HAP, MASS, NJHS, OSHAWAC, PA, SARA313, TXAIR
- *Distillates, petroleum, hydrotreated middle (64742467 4-10%) TSCA
- *Soybean oil (8001227 1-2%) PA, TSCA

TSCA: All components in this mixture are included on the TSCA inventory.

REGULATORY KEY DESCRIPTIONS

- CERCLA = Superfund clean up substance
- HAP = Hazardous Air Pollutants
- MASS = MA Massachusetts Hazardous Substances List
- NJHS = NJ Right-to-Know Hazardous Substances
- OSHA = OSHA workplace Air Contaminants
- PA = PA Right-To-Know List of Hazardous Substances
- SARA313 = SARA 313 Title III Toxic Chemicals
- TXAIR = TX Air Contaminants with Health Effects Screening Level

TSCA = Toxic Substances Control Act

16 OTHER INFORMATION

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).

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