

Material Safety Data Sheet

Revised 3/01
Reviewed 1/04

Section I

Manufacturer's Name
Coatings For Industry, Inc.

Emergency Response #
1-800-535-5053

Address
319 Township Line Road
Souderton, PA 18964

Non-Emergency #
215-723-0919

Chemical Name & Synonyms
Moisture Cure Polyurethane Coating

Trade Name & Synonyms
Urethabond 104

Section II - Hazardous Ingredients

| | Approx. % | TLV | CAS# |
|--|----------------|---|------------|
| Diphenylmethane Diisocyanate (MDI) | Less than 1.86 | OSHA: not established ACGIH: not established | 26447-40-5 |
| Non isomer specific CAS number includes 2,2' MDI and 2,4' MDI. | | | |
| Polyisocyanate Based MDI | 32.4 | OSHA: not established * ACGIH: not established | |
| *Specific chemical identity is withheld as a trade secret. | | | |
| 4,4'-Diphenylmethane Diisocyanate (MDI) | 8.5 | OSHA: .020 ppm ceiling-PEL .200 mg/m ³ ceiling ACGIH: .005 ppm TWA .051 mg/m ³ TWA | 101-68-8 |
| Aromatics 100 | 38.0 | OSHA: 50 ppm(245 mg/m ³) For 8 hour workday | 64742-95-6 |
| Aluminum | 18.4 | 10 mg/m ³ | 7429-90-5 |

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). In addition, other substances not "hazardous" per this OSHA standard may be listed.

Section III - Physical Data

Specific Gravity ~~~~~ 1.12
 % Volatile by Volume ~~~~~ 49.0%
 Vapor Density (air=1) ~~~~~ Approximately 4.1
 Vapor Pressure ~~~~~ Less than 10 mm hg. @ 25° C.
 Evaporation Rate ~~~~~ 0.2
 (N Butyl Acetate=1)
 Water Solubility ~~~~~ Insoluble/reacts slowly with water to
 liberate CO₂ gas. Solvent less than
 0.1% soluble.

Appearance & Odor ~~~~~ Metallic aluminum color/solvent odor
 V.O.C. ~~~~~ 3.4 Lbs./Gal.

Section IV - Fire and Explosion Hazard Data

Flash Point ~~~~~ 107° F. TCC
 Flammable Limits ~~~~~ LEL ~~~~~ UEL
 Aromatics 100 ~~~~~ 0.9% ~~~~~ 7.0%

Extinguishing Media

Dry chemical (e.g. monoammonium, phosphate, potassium sulfate, and potassium chloride), carbon dioxide, high expansion (proteinic) chemical foam, water spray for large fires. Special Fire Fighting Procedures : Full emergency equipment with self-contained breathing apparatus and full protective clothing should be worn by fire fighters. During a fire, MDI vapors and other irritating, highly toxic gases may be generated by thermal decomposition or combustion (see Section VII). At temperatures greater than 400° F. (204° C.), polymeric MDI can polymerize and decompose which can cause pressure build up in closed containers. Explosive rupture is possible. Do not use water, water may react with aluminum to form hydrogen gas.

Section V - Health Hazard Data

Route of entry: Skin contact from liquid and aerosols (spray application), inhalation. Although MDI is low in volatility, an inhalation hazard can exist from MDI aerosols or vapors formed during heating or spraying.

Human Effects and Symptoms of Overexposure

Acute Inhalation- 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). Persons with a preexisting, nonspecific bronchial hyperreactivity can respond to concentrations below the TLV with similar symptoms as well as an 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. Solvent vapors may be irritating to the eyes, nose and throat. These symptoms can be delayed up to several hours after exposure.

Chronic Inhalation- As a result of previous repeated overexposures or a single large dose, certain individuals will develop isocyanate sensitization (chemical asthma) which will cause them to react to later exposure to isocyanate at levels well below the TLV. These symptoms, which include: chest tightness, wheezing, cough, shortness of breath or asthmatic 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. Chronic overexposure to isocyanates has also been

U-104 Page 3 of 8

Human Effects and Symptoms of Overexposure

reported to cause lung damage, including decrease in lung function, which may be permanent. Chronic exposure to organic solvents has been associated with various neurotoxic effects including permanent brain and nervous system damage. Symptoms include: loss of memory, loss of intellectual ability and loss of coordination.

Acute Skin Contact- Isocyanates react with skin protein and moisture and can cause irritation. Symptoms of skin irritation may be reddening, swelling, rash, scaling or blistering. Some persons may develop skin sensitization from skin contact. Cured material is **very difficult** to remove. Repeated or prolonged skin contact can result in dry, defatted and cracked skin causing increased susceptibility to infection. In addition, skin irritation (i.e. redness, swelling), which can develop into dermatitis.

Chronic Skin Contact- Prolonged contact with the isocyanate can cause reddening, swelling, rash, scaling or blistering. In those who have developed a skin sensitization, these symptoms can develop as a result of contact with very small amounts of liquid material or even as a result of vapor only exposure. Animal tests have indicated respiratory sensitization can result from skin contact with MDI.

Acute Eye Contact- Liquid, aerosols, and vapors of this product (isocyanate solvents) are irritating and can cause tearing, reddening and swelling accompanied by a stinging sensation and/or a feeling like that of fine dust in the eyes. If left untreated, corneal damage can occur and injury is slow to heal. However, damage is usually reversible.

Chronic Eye Contact- None determined.

Acute Ingestion- Can result in irritation and possible corrosive action in the mouth, stomach tissue and digestive tract. However, it is not considered a common occupational route of exposure.

Chronic Ingestion- None determined.

Carcinogenicity- None of the components of this product are listed by the NTP, IARC, or regulated by OSHA as carcinogens.

Medical Conditions Aggravated by Exposure : Asthma and other respiratory disorders (bronchitis, emphysema, hyperreactivity), skin allergies, eczema.

Exposure Limits: Not established for product as a whole. Refer to Section II for exposure limits of hazardous constituents.

Emergency and First Aid Procedures

Eye Contact- Flush with copious amounts of lukewarm water for a minimum of 15 minutes, while lifting eyelids. Contact eye physician for immediate follow up.

Skin Contact - Remove contaminated clothing. Wash skin thoroughly with water and soap. Wash contaminated clothing before reuse. Seek medical attention if irritation develops or persists.

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 or convulsing person. Consult a physician.

Inhalation - Remove to fresh air. 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 a physician should this occur.

NOTE TO PHYSICIAN...

Eyes- Stain for evidence of corneal injury. If cornea is burned, instill antibiotic/steroid preparation frequently. Workplace vapors could produce reversible corneal epithelial edema impairing vision.

Skin- This product is a known skin sensitizer. Treat symptomatically as for contact dermatitis or thermal burn.

Ingestion- Treat symptomatically. There is no specific antidote. Inducing vomiting is contraindicated because of the irritating nature of the product.

Inhalation- This product is a known pulmonary sensitizer. Treatment is essentially symptomatic. An individual having a dermal or pulmonary sensitization reaction to this material must be removed from any further exposure to any isocyanate.

Section VI - Employee Protection

Eye Protection Requirements... Liquid chemical goggles. Vapor resistant goggles should be worn when contact lenses are in use. In a splash hazard environment chemical goggles should be worn along with a full face shield.

Skin Protection Requirements... Permeation resistant gloves (butyl rubber, nitrile rubber, polyvinyl alcohol). However, please note that PVA degrades in water. Cover as much of the exposed skin area as possible with appropriate clothing. If skin creams are used, keep the area covered by the cream to a minimum.

Respiratory Requirements... Concentrations greater than TLV can occur when MDI is sprayed, heated or used in poorly ventilated areas. In such case, or whenever concentrations of MDI exceed the TLV, respiratory protection must be worn. A positive pressure, supplied air-respirator or self-contained breathing apparatus is recommended. In situations where MDI is not sprayed, heated or used in a poorly ventilated area, and a supplied air or self-contained breathing apparatus is unavailable or its use impractical, at least an air-purifying respirator equipped with an organic vapor cartridge and particulate pre-filters must be worn. However, this should be permitted only for short periods of time at relatively low concentrations (at or below the TLV). However, due to the poor warning properties of MDI, proper fit and timely replacement of filter elements must be ensured. Observe OSHA regulations for respirator use (29 CFR 1910.134).

Ventilation Requirements... Exhaust ventilation sufficient to keep the airborne concentrations of MDI and solvent below the respective TLV to be utilized. Standard reference sources regarding industrial ventilation (i.e. ACGIH industrial ventilation) should be consulted for guidance about adequate ventilation.

Additional Protective Measures... Safety showers and eyewash stations should be available. Educate and train employees in safe use of product. Follow all label instructions.

Section VII – Toxicological Information

Toxicity Data for: Diphenylmethane Diisocyanate (Monomeric and Polymeric)

Acute Toxicity

Oral LD50.....:Greater than 15,800 mg/kg (Rat)

Dermal LD50.....:Greater 5010 but less than 7,940 mg/kg (Rabbit)

Inhalation LC50.....:The 4-hour LC50 for polymeric MDI in rats ranges from 370 to 490 mg/m³. The LC50 for monomeric MDI was estimated to be between 172 and 187 mg/m³.

Eye Effects.....:Slight to moderate irritation.

Skin Effect.....:Slight to moderate irritation.

Sensitization.....:MDI has been shown to produce dermal sensitization in laboratory animals. Evidence of respiratory sensitization has also been observed in guinea pigs. In addition, there is some evidence suggestive of cross-sensitization between different types of diisocyanates.

Section VII – Toxicological Information Cont'd

Chronic Toxicity.....: In a combined chronic inhalation toxicity/oncogenicity study, rats were exposed to an aerosol of polymeric MDI for 6 hours per day, 5 days per week for one or two years. The exposure concentrations were 0, 0.2, 1.0 and 6.0 mg/m³. Microscopic examination of tissues revealed the effects of irritation to the nasal cavity and lungs in animals exposed to 1.0 and 6.0 mg/m³. The No Observable Effect Level (NOEL) was 0.2 mg/m³.

Carcinogenicity.....: In the study described above (See Chronic Toxicity), the occurrence of pulmonary adenomas and a single pulmonary adenocarcinoma was considered to be related to MDI. These tumors were observed only in rats exposed to the high concentration of 6.0 mg/m³.

Mutagenicity.....: MDI has been reported by NIOSH to be mutagenic to salmonella typhimurium bacteria in the presence of a mammalian activating system. Recent work done by M. Anderson, at the Danish School of Pharmacy in Health, also shows a positive result for Desmodur E 21. There is not full agreement in the scientific community on the significance of these Ames test results and their relationship to human safety in the risk of cancer in man.

Developmental Toxicity: Rats were exposed to polymeric MDI at air concentrations of 0, 1, 4 and 12 mg/m³ during days 6-15 of gestation.

Maternal Toxicity (including mortality) was observed at the highest concentration of 12 mg/m³ accompanied by embryo and fetal toxicity. However, no teratogenic effects were observed even at this lethal concentration.

Other Toxicity Data: No conclusive evidence has been developed to indicate that either MDI for Desmodur E 21 is carcinogenic, teratogenic or that it cause reproductive effects in animals or in humans.

Toxicity Data For: for a similar product (Desmodur E 21)

Mutagenicity.....: MDI has been reported by NIOSH to be mutagenic to salmonella typhimurium bacteria in the presence of a mammalian activating system. Recent work done by M. Anderson, at the Danish School of Pharmacy in Denmark and published in the Scandinavian Journal of Work and Environmental Health, also shows a positive result for Desmodur E 21. There is not full agreement in the scientific community on the significance of these Ames test results and their relationship to human safety in the risk of cancer in man.

Other Toxicity Data: No conclusive evidence has been developed to indicate that either MDI for Desmodur E 21 is carcinogenic, teratogenic or that it cause reproductive effects in animals or in humans.

Section VIII - Reactivity Data

Stability Stable under normal conditions

Hazardous Polymerization..... May occur

Contact with moisture and other materials which react with isocyanates or temperatures over 400° F. (204 C.) may cause polymerization.

Incompatibilities.....Water may react to form carbon dioxide

Avoid contact with water. Also avoid amines, strong bases, alcohols.

Material can cause some corrosion to copper alloys and aluminum.

Instability Conditions..... Contamination with water.

Decomposition Products..... By heat and fire : carbon dioxide, carbon monoxide, oxides of nitrogen, traces of HCN and MDI.

Section IX - Spill or Leak Procedures

If material is spilled : evacuate nonessential personnel. Ventilate area. Control further spillage if feasible. Notify appropriate authorities if necessary. Equip clean up crew with appropriate protective equipment (see Section VI). Dike or impound spilled material. Cover the spill with sawdust, vermiculite, fuller's earth or other absorbent material. Shovel into suitable unsealed containers and transport to well-ventilated area (outside). Cover loosely.

Waste Disposal Method - Waste must be disposed of in accordance with federal, state, and local environmental control regulations. Incineration is preferred method. Empty containers must be handled with care due to product residue. Do not heat or cut empty container with electric or gas torch. (See Sections IV and VII). Gases may be highly toxic.

Section X - Special Precautions and Storage Data

Storage Temperature (min/max)..... 32° F. (0° C.)/122° F. (50° C.)

Shelf Life..... 24 months at 77° F. when stored in a sealed container.

Special Sensitivity: If container is exposed to high heat, it can be pressurized and possibly rupture explosively. MDI reacts with water to form CO₂ gas. This can cause sealed containers to expand and possibly rupture explosively.

Handling and Storage Precautions: Store in tightly closed containers to prevent moisture contamination. Do not reseal if contamination is suspected. Avoid contact with skin and eyes. Do not breathe vapor. Warning properties (irritation of the eyes, nose and throat or odor) are not adequate to prevent chronic overexposure from inhalation. This material can produce asthmatic sensitization upon either single inhalation exposure to a relatively high concentration or upon repeated inhalation exposures to lower concentrations. Exposure to vapors of heated MDI can be extremely dangerous. Employee education and training in the safe use and handling of this product are required under the OSHA Hazard Communication Standard.

Section XI - Regulatory Information

D.O.T. Hazard Class ~~~~~Non-Regulated for surface transportation (no hazard label required for surface transportation via motor freight)

AIR /SEA SHIPMENT:

UN Number & Shipping Classification:

PAINT, 3, UN1263, PG III

D.O.T. Label ~~~~~ Flammable Liquid

D.O.T. Placard ~~~~~ Flammable Liquid

OSHA Status ~~~~~ This product is hazardous under the criteria of the federal OSHA Hazard Communication Standard 29 CFR 1910.1200.

TSCA Status ~~~~~ On TSCA inventory

SARA Title III

Section 302 Extremely Hazardous Substances: None

Section 311/312 Hazard Categories:

Immediate Health Hazard
Delayed Health Hazard
Reactive Hazard
Fire Hazard

Section 313 Toxic Chemicals:

Aromatics 100 (CAS#64742-95-6)
Aluminum (CAS#7429-90-5)
4'4'- Diphenylmethane Diisocyanate
(CAS#101-68-8)

Section XII - Other Regulatory Information

The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

| Component Name/ CAS # | Concentration | State Code |
|--|-----------------|------------------------------------|
| Diphenylmethane Diisocyanate (MDI) (2,2;2,4) 26447--40-5 | Less than 1.86% | NJ 4 |
| Polyisocyanate Based on MDI NJTSRN (31765300002)-5317P | Approx. 32.4% | PA 3,NJ 4 |
| 4,4' Diphenylmethane Diisocyanate (MDI) 101-68-8 | Approx. 8.5% | PA 1,FL,IL,MA,RI,NJ1, NJ 4,CN 2 |

FL = Florida Substance List

IL = Illinois Toxic Substances List

MA = Massachusetts Hazardous Substance List

NJ1 = New Jersey Hazardous Substance List

NJ4 = New Jersey Other - included in 5 predominant ingredients >1%

NJTSRN = New Jersey Trade Secret Registry Number

PA1 = Pennsylvania Hazardous Substance List

PA3 = Pennsylvania Non-Hazardous present at 3% or greater

RI = Rhode Island List of Designated Substances

CN2 = Canada WHMIS Ingredient Disclosure List over 0.1%

California Proposition 65

To the best of our knowledge, this product contains no levels of listed substances, which the state of California has found to cause cancer, birth defects or other reproductive effects.

NFPA 704M RATINGS

| Health | Flammability | Reactivity | Other |
|--------|--------------|------------|-------|
| 3 | 2 | 1 | |

0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

HMIS RATINGS

| Health | Flammability | Reactivity | * = Chronic Health Hazard |
|--------|--------------|------------|---------------------------|
| 3* | 2 | 1 | |

0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

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