



MATERIAL SAFETY DATA SHEET

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1. PRODUCT IDENTIFICATION

PRODUCT NAME: IS-50560A
CHEMICAL FAMILY: Aromatic Isocyanate Prepolymer.
CHEMICAL NAME: Modified Diphenylmethane Diisocyanate (MDI) Prepolymer

2. COMPOSITION / INFORMATION ON INGREDIENTS

OSHA HAZARD COMMUNICATION STATUS: This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.

| <i>INGREDIENT NAME</i> | <i>CAS NUMBER</i> | <i>%</i> | <i>OSHA PEL</i> | <i>ACGIH TLV</i> |
|------------------------------------|-------------------|----------|---|--|
| Diphenylmethane Diisocyanate (MDI) | 101-68-8 | 3-7 | 0.02 ppm Ceiling 0.2(mg/m ³ -Ceiling) | 0.005 ppm TWA (0.055 mg/m ³ -TWA) |
| Polyurethane Prepolymer | 59675-67-1 | 60-99 | Not Established | Not Established |
| | | | | |

3. HEALTH HAZARD DATA

Note: Data has not been established for this product. Data is listed for MDI.

ROUTES OF ENTRY:

INHALATION? Yes. Although MDI is low in volatility, an inhalation hazard can exist from MDI aerosols or vapors formed during heating, foaming, or spraying.
SKIN CONTACT? Yes. From liquid and aerosols (spray application).
EYE CONTACT? Yes.
INGESTION? Yes.

ACUTE HEALTH HAZARDS:

INHALATION- MDI vapors or mist at concentrations above 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 hyper reactivity 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.

SKIN- 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.

EYE- 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.

INGESTION- 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 HEALTH HAZARDS:

INHALATION- 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, 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.

CHRONIC HEALTH HAZARDS (Continued):

SKIN- 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.

EYE- None Found.

INGESTION- None Found.

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

NTP (National Toxicology Program)? No.

IARC (International Agency for Research on Cancer)? No.

OSHA REGULATED? No.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: Asthma, other respiratory disorders (bronchitis, emphysema, bronchial hyperreactivity), skin allergies, eczema.

4. EMERGENCY & FIRST AID PROCEDURES

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- 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 exposures, seek medical attention if irritation develops or persists after the area is washed.

EYE- Flush with copious amount of water, preferably, lukewarm water for at least 15 minutes, holding eyelids open all the time to ensure that the eyes are being irrigated. 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. Consult physician.

NOTE TO PHYSICIAN:

INHALATION / RESPIRATORY- This compound is a known pulmonary sensitizer. Treatment is essentially symptomatic. An individual having a pulmonary sensitization reaction to this material should be removed from exposure to any isocyanate.

SKIN- This compound is a known skin sensitizer. Treat symptomatically as for contact dermatitis or thermal burns. If burned, treat as thermal burn. An individual having a skin sensitization reaction to this material should be removed from exposure to any isocyanate.

EYE - Stain for evidence for corneal injury. If cornea is burned, instill antibiotic steroid preparation frequently. Workplace vapors have produced reversible corneal epithelial edema impairing vision.

INGESTION- Treat symptomatically. There is no specific antidote. Inducing vomiting is contraindicated because of the irritating nature of this compound.

5. FIRE & EXPLOSION HAZARD DATA

FLASH POINT (Method Used): > 200° F (93.3° C) Pensky-Martens Closed Cup

FLAMMABLE LIMITS:

LEL (Lower Explosion Limit)= Not Available.

UEL (Upper Explosion Limit)= Not Available.

EXTINGUISHING MEDIA: Carbon dioxide (CO₂), dry chemical or foam. Water spray for large fires. If water is used, it should be in very large quantities. The reaction between water and hot product may be vigorous.

SPECIAL FIRE FIGHTING PROCEDURES: Full emergency equipment with self-contained breathing apparatus and full protective clothing should be worn by firefighters. During a fire, MDI vapors and other irritating, highly toxic gases may be generated by thermal decomposition or combustion. (See Section V – Reactivity Data). 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. Therefore, use cold water to cool fire-exposed containers. Do not spray pool fires with direct water stream.

UNUSUAL FIRE & EXPLOSION HAZARDS: See above.

6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

Evacuate and ventilate spill area.

Dike spill to prevent entry into water system.

Wear full protective equipment, including respiratory equipment during clean-up.

MAJOR SPILL: If temporary control of isocyanate vapor is required, a blanket of protein foam (available at most fire departments) may be placed over the spill. Large quantities may be pumped into closed, but not sealed, container for disposal.

MINOR SPILL: Absorb isocyanates with sawdust or other absorbent, shovel into suitable unsealed containers, transport to well-ventilated area (outside) and treat with neutralizing solution: mixture of water (80%) with non-ionic surfactant Tergitol TMN-10 (20%), or; water (90%), concentrated ammonia (3-8%) and detergent (2%). Add about 10 parts of neutralizer per part of isocyanate, with mixing. Allow to stand uncovered for 48 hours to let CO₂ escape.

CLEAN-UP: Decontaminate floor with decontamination solution letting stand for at least 15 minutes.

7. HANDLING & STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING & STORING: Store in tightly closed containers to prevent moisture contamination. Do not reseal if contamination is suspected. Store in cool dry area. Avoid contact with skin and eyes. Do not breathe aerosols or vapors. 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 exposure 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 compound are required under the OSHA Hazard Communication Standard.

OTHER PRECAUTIONS:

STORAGE TEMPERATURE (MIN./MAX.): Ambient/90° F (32° C)

AVERAGE SHELF LIFE: 6 months

SPECIAL SENSITIVITY (HEAT, LIGHT, MOISTURE): If container is exposed to high heat, 400° F (204° C) it can be pressurized and possibly rupture. MDI reacts slowly with water to form CO₂ gas. This gas can cause sealed containers to expand and possibly rupture.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

RESPIRATORY PROTECTION: Concentrations greater than the TLV can occur when MDI is sprayed, heated or used in a poorly ventilated area. In such cases, or whenever concentrations of MDI exceed the TLV, respiratory protection must be worn. A supplied-air respirator or a self-contained breathing apparatus is recommended. In situations where MDI is not sprayed or heated and a supplied-air or self-contained apparatus is unavailable or its use impractical, at least an air purifying respirator equipped with a particulate filter must be worn. **HOWEVER, THIS SHOULD BE PERMITTED ONLY FOR SHORT PERIODS OF TIME (LESS THAN ONE HOUR) AT RELATIVELY LOW CONCENTRATIONS (AT OR NEAR 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: Local exhaust should be used to maintain levels below the TLV whenever MDI is processed, heated or spray applied. For spray applications, an air-supplied respirator must be worn. Standard reference sources regarding industrial ventilation (ie., ACGIH Industrial Ventilation) should be consulted for guidance about adequate ventilation.

SKIN PROTECTION: Chemical 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.

EYE PROTECTION: Safety glasses with side shields. Liquid chemical goggles or full-face shield if there is a possibility of splashing. Contact lenses should not be worn.

MONITORING: MDI exposure levels must be monitored by accepted monitoring techniques to ensure that the TLV is not exceeded. For guidance-See Volume 1 (Chapter 17) and Volume 3 (Chapter 3) in Patty's Industrial Hygiene and Toxicology for sampling strategy.

MEDICAL SURVEILLANCE: Medical supervision of all employees who handle or come in contact with polymeric MDI is recommended. These should include pre-employment and periodic medical examinations with respiratory function tests (FEV, FVC as a minimum). Persons with asthmatic-type conditions, chronic bronchitis, other chronic respiratory diseases or recurrent skin eczema or sensitization should be excluded from working with MDI. Once a person is diagnosed as sensitized to MDI, no further exposure can be permitted.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: Safety showers and eyewash stations should be available.

WORK/HYGIENIC PRACTICES: Wash hands, forearms, and face thoroughly after handling compounds and before eating, smoking, using lavatory, and at the end of the day. Educate and train employees in safe use of product. Follow all label instructions

9. PHYSICAL / CHEMICAL CHARACTERISTICS

| | |
|---|--|
| <i>APPEARANCE (physical form, color, texture, etc.)</i> | Light yellow Viscous Liquid |
| <i>ODOR:</i> | Slightly musty odor. |
| <i>MELTING POINT:</i> | Not Established. |
| <i>FREEZE POINT:</i> | Not Established. |
| <i>BOILING POINT:</i> | 406° F (208° C) @ 5 mm Hg Estimated based on components(s) |
| <i>VAPOR PRESSURE (mm Hg):</i> | Less than 10 ⁻⁵ mm Hg @ 77° F (25° C) |
| <i>VAPOR DENSITY (Air = 1)</i> | 8.5 (for MDI) |
| <i>SPECIFIC GRAVITY (H₂O = 1):</i> | 1.2 @ 77° F (25° C) |
| <i>EVAPORATION RATE (Butyl Acetate = 1):</i> | Not Established. |
| <i>SOLUBILITY IN WATER:</i> | Reacts slowly with water to liberate CO ₂ gas |
| <i>BULK DENSITY:</i> | ~8.8 lb/gal |
| <i>MOLECULAR WEIGHT:</i> | Not Established. |
| <i>% VOLATILE BY VOLUME:</i> | Negligible. |

10. STABILITY & REACTIVITY DATA

STABILITY: Stable under normal conditions.
CONDITIONS TO AVOID (if unstable): High heat.

INCOMPATIBILITY (MATERIALS TO AVOID): Water, amines, strong bases, alcohols. Will cause some corrosion to copper alloys and aluminum.

HAZARDOUS DECOMPOSITION OF BYPRODUCTS: By high heat and fire: carbon monoxide (CO), oxides of nitrogen, traces of HCN, MDI vapors or aerosols. Oxides of carbon.

HAZARDOUS POLYMERIZATION: May occur if in contact with moisture or other materials which react with isocyanates. May occur at temperatures over 400° F (204° C). See Section IV. (Fire & Explosion Hazard Data).

CONDITIONS TO AVOID (if polymerization may occur): See above.

11. TOXICOLOGICAL INFORMATION

4,4 -Diphenylmethane Diisocyanate (MDI)

Acute Inhalation Toxicity

LC50: 369 mg/m³, 4 hrs (rat, male/female)

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

Acute Dermal Toxicity

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

Skin Irritation

Rabbit, Draize test, slightly irritation

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, 17hrs/day, 5 days/week

Results: negative

12. ECOLOGICAL INFORMATION

Ecotoxicity data based on polymeric MDI

Bioaccumulation

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

Does not bioaccumulate.

Acute and Prolonged Toxicity to Fish

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

LC0:>3,000mg/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: 1,640mg/l, End Point: growth (*Green algae (Scenedesmus subspicatus)*, 72 hrs)

Toxicity to Microorganisms

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

Ecological Data for 4,4'-Diphenylmethane Diisocyanate (MDI)

Acute and Prolonged Toxicity to fish

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

Acute Toxicity to Aquatic Invertebrates

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

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Waste must be disposed of in accordance with federal, state, and local environmental control regulations. Incineration is the preferred method.

EMPTY CONTAINER PRECAUTIONS: Empty containers must be handled with care due to product residue. Decontaminate containers prior to disposal. Empty decontaminated containers should be crushed to prevent reuse. DO NOT HEAT OR CUT EMPTY CONTAINER WITH ELECTRIC OR GAS TORCH. (See Sections IV-Fire & Explosion Hazard Data and Section V-Reactivity Data). Vapors and gases may be highly toxic.

14. TRANSPORTATION INFORMATION

Land transport (DOT)

Non-regulated

Sea transport (IMDG)

Non-regulated

Air transport (ICAO/IATA)

Non-regulated

15. REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STATUS: This product is considered hazardous as defined under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.

RCRA STATUS: MDI is not listed as a hazardous waste. To the best of our knowledge, MDI does not meet the criteria of a hazardous waste if discarded in its purchased form. However, under RCRA, it is the responsibility of the user of products to determine, at the time of disposal, whether a product meets any of the criteria for a hazardous waste. This is because product uses, transformations, mixtures, processes, etc., may render the resulting material hazardous, under the criteria of ignitability, corrosivity, reactivity, and EP toxicity (40 CFR 261.20-24).

US INVENTORY (TSCA): The ingredients of this product are listed on the TSCA inventory or are not required to be listed on the TSCA inventory.

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA), TITLE III:

Sections 301-303 – Emergency Planning - Extremely Hazardous Substances:

None.

Section 304 – Emergency Release Notification – Reportable Substances:

4,4'-Diphenylmethane Diisocyanate (MDI) (CAS# 101-68-8) Reportable quantity: 5,000 lbs

Section 311/312 – Community Right-to-Know Reporting Requirements - Emergency Hazard Categories:

Immediate health hazard.

Delayed health hazard.

Section 313 – Toxic Chemical Notification & Release Inventory Reporting – Listed Substances:

4,4'-Diphenylmethane Diisocyanate (MDI) (CAS# 101-68-8)

This information must be included in all MSDSs that are copied and distributed for this material.

16. OTHER INFORMATION

HMS RATINGS:

| | | | | | |
|---------------|----|---------------------|---|-------------------|---|
| <i>HEALTH</i> | 2* | <i>FLAMMABILITY</i> | 1 | <i>REACTIVITY</i> | 1 |
|---------------|----|---------------------|---|-------------------|---|

(0=Minimal; 1=Slight; 2=Moderate; 3=Serious; 4=Severe; *=Chronic)

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