SAFETY DATA SHEET

THERMACOR

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TRANSPORTATION EMERGENCY
CALL CHEMTREC: (800) 424-9300

NON- TRANSPORTATION EMERGENCY
Emergency &
Information Phone: (817) 847-7300

1. Product and Company Identification

Product Name:	"A" Component
Chemical Family:	Aromatic Isocyanate
Chemical Name:	Polymeric Diphenylmethane Diisocyanate (pMDI)
CAS-NO.:	9016-87-9

2. Hazards Identification

Emergency Overview

WARNING! Color: Brown **Form:** liquid. **Odor:** musty
Toxic gases/ fumes may be given off during burning or thermal decomposition. Closed container may forcibly rupture under extreme heat or when contents have been contaminated with water. Use cold water spray to cool fire-exposed containers to minimize the risk of rupture. Causes respiratory tract irritation. May cause allergic respiratory reaction. Harmful if inhaled. Respiratory sensitizer. Lung damage and respiratory sensitization may be permanent. Causes skin irritation. May cause allergic skin reaction. Skin sensitizer. Animal tests indicate that skin contact alone may lead to allergic respiratory reaction. Causes eye irritation. May cause lung damage.

Potential Health Effects

Primary Routes of Entry: Skin Contact, Inhalation, Eye Contact

Medical Conditions Aggravated by Exposure: Asthma, Respiratory disorders, Skin Allergies, Eczema

HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE

Inhalation

Acute Inhalation

For Product: "A" Component

Diisocyanate vapors or mist at concentrations above the TLV or PEL 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 or PEL with similar symptoms as well as asthma attack or asthma-like symptoms. Exposure well above the

TLV or PEL rnay lead to bronchitis, bronchial spasm and pulmonary edema (fluid in lungs). Chemical or hypersensitivity pneumonitis, with flu-like symptoms (e.g., fever, chills), has also been reported. These symptoms can be delayed up to several hours after exposure. These effects are usually reversible.

Chronic Inhalation
For Product: "A" Component
As a result of previous repeated overexposures or a single large dose, certain individuals may develop sensitization to diisocyanates (asthma or asthma-like symptoms) that may cause them to react to a later exposure to diisocyanates at levels well below the TLV or PEL. These symptoms, which can include chest tightness, wheezing, cough, shortness of breath or asthmatic attack, could be immediate or delayed up to several hours after exposure. Extreme asthmatic reactions can be life threatening. 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. Sensitization can be permanent. Chronic overexposure to diisocyanates has also been reported to cause lung damage (including fibrosis, decrease in lung function) that may be permanent.

Skin
Acute Skin
For Product: "A" Component
Causes irritation with symptoms of reddening, itching, and swelling. Persons previously sensitized can experience allergic skin reaction with symptoms of reddening, itching, swelling, and rash. Cured material is difficult to remove. Contact with MDI can cause discoloration.

Chronic Skin
For Product: "A" Component
Prolonged contact can cause reddening, swelling, rash, and, in some cases, skin sensitization. Animal tests on MDI indicate skin contact alone may lead to an allergic respiratory reaction.

Eye
Acute Eye
For Product: "A" Component
Causes irritation with symptoms of reddening, tearing, stinging, and swelling. May cause temporary corneal injury. Vapor or aerosol may cause irritation with symptoms of burning and tearing.

Chronic Eye
For Product: "A" Component
Prolonged vapor contact may cause conjuntivitis.

Ingestion
Acute Ingestion
For Product: "A" Component
May cause irritation; Symptoms may include abdominal pain, nausea, vomiting, and diarrhea.

Carcinogenicity
No Carcinogenic substances as defined by IARC, NTP and/ or OSHA

3. Composition/ Information on Ingredients

Hazardous Components

Weight %	Components	CAS- No.
40 - 55%	Polymeric Diphenylmethane Diisocynate (pMDI)	9016-87-9

Weight %	Components	CAS- No.
35 - 45%	4, 4'- Diphenylmethane Diisocyanate (MDI)	101-68-8
1 - 5%	Diphenylmethane Diisocyanate (MDI) Mixed Isomers	26447-40-5

4. First Aid Measures

Eye Contact
In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Use lukewarm water if possible. Use fingers to ensure that eyelids are separated and that the eye is being irrigated. Get medical attention.

Skin Contact
Immediately remove contaminated clothing and shoes. Wash off with soap and water. Use lukewarm water if possible. Wash contaminated clothing before reuse. For severe exposures, immediately get under safety shower and begin rinsing. Get medical attention if irritation develops.

Inhalation
Move to an area free from further exposure. Get medical attention immediately. Administer oxygen or artificial respiration as needed. Asthmatic symptoms may develop and may be immediate or delayed up to several hours. Extreme asthmatic reactions can be life threatening.

Ingestion
Do not induce vomiting. Wash mouth out with water. Do not give anything by mouth to an unconscious person. Get medical attention.

Notes to Physician
Eyes: Stain for evidence of corneal injury. If cornea is burned, instill antibiotic/ steroid preparation as needed. Workplace vapors could produce reversible corneal epithelial edema impairing vision. Skin: This compound is a 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 compound. Inhalation: Treatment is essentially symptomatic. An individual having a dermal or pulmonary sensitization reaction to this material should be removed from further exposure to any diisocyanate.

5. Fire Fighting Measures

Suitable Extinguishting Media: dry chemical, carbon dioxide (C02), foam, water spray for large fires.

Special Fire Fighting Procedures
Firefighters should wear NFPA compliant structural firefighting protective equipment, including self-contained breathing apparatus and NFPA compliant helmet, hood, boots and gloves. Avoid contact with product. Decontaminate equipment and protective clothing prior to reuse. During a fire, isocyanate vapors and other irritating, highly toxic gases may be generated by thermal decomposition or combustion. Exposure to heated diisocyanate can be extremely dangerous.

Unusual Fire/ Explosion Hazards
Closed container may forcibly rupture under extreme heat or when contents are contaminated with water (C02 formed). Use cold-water spray to cool fire-exposed containers to minimize the risk of rupture. Large fires can be extinguished with large volumes of water applied from a safe distance, since reaction between water and hot diisocyanate can be vigorous.

6. Accidental Release Measures

Spill and Leak Procedures
Evacuate non-emergency personnel. Isolate the area and prevent access. Remove ignition sources. Notify management. Put on protective equipment. Control source of the leak. Ventilate. Contain the spill to prevent spread into drains, sewers, water supplies, or soil. Call Thermacor at 817- 847- 7300 for assistance and advice. Major Spill or Leak (Standing liquid): Released material may be pumped into closed, but not sealed, metal container for disposal. Process can generate heat. Minor Spill or Leak (Wet surface): Cover spill area with suitable absorbent material (Kitty Litter, Oil-Dri®, etc). Saturate absorbent material with neutralization solution and mix. Wait 15 minutes. Collect material in open-head metal containers. Repeat applications of decontamination solution, with scrubbing, followed by absorbent until the surface is decontaminated. Check for residual surface contamination. Swype® test kits have been used for this purpose. Apply lid loosely and allow containers to vent for 72 hours to let carbon dioxide (C02) escape.

Additional Spill Procedures/ Neutralization
Neutralization solutions:
(1) Colorimetric Laboratories Inc. (CLI) decontamination solution.
(2) A mixture of 75% water, 20% non-ionic surfactant (e.g. Poly-Tergent SL-62, Tergitol TMN- 10) and 5% n-propanol.
(3) A mixture of 80% water, 20% non-ionic surfactant (e.g. Poly-Tergent SL-62, Tergitol TMN- 10).
(4) A mixture of 90% water, 3-8% ammonium hydroxide or concentrated ammonia, and 2% liquid detergent.

7. Handling and Storage

Storage Temperature:

minimum:	17.78 °C (64 °F)
maximum:	30 °C (86 °F)

Storage Period
6 Months

Handling/ Storage Precautions
Do not breathe vapors, mists, or dusts. Use adequate ventilation to keep airborne isocyanate levels below the exposure limits. Wear respiratory protection if material is heated, sprayed, used in a confined space, or if the exposure limit is exceeded. Warning properties (irritation of the eyes, nose and throat or odor) are not adequate to prevent 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 tower concentrations. Individuals with lung or breathing problems or prior allergic reactions to isocyanates must not be exposed to vapor or spray mist. Avoid contact with skin and eyes. Wear appropriate eye and skin protection. Wash thoroughly after handling. Do not breathe smoke and gases created by overheating or burning this material. Decomposition products can be highly toxic and irritating. Store in tightly closed containers to prevent moisture contamination. Do not reseal if contamination is suspected.

Further Info on Storage Conditions
Employee education and training in the safe use and handling of this product are required under the OSHA Hazard Communication Standard 29 CFR 1910.1200.

8. Exposure Controls/ Personal Protection

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

US. ACGIH Threshold Limit Values

Time Weighted Average (TWA): 0.005 ppm

US. OSHA Table Z- 1 Limits for Air Contaminants (29 CFR 19 10.1000)

Ceiling Limit Value: 0.02 ppm, 0.2 mg/ m3

Industrial Hygiene/ Ventilation Measures

Local exhaust should be used to maintain levels below the TLV whenever MDI is heated, sprayed, or aerosolized. Standard reference sources regarding industrial ventilation (e.g., ACGIH Industrial Ventilation Manual) should be consulted for guidance about adequate ventilation. To ensure that published exposure limits have not been exceeded, monitoring for airborne diisocyanate should become part of the overall employee exposure characterization program. NIOSH, OSHA, and others have developed sampling and analytical methods.

Respiratory Protection

Airborne MDI concentrations greater than the ACGIH TLV-TWA (TLV) or OSHA PEL-C (PEL) can occur in inadequately ventilated environments when MDI is sprayed, aerosolized, or heated. In such cases, respiratory protection must be worn. The type of respiratory protection selected must comply with the requirements set forth in OSHA's Respiratory Protection Standard (29 CFR 1910.134). The type of respiratory protection available includes (1) an atmosphere-supplying respirator such as a self-contained breathing apparatus (SCBA) or a supplied air respirator (SAR) in the positive pressure or continuous flow mode, or (2) an air-purifying respirator (APR). If an APR is selected then (a) the cartridge must be equipped with an end-of-service life indicator (ESLI) certified by NIOSH, or (b) a change out schedule, based on objective information or data that will ensure that the cartridges are changed out before the end of their service life, must be developed and implemented. The basis for the change out schedule must be described in the written respirator program. Further, if an APR is selected, the airborne diisocyanate concentration must be no greater than 10 times the TLV or PEL. The recommended APR cartridge is an organic vapor/ particulate filter combination cartridge (OV/ P100).

Hand Protection

Gloves should be worn., Nitrile rubber showed excellent resistance., Butyl rubber, neoprene and PVC are also effective.

Eye Protection

When directly handling liquid product, eye protection is required. Examples of eye protection include a chemical safety goggle, or chemical safety goggle in combination with a full face shield when there is a greater risk of splash.

Skin and Body Protection

Avoid all skin contact. Depending on the conditions of use, cover as much of the exposed skin area as possible with appropriate clothing to prevent skin contact.

Medical Surveillance

All applicants who are assigned to an isocyanate work area should undergo a pre-placement medical evaluation. A history of eczema or respiratory allergies such as hay fever, are possible reasons for medical exclusion from isocyanate areas. Applicants who have a history of adult asthma should be restricted from work with isocyanates. Applicants with a history of prior isocyanate sensitization should be excluded from further work with isocyanates. A comprehensive annual medical surveillance program should be instituted for all employees who are potentially exposed to diisocyanates. Once a worker has been diagnosed as sensitized to any isocyanate, no further exposure can be permitted.

Additional Protective Measures
Emergency showers and eye wash stations should be available. Educate and train employees in the safe use and handling of this product. Follow all label instructions.

9. Physical and Chemical Properties

Form:	Liquid
Color:	Brown
Odor:	Musty
pH:	Not Applicable
Freezing Point:	< 0 °C (< 32 °F) For the active ingredient
Boiling Point/ Range:	Approximately 208 °C (406.4 °F)
Flash Point:	198.89 °C (390 °F) (Pensky-Martens Closed Cup (ASTM D-93))
Vapor Pressure:	< 0.000 1 mmHg @ 25 °C (77 °F)
Specific Gravity:	1.24 @ 25 °C (77 °F)
Solubility in Water:	Insoluble - Reacts slowly wlth water to liberate C02 gas
Bulk Density:	10.3 lb/ gal

10. Stability and Reactivity

Hazardous Reactions
Contact with moisture, other materials that react with isocyanates, or temperatures above 350 °F (177 °C), may cause polymerization.

Materials to Avoid
Water, Amines, Strong bases, Alcohols, copper alloys

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.

11. Toxicological Information

“A” Component
Toxicity Note
Toxicity data based on polymeric MDI.

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

Acute Inhalation Toxicity
LC50: 490 mg/ m3, vapor, 4 h (rat)

Skin Irritation
rabbit, Slightly irritating

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.

Toxicity Data for 4,4'- Diphenylmethane Diisocyanate (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

12. Ecological Information

"A" Component

Biodegradation

0 %, Exposure time: 28 Days

Bioaccumulation

Rainbow trout, Exposure tlme: 112 d, < 1 BCF
Does not bioaccumulate.

Acute and Prolonged Toxicity to Fish

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

Ecological Data for 4,4'-Diphenylmethane Diisocyanate (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/1 (Water flea (Daphnia magna), 24 hrs)

13. Disposal Considerations

Waste Disposal Method

Waste disposal should be in accordance with existing federal, state and local environmental control laws. Incineration is the preferred method.

Empty Container Precautions

Empty containers retain product residue; observe all precautions for product. Do not heat or cut empty container with electric or gas torch because highly toxic vapors and gases are formed. Do not reuse without thorough commercial cleaning and reconditioning. If container is to be disposed, ensure all product residues are removed prior to disposal.

14. Transportation Information

Land Transport (DOT)

Proper Shipping Name:	Other regulated substances, liquid, n.o.s. (contains 4,4'- Diphenylmethane Diisocyanate (MDI))
Hazard Class or Division:	9
UN/ NA Number:	NA3082
Packaging Group:	III
Hazard Label(s):	Class 9

RSPA/ DOT Regulated Components:
4.4'-Diphenylmethane Diisocyanate (MDI)

Reportable Quantity: 11,111 lb

Sea Transport (IMDG)
Non- Regulated

Air Transport (ICAO/ IATA)
Non- Regulated

Additional Transportation Information
When in individual containers of less than the Product RQ, this material ships as non- regulated.

15. Regulatory Information

United States Federal Regulations

OSHA Hazcom Standard Rating: Hazardous

US. Toxic Substances Control Act: Listed on the TSCA Inventory

US. EPA CERCLA Hazardous Substances (40 CFR 302):
Components

4,4'- Diphenylmethane Diisocyanate (MDI)	Reportable quantity: 5,000 lbs.

SARA Section 311/ 312 Hazard Categories:
Acute Health Hazard, Chronic Health Hazard

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 302 Extremely Hazardous Substance (40 CFR 355, Appendix A):
Components
None

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 313 Toxic Chemicals (40 CFR 372.65)- Supplier Notification Required:
Components
Polymeric Diphenylmethane Diisocyanate (pMDI)
4,4'- Diphenylmethane Diisocyanate (MDI)

US. EPA Resource Conservation and Recovery Act (RCRA) Composite List of Hazardous Wastes and Appendix VIII Hazardous Constituents (40 CFR 261):
If discarded in its purchased form, this product would not be a hazardous waste either by listing or by characteristic. However, under RCRA, it is the responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste. (40 CFR 261.20- 24)

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

This product contains a trace (ppm) amount of phenyl isocyanate (CAS# 103-71-9 and monochlorobenzene (CAS# 108-90-07) as impurities.

Massachusetts, New Jersey or Pennsylvania Right to Know Substance Lists:

Weight %	Components	CAS- No.
40 - 55%	Polymeric- Diphenylmethane Diisocyanate (pMDI)	9016-87-9
35 - 45%	4,4'- Diphenylmethane Diisocyanate (MDI)	101-68-8
1 - 5%	Diphenylmethane Diisocyanate (MDI) Mixed Isomers	26447-40-5

New Jersey Environmental Hazardous Substances List and/ or New Jersey RTK Special Hazardous Substances Lists:

Weight %	Components	CAS- No.
40 - 55%	Polymeric- Diphenylmethane Diisocyanate (pMDI)	9016-87-9
35 - 45%	4,4'- Diphenylmethane Diisocyanate (MDI)	101-68-8

California Prop. 65:
To the best of our knowledge, this product does not contain any of the listed chemicals, which the state of California has found to cause cancer, birth defects or other reproductive harm.

16. Other Information

NFPA 704M Rating

Health	2
Flammability	1
Reactivity	1
Other	

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

HMIS Rating

Health	2*
Flammability	1
Physical Hazard	1

0= Minimal 1= Slight 2= Moderate 3= Serious 4= Severe
* = Chronic Health Hazard

The method of hazard communication is comprised of Product Labels and Material Safety Data Sheets. HMIS and NFPA ratings are provided as a customer service.

Contact Person: Thermacor Process Inc.
Telephone: (817) 847- 7300
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