

PRODUCT NAME: HiChem™ 11-70 Isocyanate
SECTION 1 – IDENTIFICATION

Manufacturer's Info:
Rhino Linings Corporation
 9747 Businesspark Avenue
 San Diego, CA, 92131

Product Name: HiChem™ 11-70 Isocyanate
Chemical Name: MDI Prepolymer
Chemical Family: Aromatic Isocyanate

Information phone: (858) 450 0441
Emergency contact: CHEMTREC (800) 424 9300

SECTION 2 – HAZARD(S) IDENTIFICATION
OSHA Hazard Communication Standard:

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

GHS-Label Elements: **Signal Word:**
 DANGER

Pictogram(s):



GHS 08



GHS 07

CONTAINS ISOCYANATES. INHALATION OF ISOCYANATE MISTS OR VAPORS MAY CAUSE RESPIRATORY IRRITATION, BREATHLESSNESS, CHEST DISCOMFORT AND REDUCED PULMONARY FUNCTION. OVEREXPOSURE WELL ABOVE THE PEL MAY RESULT IN BRONCHITIS, BRONCHIAL SPASMS AND PULMONARY EDEMA. LONG-TERM EXPOSURE TO ISOCYANATES HAS BEEN REPORTED TO CAUSE LUNG DAMAGE, INCLUDING REDUCED LUNG FUNCTION WHICH MAY BE PERMANENT. ACUTE OR CHRONIC OVEREXPOSURE TO ISOCYANATES MAY CAUSE SENSITIZATION IN SOME INDIVIDUALS, RESULTING IN ALLERGIC RESPIRATORY REACTIONS INCLUDING WHEEZING, SHORTNESS OF BREATH AND DIFFICULTY BREATHING. ANIMAL TESTS AND OTHER RESEARCH INDICATE THAT SKIN CONTACT WITH MDI MAY PLAY A ROLE IN CAUSING RESPIRATORY SENSITIZATION.

Classification of the substance or mixture:

Hazard Class	Category	Hazard Statement Codes	Hazard Statements
Acute Toxicity – Inhalation (mist)	4	H332	Harmful if inhaled
Skin Corrosion/Irritation	2	H315	Causes skin irritation
Serious Eye Damage/Eye irritation	2B	H319	Causes serious eye irritation
Respiratory Sensitization	1	H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled
Skin Sensitization	1B	H317	May cause an allergic skin reaction
STOT-Single Exposure	3	H335	May cause respiratory irritation
STOT-Repeated Exposure	2	H373	May cause damage to organs (Respiratory Tract) through prolonged or repeated exposure if inhaled

Precautionary Statements:

Prevention:	P201 P202 P260 P264 P271 P272 P281 P285	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe mist, vapors, spray. Wash exposed area with plenty of water and soap thoroughly after handling. Use only outdoors or in a well-ventilated area. Contaminated work clothing should not be allowed out of the workplace. Use personal protective equipment as required. In case of inadequate ventilation wear respiratory protection.
Response:	P304+P341 P342+P311 P302+P352 P333+P313 P362 P305+P351+P338 P337+P313 P308+P313	IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician. IF ON SKIN: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. IF exposed or concerned: Get medical advice/attention.
Storage:	P403+P233 P405	Store in a well-ventilated place. Keep container tightly closed. Store locked up.
Disposal:	P501	Dispose of contents/container to hazardous or special waste collection point in Accordance with local/regional/national/international regulations.

Hazards not otherwise classified (HNOC): No specific dangers known.

SECTION 3 – COMPOSITION / INFORMATION ON INGREDIENTS

Components	CAS #	EC #	Concentration, %
4,4'-Diphenylmethane Diisocyanate (MDI)	101-68-8	202-966-0	55 – 75
2,4'-Diphenylmethane Diisocyanate (MDI)	5873-54-1	227-534-9	10 – 20
4,4'-Diphenylmethane Diisocyanate, oligomers	25686-28-6	500-040-3	5 – 15

Note: CAS 101-68-8 is an MDI isomer that is part of CAS 25686-28-6.

SECTION 4 – FIRST-AID MEASURES**Description of First Aid measures:**

Inhalation: Move person to fresh air and keep comfortable for breathing. If not breathing, give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask, etc). If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

Skin: Remove material from skin immediately by washing with soap and plenty of water. Remove contaminated clothing and shoes while washing. Seek medical attention if irritation or rash occurs. Wash clothing before reuse. An MDI skin decontamination study demonstrated that cleaning very soon after exposure is important, and that a polyglycol-based skin cleanser or corn oil may be more effective than soap and water. Discard items which cannot be decontaminated, including leather articles such as shoes, belts and watchbands.

Eye: Immediately flush eyes with water; remove contact lenses, if present, after the first 5 minutes, then continue flushing eyes for at least 15 minutes. Obtain medical attention without delay, preferably from an ophthalmologist. Suitable emergency eye wash facility should be immediately available.

Ingestion: If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.

Most important symptoms/effects, acute and delayed: Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

General advice for First Aid responders: First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment. Show this SDS to physician.

Note to physician: Maintain adequate ventilation and oxygenation of the patient. May cause respiratory sensitization or asthma-like symptoms. Bronchodilators, expectorants and antitussives may be of help. Treat bronchospasm with inhaled beta2 agonist and oral or parenteral corticosteroids. Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed 24-48 hours for signs of respiratory distress. If you are sensitized to diisocyanates, consult your physician regarding working with other respiratory irritants or sensitizers. Cholinesterase inhibition has been noted in human exposure but is not of benefit in determining exposure and is not correlated with signs of exposure. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Excessive exposure may aggravate preexisting asthma and other respiratory disorders (e.g. emphysema, bronchitis, reactive airways dysfunction syndrome).

SECTION 5 – FIRE-FIGHTING MEASURES

Suitable extinguishing media: Water fog or fine spray, alcohol-resistant foam, dry chemical or carbon dioxide fire extinguishers.

Unsuitable extinguishing media: Direct water stream may cause frothing, splattering of burning material and spreading of fire.

Specific hazards arising from the chemical: Material may be ignited only if preheated to high temperatures (such in fire conditions). Fire in vicinity poses risk of pressure build-up and rupture. Containers at risk from fire should be cooled with water and, if possible, removed from the danger area. Exposure to heated diisocyanate can be extremely dangerous. Reaction between water and hot isocyanate may be vigorous. Hazardous Combustion products: carbon dioxide, carbon monoxide, nitrogen oxides, amines, hydrogen cyanide, lower molecular weight organic molecules.

Special Protective Equipment and Precautions for fire-fighters: Wear NIOSH or OSHA approved self-contained breathing apparatus in positive pressure mode with full face piece and full protective gear. Isolate the scene by removing all persons from the incident area. No action should be taken involving any personal risk or without suitable training. Dispose of fire debris and contaminated extinguishing water in accordance with official regulations.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Isolate area. Keep unnecessary and unprotected personnel from entering the area. Refer to section 7, Handling, for additional precautionary measures. Keep personnel out of low areas. Keep upwind of spill. Spilled material may cause a slipping hazard. Ventilate area of leak or spill. If available, use foam to smother or suppress. See Section 10 for more specific information. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

Environmental precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. Inform the relevant authorities if the product has caused environmental pollution. See Section 12, Ecological Information.

Methods and materials for containment and cleaning up: Contain spilled material if possible. **Absorb with materials such as:** Dirt. Vermiculite. Sand. Clay. **Do NOT use absorbent materials such as:** Cement powder (Note: may generate heat). Collect in suitable and properly labeled open containers. Do not place in sealed containers. Suitable containers include: Metal drums. Plastic drums. Polylined fiber pacs. Wash the spill site with large quantities of water. Attempt to neutralize by adding suitable decontaminant solution: Formulation 1: sodium carbonate 5 - 10%; liquid detergent 0.2 - 2%; water to make up to 100%, OR Formulation 2: concentrated ammonia solution 3 - 8%; liquid detergent 0.2 - 2%; water to make up to 100%. If ammonia is used, use good ventilation to prevent vapor exposure. Contact your supplier for clean-up assistance.

Residues from spill cleanup may continue to be regulated under provisions of RCRA and require storage and disposal as hazardous waste. For major spills, see Section 1 for the Emergency contact; for further disposal measures, see Section 13.

SECTION 7 – HANDLING AND STORAGE

Precautions for safe handling: Avoid breathing vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated contact with skin. Use with adequate ventilation. Wash thoroughly after handling. Keep container tightly closed. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION. Spills of these organic materials on hot fibrous insulations may lead to lowering of the auto-ignition temperatures possibly resulting in spontaneous combustion.

This material can produce asthmatic sensitization upon either single inhalation exposure to a relatively high concentration or upon repeated inhalation exposures to lower concentrations. Individuals with asthma, chronic respiratory disease or prior allergic reactions to isocyanates and those with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not handle until all safety precautions have been read and understood.

Conditions for safe storage, including any incompatibilities: Store in a dry place. Protect from atmospheric moisture. Do not store product contaminated with water to prevent potential hazardous reaction. Segregate from acids and acid forming substances. Protect from freezing. See Section 10 for more specific information.

Storage stability: Stable under normal conditions.

Recommended storage temperature: 60 - 90°F (16 - 32°C)

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. Employees and consumers should be warned of health risks associated with product use. See Section 8 for additional information on hygiene measures.

SECTION 8 – EXPOSURE CONTROLS / PERSONAL PROTECTION

Control Parameters/Occupational exposure limit values: Components listed in the OSHA Occupational Chemical and/or OARS-WEEL Database.

OSHA PEL 8-hour TWA (ST) STEL (C) Ceiling Peak		NIOSH REL Up to 10-hour TWA (ST) STEL (C) Ceiling		ACGIH TLV® 8-hour TWA (ST) STEL (C) Ceiling		Cal/OSHA PEL 8-hour TWA (ST) STEL (C) Ceiling Peak	
4,4-DIPHENYLMETHANE DIISOCYANATE (MDI) – CAS # 101-68-8							
PEL-TWA	---	REL-TWA	0.005 ppm (0.05 mg/m ³)	TLV-TWA	0.005 ppm [1985]	PEL-TWA	0.005 ppm (0.051 mg/m ³)
PEL-STEL	---	REL-STEL	---	TLV-STEL	---	PEL-STEL	---
PEL-C	0.02 ppm (0.2 mg/m ³)	REL-C	0.020 ppm (0.2 mg/m ³) [10 minutes]	TLV-C	---	PEL-C	---
		IDLH	75 mg/m ³				
Skin Notation	N	Skin Notation	N	Skin Notation	N	Skin Notation	N
Carcinogenicity classifications: IARC-3, EPA-CBD;D							
AIHA emergency response planning guidelines - ERPG-1/ERPG-2/ERPG-3: -NA/5 mg/m ³ /55 mg/m ³							
AIHA OARS-WEEL: ---							

Advice on system design: Provide process enclosures, local exhaust ventilation or other engineering controls to maintain recommended PEL.

Appropriate engineering controls: Use only with adequate ventilation. Diisocyanates can only be smelled if the occupational exposure limit has been exceeded considerably. Emissions from ventilation or process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Personal protective equipment:

Eye/face protection: When directly handling liquid product, eye protection is required. Examples of eye protection include safety glasses and goggles or full face shield when there is a greater risk of splash. Contact lenses should not be worn when working with chemicals.

Skin/body protection: Avoid contact with skin. Impervious gloves (nitrile butyl rubber, neoprene and PVC) should be worn always when working with this product. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact. Dispose contaminated gloves after use in accordance with good laboratory practices. Body should be covered with appropriate clothing (apron, arm covers or full body suit) depending on the task being performed and the risks involved. Protective clothing should be selected and used in accordance with "Guidelines for the Selection of Chemical Protective Clothing" published by ACGIH. Wash contaminated clothing before reuse. Store work clothing separately. Appropriate footwear should be also selected based on the task being performed and the risks involved.

Respiratory protection: Use local or general ventilation to control exposures below applicable exposure limits. When ventilation is inadequate, use either an atmosphere supplying respirator or NIOSH or OSHA approved air-purifying respirator for organic vapors. Respirator must be properly fitted and its selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Additional Protective Measures: Educate and train employees in safe handling of this product. Follow all label instructions. As a general hygiene practice, wash hands and face after use. Emergency eyewash fountains and safety shower should be in close proximity as a matter of good practice.

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, further exposure cannot be permitted. The Occupational Exposure Limits listed do not apply to previously sensitized individuals. Sensitized individuals should be removed from any further exposure.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Amber/Brown
Odor:	Musty
Odor threshold:	Not applicable
pH:	Not applicable
Melting point/ freezing point:	Not available
Initial boiling point and boiling range:	> 200°C
Flash point:	> 200°C (open cup)
Evaporation rate:	Negligible
Flammability (solid, gas):	Not flammable
Upper/ lower flammability or explosive limits:	Not relevant
Vapor pressure:	~ 0.00001 mmHg @ 25°C (77°F)
Vapor density:	Not applicable
Relative density:	Not available
Solubility (water):	Insoluble
Partition coefficient n-octanol/water:	Not applicable
Auto-ignition temperature:	Not available
Decomposition temperature:	Not available
Viscosity:	Not available

SECTION 10 – STABILITY AND REACTIVITY

Reactivity: MDI is insoluble in and heavier than water and sinks to the bottom but reacts slowly at the interface. A solid water-insoluble layer of polyurea is formed at the interface accompanied by carbon dioxide release. This can lead to container bursting, if tightly closed. There is a risk of exothermic reaction with materials containing active hydrogen groups. The reaction becomes progressively more vigorous and can be violent at higher temperatures if the miscibility of the reaction partners is good or is supported by stirring or by the presence of solvents. Contact with certain rubbers and plastics can cause brittleness of the product with subsequent loss in strength.

Hazardous Polymerization: Contact with moisture, alcohols, amines, bases and acids or temperatures above 350°F (177°C).

Chemical stability: Stable under recommended storage conditions. Product is hygroscopic; contamination with moisture will negatively affect product performance. Avoid unintended contact with incompatible chemicals; the reaction will generate heat.

Conditions to avoid: Unintentional contact with moisture, excessive heat, open flame and sparks. Avoid mist formation.

Incompatible materials: Strong oxidizing agents. Water, alcohols, amines, bases, acids, copper, aluminum and zinc alloys.

Hazardous decomposition products: Depend upon temperature, air supply and presence of other materials. Can include, but are not limited to carbon dioxide, carbon monoxide, nitrogen oxides, amines, hydrogen cyanide, lower molecular weight organic molecules. Creates dense black smoke in fire conditions.

SECTION 11 – TOXICOLOGICAL INFORMATION

Likely Routes of Exposure: Inhalation, Skin and Eye Contact, Ingestion.

Symptoms of exposure:**Acute Toxicity:****Oral:**

Not classified.

Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. Observations in animals include: Gastrointestinal irritation.

Dermal:

Not classified.

May be harmful in contact with skin. Adverse symptoms may include irritation and redness.

Inhalation:

Harmful if inhaled.

At room temperature, vapors are minimal due to low volatility. However, certain operations may generate vapor or mist. Concentrations sufficient to cause respiratory irritation and other adverse effects. Such operations include those in which the material is heated, sprayed or otherwise mechanically dispersed such as drumming, venting or pumping. Excessive exposure may cause irritation to upper respiratory tract (nose and throat) and lungs. May cause pulmonary edema (fluid in the lungs). Effects may be delayed. Decreased lung function has been associated with overexposure to isocyanates.

Skin corrosion / irritation:

Causes skin irritation.

Irritating to skin. Skin contact may result in dermatitis, either irritative or allergic.

Serious eye damage / eye irritation:

Causes serious eye irritation.

Irritating to eyes. Adverse symptoms may include tearing, redness and itching. May cause slight temporary corneal injury.

Specific target organ toxicity, single exposure:

May cause respiratory irritation.

Aspiration hazard:

Not classified.

Chronic Toxicity:**Respiratory and Skin Sensitizer:**

May cause an allergic skin reaction.

Has caused allergic skin reactions when tested in guinea pigs. Animal studies have shown that skin contact with isocyanates may play a role in respiratory sensitization.

May cause allergy or asthma symptoms or breathing difficulties if inhaled.

May cause allergic respiratory reaction. MDI concentrations below the exposure guidelines may cause allergic respiratory reactions in individuals already sensitized. Asthma-like symptoms may include coughing, difficult breathing and a feeling of tightness in the chest. Occasionally, breathing difficulties may be life threatening.

- 4,4'-Diphenylmethane Diisocyanate (MDI) – CAS # 101-68-8
- 2,4'-Diphenylmethane Diisocyanate (MDI) – CAS # 5873-54-1
- 4,4'-Diphenylmethane Diisocyanate, oligomers – CAS # 25686-28-6

Germ cell mutagenicity:

Not classified.

Genetic toxicity data on MDI are inconclusive. MDI was weakly positive in some in vitro studies; other in vitro studies were negative. Animal mutagenicity studies were predominantly negative. Contains component(s) which were negative in some in vitro genetic toxicity studies and positive in others. Contains component(s) which were negative in some animal genetic toxicity studies and positive in others.

Carcinogenicity:

Not classified.

Lung tumors have been observed in laboratory animals exposed to respirable aerosol droplets of MDI/Polymeric MDI (6 mg/m³) for their lifetime. Tumors occurred concurrently with respiratory irritation and lung injury. Current exposure guidelines are expected to protect against these effects reported for MDI.

Reproductive toxicity:

Not classified.

Specific target organ toxicity, repeated exposure:

May cause damage to organs (Respiratory Tract) through prolonged or repeated exposure if inhaled.

Medical conditions aggravated by overexposure:

The isocyanate component is a respiratory sensitizer. Respiratory sensitization may result in allergic (asthma-like) signs in the lower respiratory tract including wheezing, shortness of breath and difficulty breathing, the onset of which may be delayed. Repeated inhalation of high concentrations may cause lung damage, including reduced lung function, which may be permanent. Medical supervision of all employees who handle or come into contact with isocyanates is recommended. Persons with history of respiratory disease or hypersensitivity should not be exposed to this product. Persons with asthmatic conditions, chronic bronchitis, other chronic respiratory diseases, recurrent eczema or pulmonary sensitization should be excluded from working with isocyanates. Once a person is diagnosed as having pulmonary sensitization (allergic asthma) to isocyanates, further exposure is not recommended.

Toxicity test results:

Product itself has not been tested. Information given is based on data on the components and the toxicology of similar products.

Components	Test Results
4,4'-Diphenylmethane Diisocyanate (MDI) CAS # 101-68-8	<p><u>Acute Toxicity</u></p> <p>Oral LD50 (Rat): >2,000 mg/kg – <i>No deaths occurred at this concentration. Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. Observations in animals include: Gastrointestinal irritation.</i></p> <p>Dermal LD50 (Rabbit): >9,400 mg/kg – <i>Prolonged skin contact is unlikely to result in absorption of harmful amounts.</i></p> <p>Inhalation LC50 (Rat): 2.24 mg/l, 1 h - <i>At room temperature, vapors are minimal due to low volatility. However, certain operations may generate vapor or mist concentrations sufficient to cause respiratory irritation and other adverse effects. Such operations include those in which the material is heated, sprayed or otherwise mechanically dispersed such as drumming, venting or pumping. Excessive exposure may cause irritation to upper respiratory tract (nose and throat) and lungs. May cause pulmonary edema (fluid in the lungs.) Effects may be delayed. Decreased lung function has been associated with overexposure to isocyanates.</i></p> <p>Skin corrosion/irritation: Prolonged contact may cause moderate skin irritation with local redness. Repeated contact may cause moderate skin irritation with local redness. May stain skin.</p> <p>Serious eye damage/eye irritation: May cause moderate eye irritation. May cause slight temporary corneal injury.</p> <p>Aspiration Hazard: Based on physical properties, not likely to be an aspiration hazard.</p> <p><u>Chronic Toxicity</u></p> <p>Sensitization: SKIN: Skin contact may cause an allergic skin reaction. Animal studies have shown that skin contact with isocyanates may play a role in respiratory sensitization. RESPIRATORY: May cause allergic respiratory reaction. MDI concentrations below the exposure guidelines may cause allergic respiratory reactions in individuals already sensitized. Asthma-like symptoms may include coughing, difficult breathing and a feeling of tightness in the chest. Occasionally, breathing difficulties may be life threatening.</p> <p>Teratogenicity: Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Did not cause birth defects in laboratory animals.</p> <p>Reproductive: No relevant data found.</p> <p>Mutagenicity: Genetic toxicity data on MDI are inconclusive. MDI was weakly positive in some in vitro studies; other in vitro studies were negative. Animal mutagenicity studies were predominantly negative.</p>

	<p>Carcinogenicity: Not classified. Lung tumors have been observed in laboratory animals exposed to respirable aerosol droplets of MDI/Polymeric MDI (6 mg/m³) for their lifetime. Tumors occurred concurrently with respiratory irritation and lung injury. Current exposure guidelines are expected to protect against these effects reported for MDI.</p> <p>STOT-SE: May cause respiratory irritation. Route of Exposure: Inhalation. Target Organs: Respiratory Tract.</p> <p>STOT-RE: Tissue injury in the upper respiratory tract and lungs has been observed in laboratory animals after repeated excessive exposures to MDI/polymeric MDI aerosols.</p>
<p>2,4'-Diphenylmethane Diisocyanate (MDI) CAS # 5873-54-1</p>	<p><u>Acute Toxicity</u></p> <p>Oral LD50 (Rat): >2,000 mg/kg – <i>No deaths occurred at this concentration. Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. Observations in animals include: Gastrointestinal irritation.</i></p> <p>Dermal LD50 (Rabbit): >9,400 mg/kg – <i>Prolonged skin contact is unlikely to result in absorption of harmful amounts.</i></p> <p>Inhalation LC50 (Rat), 1hr: 2.24 mg/L - <i>At room temperature, vapors are minimal due to low volatility. However, certain operations may generate vapor or mist concentrations sufficient to cause respiratory irritation and other adverse effects. Such operations include those in which the material is heated, sprayed or otherwise mechanically dispersed such as drumming, venting or pumping. Excessive exposure may cause irritation to upper respiratory tract (nose and throat) and lungs. May cause pulmonary edema (fluid in the lungs.) Effects may be delayed. Decreased lung function has been associated with overexposure to isocyanates.</i></p> <p>Skin corrosion/irritation: Prolonged contact may cause moderate skin irritation with local redness. Repeated contact may cause moderate skin irritation with local redness. May stain skin.</p> <p>Serious eye damage/eye irritation: May cause moderate eye irritation. May cause slight temporary corneal injury.</p> <p>Aspiration Hazard: Based on physical properties, not likely to be an aspiration hazard.</p> <p><u>Chronic Toxicity</u></p> <p>Sensitization: SKIN: Skin contact may cause an allergic skin reaction. Animal studies have shown that skin contact with isocyanates may play a role in respiratory sensitization. RESPIRATORY: May cause allergic respiratory reaction. MDI concentrations below the exposure guidelines may cause allergic respiratory reactions in individuals already sensitized. Asthma-like symptoms may include coughing, difficult breathing and a feeling of tightness in the chest. Occasionally, breathing difficulties may be life threatening.</p> <p>Teratogenicity: Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Did not cause birth defects in laboratory animals.</p> <p>Reproductive: No relevant data found.</p> <p>Mutagenicity: Genetic toxicity data on MDI are inconclusive. MDI was weakly positive in some in vitro studies; other in vitro studies were negative. Animal mutagenicity studies were predominantly negative.</p> <p>Carcinogenicity: Not classified. Lung tumors have been observed in laboratory animals exposed to respirable aerosol droplets of MDI/Polymeric MDI (6 mg/m³) for their lifetime. Tumors occurred concurrently with respiratory irritation and lung injury. Current exposure guidelines are expected to protect against these effects reported for MDI.</p> <p>STOT-SE: May cause respiratory irritation. Route of Exposure: Inhalation. Target Organs: Respiratory Tract.</p> <p>STOT-RE: Tissue injury in the upper respiratory tract and lungs has been observed in laboratory animals after repeated excessive exposures to MDI/polymeric MDI aerosols.</p>
<p>4,4'-Diphenylmethane Diisocyanate, oligomers CAS # 25686-28-6</p>	<p>No test data available.</p>

The products in question have been evaluated against the Hazardous Products Regulations (WHMIS 2015) and no additional classifications, ingredient disclosure or exposure limits are required for those regulations.

SECTION 12 – ECOLOGICAL INFORMATION
Ecotoxicity:

By considering the production and use of the substance, it is unlikely that product is harmful to aquatic organisms, neither acutely nor chronically. Immiscible with water, but will react with water to produce inert and non-biodegradable solids. Conversion to soluble products, including diamino-diphenylmethane (MDA), is very low under the optimal laboratory conditions of good dispersion and low concentration. In air, the predominant degradation process is predicted to be a relatively rapid OH radical attack, based on calculation and analogy with related diisocyanates.

Persistence and degradability:

Poorly biodegradable by OECD criteria. In contact with water the substance will hydrolyze slowly. After evaporation or exposure to the air, the product will be rapidly degraded by photochemical processes.

Bioaccumulative potential:

No significant accumulation in organisms is expected.

Mobility in soil:

Not expected.

Other adverse effects:

No known significant effects or critical hazards.

Ecotoxicity test results:

Product itself has not been tested. Information given is based on data on the components and the toxicology of similar products.

Components	Test Results
4,4'-Diphenylmethane Diisocyanate (MDI) CAS # 101-68-8	<p><u>Acute Toxicity</u> Fish LC50: Danio rerio (zebra fish), 96h, > 1,000 mg/l, OECD Test Guideline 203 or Equivalent Invertebrates EC50: Daphnia magna (Water flea), 24h, > 1,000 mg/l, OECD Test Guideline 202 Aquatic plants: Desmodemus subspicatus (green algae), 72h, 1,640 mg/l, OECD Test Guideline 201 Bacteria EC50: Eisenia fetida (earthworms), Based on information for a similar material:, 14 d, > 1,000 mg/kg Terrestrial Planta EC50: Avena sativa (oats), Growth inhibition, 1,000 mg/l EC50, Lactuca sativa (lettuce), Growth inhibition, 1,000 mg/l</p> <p><u>Ecological Data</u> Persistence and degradability: In the aquatic and terrestrial environment, material reacts with water forming predominantly insoluble polyureas which appear to be stable. In the atmospheric environment, material is expected to have a short tropospheric half-life, based on calculations and by analogy with related. Biodegradation: Poorly biodegradable. 0 % Exposure time: 28 d Method: OECD Test Guideline 302C. Bioaccumulative Potential: Bioconcentration potential is low (BCF < 100 or Log Pow < 3). Bioconcentration factor (BCF): 92 Cyprinus carpio (Carp) 28 d Mobility in Soil: In the aquatic and terrestrial environment, movement is expected to be limited by its reaction with water forming predominantly insoluble polyureas. <i>Assessment of aquatic toxicity: Test data is based on information from similar material. The measured ecotoxicity is that of the hydrolyzed product, generally under conditions maximizing production of soluble species. Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).</i></p>
2,4'-Diphenylmethane Diisocyanate (MDI) CAS # 5873-54-1	<p><u>Acute Toxicity</u> Fish LC50: Danio rerio (zebra fish), 96h, > 1,000 mg/l, OECD Test Guideline 203 or Equivalent Invertebrates EC50: Daphnia magna (Water flea), 24h, > 1,000 mg/l, OECD Test Guideline 202 Aquatic plants: Desmodemus subspicatus (green algae), 72h, 1,640 mg/l, OECD Test Guideline 201 Bacteria EC50: Eisenia fetida (earthworms), Based on information for a similar material:, 14 d, > 1,000 mg/kg Terrestrial Planta EC50: Avena sativa (oats), Growth inhibition, 1,000 mg/l EC50, Lactuca sativa (lettuce), Growth inhibition, 1,000 mg/l</p> <p><u>Ecological Data</u> Persistence and degradability: In the aquatic and terrestrial environment, material reacts with water forming predominantly insoluble polyureas which appear to be stable. In the atmospheric</p>

	<p>environment, material is expected to have a short tropospheric half-life, based on calculations and by analogy with related. Biodegradation: Poorly biodegradable. 0 % Exposure time: 28 d Method: OECD Test Guideline 302C.</p> <p>Bioaccumulative Potential: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).</p> <p>Bioconcentration factor (BCF): 92 Cyprinus carpio (Carp) 28 d</p> <p>Mobility in Soil: In the aquatic and terrestrial environment, movement is expected to be limited by its reaction with water forming predominantly insoluble polyureas.</p> <p><i>Assessment of aquatic toxicity: Test data is based on information from similar material. The measured ecotoxicity is that of the hydrolyzed product, generally under conditions maximizing production of soluble species. Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).</i></p>
4,4'-Diphenylmethane Diisocyanate, oligomers CAS # 25686-28-6	No test data available.

SECTION 13 – DISPOSAL CONSIDERATIONS

Product Disposal: The generation of waste should be avoided or minimized wherever possible. If product becomes a waste, it does not meet criteria of hazardous waste as defined in 40 CFR 261, Subpart C and D. Do not discharge into sewer system. Spill cleanup residues may still be subject to RCRA storage and disposal requirements. Dispose waste in compliance with local, state and federal regulations via licensed waste disposal contractor.

Container disposal: Even after emptying, container may retain residues. Empty containers should be completely drained and safely stored until appropriately reconditioned or disposed through licensed contractor in accordance with government regulations. This material and its container must be disposed of in a safe way.

SECTION 14 – TRANSPORT INFORMATION

Non-Bulk:	
Land Transport, U.S. DOT:	Non-regulated
Sea Transport, IMDG:	Non-regulated
Air Transport, IATA/ICAO:	Non-regulated
Bulk:	
This product is regulated if the amount in an individual container exceeds the Product Reportable Quantity. 4,4'-Diphenylmethane Diisocyanate (MDI), RQ: 5,000 lbs; Product RQ: > 5,000 lbs	
UN Number:	NA 3082
UN Proper Shipping Name:	Other regulated substances, liquid, n.o.s. (contains 4,4'-Diphenylmethane Diisocyanate (MDI))
Transport Hazard Class:	9
Packing Group:	III
Hazard Label:	9

NOTE: This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

SECTION 15 – REGULATORY INFORMATION
U.S. FEDERAL REGULATIONS:
U.S. Toxic Substances Control Act:

None present or none present in regulated quantities.

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

None present or none present in regulated quantities.

SARA Section 311/312 Hazard Categories:

Refer to hazard classification information in Section 2.

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:

- 4,4'-Methylenediphenyl diisocyanate (MDI), CAS # 101-68-8, RQ: 5,000 lbs

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:

- 4,4'-Methylenediphenyl diisocyanate (MDI), CAS # 101-68-8

US. EPA Resource Conservation and Recovery Act (RCRA) Composite List of Hazardous Wastes and Appendix VIII Hazardous Constituents (40 CFR 261):

Under RCRA, it is the responsibility of the person who generates a solid waste, as defined in 40 CFR 261.2, to determine if that waste is a hazardous waste.

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 the SDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

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

- 4,4'-Methylenediphenyl diisocyanate (MDI) – CAS # 101-68-8
- 2,4'-Diphenylmethane Diisocyanate (MDI) – CAS # 5873-54-1
- 4,4'- Diphenylmethane Diisocyanate, oligomers – CAS # 25686-28-6

California Prop. 65 Components:

This product contains no substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute unless otherwise listed. For more information, visit www.P65Warnings.ca.gov

NFPA Hazard Rating:

HEALTH	FIRE	INSTABILITY	SPECIFIC
2	1	1	
0 = Normal 1 = Slight 2 = Hazardous 3 = Extreme Danger 4 = Deadly	(Flash Points) 0 = Will not burn 1 = Above 200°F 2 = Below 200°F 3 = Below 100°F 4 = Below 73°F	0 = Stable 1 = Unstable if Heated 2 = Violent Chemical Change 3 = Shock and Heat May Detonate 4 = May Detonate	ACID (Acid) ALK (Alkaline) COR (Corrosive) OXY (Oxidizer) W (Use No Water)

HMIS Hazard Rating:

HEALTH	FLAMMABILITY	REACTIVITY	PROTECTIVE EQUIPMENT
2*	1	1	X
0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe *CHRONIC			X = Ask your Supervisor or Safety Specialist for handling instructions

Canada regulations/legislation:

This product has been classified in accordance with the hazard criteria of the Hazardous Products Regulations and the SDS contains all the information required by the Hazardous Products Regulations.

International Regulations/Inventories:

No data available.

SECTION 16 – OTHER INFORMATION**LEGEND**

GHS	Globally Harmonized System
CAS	Chemical Abstracts Services
EC	European Community
EPA	Environmental Protection Agency
OSHA	Occupational Safety and Health Administration
ACGIH	American Conference of Governmental Industrial Hygienists
NIOSH	National Institute of Occupational Safety and Health
PEL	Permissible Exposure Limits
TLV	Threshold Limit Value
REL	Recommended Exposure Limit
TWA	Time-Weighted Average
STEL	Short-term exposure limit
IARC	International Agency for Research on Cancer
NTP	National Toxicology Program
COD / BOD	Chemical Oxygen Demand / Biological Oxygen Demand
STOT-SE	Specific Target Organ Toxicity following Single Exposure
STOT-RE	Specific Target Organ Toxicity following Repeated Exposure
DOT	Department of Transportation
IMDG	International maritime dangerous goods code
IATA, ICAO	International Air Transport Association, International Civil Aviation Organization
TSCA	Toxic Substances Control Act
EPCRA	Emergency Planning and Community Right-to-Know Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
RQ	Reportable Quantity
DSL	Domestic Substance List
WHMIS	Workplace Hazardous Materials Information System

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Date of the previous revision: June 8, 202

Disclaimer: The data set forth in this sheet are based on information provided by the suppliers of the raw materials and chemicals used in the manufacture of the aforementioned product. **Rhino Linings Corporation** makes no warranty with respect to the accuracy of the information provided by their suppliers, and disclaims all liability of reliance thereof.