PRODUCT NAME(S): Rhino™ Concrete Repair Isocyanate

SECTION 1 – IDENTIFICATION

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

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

Product name: **Rhino™ Concrete Repair Isocyanate**
Chemical Name: Polymeric Diphenylmethane Diisocyanate Emulsion
Chemical Family: Aromatic Isocyanate

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 02 GHS 09 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
Acute Toxicity, Oral	5	H303	May be harmful if swallowed
Skin corrosion / Irritation	2	H315	Causes skin irritation
Serious eye damage / Eye irritation	2A	H319	Causes serious eye irritation
Aspiration hazard	1	H304	May be fatal if swallowed and enters airways
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
Carcinogenicity	2	H351	Suspected of causing cancer
Reproductive Toxicity	2	H361	Suspected of damaging fertility or the unborn child
Specific target organ toxicity, single exposure	3	H335 H336	May cause respiratory irritation May cause drowsiness or dizziness.
Specific target organ toxicity, repeated exposure	2	H373	May cause damage to respiratory system through prolonged or repeated exposure by inhalation May cause damage to liver, kidney, blood and nervous system through prolonged or repeated exposure May cause damage to the eyes through prolonged or repeated exposure (vapors)
Aquatic Hazard, Acute	2	H401	Toxic to aquatic life
Aquatic Hazard, Long term	2	H411	Toxic to aquatic life with long lasting effects
Flammable Liquids	3	H226	Flammable liquid and vapor

Precautionary Statements:

Prevention:	P201	Obtain special instructions before use.
	P202	Do not handle until all safety precautions have been read and understood.
	P281	Use personal protective equipment as required.
	P260	Do not breathe mist, vapors, spray.
	P271	Use only outdoors or in a well-ventilated area.
	P264	Wash exposed area with plenty of water and soap thoroughly after handling.
	P272	Contaminated work clothing should not be allowed out of the workplace.

	P273	Avoid release in environment.
	P210	Keep away from flames and hot surfaces. No smoking.
	P233	Keep container tightly closed.
	P240	Ground container and receiving equipment.
	P241	Use explosion proof electrical, ventilating, lighting equipment.
	P242	Use only non-sparking tools.
	P243	Take precautionary measures against static discharge.
Response:	P301 + P310 + P331	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Do NOT induce vomiting.
	P304 + P341	IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.
	P342 + P311	If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.
	P303 + P361 + P353	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
	P333 + P313	If skin irritation or rash occurs: Get medical advice/attention.
	P363	Wash contaminated clothing before reuse.
	P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
	P337 + P313	If eye irritation persists: Get medical advice/attention.
	P308 + P313	IF exposed or concerned: Get medical advice/attention.
	P391	Collect spillage.
	P370 + P378	In case of fire: Use alcohol-resistant foam, dry chemical or carbon dioxide for extinction.
Storage:	P403 + P233 + P235	Store in a well-ventilated place. Keep container tightly closed. Keep cool.
	P405	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: No specific dangers known, if the regulations/notes for storage and handling are considered.

SECTION 3 – COMPOSITION / INFORMATION ON INGREDIENTS

Components	CAS #	EC #	Concentration, %
4,4'-Diphenylmethane Diisocyanate (MDI)	101-68-8	202-966-0	25 – 35
Solvent naphtha (petroleum), light aromatic	64742-95-6	265-199-0	20 – 35
Polymeric Diphenylmethane Diisocyanate	9016-87-9	None	20 – 30
Methyl-naphthalenes, mixed isomers	Not available	Not available	0 – 15
Naphthalene	91-20-3	202-049-5	0 – 4

SECTION 4 – FIRST-AID MEASURES

Description of First Aid measures:

Inhalation: Remove the exposed person to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or physician if experiencing respiratory symptoms.
If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed.
Asthmatic symptoms may develop and may be immediate or delayed up to several hours. Extreme asthmatic reactions can be life threatening.

Skin: Wash material off of the skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes immediately and wash them before reuse. Continue to rinse for at least 10 minutes. An MDI study has demonstrated that a polyglycol-based skin cleanser (such as D-TamTM,PEG-400) or corn oil may be more effective than soap and water. For severe exposures, immediately get under safety shower and begin rinsing.
If irritation develops, consult a physician or dermatologist.

Eye: Rinse cautiously with water for several minutes, especially under the eyelids. Remove contact lenses, if present and easy to do. Continue rinsing for at least 15 minutes. Do not rub eyes in order to prevent cornea injury. Immediate medical attention required.

Ingestion: Immediate medical attention required. Remove victim to fresh air and keep at rest in a position comfortable for breathing. Remove dentures if any.

If the exposed person is conscious, rinse mouth with water and then give plenty of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Do not induce vomiting unless directed to do so by medical personnel.
If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. Never induce vomiting or give anything by mouth if the victim is unconscious or having convulsions.

Most important symptoms/effects, acute and delayed: See Section 11 for more details.

General advice for First Aid responders: No action should be taken involving any personal risk or without suitable training. If potential for exposure exist refer to Section 8 for specific personal protective equipment. Show this SDS to physician.

Note to physician: Specific antidotes or neutralizers do not exist. Treatment should be supportive and based on the judgment of the physician in response to the reaction of the patient. Recommended medical monitoring for at least 48 hours.
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.
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.

SECTION 5 – FIRE-FIGHTING MEASURES

Suitable extinguishing media: Those recommended for Class B fuels: Alcohol-resistant foam, dry chemical or carbon dioxide fire extinguishers.

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

Specific hazards arising from the chemical: Flammable Liquid, Category 3 per GHS. If heated above its flash point, product will release flammable vapors which can burn in the open or be explosive in confined spaces if exposed to ignition source. Mists or sprays may be flammable below oils normal flash point. Keep away from extreme heat or open flame.
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. Water may not effectively extinguish fire; however, it should be used to keep fire-exposed containers and surfaces cool and prevent explosive rupture.

- Exposure to heated diisocyanate can be extremely dangerous. Reaction between water and hot isocyanate may be vigorous.
- Solvent naphtha (petroleum), light aromatic, CAS #: 64742-95-6: Flammable Liquid, Category 3 per GHS. Combustible Liquid, Class II per OSHA 29 CFR 1910.106.

Hazardous Combustion products: carbon and 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. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Always stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn. No action should be taken involving any personal risk or without suitable training.
No action should be taken involving any personal risk or without suitable training.

This material is toxic to aquatic life with long lasting effects. Water contaminated with this material must be contained and prevented being discharged to any waterway, sewer or drain. Fire water run-off, if not contained, will cause environmental damage.
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:
Keep unnecessary and unprotected personnel from entering. Ensure adequate ventilation/exhaust extraction. Avoid breathing vapors or mist during clean up. Use protective equipment as described in Section 8. Do not touch or walk through spilled material.

Environmental precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. Inform the relevant authorities if the product has caused environmental pollution. Water polluting material. May be harmful to the environment if released in large quantities. See Section 12.

Methods and materials for containment and cleaning up: Remove mechanically; cover the remainder with non-combustible absorbent material (e.g. sawdust, sand, earth, vermiculite or diatomaceous earth). After approximately one hour, transfer into properly labeled and approved chemical waste containers. Do not fill the container more than 2/3 full to allow for expansion. Cover container, but do not seal, and remove from work area. Keep in a well ventilated area. If necessary, repeat application of absorbent material until all liquid has been removed from the surface. Decontaminate the spill surface area using a neutralization solution. Scrubbing the surface with a broom or brush helps the decontamination solution to penetrate into porous surfaces. Wait at least 15 minutes after first

application of the neutralization solution. Cover the area again with absorbent material and shovel this into chemical waste container. Apply lid loosely to the waste container (do not tighten the lid because carbon dioxide gas and heat can be generated from the neutralization process). With the lid still loosely in place, move the container to an isolated, well-ventilated area to allow release of carbon dioxide. After 72 hours, seal the container, and properly dispose of the waste material and any contaminated equipment (i.e., broom or brush) in accordance with existing federal, state and local regulations.

Spill cleaning solutions:
Products or product mixtures that have been shown to be effective neutralization solutions for decontaminating surfaces, tools, or equipment that have been in contact with an isocyanate includes:

Products available through industrial suppliers:

- Spartan Chemical Company: 1-800-537-8990:
  - Spartan® ShineLine Emulsifier Plus
  - Spartan® SC-200 Heavy Duty Cleaner

Products available through retail outlets:

- ZEP® Commercial Heavy-Duty Floor Stripper
- Greased Lightning® Super Strength Cleaner and Degreaser
- EASY OFF® Grill and Oven Cleaner or EASY OFF® Fume Free Oven Cleaner
- A mixture of 50% Simple Green® Pro HD Heavy-Duty Cleaner and 50% household ammonia
- A mixture of 90% Fantastic® Heavy Duty All Purpose Cleaner and 10% household ammonia.

Note: Always wear proper PPE when cleaning up an isocyanate spill and using a neutralization solution. It may take two or more applications of the neutralization solution to decontaminate the surface. Check for residual surface contamination using a surface wipe method such as the CLI Swype® pad.

For major spills: Stop leak if without risk. Move containers from spill area. Remove ignition sources. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or contain and collect with an absorbent material as described in the previous paragraph.

For minor spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly with soap and water to remove residual contamination.
Never return spills to original containers for re-use.

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: Protect chemical from atmospheric moisture. Avoid prolonged exposure to heat and air. Keep away from sources of ignition. Use only non-sparkling tools. Do not reseal if contamination is suspected.
Use adequate ventilation to keep airborne levels below the exposure limits. Do not inhale vapors and mists. Wear respiratory protection if material is heated, mixed, sprayed or used in a confined space. Avoid contact with skin and eyes. Wear appropriate eye and skin protection. Wash hands thoroughly after handling. Hands and/or face should be washed before eating, drinking and smoking and at the end of the shift. Remove contaminated clothing and protective equipment before entering eating areas. Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed.

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 original or approved alternative container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink.
Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Protect it against physical damage and moisture. Normal temperature and pressures do not affect the material. Keep liquid away from heat, sparks and flame. Do not cut, drill, grind, weld or perform similar operations on or near containers. Use appropriate containment to avoid environmental contamination. Segregate from acids and acid forming substances.

Storage stability: Stable under normal conditions.
Storage temperature: 60 - 90°F (15 - 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: Not available for mixture. Results for components are listed in Section 15.

Advice on system design:
Provide process enclosures, local exhaust ventilation or other engineering controls to maintain recommended PEL. See Section 2 for applicable hazards.

Appropriate engineering controls: Use only with adequate ventilation. Use explosion-proof ventilation equipment.
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. 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. Wear anti-static protective clothing, boots and gloves when there is a risk of ignition from static electricity.

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:	Brown Liquid
Odor:	Solvent-like
Odor threshold:	Not available
pH:	Not available
Melting point/ freezing point:	Not available for mixture; Solvent Naphtha -95-(-44)°C; Naphthalene: 79 - 81.0°C (175 - 178°F)
Initial boiling point and boiling range:	For mixture: >176°C (>350°F); Solvent Naphtha: 161-173°C; Naphthalene: 218°C (424°F)
Flash point:	Not available for mixture; Solvent Naphtha: 40°C (104°F) (CC); Naphthalene 80°C (176°F) (CC)
Evaporation rate:	Slow
Flammability (solid, gas):	Not flammable
Upper/ lower flammability or explosive limits:	Not available for mixture; Solvent Naphtha: 7.0%(V)/1.0%(V); Naphthalene: 5.9%(V)/ 0.9%(V)
Vapor pressure:	Not available for mixture; Solvent Naphtha 2.8-4.05 hPa at 25°C; Naphthalene: 0.04 hPa (0.03 mmHg) at 25.0°C and 1.3 hPa (1.0 mmHg) at 53.0°C
Vapor density:	Not available for mixture; Solvent Naphtha: 4.3; Naphthalene: 4.4 (vs air)
Relative density:	for mixture: 1.1; Solvent Naphtha: 0.86-0.88 g/cm^3 at 25°C; Naphthalene: 0.99
Solubility (water):	Not available for mixture; Solvent Naphtha: 40-75 mg/L at 25°C; Naphthalene: 30 mg/L (25°C)

Partition coefficient n-octanol/water:	Not available for mixture; Solvent Naphtha: log Kow: 3.42-3.90 at 25C; Naphthalene: log Pow: 3.30
Auto-ignition temperature:	For mixture: >449°C (>840°F); Solvent Naphtha: 400°C; Naphthalene: 526°C (979°F)
Decomposition temperature:	Not available
Viscosity:	For mixture: 5 - 15 cps

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.

Note: Product contains Solvent naphtha (petroleum), light aromatic, CAS #: 64742-95-6: Flammable Liquid, Category 3 per GHS. Keep away from open flame and sparks.

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 and 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: May be harmful if swallowed. Adverse symptoms may include abdominal pain, nausea, vomiting, and diarrhea.
Dermal: May be harmful in contact with skin. Adverse symptoms may include irritation, redness, swelling, dryness and cracking.
Inhalation: Harmful if inhaled. Irritating to respiratory system. Inhalation of vapors may cause irritation of the mucous membranes of the nose, throat or trachea, breathlessness, chest discomfort, difficult breathing and reduced pulmonary function. Inhalation exposure well above the PEL may result additionally in eye irritation, headache, chemical bronchitis, asthma-like findings or pulmonary edema. Isocyanates have also been reported to cause hypersensitivity pneumonitis, which is characterized by flu-like symptoms, the onset of which may be delayed.
Skin corrosion / irritation:
Irritating to the skin. Skin contact may result in dermatitis, either irritative or allergic with symptoms of reddening, itching, and swelling.
Serious eye damage / eye irritation:
May cause serious eye irritation. Adverse symptoms may include tearing, redness and itching. Prolonged contact may cause conjunctivitis.
Specific target organ toxicity, single exposure:
May cause temporary irritation of the respiratory tract. May cause central nervous system depression.

- Isocyanate may cause respiratory system irritation.
- Solvent naphtha (petroleum), light aromatic, CAS #: 64742-95-6: May cause drowsiness or dizziness.
- Naphthalene, CAS #: 91-20-3: May cause respiratory irritation. May cause drowsiness or dizziness.

Aspiration hazard: Yes.

Chronic toxicity:
Respiratory and Skin Sensitizer:
This product contains components that are reported to be a respiratory and skin sensitizer.

- 4,4'-Diphenylmethane Diisocyanate (MDI), CAS #: 101-68-8: Reported to be a respiratory and skin sensitizer in humans. Sensitization possible after skin contact. The substance may cause sensitization of the respiratory tract. 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 a later exposure to isocyanate at levels well below the PEL/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 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 reported to cause lung damage, including a decrease in lung function, which may be permanent. Prolonged contact 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 indicate that skin contact may play a role in causing respiratory sensitization. However, the relevance of this result for humans is unclear.
- Naphthalene, CAS #: 91-20-3: may cause skin allergy.

Germ cell mutagenicity:

Based on available data, risk to humans is not expected from exposure to this product.

Carcinogenicity:

This product contains component(s) suspected to be carcinogenic by IARC.

- 4,4'-Diphenylmethane Diisocyanate (MDI), CAS #: 101-68-8: IARC: Group 3 (Not classifiable as to its carcinogenicity to humans).
- Petroleum solvents: IARC: Group 3 (Not classifiable as to its carcinogenicity to humans).
- Naphthalene, CAS #: 91-20-3: IARC: Group 2B (Possible human carcinogen)

Reproductive toxicity:

This product contains component(s) which are suspected of damaging fertility or the unborn child.

- Solvent naphtha (petroleum), light aromatic, CAS #: 64742-95-6: Possible reproductive hazard.
- Naphthalene, CAS #: 91-20-3: limited evidence that may damage the developing fetus.

Specific target organ toxicity, repeated exposure:

Respiratory system, lungs, olfactory epithelium after repeated inhalation, liver, kidney, blood, eyes, skin.

Medical conditions aggravated by overexposure:

Respiratory system, kidney, liver, blood, eyes and skin disorders.

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.

Pre-employment and periodic medical examinations with respiratory function tests (FEV, FVC as a minimum) are suggested.

Toxicity test results: Not available for mixture. Results for components:

Components	Test Results
4,4'-Diphenylmethane Diisocyanate (MDI), CAS #: 101-68-8	Acute Toxicity Oral LD50 (Rat): >2,000 mg/kg (Directive 84/449/EEC, B.1) Dermal LD50 (Rabbit): >9,400 mg/kg Inhalation LC50 (Rat), 1hr: 2.0 mg/L (OECD Guideline 403) An aerosol was tested. Skin corrosion/irritation (Rabbit): irritating (Draize test) Serious eye damage/eye irritation (Rabbit): irritating (Draize test) Chronic Toxicity Sensitization (guinea pig): sensitizing (Buehler test) (mouse): Can cause skin sensitization (Mouse Local Lymph Node Assay) Genetic toxicity: in vitro (Salmonella typhimurium): with and without metabolic activation ambiguous (OECD Guideline 471 Ames-test) / in vivo (rat): Inhalation negative (OECD Guideline 474 Micronucleus assay); The substance was mutagenic in various bacterial test systems; however, these results could not be confirmed in tests with mammals. Carcinogenicity: Experimental/calculated data (rat, inhalation) at 0, 0.2, 1, 6 mg/m³: Lung tumors (OECD Guideline 453) Teratogenicity: (rat, inhalation) at 0, 1, 4, 12 mg/m³: NOAEL Mat.; 4 mg/m³, NOAEL Teratog.: 4 mg/m³ (OECD Guideline 414) - The substance did not cause malformations in animal studies; however, toxicity to development was observed at high doses that were toxic to the parental animals. Repeated inhalative uptake of the substance did not cause damage to the reproductive organs. Birth defects were not seen in two independant animal (rat) studies. Fetotoxicity was observed at doses that were extremely toxic (including lethal) to the mother. Fetotoxicity was not observed at doses that were not maternally toxic. The doses used in these studies were maximal, respirable. STOT, RE: Experimental/calculated data: (rat, inhalation) 2 yrs, 6 hr/day at 0, 0.2, 1, 6 mg/m³: olfactory epithelium; NOAEL: 0.2 mg/m³, LOAEL: 1 mg/m³
Solvent naphtha (petroleum), light aromatic, CAS #: 64742-95-6	Acute Toxicity: Oral (Rat): LD50: >5,000 mg/kg; Minimally toxic. May cause gastro-intestinal pain, coughing, headache, dizziness, diarrhea, nausea, vomiting and unconsciousness. Dermal (Rabbit): LD50: >3,000 mg/kg; Minimally toxic. May cause dryness leading to itching and dermatitis. Inhalation (Rat), 4hrs: LC50: 6,000-10,000 mg/m^3; Minimally toxic. Exposure to levels exceeding the TLV or PEL may result in central nervous system depression. Symptoms include drowsiness, dizziness and loss of coordination. Skin corrosion/irritation (Rabbit): moderately irritating to skin. Adverse symptoms: redness, dryness or roughness. Serious eye damage/eye irritation (Rabbit): Irritating to eyes. Not expected to cause serious eye damage. STOT, SE: May cause drowsiness or dizziness. Target organs: Central nervous system Aspiration Hazard: Aspiration into the lungs if swallowed or when vomiting may cause chemical pneumonitis which can be fatal. Chronic Toxicity Respiratory and Skin Sensitization: Not expected to be a skin sensitizer. Did not cause sensitization in laboratory animals. Germ cell mutagenicity: Negative. Carcinogenicity: IARC: Group 3 Reproductive Toxicity: Possible reproductive toxicant. STOT, RE: Not expected to cause organ damage from prolonged or repeated exposure. *Based on the Systematic Toxicity and physical-chemical properties of this material when compared with test data from similar compounds.
Naphthalene, CAS #: 91-20-3	Inhalation and skin absorption Acute Toxicity: Oral (Rat): LD50: 490 mg/kg; Abdominal pain. Diarrhea. Convulsions. Unconsciousness. Dermal (Rabbit): LD50: >20,000 mg/kg Inhalation (Rat), 1hr: LC50: >340 mg/m^3; Can irritate nose and throat causing coughing and wheezing, eyes and cause general depressed activity. High exposure may cause headache, fatigue, tremor, dizziness, nausea, vomiting, weakness, sweating, confusion. Skin corrosion/irritation (Rabbit): May be absorbed through skin. High or repeated exposure can irritate skin. Serious eye damage/eye irritation (Rabbit): High or repeated exposure can irritate and burn the eyes. STOT, SE: May cause respiratory irritation. May cause drowsiness or dizziness.

	Aspiration Hazard: No. Chronic Toxicity Respiratory and Skin Sensitization: may cause skin allergy. Germ cell mutagenicity: EPA GENETOX PROGRAM 1988, Cell transformation /mouse and rat embryo, Histidine reversion-Ames test: Negative Carcinogenicity: GHS: Carcinogenicity (Category 2); IARC: Group 2B (possible human carcinogen); NTP - Reasonably anticipated to be a human carcinogen; ACGIH: A4 (Not Classifiable as a Human Carcinogen); OSHA: No component of this product is identified as a carcinogen. OSHA - No component of this product is identified as a carcinogen. Limited evidence of carcinogenicity in animal studies; NCI Carcinogenesis Studies (inhalation); clear evidence: rat; unclear evidence: mouse; NTP Carcinogenesis Studies (inhalation);some evidence: mouse; There is evidence that it causes cancer of larynx and intestines in humans and nasal and lung in animals. Reproductive Toxicity: limited evidence that may damage the developing fetus. Tumorogenic effects - uterine tumors. Teratogenicity: Naphthalene and its metabolites have been reported to cross the human placenta in amounts sufficient to cause fetal toxicity. Oral, rat: TDLo = 4500 mg/kg (female 6-15 day(s) after conception) Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus) and Specific Developmental Abnormalities - other developmental abnormalities.; Intraperitoneal, rat: TDLo = 5925 mg/kg (female 1-15 day(s) after conception) Specific Developmental Abnormalities - musculoskeletal system and cardiovascular (circulatory) system. STOT, RE: Liver (Jaundice), kidney, blood (anemia) , central nervous and respiratory system, eyes (cataract), skin. Absorption into the body leads to the formation of methemoglobin which in sufficient concentration causes cyanosis. Onset may be delayed 2 to 4 hours or longer. Naphthalene is retinotoxic and systemic absorption of its vapors above 15ppm, may result in: cataracts, optic neuritis, corneal injury, eye irritation. Ingestion may provoke the following symptoms: hemolytic anemia, hemoglobinuria, nausea, headache, vomiting, gastrointestinal disturbance, convulsions, anemia, kidney injury, seizures, coma.

SECTION 12 – ECOLOGICAL INFORMATION

Ecotoxicity: Acutely and chronically hazardous for aquatic organisms. 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: Not known for mixture. See Table below for components.
Mobility in soil: Not known for mixture. See Table below for components.

Other adverse effects: Not known.

Ecotoxicity test results: Not available for the mixture. Results for components:

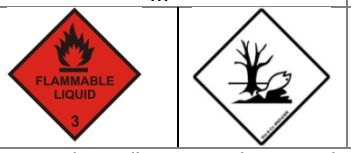
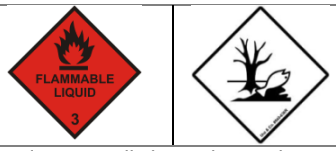
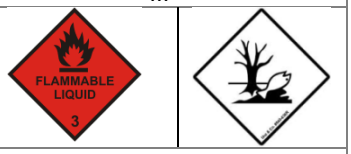
Components	Test Results
4,4'-Diphenylmethane Diisocyanate (MDI), CAS #: 101-68-8	Acute Toxicity Fish: LC50, 96hrs: > 1,000 mg/L (OECD Guideline 203, static) LC50, 96hrs: 772.14mg/L (OECD Guideline 203, static) Aquatic invertebrates: EC50, 24hrs: > 1,000 mg/L (OECD Guideline 202, part 1, static) Aquatic plants: EC50, 72hrs: 1,640 mg/L (growth rate) (OECD Guideline 201, static) Ecological Data Activated sludge (EC50 aerobic bacteria from a domestic water treatment plant), 3hrs: >100 mg/L (OECD Guideline 209) Elimination data Aerobic, activated sludge, 28days: 0 % BOD of the ThOD; Poorly biodegradable (OECD Guideline 302 C); Stability in Water (Hydrolysis): $t_{1/2:}$ 20 hours (25 °C) Bioconcentration factor (common carp), 28days: 200 (OECD Guideline 305 E)
Solvent naphtha (petroleum), light aromatic, CAS #: 64742-95-6 Use these data	Acute Toxicity: Harmful to aquatic life in very low concentrations. Fish (Rainbow trout), 96hrs: LC50=9.2 mg/L; Aquatic invertebrates (Daphnia magna), 48hrs: EC50=3.2 mg/L Aquatic plants (algae), 72hrs: EC50= 2.6 mg/L Chronic toxicity: Very toxic to aquatic life with long lasting effects. Fish (Rainbow trout), 28days: NOELR: 1.23 mg/L; Aquatic invertebrates (Daphnia magna), 21day: NOELR: =2.14 mg/L Ecological Data Biodegradability: Not readily biodegradable. Half-lives can be expected to range from a couple of days to a few months. Oxygen depletion: 30.9% in 2days Bioaccumulative potential: log Kow: >3, has potential to bioacumulate. Bioconcentration factor (BCF): No data available. Mobility in soil: No data available. Results of PBT and vPvB assessment: not a PBT or a vPvB.
Naphthalene, CAS #: 91-20-3 For SDS	Acute Toxicity: Harmful to aquatic life in very low concentrations. Fish (Rainbow trout), 96hrs: LC50=0.9-9.8 mg/L; (fathead minnow): 1 - 6.5 mg/L Aquatic invertebrates (Daphnia magna), 48hrs: EC50=1.0-3.4 mg/L Aquatic plants: (green algae), 24hrs: EC50= 33 mg/L Chronic toxicity: Very toxic to aquatic life with long lasting effects. Fish, 3 days: NOEC: 1.8 mg/L; LOEC: 3.2 mg/L Ecological Data Biodegradability: Not readily biodegradable. Half-lives can be expected to range from a couple of days to a few months. Bioaccumulative potential: Bioconcentration factor (BCF): 427 - 1,158. Bioconcentration occurs to a moderate extent but since depuration and metabolism readily proceed in aquatic organisms, this is a short term problem. In the atmosphere, naphthalene rapidly photodegrades (half-life 3-8 hr). Naphthalene shows low biological oxygen demand and is expected to cause little O_2 depletion in aquatic systems. Mobility in soil: When adsorbed to sediment, biodegradation occurs much more rapidly than in the overlying water column. When spilled on land, naphthalene is adsorbed moderately to soil and undergoes biodegradation. However, in some cases it will appear in the groundwater where biodegradation still may occur if conditions are aerobic. Results of PBT and vPvB assessment: Log P (oct) = 3.01 - 3.59

SECTION 13 – DISPOSAL CONSIDERATIONS

Product Disposal: The generation of waste should be avoided or minimized wherever possible. If product becomes a waste, it meets criteria of hazardous waste as defined in 40 CFR 261, Subpart C and D. Do not discharge into sewer system. Spill cleanup residues are subject to RCRA storage and disposal requirements.
Dispose waste in compliance with local, state and federal regulations via licensed waste disposal contractor. Preferred disposal method is burning in a chemical incinerator equipped with an afterburner and scrubber; extra care should be taken in igniting as this material is highly flammable.

Container disposal: Even after emptying, container may retain residues. Do not heat or cut empty container with electric or gas torch since highly toxic vapors and gases can be formed. 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

	Land transport, U.S. DOT	Sea transport, IMDG:	Air transport, IATA/ICAO:
UN number:	UN 1993	UN 1993	UN 1993
UN proper shipping name:	Flammable liquids, n.o.s. (contains Solvent naphtha and 4,4'-Diphenylmethane Diisocyanate (MDI))	Flammable liquids, n.o.s. (contains Solvent naphtha and 4,4'-Diphenylmethane Diisocyanate (MDI))	Flammable liquids, n.o.s. (contains Solvent naphtha and 4,4'-Diphenylmethane Diisocyanate (MDI))
Transport hazard class(es):	3	3	3
Packing group:	III	III	III
Hazard Label			
Environmental Hazard:	Yes. Marine pollutant. Product contains environmentally hazardous substances.		
Special precautions:	Special Provisions: B1, B52, IB3, T4, TP1, TP29 Exceptions: 150 Non bulk: 203 / Bulk: 242 Passenger aircraft rail: 60L / Cargo aircraft only: 220L		

SECTION 15 – REGULATORY INFORMATION

U.S. Regulations:
OSHA HCS: This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29CFR 1910.1200.
TSCA Regulations:
All components of this product are listed or are exempt from TSCA Inventory requirements under 40 CFR 720.30.
EPCRA Section 302 (40 CFR Part 355) (Emergency Response Planning, Extremely Hazardous Substance):
No components are subject to the reporting.
EPCRA Section 304 (40 CFR Part 355) (Emergency Release Notification Requirements):
No components are subject to the reporting.
EPCRA Sections 311 & 312 (Hazardous Chemical Inventory Reporting, Hazard Categories):
Fire hazard, Acute Health Hazard, Chronic Health Hazard
EPCRA Section 313 (40 CFR Part 372) (Toxic Chemical Release Inventory Reporting):
The following components are subject to the reporting:
4,4'-Diphenylmethane Diisocyanate (MDI), CAS #: 101-68-8
Naphthalene, CAS #: 91-20-3: De Minimis: 0.1%
CERCLA Sections 102-103 (40 CFR Part 302) (Hazardous Substances Release Notification):
The following components are subject to the reporting if a criterion of reportable quantity is fulfilled:
4,4'-Diphenylmethane Diisocyanate (MDI): RQ: 5,000 lbs; Product RQ: 15,000 lbs. (1,900 gallons)
Solvent naphtha (petroleum), light aromatic, CAS #: 64742-95-6: RQ: Not assigned
Naphthalene, CAS #: 91-20-3: RQ: 100 lbs; Product RQ: 3,000 lbs. (380 gallons)
Clean Air Act:

- Ozone Depleting Substances (ODS): This product does not contain and is not manufactured with ozone depleting substances.
- Hazardous Air Pollutants, OSHA, Section 112(b), Table Z-1: The following component(s) are listed:

Substance	Regulatory Limits			Recommended Limits	
	OSHA PEL		Cal/OSHA PEL (as of 4/26/13)	NIOSH REL (as of 4/26/13)	ACGIH® 2015 TLV®
	ppm[(d)]	mg/m^3	8-hour TWA, mg/m^3	Up to 10-hour TWA, mg/m^3	8-hour TWA, mg/m^3
4,4'-Diphenylmethane Diisocyanate, CAS #: 101-68-8	(C) 0.02	(C) 0.2	0.005 ppm	0.05 mg/m^3 (C) 0.2 mg/m^3 [10-min]	0.005 ppm
Solvent naphtha (petroleum), light aromatic, CAS #: 64742-95-6	500	2,000	1,600 ppm	350 (C) 1,800 (15min)	See TLV Book Appendix H
Naphthalene, CAS #: 91-20-3	10	50	10ppm (ST) 15ppm	10ppm (ST) 15ppm	10ppm (ST) 15ppm

ppm-parts per million; C-Ceiling Limit; ST-Short term exposure limit

Clean Water Act:

- Section 307(a)(1) (Toxic pollutants): Naphtahalene, CAS #: 91-20-3
- Section 311(b)(2): The following components are listed in Table 116.4A (Hazardous chemicals) / Table 117.3 (RQ):
  Naphtahalene, CAS #: 91-20-3 / 100 lbs

EPA Hazardous Waste Code: D001 (Ignitable waste)
RCRA Code: Naphtahalene, CAS #: 91-20-3: U165

NFPA rating: Health: 2 Fire: 2 Reactivity: 1 Special: 0
HMIS rating: Health: 2 Flammability: 2 Physical hazard: 1

State Regulations:
California Prop. 65 Components:
This product contains chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.
Naphtahalene, CAS #: 91-20-3:
- causes cancer; Date listed: April 19, 2002

Instruction: for regulatory information on components of this mixture, check the appropriate state websites.

International Regulations/Inventories:
Canadian Regulations: All components of this product are listed or are exempt from the DSL.
WHMIS Classification (Controlled Products Regulations):
Class D-1A: Material causing immediate and Serious toxic effects (very toxic).
Class D-2A: Material causing other toxic effects (very toxic).
Class D-2B: Material causing other toxic effects (Toxic).
Class B3: Combustible Liquid
WHMIS Label Information:

Europe, European Inventory of Existing Commercial Chemical Substances (EINECS): All components are listed or exempted.
Australia inventory (AICS): All components are listed or exempted.
China inventory (IECSC): All components are listed or exempted.
Japan inventory: All components are listed or exempted.
Korea inventory: All components are listed or exempted.
Malaysia Inventory (EHS Register): All components are listed or exempted.
New Zealand Inventory of Chemicals (NZIoC): All components are listed or exempted.
Philippines inventory (PICCS): All components are listed or exempted.
Taiwan inventory (CSNN): All components are listed or exempted
Brazil Regulations Classification system used: Norma ABNT-NBR 14725-2:2012

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
HEPA	High Efficiency Particulate Air
IARC	International Agency for Research on Cancer
NTP	National Toxicology Program
COD	Chemical Oxygen Demand
BOD	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
TQ	Threshold Quantity

TPQ	Threshold Planning Quantity
EHS	Extremely Hazardous Substances
DSL	Domestic Substance List
WHMIS	Workplace Hazardous Materials Information System

Latest revision date: January 7, 2016 – Preparation of SDS in accordance to the GHS requirements
Date of the previous revision: September 4, 2014

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.