PRODUCT NAME(S): RhinoChrome

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: **RhinoChrome**
Chemical Name: Homopolymer of Hexamethylene Diisocyanate
Chemical Family: Aliphatic 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 07 GHS 02

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
Respiratory Sensitization	1	H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled
Skin Sensitization	1	H317	May cause an allergic skin reaction
Specific target organ toxicity, single exposure	3	H335 H336	May cause respiratory irritation May cause drowsiness and 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 the eyes (conjunctivitis) through prolonged or repeated exposure (vapors)
Flammable Liquids	3	H226	Flammable liquid and vapor

Precautionary Statements:

Prevention:	P260	Do not breathe mist, vapors, spray.
	P271	Use only outdoors or in a well-ventilated area.
	P285	In case of inadequate ventilation wear respiratoryprotectio n
	P270	Do not eat, drink or smoke when using this product.
	P280	Wear protective gloves/ protective clothing / eye protection/ face protection.
	P264	Wash exposedarea with plentyof water and soap thoroughlyafter handling.
	P272	Contaminated work clothing should not be allowed out of the workplace.
	P210	Keep away from flames and hot surfaces. No smoking.
	P240	Ground container and receiving equipment.
	P241	Use explosion proof electrical, ventilating, lighting equipment.
	P242	Use only non-sparking tools.
	P243	Take precautionarymeasures against static discharge.
Response:	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 respiratorysymptoms: Call a POISON CENTER or doctor/physician.

	P305 + P351 + P338	IF IN EYES: Rinse cautiouslywith water for several minutes. Remove contact lenses, if present and easyto do. Continue rinsing.
	P337 + P313	If eye irritation persists: Get medical advice/attention.
	P303 + P361 + P353	IF ON SKIN (or hair): Remove/Take off immediatelyall 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.
	P314	Get medical advice/attention if you feel unwell.
	P370 + P378	In case of fire: Use alcohol-resistant foam, dry chemical, carbon dioxide or dry sand 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: Repeated exposure maycause skin dryness or cracking.

SECTION 3 – COMPOSITION / INFORMATION ON INGREDIENTS

Components	CAS #	EC #	Concentration, %
Homopolymer of Hexamethylene Diisocyanate	28182-81-2	500-060-2	70
Triethyl Phosphate	78-40-0	201-114-5	30

SECTION 4 – FIRST-AID MEASURES

Description of First Aid measures:

Inhalation: Immediate medical attention required. Call a poison center or physician. Remove exposed person to fresh air and keep at rest in a position comfortable for breathing.
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 respiratoryarrest 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 maybe delayed.
Asthmatic symptoms maydevelop and may be immediate or delayed up to several hours. Extreme asthmatic reactions that may occur in sensitized persons 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 immediatelyand 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, immediatelyget under safety shower and begin rinsing.
If irritation develops, consult a physician or dermatologist.

Eye: Immediatelyrinse with lukewarm water for several minutes, especially under the eyelids. Remove contact lenses, if present and easyto 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 exposed person to fresh air and keep at rest in a position comfortable for breathing. Remove dentures if any. Do NOT induce vomiting unless directed to do so by medical personnel.
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 maybe dangerous. If vomiting occurs, prevent aspiration by holding the head below the knees, so that vomit does not enter the lungs.
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. A qualified physician can perform gastric lavage onlywhen the airway (trachea) has been secured to prevent aspiration.

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 essentiallysymptomatic. An individual having a dermal or pulmonarysensitization 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 symptomaticallyas 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. Administration of absorbents such as activated charcoal maybe of value. Gastric lavage may be effective when performed by a physician within 4 hours of ingestion.

SECTION 5 – FIRE-FIGHTING MEASURES

Suitable extinguishing media: Alcohol-resistant foam, dry chemical, carbon dioxide fire extinguishers and water spray.
Unsuitable extinguishing media: Direct water stream maycause frothing, splattering of burning material and spreading of fire.

Specific hazards arising from the chemical: Product is flammable. Keep awayfrom extreme heat or open flame. Product may release flammable vapors below normal ambient temperatures. When mixed with air and exposed to ignition source, they can burn in the open or be explosive in confined spaces. Flammable vapors maybe heavier than air and travel long distances along the ground before igniting and flashing back to vapor source. Mists or sprays may be flammable below regular flash points.
Fire in vicinity poses risk of pressure build-up and rupture. Containers at risk from fire should be cooled with water and, if it can be done without risk, 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. Hazardous Combustion products: carbon and nitrogen oxides, amines, hydrogen cyanide, lower molecular weight organic molecules, hydrogen chloride, hydrogen fluoride and other halogenated 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. Immediatelywithdraw all personnel from the area in case of rising sound from venting safetydevice or discoloration of the c ontainer. Always stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this i s impossible, withdraw from area and let fire burn. No action should be taken involving any personal risk or without suitable training.

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 unnecessaryand unprotected personnel from entering. Ensure adequate ventilation/exhaust extraction. Avoid breathing vapors or mist during clean up. Use protec tive 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.

Methods and materials for containment and cleaning up: Product is flammable. Eliminate all sources of ignition. Use clean non-sparking tools to collect absorbed material. All equipment used when handling this product must be grounded. A vapor suppressing foam may be used to reduce vapors. Water spraymay reduce vapor; but may not prevent ignition in closed spaces.
Remove mechanically; cover the remainder with non-combustible absorbent material (e.g. sand, earth, vermiculite or diatomaceous earth). After approximatelyone 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 looselyto 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 looselyin place, move the container to an isolated, well-ventilated area to allow release of carbon dioxide. After 72 hours, seal the container, and properlydispose of the waste material and any contaminated equipment (i.e., broom or brush) in accordance with existing federal, state and local regulatio ns.

Spill cleaning solutions:
Products or product mixtures that have been shown to be effective neutralization solutions fo r 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 su rface 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 thoroughlywith 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 RCRAand require storage and disposal as hazardous waste. For major spills, see Section 1 for the Emergencycontact; for further disposal measures, see Section 13.

SECTION 7 – HANDLING AND STORAGE

Precautions for safe handling: Product is flammable. Check atmosphere for explosiveness and oxygen deficiencies. Eliminate all sources of ignition. Ground and bond containers and equipment before transferring to avoid static sparks. All equipment must conform to applicable electrical code. Use clean non-sparking tools. Carefullyvent any internal pressure before removing closure. Handleempty containers with care; vapor/residue may be flammable.
Avoid exposure to heat and air. Protect chemical from atmospheric moisture. 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 respiratoryprotection 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.
This material can produce asthmatic sensitization upon either single inhalation exposure to a relatively high concentration o r upon repeated inhalation exposures to lower concentrations. Individuals with asthma, chronic respiratorydisease or prior allergic reactions to isocyanates and those with a historyof 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 readyfor 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 awayfrom heat, sparks and flame. Do not cut, drill, grind, weld or perform similar operations on or near containers. Use clean non-sparking tools. Ground and bond containers and equipment. Use appropriate containment to avoid environmental contamination. Segregate from acids and acid forming substances.

Storage stability: Stable under normal conditions.
Storage temperature: 39 - 86°F (4 - 30°C)
Storage Period: 12 months

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. All equipment must conform to applicable electrical code. Use clean non-sparking tools.

Appropriate engineering controls: Use only with adequate ventilation. Diisocyanates can onlybe smelled if the occupational exposure limit has been exceeded considerably. Emissions from ventilation or process equipment should be checked to ensure they complywith the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessaryto reduce emissions to acceptable levels. Curing ovens must be ventilated to prevent emissions into the workplace. If oven off-gases are not vented properly(i.e. they are released into the work area), it is possible to be exposed to airborne monomeric HDI.

Personal protective equipment:
Eye/face protection:

When directly handling liquid product, eye protection is required. Exam ples of eye protection include safetyglasses 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 byACGIH. 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:

A respirator that is recommended or approved for use in isocyanate-containing environments (air-purifying or fresh air-supplied) maybe necessaryfor spray or high temperature applications which mayproduce inhalation exposures. A supplied-air respirator (either positive pressure or continuous flow-type) is recommended. Before an air-purifying respirator can be used, air monitoring must be performed to measure airborne concentrations of HDI monomer and HDI polyisocyanate. Observe OSHA regulations for respirator use (29 CFR 1910.134).
Spray application: Good industrial hygiene practice dictates that when isocyanate -based coatings are sprayapplied, some form of respiratoryprotection should be worn.
Non-sprayapplication: During non-sprayoperations such as mixing, batch-making, brush or roller application, etc., at elevated temperatures (heating of material or application to a hot substrate), it is possible to be exposed to airborne isocyanate vap ors.

Regardless of the application, use of a supplied-air (either positive pressure or continuous flow-type) respirator is mandatory when ONE OR MORE of the following conditions exists:

- the airborne isocyanate concentrations are not known or
- the airborne isocyanate monomer concentrations exceed 0.05ppm averaged over 8hours (10 times the 8hour TWA exposure limit) or
- the airborne polyisocyanate (polymeric, oligomeric) concentrations exceed 5mg/m^3 averaged over 8hours or 10mg/m^3 averaged over 15 minutes (10 times the 8hour TWA or the 15 minute STEL exposure limits) or
- operations are performed in a confined space (See OSHA Confined Space Standard, 29 CFR 1910.146).

A properly fitted air-purifying (combination organic vapor and particulate) respirator, proven by test to be effective in isocyanate-containing environments, and used in accordance with all recommendations made bythe manufacturer, can be used when ALL of the following conditions are met:

- The airborne isocyanate monomer concentrations are known to be below 0.05 ppm averaged over 8 hours (10 times 8 hour TWA exposure limit); and -the airborne polyisocyanate (polymeric, oligomeric) concentrations are known to be below 5 mg/m^3 averaged over 8 hours or 10 mg/m3 averaged over 15 minutes (10 times the 8 hour TWA or the 15 minute STEL exposure limits) and
- a NIOSH-certified End of Service Life Indicator or a change schedule based upon objective information or data is used to ensure that cartridges are replaced before the end of their service life. In addition, prefilters should be changed whenever breathing resistance increases due to particulate buildup.

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. Emergencyeyewash fountains and safetyshower 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 historyof eczema or respiratoryallergies such as hayfever, are possi ble 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 histo ryof prior isocyanate sensitization should be excluded from further work with is ocyanates. A comprehensive annual medical surveillance program should be instituted for all employees who are potentiallyexposed to diisocyanates. Once a worker has been diagnosed as sens itized 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 anyfurther exposure.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Colorless to light yellow liquid
Odor:	Fruity
Odor threshold:	Not available
pH:	Not available
Melting point/ freezing point:	Not available for mixture; PCBTF: 36°C
Initial boiling point and boiling range:	Not available for mixture; PCBTF: 139°C
Flash point:	Not available for mixture; CAS #: 28182-81-2: 158°C (316°F) (DIN 53213); DMM: 65°C (149°F)
Evaporation rate:	Not available
Flammability(solid, gas):	Not available
Upper/ lower flammabilityor explosive limits:	Not available for mixture; PCBTF: 10.5 %/0.9 %
Vapor pressure:	Not available for mixture; HDI: 5.2 x 10^{-9} mm Hg at 20°C (68°F); PCBTF: 5.3mm Hg @ 20°C and 7.63mm Hg

Vapor density:	Not available;
Relative density:	Not available for mixture; CAS #: 28182-81-2: 1.17 g/cm^3 at 20°C (DIN 53217); PCBTF: 1.334 g/cm^3 @ 25°C (77°F)
Solubility (water):	Insoluble, reacts slowlywith water to liberate CO_2
Partition coefficient n-octanol/water:	Not available for mixture; PCBTF: log Kow = 3.70
Auto-ignition temperature:	Not available for mixture; CAS #: 28182-81-2: ~445°C (833°F) (DIN 51794); PCBTF: >500°C
Decomposition temperature:	Not available for mixture; PCBTF: starts at 124°C
Viscosity:	Not available for mixture

SECTION 10 – STABILITY AND

Reactivity: Isocyanate is insoluble in and heavier than water, sinks to the bottom, but reacts slowlyat 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 progressivelymore vigorous and can be violent at higher temperatures if the miscibilityof the reaction partners is good or is supported by stirring or by the presence of solvents. Vapors may form explosive mixture with air.
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, mist formation, heat, open flame and sparks , pressure formation. Protect from freezing.

Incompatible materials: Strong oxidizing agents. Water, alcohols, amines, bases, acids, nitrates, copper, aluminum and zinc alloys. This material mayattack some forms of plastics (vinyl and styrene based), rubbers, and coatings.

Hazardous decomposition products: Depend upon temperature, air supplyand presence of other materials. Can include, but are not limited to carbon and nitrogen oxides, amines, hydrogen cyanide, lower molecular weight organic molecules , hydrogen chloride, hydrogen fluoride and other halogenated molecules. Creates dense black smoke when burned without sufficient oxygen.

SECTION 11 – TOXICOLOGICAL INFORMATION

Likely Routes of Exposure: Inhalation, Skin and Eye Contact, Ingestion.
Symptoms of exposure:
Acute toxicity:
Oral: Harmful if swallowed (irritation and burns of the digestive tract). Adverse symptoms mayinclude abdominal pain, nausea, vomiting and diarrhea.
Dermal: May be harmful in contact with skin. Adverse symptoms mayinclude irritation and redness.
Inhalation: Irritating to respiratorysystem. Inhalation of vapors may cause irritation of the mucous membranes of the nose, throat or trachea with symptoms of runny nose, sore throat, coughing, choking, wheezing, breathlessness, chest discomfort, difficult breathing and reduced pulmonaryfunction. Inhalation exposure well above the PEL may result additionallyin eye irritation, headache, chemical bronchitis, asthma-like findings or pulmonaryedema and CNS depression (fatigue, dizziness , loss of concentration, collapse, coma and death in cases of severe over-exposure). Isocyanates have also been reported to cause hypersensitivitypneumonitis, which is characterized by flu-like symptoms, the onset of which may be delayed.
Skin corrosion / irritation: Irritating to skin. Skin contact may result in dermatitis , either irritative or allergic with symptoms of reddening, itching, and swelling.
Serious eye damage / eye irritation: Causes serious eye irritation. Adverse symptoms mayinclude tearing, redness, itching and swelling. May cause temporarycorneal injury. Vapor or aerosol maycause irritation with symptoms of burning and tearing.
Specific target organ toxicity, single exposure:
Causes temporaryirritation of the respiratorytract.
Aspiration hazard:
Based on physical properties, not likely to be an aspiration hazard.

Chronic toxicity:
Respiratory and Skin Sensitizer:
This product is a skin and respiratory sensitizer.

- Homopolymer of Hexamethylene Diisocyanate, CAS #:28182-81-2: skin and respiratory sensitizer
- Polyisocyanate based on Hexamethylene Diisocyanate, CAS #: Trade Secret: skin and respiratory sensitizer
- Hexamethylene-1,6-Diisocyanate, CAS #: 822-06-0: skin and respiratory sensitizer

Sensitization ispossible after skin contact. The substance may cause sensitization of the respiratory tract. Asa 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 hoursafter 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. Thisincreased lung sensitivity can persist for weeks and in severe cases for several years. Chronic overexp osure 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 asa result of contact with very small amountsof liquid material, or even asa result of vapor-only exposure. Animal testsindicate that skin contact may play a role in causing respiratory sensitization. However, the relevance of thisresult for humansisunclear.

Germ cell mutagenicity:

This product does not contain component(s) known or reported to be mutagenic.

Carcinogenicity:

No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC, NTP, OSHA or AGCIH.

Reproductive toxicity:

This product does not contain component(s) known or reported to cause reproductive toxicity.

Specific target organ toxicity, repeated exposure:

Respiratorysystem, lungs, olfactoryepithelium , liver and kidney damage, central nervous system damage after repeated or prolonged inhalation. Prolonged vapor contact with the eyes may cause conjunctivitis.

Medical conditions aggravated by overexposure:

The isocyanate component is a respiratorysensitizer. Respiratorysensitization mayresult in allergic (asthma-like) signs in the lower respiratorytract including wheezing, shortness of breath and difficulty breathing, the onset of which may be delayed. Repeated inhalation of high concentrations maycause lung damage, including reduced lung function, which maybe permanent.

Medical supervision of all employees who handle or come into contact with isocyanates is recommended. Persons with history of respiratorydisease or hypersensitivity should not be exposed to this product. Persons with asthmatic conditions, chronic bronchitis, other chronic respiratorydiseases, recurrent eczema or pulmonarysensitization should be excluded from working with isocyanates. Once a person is diagnosed as having pulmonarysensitization (allergic asthma) to isocyanates, further exposure is not recommended.

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

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

Components	Test Results
Homopoly mer of Hexamethy lene Diisocy anate, CAS #:28182-81-2 and Poly isocy anate based on Hexamethy lene Diisocy anate, CAS #: Trade Secret	Data is based on similar product, including residual monomer. Acute Toxicity Oral LD50 (Rat): >2,500 mg/kg (OECD Guideline 423) Dermal LD50 (Rabbit): >2,000 mg/kg / (Rat): >2,000 mg/kg (OECD Guideline 402) Inhalation LC50 (Rat), 4hr: 0.39-0.543 mg/L (OECD Guideline 403); The test atmosphere generated in the animal study is not representativ e of workplace env ironments, how the substance is placed on the market, and how it can reasonably be expected to be used. Theref or e the test result cannot be directly applied f or the purpose of assessing hazard. Based on the weight of the ev idence, a modif ied classif ication f or acute inhalation toxicity is justified. Skin corrosion/irritation (Rabbit), 4hrs: slightly irritating (OECD Test Guideline 404) Serious ey e damage/ey e irritation (Rabbit): slightly irritating (OECD Test Guideline 405) Chronic Toxicity Sensitization (mouse): skin sensitizer (Mouse Local Ly mph Node Assay) (OECD Test Guideline 429); (guinea pig): skin sensitizer (Maximisation Test (OECD Test Guideline 406, GPMT) respiratory sensitizer Germ cell mutagenicity : in v itro (Salmonella ty phimurium): negativ e (OECD Guideline 471, Ames-test) and (Chinese hamster): negativ e (chromosome aberration test) / in v iv o in mammalian cells: negativ e (HPRT test) Carcinogenicity (Rat), 5 day s a week/6 hours a day : Negativ e in animal experiments. STOT, RE (Rat, inhalation), 90 day s/5 day s a week/6 hours a day : NOAEL: 3,3 mg/m³ Irritation to lungs and nasal cav ity . Evidence of damage to other organs was not f ound.
Triethyl Phospate CAS# 78-40-0	Acute oral toxicity Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury ; howev er, swallowing larger amounts may cause injury . LD50, Rat, 3,300 mg/kg Acute dermal toxicity Prolonged skin contact is unlikely to result in absorption of harmf ul amounts. LD50, Rat, > 2,000 mg/kg Acute inhalation toxicity Prolonged exposure is not expected to cause adv erse ef f ects. Based on the av ailable dat a, narcotic ef f ects were not observ ed. Based on the av ailable data, respiratory irritation was not observ ed. LC50, Rat, 4 Hour, v apour, > 5.25 mg/l No deaths occurred at this concentration. Skin corrosion/irritation Prolonged exposure not likely to cause signif icant skin irritation. Serious ey e damage/ey e irritation May cause slight ey e irritation. Corneal injury is unlikely . Sensitization Skin contact may cause an allergic skin reaction in a small proportion of indiv iduals. For respiratory sensitization: No relev ant data f ound. Specif ic Target Organ Sy stemic Toxicity (Single Exposure) Ev aluation of av ailable data suggests that this material is not an STOT-SE toxicant. Specif ic Target Organ Sy stemic Toxicity (Repeated Exposure) In animals, ef f ects hav e been reported on the f ollowing organs: Adrenal gland. Kidney . Liv er. Carcinogenicity No relev ant data f ound.

	Teratogenicity Has been toxic to the f etus in laboratory animals at doses toxic to the mother. Did not cause birth def ects in la boratory animals. Reproductiv e toxicity In animal studies, did not interf ere with reproduction. Mutagenicity In v itro genetic toxicity studies were negativ e. Animal genetic toxicity studies were negativ e. Aspiration Hazard Based on phy sical properties, not likely to be an aspiration hazard.
Hexamethy lene-1,6- Diisocy anate, CAS #: 822-06-0	Acute Toxicity Oral LD50 (Rat): 746 mg/kg (OECD Test Guideline 401) Dermal LD50 (Rat): > 7,000 mg/kg (OECD Test Guideline 402) Inhalation LC50 (Rat), 4hrs: 0.124 mg/L (OECD Guideline 403) Skin corrosion/irritation (Rabbit): Corrosiv e (OECD Test Guideline 404) Serious ey e damage/ey e irritation (Rabbit): Corrosiv e (OECD Test Guideline 405) Chronic Toxicity Sensitization (guinea pig): skin and respiratory sensitizer (Maximisation Test (GPMT) (mouse): skin sensitizer (Mouse Local Ly mph Node Assay) (human): skin sensitizer Germ cell mutagenicity : in v itro (Salmonella ty phimurium): with and without metabolic activ ation: negativ e (OECD Guideline, 471 Ames-test) / in v iv o (mammalian cells): negativ e (OECD Guideline 474, Micronucleus assay (HPRT test)) Carcinogenicity (Rat, Inhalation), 2 y rs/5 day s/week/6 hours/day : Negative in animal experiments. Reproductiv e toxicity (Rat), Inhalation, 6 hours/day , 7 day s/week: NOAEL: 0.3 ppm; Negativ e in animal experiments (combin ed with Repeated Dose Toxicity Study); Dev elopmental (Rat, f emale, inhalation), gestation day s 0 - 19, daily : NOAEL(teratogenicity): >0.3 ppm, NOAEL (maternal): < 0.3 ppm / Ef f ects not observ ed at tested doses. STOT, RE (Rat, inhalation), 2 y ears/5 day s a week/6 hours a day : NOAEL: < 0.005 ppm; LOAEL: 0.005 ppm / Irritation to lungs and nasal cav ity . Ev idence of damage to other organs was not f ound. Neurological: (Rat, inhalation), 3weeks/6hours a day : 0.3ppm -no ef f ects or damage to nerv e tissue.

SECTION 12 – ECOLOGICAL INFORMATION

Ecotoxicity: Although not classified as environmental hazard, it is not excluded possibilitythat product may be acutely and chronically harmful to aquatic organisms. Product is immiscible, but will react with water to produce inert and non-biodegradable solids. In air, the predominant degradation process is predicted to be a relatively rapid OH radical attack, based on calculation and analogywith related diisocyanates.

Persistence and degradability: Not readily biodegradable byOECD 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: Isocyanate emitted to water or soil will be readily converted into polyureas.

Other adverse effects: No known significant effects or critical hazards.

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

Components	Test Results
Homopoly mer of Hexamethy lene Diisocy anate, CAS #:28182-81-2 and Poly isocy anate based on Hexamethy lene Diisocy anate, CAS #: Trade Secret	Data is based on similar product, including residual monomer. Acute Toxicity Fish (Zebra f ish), 96hrs: LC50>100 mg/L (OECD Guideline 203, static) Aquatic inv ertebrates (Daphnia magna), 48hrs: EC50>100 mg/L (OECD Guideline 202, part 1, static) Aquatic plants (algae), 72hrs: ErC50>1,000 mg/L (growth rate) (OECD Guideline 201, static) Microorganisms (Activ ated sludge), 3hrs: EC50=3,238 mg/L Elimination data Biodegradability , 28 day s: 1%; Not readily degradable. Bioaccumulation: Not considered to be persistent, bioaccumulating nor toxic (PBT).
Triethyl Phospate CAS# 78-40-0	Very toxic to aquatic lif e with long lasting ef f ects. Acute toxicity to f ish Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitiv e species tested). LC50, Poecilia reticulata (guppy), static test, 96 Hour, > 1,000 mg/l NOEC sublethal, Oncorhy nchus my kiss (rainbow trout), f low-through test, 14 Hour, > 300 mg/l Acute toxicity to aquatic inv ertebrates LC50, Daphnia magna (Water f lea), static test, 24 Hour, > 1,000 mg/l Chronic aquatic toxicity Chronic toxicity to aquatic inv ertebrates NOEC, Daphnia magna (Water f lea), semi-static test, 21 d, number of of fspring, 10 mg/l LOEC, Daphnia magna (Water f lea), semi-static test, 21 d, number of of f spring, 32 mg/l MATC (Maximum Acceptable Toxicant Lev el), Daphnia magna (Water f lea), semi-static test, 21 d, number of of f spring, 18 mg/l Toxicity to soil-dwelling organisms LC50, Eisenia f etida (earthworms), 14 d, surv iv al, > 1,000 mg/kg Biodegradability : Material is inherently biodegradable (reaches > 20% biodegradation in OECD test(s) f or inherent biodegradability). Based on stringent OECD test guidelines, this material cannot be considered as readily biodegradable; howev er, these results do not n e cessarily mean that the material is not biodegradable under env ironmental conditions. 10-day Window: Fail Biodegradation: 18 - 32 % Exposure time: 28 d Method: OECD Test Guideline 301B or Equiv alent 10-day Window: Not applicable Biodegradation: 25 % Exposure time: 28 d Method: OECD Test Guideline 302B or Equiv alent

	Theoretical Oxy gen Demand: 2.17 mg/mg Photodegradation Test Ty pe: Half -lif e (indirect photoly sis) Sensitizer: OH radicals Atmospheric half -lif e: 3.8 Hour Method: Estimated. Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3). Partition coef f icient: n-octanol/water(log Pow): 0.42 Measured Bioconcentration f actor (BCF): 4 Oncorhy nchus my kiss (rainbow trout) 43 d Measured Giv en its v ery low Henry 's constant, v olatilization f rom natural bodies of water or moist soil is not expected to be an important f ate process. Potential f or mobility in soil is v ery high (Koc between 0 and 50). Partition coef f icient (Koc): 2 Estimated.
Triethyl Phospate CAS# 78-40-0	Acute Toxicity Fish (Zebra f ish), 96hrs: LC50=82.8 mg/L (OECD Guideline 203, static) Aquatic inv ertebrates (Daphnia magna), 48hrs: EC50=89.1 mg/L (OECD Guideline 202, part 1, static) Aquatic plants (algae), 72hrs: ErC50=77.4 mg/L (growth rate) (OECD Guideline 201, static) Microorganisms (Activ ated sludge), 3hrs: EC50=842 mg/L Elimination data Biodegradability , aerobic, 28 day s: 42%; Not readily degradable. Bioaccumulation: 57.6 BCF (calculated). An accumulation in aquatic organisms is not expected.

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 highlyflammable.

Container disposal: Even after emptying, container may retain residues. Do not heat or cut empty container with electric or gas torch since highlytoxic vapors and gases can be formed. Empty containers should be completelydrained and safelystored until appropriatelyreconditioned or disposed through licensed contractor in accordance with government regulation s.
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. Hexamethylene-1,6-Diisocyanate, CAS #: 822-06-0: RQ: 100 lbs; Product RQ: >5,000 lbs
UN number:	UN 3082
UN proper shipping name:	Other regulated substances, liquid, n.o.s. (contains Hexamethylene-1,6-Diisocyanate)
Transport hazard classes:	9
Packing group:	III
Hazard Label	

SECTION 15 – REGULATORY INFORMATION

U.S. Regulations:
OSHA HCS: This product is a "Hazardous Chemical" as defined bythe 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) (EmergencyResponse Planning, Extremely Hazardous Substance):
No components are subject to the reporting.
EPCRA Section 304 (40 CFR Part 355) (EmergencyRelease 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 and impurities are subject to the reporting:
- Hexamethylene-1,6-Diisocyanate, CAS #: 822-06-0

CERCLA Sections 102-103 (40 CFR Part 302) (Hazardous Substances Release Notification):
The following components are subject to the reporting:
- Hexamethylene-1,6-Diisocyanate, CAS#: 822-06-0: RQ: 100 lbs; Product RQ: >5,000 lbs

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: No components are listed.

Available Exposure Limits for Components not regulated by OSHA:

Homopoly mer of Hexamethy lene Diisocy anate, CAS #:28182-81-2	Supplier Exposure Limit: TWA: 0.5 mg/m ^{3} Supplier STEL: 1.0 mg/m^3 (15 min)
Triethyl Phosphate, CAS #: 78-40-0	US. ACGIH TLV: TWA: 0.005 ppm NIOSH REL: TWA: 0.005 ppm (0.035 mg/m^3) and 0.020 ppm (0.140 mg/m^3) [10-minute]

Clean Water Act:

- Section 307(a): (Priority Toxic Pollutants 40 CFR 401.15): No components are listed.
- Section 311(b)(2): Table 116.4A (Hazardous chemicals) / Table 117.3 (RQ): No components are listed.

RCRA Hazardous Waste Code: D001 (Ignitable waste)

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

State Regulations:

California Prop. 65 Components:

This product does not contain chemicals known to State of California to cause cancer, birth defects, or any oth er reproductive harm.

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

International Regulations/Inventories:

Canada: All ingredients of this product are listed or are exempt from the DSL.

SECTION 16 – OTHER INFORMATION

LEGEND

GHS	Globally Harmonized Sy stem
CAS	Chemical Abstracts Serv ices
EC	European Community
EPA	Env ironmental Protection Agency
OSHA	Occupational Saf ety and Health Administration
ACGIH	American Conf erence of Gov ernmental Industrial Hy gienists
NIOSH	National Institute of Occupational Saf ety and Health
PEL	Permissible Exposure Limits
TLV	Threshold Limit Value
REL	Recommended Exposure Limit
TWA	Time-Weighted Av erage
STEL	Short-term exposure limit
IARC	International Agency f or Research on Cancer
NTP	National Toxicology Program
COD / BOD	Chemical Oxy gen Demand / Biological Oxy gen Demand
STOT, SE	Specif ic Target Organ Toxicity f ollowing Single Exposure
STOT, RE	Specif ic Target Organ Toxicity f ollowing Repeated Exposure
DOT	Department of Transportation
IMDG	International maritime dangerous goods code
IATA, ICAO	International Air Transport Association, International Civ il Av iation Organization
TSCA	Toxic Substances Control Act
EPCRA	Emergency Planning and Community Right-to-Know Act
CERCLA	Comprehensiv e Env ironmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
RQ	Reportable Quantity
DSL	Domestic Substance List
WHMIS	Workplace Hazardous Materials Inf ormation Sy stem

Latest revision date: May 16, 2016
Date of the previous revision: November 5, 2015 – Preparation of SDS in accordance to the GHS requirements

Disclaimer: The data set forth in this sheet are based on information provided by the suppliers of the raw materials and chemic als 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 liabilityof reliance thereof.