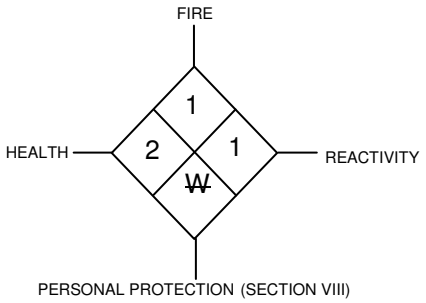
Rhino Linings®

MATERIAL SAFETY DATA SHEET

Part No.: 10374-A, 10378-A, 10390-A, 10392-A, 10394-A

PRODUCT NAME: RHINOPAK™ 55D ISO



HMIS HAZARD RATING
LEAST---0 SLIGHT---- 1
MODERATE --- 2 HIGH ------- 3
EXTREME ---- 4

SECTION 1 - MANUFACTURER IDENTIFICATION

MANUFACTURER'S NAME: Rhino Linings Corporation

ADDRESS: 9151 Rehco Road, San Diego, CA, 92121

INFORMATION PHONE: 858-450-0441

EMERGENCY CONTACT: (CHEMTREC): **800-424-9300**

DATE: December 8, 2008

SUPERSEDES: June 8, 2007

SECTION 2 - HAZARDOUS INGREDIENTS

Ingredients	CAS #	Percent By Weight	ACGIH TLV
4,4'-Diphenylmethane Diisocyanate	101-68-8	45-55%	0.005ppm
Polyurethane Prepolymer	59675-67-1	35-45%	Not listed
Diphenylmethane Diisocyanate Mixed Isomers	26447-40-5	≤ 1%	Not listed

Section 313 Supplier Notification
This product contains the following EPCRA section 313 chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (40 CFR 372): Diisocyanate Compounds (Category Code N120)

4,4' - MDI	101-68-8	45-55%	0.005 ppm

SECTION 3 – PHYSICAL DATA

Appearance: Yellow or light straw colored liquid.
Odor: Slightly misty.
Odor Threshold (ppm): 0.4 mg/ m^3 (4,4' Diphenylmethane Diisocyanate)
pH: Not applicable
Flash Point: > 200˚ F (93˚ C) Pensky-Martens Closed Cup
Vapor Pressure (mm Hg at 20˚ C): Approx. 0.0001 mmHg @ 77˚ F
Vapor Density (air = 1): 8.5 approx.
Boiling Point: 406 ˚ F estimated

Melting Point: Not available
Solubility (Water): Reacts with water.
Solubility (Other): Soluble in most organic solvents.
Specific Gravity: 1.16 @ 77˚ F

Viscosity: 180 – 250 cps @ 25º C
V.O.C.s: None
Freezing Point: 41 ˚ F

SECTION 4 – HEALTH HAZARDS DATA

Health Hazards: Irritating to eyes, respiratory system and skin. Inhalation at levels above the occupational exposure limit could cause respiratory sensitization. Risk of serious damage to respiratory system. The onset of the respiratory symptoms may be delayed for several hours after exposure. A hyper-reactive response to even minimal concentrations of MDI may develop in sensitized persons. Sensitized persons should not be exposed to any mixture containing unreacted MDI.
Physical Hazards: Reacts slowly with water to produce carbon dioxide, which may rupture closed containers. This reaction accelerates at higher temperatures.

General: Polymeric MDI:
Oral LD50 (rat) > 5,000 mg/kg
Dermal LD50 (rabbit) > 5,000 mg/kg
Inhalation LC50 (rat) > 490 mg/ m^3/4 hour (respirable aerosol)

Inhalation: This product is a respiratory irritant and potential respiratory sensitizer. Inhalation of vapor or aerosol at levels above the occupational exposure limit could cause respiratory sensitization and lung injury. Symptoms may include irritation to the eyes, nose, throat, and lungs, possibly combined with dryness of the throat, tightness of chest and difficulty in breathing and/or flu-like symptoms. The onset of the respiratory symptoms may be delayed for several hours after exposure. A hyper-reactive response to even minimal concentrations of MDI may develop in sensitized persons.

SECTION 4 – HEALTH HAZARDS DATA (Continued)

Skin Contact: Moderate irritant. Repeated and/or prolonged contact may cause skin sensitization. There is limited evidence from animal studies that skin contact may play a role in respiratory sensitization. These results emphasize the need for protective clothing including gloves to be worn at all times when handling these chemicals or in maintenance work.
Eye Contact: The aerosol, vapor or liquid will irritate human eyes following contact.
Ingestion: Ingestion may cause irritation of the gastrointestinal tract. Based on the acute oral LD50, this product is considered practically non-toxic by ingestion.
Chronic Effects: A study was conducted where groups of rats were exposed for 6 hours a day, 5 days a week for a lifetime to atmospheres of respirable polymeric MDI aerosol either at concentrations of 0, 0.2, 1, 6 mg/m^3. No adverse effects were observed at 0.2 mg/m^3 concentrations. At the 1 mg/m^3 concentrations, minimal nasal and lung irritant effects were seen. Only at the top concentration (6.0 mg/m^3) there was an increased incidence of a beginning tumor of the lung (adenoma) and on malignant tumor (adenocarcinoma). Overall, the tumor incidence, both benign and malignant, and the number of animals with tumors were not different. The increased incidence of lung tumors is associated with prolonged respiratory irritation and the concurrent accumulation of yellow material in the lung. In the absence of prolonged exposure to high concentrations leading to chronic irritation and lung damage, it is highly unlikely that a tumor formation will occur.
There are reports that excessive chronic exposure to diisocyanates may result in permanent decrease in lung function.
Carcinogenicity: The ingredients of this product are not classified as carcinogenic by ACGIH or IARC, not regulated as carcinogens by OSHA, and not listed as carcinogens by NTP.
Mutagenicity: There is no substantial evidence of mutagenic anticipated.
Reproductive Effects: No adverse reproductive effects are anticipated.
Teratogenicity & Fetotoxicity: No birth defects were seen in two independent 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 concentrations well in excess of the defined occupational limits.

SECTION 5 – FIRST AID MEASURES

First Aid Procedures
General: In case of accident or if you feel unwell, seek medical advice IMMEDIATELY (show the label where possible).
Inhalation: Remove patient from exposure, keep warm and at rest. Obtain medical attention. Treatment is symptomatic for primary irritation or difficulty in breathing. If breathing is labored, oxygen should be administered by qualified personnel. Apply artificial respiration if breathing has ceased or shows signs of failing.
Skin Contact: Remove contaminated clothing. Wash affected areas thoroughly with soap and lukewarm water. If irritation, redness, or a burning sensation develops and persists, obtain medical advice. Contaminated clothing should be thoroughly cleaned before reuse.
Eye Contact: Immediately flush eyes with running water for a minimum of 15 minutes. Hold eyelids open during flushing. If irritation persists, repeat flushing eyes. Obtain medial attention IMMEDIATELY.
Ingestion: *Do not* induce vomiting. Provided the patient is conscious, wash out mouth with water, then give 1 or 2 glasses of water to drink. Refer person to medical personnel for immediate attention.
Note to Physician: Symptomatic and supportive therapy as needed. Following severe exposure medical follow-up should be monitored for at least 48 hours.

SECTION 6 - FIRE AND EXPLOSION HAZARD DATA

Flash Point: > 200 ˚ F (93˚ C) **Flammable Limits (Lower):** Not available. **Flammable Limits (Upper):** Not available.
Auto Ignition Temperature: 464˚ F (240˚ C) 4,4'-Diphenylmethane Diisocyanate
Decomposition Temperature: Not available **Rate of Burning:** Not available.
Explosive Power: None **Sensitivity to Mechanical Impact:** None
Sensitivity to Static Discharge: None
Combustion Products: Carbon monoxide, carbon dioxide, nitrogen oxides and some HCN.
Fire & Explosion Hazards: Containers may burst under intense heat. Due to reaction with water, a hazardous build up of pressure could result if contaminated containers are re-sealed.
Extinguishing Media: Carbon dioxide, dry chemical, or appropriate foam. If water is used, very large quantities are required. Reaction between water and hot isocyanate may be vigorous. Contain run-off water with temporary barriers.
Fire Fighting Procedures: As appropriate for surrounding materials/equipment.
Fire Fighting Protective Equipment: Use self-contained breathing apparatus & full protective clothing (Bunker gear).

SECTION 7 – REACTIVITY DATA

Hazardous Decomposition Products: Highly unlikely under normal industrial use. See section 4.
Chemical Stability: Stable at room temperature.
Conditions to Avoid: Avoid high temperatures. Avoid freezing.
Incompatibility With Other Substances: This product will react with any materials containing active hydrogens such as water, alcohol, amines, bases and acids. The reaction with water is very slow under 122˚ F (55˚ C) but is accelerated at higher temperatures.
Hazardous Polymerization: Polymerization may occur at elevated temperatures in the presence of alkalies, tertiary amines and metal compounds.

SECTION 8 – SPILL OR LEAK PROCEDURES

For major spills call CHEMTREC (800) 424-9300
Spills, Leaks, or Release: Clean-up should only be performed by trained personnel. People dealing with major spillages should wear full protective clothing including full air supplied respirator. Evacuate the area. Prevent further leakage, spillage or entry into drains. Contain and absorb large spillages onto an inert, non-flammable absorbent carrier (such as earth or sand). Shovel into open-top drums or plastic bags for further decontamination, if necessary. Wash the spillage area clean with liquid decontaminant. Test atmosphere for MDI. Neutralize small spillages with decontaminant. Remove and properly dispose of residue. Notify applicable government authorities if release is reportable. The CERCLA RQ for MDI is 5,000 lbs (see CERCLA in section 15).
Preparation of Decontamination Solution: Prepare a decontamination solution of 0.2 – 0.5% liquid detergent and 3 – 8% concentrated ammonium hydroxide in water (5 – 10% sodium carbonate may be substituted for the ammonium hydroxide). Follow the precautions on the supplier's material safety data sheet when preparing and using solution.
Use of Decontamination Solution: Allow deactivated material to stand for al least 30 minutes before shoveling into drums. Do not tighten bungs. Mixing with water is also effective, but slower.

SECTION 9 – PERSONAL PROTECTION/PREVENTATIVE MEASURES

PREVENTIVE MEASURES
Conditions of use, adequacy of engineering or other control measures, and actual exposure will dictate the need for specific devices at your workplace.
Engineering Controls: Use local exhaust ventilation to maintain airborne concentrations below the TLV. Suitable respiratory equipment should be used in cases of insufficient ventilation or where operational procedures demand it. For guidance on engineering control measures refer to the ACGIH publication "Industrial Ventilation".

PERSONAL PROTECTIVE EQUIPMENT
Eye Protection: Chemical safety goggles. If there is a potential for splashing, use a full face shield.
Skin Protection: The following protective materials are recommended: Gloves – neoprene, nitrile rubber, butyl rubber. Thin latex disposable gloves should be avoided for repeated or long term use. Protective clothing should be selected and used in accordance with "Guidelines for the Selection of Chemical Protective Clothing" published by ACGIH.
Respiratory Protection: Use an approved NIOSH/MSHA positive pressure air-supplied respirator equipped with a full face piece, or an air-supplied hood, if airborne concentrations exceed or are expected to exceed the occupational exposure standard. Air purifying (cartridge type) respirators are not approved for protection against diisocyanates.
Exposure Guidelines: Medical supervision of all employees who handle or come in contact with respiratory sensitizers is recommended. Persons with respiratory problems including asthmatic-type conditions, chronic bronchitis, other chronic respiratory diseases or recurrent ski eczema or skin allergies should be evaluated for there suitability of working with this product. Once a person is diagnosed as sensitized, no further exposure to the material that caused the sensitization should be permitted.
Hazardous Ingredient(s):
4,4'-Dipheylmethane Diisocyanate:

ACGIH TLV	0.005 ppm (8 hour, 40 hours/week)
OSHA PEL CEILING	0.02 ppm
NIOSH REL/TWA	0.005 ppm (10 hour, 40 hours/week)
NIOSH REL/CEILING	0.002 ppm (10 minutes)

Note: The Occupational Exposure Limit listed for isocyanates do not apply to previously sensitized individuals.

SECTION 10 – HANDLING & STORAGE

Handling: Avoid personal contact with the product or reaction mixture. Use only with adequate ventilation to ensure that the occupational exposure limit is not exceeded. The efficiency of the ventilation system must be monitored regularly because of possibility of blockage. Avoid breathing aerosols, mists and vapors. When the product is sprayed or heated, an approved MSHA/NIOSH positive-pressure supplied air respirator may be required.

SECTION 10 – HANDLING & STORAGE (Continued)

Storage Requirements: Keep containers properly sealed. When stored indoors, keep in well ventilated area. Keep contents away from moisture due to reaction with water, producing CO2 – gas, a hazardous build-up of pressure could result if contaminated containers are re-sealed. **Do not reseal contaminated containers.** Uncontaminated containers, free of moisture, may be resealed only after placing under a nitrogen blanket. Do not store in containers made of copper, copper alloys, or galvanized surfaces.
Storage Temperature: Ideal storage temperature is 60 - 100˚ F (16 - 38˚ C). Keep stocks of decontaminant (see section 8).
Container Disposal: The generation of waste should be avoided or minimized wherever possible.
Disposal should be in accordance with local, state, provincial or national regulations. This material is not a hazardous waste under RCRA 40 CFR 261. Small quantities should be treated with a decontaminant solution (see section 8). The treated waste is not a hazardous material under RCRA 40 CFR 261. Chemical waste, even small quantities, should never be poured down drains, sewers or waterways.
Empty containers should be decontaminated and either passed to an approved drum recycler or destroyer.

SECTION 11 – REGULATORY INFORMATION

DOT: Single containers less than 5,000 lbs are not regulated. Single containers with 5,000 lbs or more of 4,4'-MDI are regulated as Other Regulated Substances, Liquid, N.O.S. (Methylene Diphenyl Diisocyanate), 9, NA3082, PGIII, RQ.
TDG: Not regulated.
IMO: Not regulated.
IATA/IACO Class: Not regulated.

USA CLASSIFICATION
OSHA Classification: This product is classified as a hazardous material under the criteria outlined in the OSHA Communication Standard (HCS) (29 CFR 1910.1200).

TSCA (Toxic Substance Control Act) Regulations: All ingredients are on the TSCA Chemical Substance Inventory.

EPCRA Section 313 (40 CFR 372): This product contains the following chemical(s) subject to reporting requirements: 49% 4,4'-MDI.

CERCLA (Comprehensive Environmental Response, Compensation and Liability Act): 4,4'-Methylene diphenyl diisocyanate (CAS # 101-68-8) has a 5,000 lb RQ (reportable quantity). Any spill or release above the RQ must be reported to the National Response Center (800-424-8802). The % of 4,4'-MDI in this product is listed in Section 2 of this MSDS.
This product does not contain nor is it manufactured with ozone depleting substances.
Other Regulations/Legislation which apply to this product: Massachusetts Right-to-Know, Pennsylvania Right-to-Know, New Jersey Right-to-Know, CERCLA.

CANADIAN CLASSIFICATION
This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS (Material Safety Data Sheet) contains all the information required by the CPR.

Controlled Products Regulations (WHMIS) Classifications: D-1A: Very toxic (acute effects) D-2A: Very toxic D-2B: Toxic

CEPA/Canadian Domestic Substances List (DSL): The substance(s) in this product is/are on the Canadian Domestic Substances List (CEPA DSL).

SECTION 12 - DISCLAIMER

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.

Rhino Linings®

MATERIAL SAFETY DATA SHEET

Part Nos.: 10374-B, 10378-B, 10390-B, 10392-B, 10394-B

PRODUCT NAME: RHINOPAK™ 55D RESIN- ALL COLORS

SECTION 1 - MANUFACTURER IDENTIFICATION

MANUFACTURER'S NAME: Rhino Linings Corporation

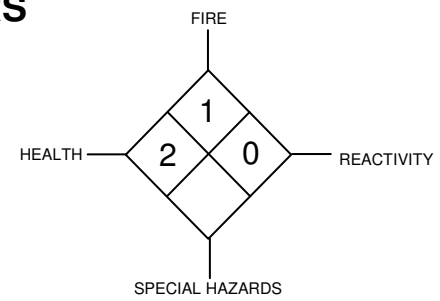
ADDRESS: 9151 Rehco Road, San Diego, CA, 92121

INFORMATION PHONE: 858-450-0441

EMERGENCY CONTACT: (CHEMTREC): **800-424-9300**

DATE: December 8, 2008

SUPERSEDES: June 8, 2007



HMIS HAZARD RATING
LEAST---0 SLIGHT---- 1
MODERATE --- 2 HIGH ------- 3
EXTREME ---- 4

SECTION 2 - HAZARDOUS INGREDIENTS

Ingredients	CAS #	OSHA PEL	ACGIH TLV
Glycol	111-46-6	N/E	N/E
Glycerol/EO/PO polymer	9082-00-2	N/E	N/E
Glyceryl poly(oxypropylene) diamine	9046-10-0	N/E	N/E

*No toxic chemical(s) subject to the reporting requirements of Section 313 of Title III and of 40 CFR 372.

SECTION 3 – PHYSICAL DATA

Boiling Point: > 392º F (> 200º C)
Vapor Density (Air = 1): Heavier than air.
Coating V.O.C.: 0 G/L (0 LB/GL)
Specific Gravity (H2O = 1): 1.06
Evaporation Rate: Slower than ether.
V.O.C.s: None

SECTION 4 – FIRE AND EXPLOSION HAZARD DATA

Flash Point: > 302º F (150º C) **Method:** PMCC
Flammable Limits in Air by Volume: (Based on Diglycol) Lower: N/E Upper: N/E
Extinguishing Media: Dry chemical, alcohol foam, carbon dioxide.
Special Fire Fighting Protective Equipment: Wear NIOSH approved self contained breathing apparatus in positive pressure mode with full face piece. Boots, gloves (neoprene), goggles & full protective clothing are also required.
Unusual Fire and Explosion Hazards: Closed containers may rupture due to very high temperatures or induced pressure.

SECTION 5 – HEALTH HAZARD ASSESSMENT

Skin Contact: Frequent and prolonged contact can cause irritation. Skin sensitization and irritation may develop after repeated and/or prolonged contact with human skin.
Skin Absorption: Systematically toxic concentrations of this product will probably not be absorbed through human skin.
Skin First Aid: Wash material off of the skin with plenty of soap and water. If redness, itching, or a burning sensation develops, get medical attention. Wash contaminated clothing and decontaminate footwear before reuse.
Eye Contact: Can induce irritation or chemical burns on contact with eyes.
Eye First Aid: Immediately flush eyes with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Have eyes examined and treated by medical personnel.
Ingestion: Swallowing small amounts of this material is not likely to cause harmful effects. Swallowing large amounts may be harmful.
Ingestion First Aid: Give 1 or 2 glasses of water and induce vomiting. Call a physician immediately. (Never give anything by mouth to an unconscious person).
Inhalation: Vapors can irritate eyes, nose and respiratory passages. Overexposure may induce headache or dizziness. Severe overexposure to this material could cause stomach or intestinal upset, chronic cough, dizziness, or weakness.
Inhalation First Aid: Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is labored, give oxygen. Consult medical personnel.

SECTION 5 – HEALTH HAZARD ASSESSMENT (Continued)

Carcinogenicity: NTP – No IARC Monographs – No OSHA Regulated – No
Health Hazards: Acute: Exposure may cause skin and eye irritation, respiratory tract irritation. Chemical burns may result due to overexposure. Affects of exposure may be delayed. **Chronic:** Repeated and prolonged exposure at low levels may result in adverse skin and eye effects, liver and kidney disorders.

SECTION 6 – REACTIVITY DATA

Stability: Stable under normal conditions.
Conditions to Avoid: Heat, high temperatures, open flame, sparks and moisture. Contact with incompatible materials in a closed system will cause buildup of pressure.
Incompatibility: Isocyanates and strong acids and oxidizers.
Hazardous Decomposition Products: Organic vapors and other thermal decomposition products.
Hazardous Polymerization: Will not occur.

SECTION 7 – SPILL OR LEAK PROCEDURES

Steps To Be Taken In Case Material is Released Or Spilled: Wear skin, eye, and respiratory protection during cleanup. Soak up material with absorbent and shovel into a chemical waste container. Cover container, but do not seal, and remove from work area. Residues from spill cleanup may continue to be regulated under provisions of RCRA and require storage and disposal as hazardous waste. For major spills, call CHEMTREC (Chemical Transportation Emergency Center) at 800-424-9300.
Disposal Method: Spill cleanup residues may still be subject to RCRA storage and disposal requirements. Dispose of in compliance with all relevant local, state, and federal laws and regulations regarding treatment.

SECTION 8 – SPECIAL PROTECTION INFORMATION

Ventilation: Good general ventilation should be sufficient to control airborne levels.
Respiratory Protection: When spraying, use a NIOSH approved supplied air respirator as required to prevent overexposure. In accordance with 29 CFR 1910.134, use either an atmosphere supplying respirator or and air purifying respirator for organic vapors.
Protective Clothing: Gloves determined to be impervious under the options of use such as nitrile gloves should be worn always when working with this product. Depending on conditions of use, additional protection may be reassured such as apron, arm covers, or full body suit. Wash contaminated clothing before wearing. Protective clothing should be selected and used in accordance with “Guidelines for the Selection of Chemical Protective Clothing” published by ACGIH.
Eye Protection: Chemical tight goggles or safety glasses.
Other Protective Equipment: Unhindered access to safety shower and eye wash stations. As a general hygiene practice, wash hands and face after use. Showers and cleaning of clothes are recommended. Follow all label instructions. Educate and train employees in safe use of product.

SECTION 9 – SPECIAL PRECAUTIONS OR OTHER COMMENTS

Precautions To Be Taken In Handling & Storing: Keep in cool, dry, ventilated storage area, in closed container and out of direct sunlight. Keep liquid away from heat, sparks and flame, store in container above ground and surrounded by dikes to contain spills or leaks. Excessive heat or pressure may ignite or detonate even liquid product in the absence of sparks or open flames. Keep containers closed when not in use. Containers, even those that have been emptied, may contain explosive vapors. Do not cut, drill, grind, weld or perform similar operations on or near containers. Do not pressurize to empty them.

SECTION 10– REGULATORY INFORMATION

USA CLASSIFICATION

OSHA Classification
Physical: Not Regulated
Health: Skin sensitizer. Irritant.
Target Organ: Skin. Central nervous system. Peripheral nervous system. Liver. Urinary tract. Gastrointestinal tract.

TSCA (Toxic Substance Control Act) Regulations: All ingredients are on the TSCA Chemical Inventory.

EPCRA Section 313 (40 CFR 372): This product does not contain any chemicals subject to reporting requirements.
This product does not contain nor is it manufactured with ozone depleting substances.

SECTION 10– REGULATORY INFORMATION (Continued)

Other Regulation/Legislation Which Apply To This Product: Massachusetts Right-to-Know, Pennsylvania Right-to-Know, New Jersey Right-to-Know.

CANADIAN CLASSIFICATION

This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS (Material Safety Data Sheet) contains all the information required by the CPR.

Controlled Products Regulations (WHMIS) Classification: D-2B: Irritant.

CEPA/Canadian Domestic Substance List (DSL): The substance(s) in this product is/are on the Canadian Domestic Substances List (CEPA DSL).

SECTION 11– SPECIAL PRECAUTIONS OR OTHER COMMENTS

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.