



PROTECT WITH  
**CONFIDENCE**

**1. Product and Company Identification**

Product Name: Raven 160

Raven Lining Systems  
13105 East 61st Street, Suite A  
Broken Arrow, OK 74012

[www.ravenlining.com](http://www.ravenlining.com)

Company Phone: (918) 615-0020  
Company Toll Free: (800) 324-2810

CHEMTREC 24 hour Emergency USA: (800) 424-9300  
CHEMTREC 24 hour International: (703) 527-3887

Product Use: Primer / Sealer / Coating / Lining  
Not recommended for: Non Professional Use

**2. Hazards Identification**

Signal Word: Danger



**GHS Ratings:**

Inhalation Toxicity	Acute Tox. 4	Gases>2500+<=5000ppm, Vapors>10+<=20mg/l, Dusts&mists>1+<=5mg/l
Skin corrosive	2	Reversible adverse effects in dermal tissue, Draize score: >= 2.3 < 4.0 or persistent inflammation.
Eye corrosive	2A	Eye irritant: Subcategory 2A, Reversible in 21 days.
Respiratory sensitizer	1	Respiratory sensitizer.
Skin sensitizer	1	Skin sensitizer.
Organ toxin single exposure	3	Transient target organ effects- Narcotic effects- Respiratory tract irritation.

**GHS Hazards**

H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.

**GHS Precautions**

P261	Avoid breathing dust/fume/gas/mist/vapours/spray.
P264	Wash thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P272	Contaminated work clothing should not be allowed out of the workplace.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P285	In case of inadequate ventilation wear respiratory protection.
P312	Call a POISON CENTER or doctor/physician if you feel unwell.
P321	Specific treatment (see Section 4 of the SDS).

P362	Take off contaminated clothing and wash before reuse.
P363	Wash contaminated clothing before reuse.
P302+P352	IF ON SKIN: Wash with soap and water.
P304+P340	IF INHALED: Remove person to fresh air and keep at rest in a position comfortable for breathing.
P304+P341	IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305+P351+P338	IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do - continue rinsing.
P332+P313	If skin irritation occurs: Get medical advice/attention.
P333+P313	If skin irritation or a rash occurs: Get medical advice/attention.
P337+P313	Get medical advice/attention.
P342+P311	If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.
P405	Store locked up.
P403+P233	Store in a well ventilated place. Keep container tightly closed.
P501	Dispose of contents/container according to Section 13 of the SDS.

### 3. Composition / Information on Ingredients

Chemical Name	CAS number	Weight Concentration %
Polymeric Isocyanate		30 - 60%
4,4'-Diphenylmethane Diisocyanate (MDI)	101-68-8	10 - 30%
Additive		10 - 30%
2,4'-Diphenylmethane Diisocyanate (MDI)	5873-54-1	5 - 15%
Polymeric Diphenylmethane Diisocyanate (pMDI)	9016-87-9	5 - 15%
Polymeric Diphenylmethane Diisocyanate		< 10%

### 4. First Aid Measures

**Inhalation:** Remove to fresh air if effects occur. If not breathing, give artificial respiration. If breathing is difficult, oxygen should be administered by qualified personnel. Consult a physician or transport to a medical facility.

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

**Skin Contact:** Wash immediately and thoroughly with soap and flowing water. Remove contaminated clothing while washing. Seek medical attention if irritation persists. An MDI skin decontamination study demonstrated that cleaning very soon after exposure is important, and that a polyglycol-based skin cleanser or corn oil may be more effective than soap and water.

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

**Notes to Physician:** No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Maintain adequate ventilation and oxygenation of the patient. May cause respiratory sensitization or asthma-like symptoms. Bronchodilators, expectorants and antitussives may be of help. Treat bronchospasm with inhaled beta2 agonist and oral or parenteral corticosteroids. Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed 24-48 hours for signs of respiratory distress. If you are sensitized to diisocyanates, consult your physician regarding working with other respiratory irritants or sensitizers. Cholinesterase inhibition has been noted in human exposure but is not of benefit in determining exposure and is not correlated with signs of exposure. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Excessive exposure may aggravate preexisting asthma and other respiratory disorders (e.g. emphysema, bronchitis, reactive airways dysfunction).

syndrome).

## 5. Fire Fighting Measures

Flash Point: >110 C (>230 F)

Flammable Properties: Product is not considered a fire hazard, but will burn if ignited.

NFPA Flammability Class: III B (Combustible liquid).

Suitable Extinguishing Media: Carbon dioxide, dry chemical, water fog or fine spray. Alcohol resistant foams are preferred, general purpose synthetic foams or protein foams may function, but will not be as effective.

Unsuitable Extinguishing Media: Do not use direct water stream, as it may spread fire.

Unusual Fire and Explosion Hazards: Product reacts with water. Reaction may produce heat and/or gases. This reaction may be violent. Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Dense smoke is produced when product burns.

Products of Combustion: Thermal decomposition in the presence of air may yield carbon monoxide, carbon dioxide, phenolics, ammonia, nitrogen oxides, isocyanates, hydrogen cyanide and other unidentified toxic and/or irritating compounds.

Fire Fighting: Stay upwind and keep people away. Isolate fire and deny unnecessary entry. Keep out of low areas where gases (fumes) can accumulate. Water is not recommended, but may be applied in large quantities as a fine spray when other extinguishing agents are not available. 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. Move container from fire area if this is possible without hazard. Use water spray to cool fire-exposed containers and fire-affected zone until fire is out. Contain fire water run-off if possible, as it may cause environmental damage. Review section 6 and section 12 of this SDS.

Protection of Firefighters: Wear positive pressure self-contained breathing apparatus (SCBA) and approved protective clothing (helmet, coat, trousers, boots and gloves). If contact is likely, use full chemical resistant fire fighting clothing with SCBA.

## 6. Accidental Release Measures

Personal Precautions: Put on appropriate personal protective equipment (see section 8).

Environmental Precautions: Prevent spilled material from contact with soil, drains and sewers.

Methods for Containment: Contain by diking with sand, earth or other suitable material.

Methods for Clean-up: Absorb spill with an inert material, use non-sparking tools to place into labeled waste container for disposal.

## 7. Handling and Storage

Handling: Wear appropriate personal protective equipment (see section 8). Avoid contact with skin, eyes or clothing. Do not breathe vapor or mist. Do not ingest. Avoid prolonged or repeated contact with skin. May cause allergic skin reaction, persons with a history of skin sensitization should not be employed in any process in which this product is used. Wash thoroughly with soap and water after handling. Do not handle or store near flame, heat or strong oxidants. Keep away from sources of ignition and hot metal surfaces.

Storage: Store original unopened containers in a sheltered area between 60°F and 80°F (15°C and 27°C) at atmospheric pressure. Do not store in direct sunlight. Keep containers closed when not in use.

## 8. Exposure Controls / Personal Protection

Chemical Name / CAS No.	OSHA Exposure Limits	ACGIH Exposure Limits	Other Exposure Limits
Polymeric Isocyanate	Not Established	Not Established	Not Established
4,4'-Diphenylmethane Diisocyanate (MDI) 101-68-8	Not Established	0.005 ppm TWA (listed under Methylene bisphenyl isocyanate (MDI))	NIOSH: 0.005 ppm TWA (listed under Methylene bisphenyl isocyanate); 0.05 mg/m <sup>3</sup> TWA 0.020 ppm Ceiling (10 min); 0.2 mg/m <sup>3</sup> Ceiling (10 min)

Additive	Not Established	Not Established	Not Established
2,4'-Diphenylmethane Diisocyanate (MDI) 5873-54-1	Not Established	Not Established	Not Established
Polymeric Diphenylmethane Diisocyanate (pMDI) 9016-87-9	Not Established	Not Established	Not Established
Polymeric Diphenylmethane Diisocyanate	Not Established	Not Established	Not Established

Engineering Controls: General mechanical ventilation is sufficient for most conditions. Control airborne levels below the exposure guidelines, if established.

Local exhaust ventilation may be necessary for some operations.

General Hygiene Considerations: Wash thoroughly after handling and before eating, drinking or smoking.

Eye/face Protection: Use chemical safety glasses, splash-proof eye goggles or goggles with full faceshield.

Skin Protection: Use neoprene, nitrile/butadiene rubber or other impermeable chemical resistant gloves to prevent skin irritation. If potential for skin contact is present, wear impervious, long-sleeved, body covering clothing and rubber boots.

Respiratory Protection: If exposure may or does exceed occupational exposure limits, respiratory irritation is experienced, or during spray application, use a properly fitted MSHA/NIOSH approved respirator fitted with organic vapor cartridges and particulate pre-filters. If the respirator is the sole means of protection, use a full-face supplied air respirator. For situations where the atmospheric levels may exceed the level for which an air-purifying respirator is effective, use an approved positive-pressure air-supplying respirator (air line or self-contained breathing apparatus). If sanding or grinding on cured material, use above respirator fitted with HEPA filters or a dust mask.

Contaminated Gear: Remove contaminated clothing and shoes while washing. Wash clothing before reuse. Discard items which cannot be decontaminated, including leather articles such as shoes, belts and watchbands.

## 9. Physical and Chemical Properties

<p><b>Appearance</b> Clear to pale yellow</p> <p><b>Odor Threshold</b> No data found</p> <p><b>pH</b> No data found</p> <p><b>Boiling Point</b> 242°C</p> <p><b>Flash Point</b> 230 F, 110 C</p> <p><b>Flammability (solid, gas)</b> No data found</p> <p><b>Vapor Pressure</b> No data found</p> <p><b>Specific Gravity</b> 1.1 - 1.3</p> <p><b>Partition Coefficient (n-octanol/water)</b> No data found</p> <p><b>Viscosity</b> No data found</p>	<p><b>Odor</b> Mild</p> <p><b>Physical State</b> Liquid</p> <p><b>Melting/Freezing Point</b> No data found</p> <p><b>Boiling Range</b> No data found</p> <p><b>Evaporation Rate</b> No data found</p> <p><b>LEL/UEL</b> No data found</p> <p><b>Vapor Density</b> No data found</p> <p><b>Solubility in Water</b> No data found</p> <p><b>Decomposition Temperature</b> No data found</p> <p><b>Lbs VOC/Gallon Less Water</b> 0.0</p>
--	---

## 10. Stability and Reactivity

Chemical Stability: Stable under recommended storage conditions (see Section 7).

Conditions to Avoid: Avoid temperatures above 450 deg F (230 deg C), potential violent decomposition may occur. Avoid contact with water, as material reacts with water, releasing carbon dioxide which can cause rapid pressure buildup and rupture of closed containers. Elevated temperatures accelerate this reaction.

Incompatible Materials: Strong acids, bases, or oxidizing agents. Avoid unintended contact with amines, alcohols, water, moist air and metals such as aluminum, brass, copper, tin, zinc and galvanized metals.

Products of Combustion: Thermal decomposition in the presence of air may yield carbon monoxide, carbon dioxide, phenolics, ammonia, nitrogen oxides, isocyanates, hydrogen cyanide and other unidentified toxic and/or irritating compounds.

Hazardous polymerization will not occur.

## 11. Toxicological Information

### Mixture Toxicity

Inhalation Toxicity LC50: >1mg/L

### Component Toxicity

### Likely Routes of Exposure:

No data found

### Target Organs

May cause damage to the following organs:

Eyes      Respiratory System

### Effects of Overexposure

Carcinogenicity: Rats have been exposed for their lifetime to respirable aerosol droplets of MDI/polymeric MDI which resulted in chronic pulmonary irritation at high concentrations. Only at the top level (6 mg/m<sup>3</sup>), there was a significant incidence of a benign tumor of the lung (adenoma) and one malignant tumor (adenocarcinoma). There were no lung tumors at 1 mg/m<sup>3</sup> and no effects at 0.2 mg/m<sup>3</sup>. Overall, the tumor incidence, both benign and malignant, and the number of animals with the tumors were not different from controls. The increased incidence of lung tumors is associated with prolonged respiratory irritation and the concurrent accumulation of yellow material in the lung, which occurred throughout the study. Tumors occurred concurrently with respiratory irritation and lung injury. In the absence of prolonged exposure to high concentrations leading to chronic irritation and lung damage, it is highly unlikely that tumor formation will occur. Current exposure guidelines (see section 8) are expected to protect against these effects reported for MDI.

<u>CAS Number</u>	<u>Description</u>	<u>% Weight</u>	<u>Carcinogen Rating</u>
None			No data found

## 12. Ecological Information

### Component Ecotoxicity

Additive      96 Hr LC50 Cyprinus carpio: >1000 mg/L [semi-static]  
48 Hr EC50 Daphnia magna: >500 mg/L  
72 Hr EC50 Desmodesmus subspicatus: >500 mg/L

## 13. Disposal Considerations

Waste Disposal Methods: Dispose of in accordance with federal, state and local regulations. The preferred method for disposal of uncontaminated product is by recycling, reclaiming, incineration or other thermal destruction device using a licensed and permitted waste disposal contractor.

## 14. Transport Information

Based on the Reportable Quantity for MDI of 5000 pounds, for DOT bulk shipments of over 15,000 pounds in a single container, the proper shipping information is:

Proper shipping name: Environmentally hazardous substance, liquid, n.o.s.(MDI)

UN number: UN3082

Packing Group: III

Class: 9

For smaller containers, such as IBC's (totes), drums and pails; this material is Not Regulated for DOT shipping.

<u>Agency</u>	<u>Proper Shipping Name</u>	<u>UN Number</u>	<u>Packing Group</u>	<u>Hazard Class</u>
DOT	Not Regulated			
ICAO/IATA	Not Regulated			
IMDG	Not Regulated			
TDG	Not Regulated			

## 15. Regulatory Information

USA Federal: This SDS has been prepared in compliance with the Occupational Safety and Health Act (OSHA) Hazard Communication Standard (29 CFR 1910.1200). This product is considered to be a hazardous chemical under that standard. The specific chemical identity and/or exact percentage of any proprietary ingredient(s) may be withheld as a trade secret, pursuant to the standard.

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986): To the best of our knowledge, this product contains the following chemicals which are known to the State of California to cause cancer or reproductive toxicity at levels which require warning under this statute:

- None

Massachusetts Right to Know: To the best of our knowledge, this product contains the following chemicals at levels which require reporting under this statute:

101-68-8 4,4'-Diphenylmethane Diisocyanate (MDI) 10 to 30 %

New Jersey Right to Know: To the best of our knowledge, this product contains the following chemicals at levels which require reporting under this statute:

9016-87-9 Polymeric Diphenylmethane Diisocyanate (pMDI) 5 to 15 %

Pennsylvania Right to Know: To the best of our knowledge, this product contains the following chemicals at levels which require reporting under this statute:

101-68-8 4,4'-Diphenylmethane Diisocyanate (MDI) 10 to 30 %

USA Resource Conservation and Recovery Act (40 CFR 261): To the best of our knowledge, this product contains the following chemicals at levels which require reporting under this statute:

- None

USA Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) - section 302 Extremely Hazardous Substances Reportable Quantities (RQs): To the best of our knowledge, this product contains the following chemicals at levels which require reporting under this statute:

101-68-8 4,4'-Diphenylmethane Diisocyanate (MDI) 10 to 30 %

USA Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) - section 302 Extremely Hazardous Substances Threshold Planning Quantities (TPQs): To the best of our knowledge, this product contains the following chemicals at levels which require reporting under this statute:

- None

USA Toxic Substances Control Act (TSCA) - section 12(b): To the best of our knowledge, this product contains the following chemicals above the de minimus concentration(s) which requires notification to the Environmental Protection Agency (EPA) per 40 CFR 707, subpart D, if any person intends to export:

- None

<b><u>Country</u></b>	<b><u>Regulation</u></b>	<b><u>All Components Listed</u></b>
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Canada Domestic Substance List	Yes
Canada	Canada Non-Domestic Substances List (NDSL)	No
China	China Inventory of Existing Chemical Substances	Yes
EU	EU REACH List of Registered Intermediates	No
EU	EU REACH List of Pre-Registered Substances	No
EU	EU REACH List of Registered Substances	No
Japan	Japanese Existing and New Chemical Substances List	Yes
South Korea	South Korea Existing Chemicals Inventory	No
Philippines	Philippines Inventory of Chemicals and Chemical	No
USA	USA TSCA Inventory list section 8(b)	Yes

- None

## 16. Other Information

### Legend

ACGIH	American Conference of Governmental Industrial Hygienists, Inc.
ADR/RID	European Agreement for transport of dangerous goods by road (ADR) and by rail (RID)
CAS No.	Chemical Abstract Service Registry Number
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act, AKA "Superfund"
DOT	Department of Transportation (USA)
HCS	OSHA Hazard Communication Standard (29 CFR 1910.1200)
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IMO	International Maritime Organization
IMDG	International Maritime Dangerous Goods
MSHA	Mine Safety and Health Administration
N.A.	Not Applicable
N.D.	Not Determined
N.E.	Not Established
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration (USA)
PEL	Permissible Exposure Limit
SARA	Superfund Amendments and Reauthorization Act of 1986 (40 CFR)
STEL	Short Term Exposure Limit (15 minute Time Weighted Average)
TDG	Canada Transport of Dangerous Goods regulations
TLV	Threshold Limit Value
TWA	Time Weighted Average
WHMIS	Canada Workplace Hazardous Materials Information System

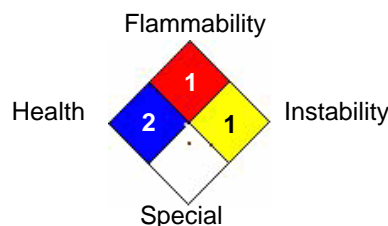
### Hazardous Material Information System (HMIS)

HEALTH	*	2
FLAMMABILITY		1
PHYSICAL HAZARD		1
PERSONAL PROTECTION		

### HMIS & NFPA Hazard Rating Legend

\* = Chronic Health Hazard  
0 = INSIGNIFICANT  
1 = SLIGHT  
2 = MODERATE  
3 = HIGH

### National Fire Protection Association (NFPA)



### Disclaimer

RAVEN LINING SYSTEMS MAKES NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO ANY INFORMATION PRESENTED HEREIN, ALL OF WHICH IS PROVIDED "AS IS". TO THE MAXIMUM EXTENT PERMITTED BY LAW, RAVEN EXPRESSLY EXCLUDES ALL WARRANTIES, OBLIGATIONS, REPRESENTATIONS, LIABILITIES, TERMS AND CONDITIONS (WHETHER THEY ARE EXPRESS OR IMPLIED, OR ARISE IN CONTRACT, STATUTE, OR OTHERWISE, AND IRRESPECTIVE OF THE NEGLIGENCE OF RAVEN, ITS EMPLOYEES OR AGENTS) IN CONNECTION WITH THE INFORMATION PRESENTED HEREIN. RAVEN MAKES NO REPRESENTATIONS OR WARRANTIES AS TO MERCHANTABILITY, FITNESS FOR PURPOSE, NONINFRINGEMENT OR CONFORMITY WITH DESCRIPTION OR SAMPLE.

Date Prepared: 12/23/2015