



Material Safety Data Sheet

Raven 563

Component A

MANUFACTURER

Raven Lining Systems, Inc.
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Issued: October 2013

1 - Chemical Product Identification

Product Code: 563A
Product Name: Raven 563 Component A (Iso)
Product Description: Component A
Synonyms:
Formula: Not applicable

2 - Composition / Information on Ingredients

CHEMICAL/CAS#	EXPOSURE LIMITS		(Wt.%)
Polymethylene polyphenyl isocyanate CAS # 9016-87-9	ACGIH TLV: N.E. OSHA PEL: N.E.	ACGIH STEL: N.E. OSHA Ceiling: N.E. OSHA Peak: N.E.	20-50
Diphenylmethane Diisocyanate (2,2:2,4) CAS # 26447-40-5	ACGIH TLV: N.E. OSHA PEL: N.E.	ACGIH STEL: N.E. OSHA Ceiling: N.E. OSHA Peak: N.E.	20-50
Polymeric Isocyanate CAS # 28182-81-2	ACGIH TLV: .005 ppm mon OSHA PEL:	ACGIH STEL: OSHA Ceiling: .02 ppm mono OSHA Peak: N.E.	20-50
MDI: Diphenylmethane-4,4',-diisocyanate CAS # 101-68-8	ACGIH TLV: .005 ppm air TWA OSHA PEL: 0.02 ppm.	ACGIH STEL: OSHA Ceiling: 0.02 ppm OSHA Peak: N.E.	5-20
Butyl Acetate CAS # 123-86-4 (1)	ACGIH TLV: 150 ppm TWA OSHA PEL: 150 ppm TWA Vapor Pressure: 7.8mm Hg20C	ACGIH STEL: 200 ppm OSHA Ceiling: N.E. OSHA Peak: N.E.1 LEL %: 1.7	5-20
Aromatic 100 CAS # 64742-95-6 (1)	ACGIH TLV: N.E. OSHA PEL: N.E. Vapor Pressure: 7.8mm Hg20C	ACGIH STEL: N.E. OSHA Ceiling: N.E. OSHA Peak: N.E. LEL %: 1.7	1-5

- Warning message: 1. Reports have associated repeated and prolonged occupational over-exposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal. Chronic exposure may cause damage to the central nervous system, respiratory system, lung, eye, skin, liver, gastrointestinal tract, spleen, kidneys, and blood.
2. See section XII for reportable hazardous air pollutants.

3 - Hazards Identification

Emergency Overview!

DANGER!

Primary Route (s) of Entry: Eyes, Ingestion, Skin, Inhalation.

Effects of Over-Exposure:

Odor Threshold: There is no available information on the polymeric isocyanate. The odor threshold of monomeric isocyanate is 0.4 ppm. The monomeric isocyanate is considered to have poor warning properties. That is if you can smell it, then it is above the recommended occupational standards for the compound.

Irritation Threshold: The irritation threshold for this product has not been clearly established because those persons sensitized to monomeric isocyanate may show signs and symptoms of irritation at levels far below those that are not sensitized.

SKIN CONTACT:

Acute: Skin contact may cause an irritation consisting of transient redness. This irritant effect would not be expected to result in permanent damage.

Chronic: Repeated contact may cause irritation of the skin and an allergic skin reaction consisting of a hive-like rash on locations not even directly contacted by the liquid.

EYE CONTACT: The effects of liquid directly contacting the eye can be significant. This may result in severe irritation and possible damage to the cornea and impairment of vision. The effects of high vapor concentration may vary from slight irritation with tearing and a burning sensation to Keratitis consisting of inflammation of the cornea and impairment of vision.

INHALATION:

Acute: exposure may cause mucous membrane and respiratory tract irritation, tightness of chest, headache, shortness of breath, and a dry cough. Inhalation may cause asthma-like symptoms to occur. These symptoms may include coughing, wheezing, and shortness of breath. A hyper-sensitive pneumonitis may also occur if the person is sensitized. This syndrome is characterized by fever, non-productive cough, wheezing, chills, and shortness of breath. The effects of acute exposure may be delayed in onset up to 12-24 hours.

Chronic: Repeated exposure may cause an allergic sensitization of the respiratory tract. This is characterized by an asthma-like response upon re-exposure to the chemical. The symptoms may include coughing, wheezing, shortness of breath and chest tightness.

INGESTION:

Acute: Can result in irritation of the mouth, stomach tissue and digestive tract. Gastroenteritis may result with any or all of the following symptoms; nausea, vomiting, diarrhea, headache.

Chronic: More pronounced gastroenteritis effects would probably occur if this material was repeatedly ingested.

Target organ toxicity: Irritation to the skin, eyes, mucus membrane, and respiratory tract.

Reproductive and Developmental Toxicity: This material is not known or reported to be a developmental or reproductive toxin.

Carcinogenicity: This material is not known or reported to be carcinogenic by any reference source including IARC, OSHA, NTP, or EPA.

Mutagenicity: Monomeric isocyanate has been tested to determine its potential for mutagenic activity in the Ames assay and under the conditions of the study was found to be negative. There is no available information on the polymeric isocyanate.

Medical Conditions Generally Aggravated by Exposure: Medical supervision of all employees who handle or come into contact with MDI is recommended. Pre-employment and periodic medical examinations with respiratory function tests (FEV, FVC as a minimum) are suggested. Persons with asthmatic conditions chronic bronchitis, other chronic respiratory diseases, recurrent eczema or pulmonary sensitization should be excluded from working with MDI. Once a person is diagnosed as having pulmonary sensitization (allergic asthma) to MDI, further exposure is not permissible.

4 - First Aid Measures

Emergency and First Aid Procedures:

Skin Contact: Immediately flush with water for at least 15 minutes while removing contaminated clothing. Wash the contaminated skin with soap and water. If irritation develops, call a physician. If clothing comes in contact with the product, the clothing should be laundered before reuse.

Eye Contact: Immediately flush with large amounts of water for at least 15 minutes occasionally lifting the upper and lower eyelids. Call a physician at once.

Inhalation: If a person experiences nausea, headache or dizziness this person should immediately move to fresh air until symptoms disappear. If breathing is labored, administer oxygen. If breathing has stopped, administer artificial respiration and seek emergency medical assistance immediately. In all cases, ensure adequate ventilation and provide respiratory protection before the person returns to work.

Ingestion: Do not induce vomiting. Immediately drink large quantities of water. Do not give fluids to an unconscious person or person having convulsions. Call a physician at once.

5 - Fire Fighting Measures

FLASH POINT: 27°C - 80°F

LEL: See Section II

FLAMMABILITY CLASSIFICATION:: * Flammable Liquid*

RECOMMENDED EXTINGUISHING MEDIA: Water spray for large fires, Carbon Dioxide (CO₂), foam, dry chemical.

CAUTION! Note that water or foam may cause frothing due to the liberation of carbon dioxide and that the reaction of water with hot isocyanates may be violent. If water is used, it should be used in very large quantities.

SPECIAL FIRE FIGHTING PROCEDURES: When fire fighting, wear full protective equipment including self-contained breathing apparatus. During a fire, monomeric isocyanate vapors and other irritating, highly toxic gases may be generated by thermal decomposition or combustion. Isolate from heat, electrical equipment, sparks and open flame. Solvent vapors may be heavier than air. Stagnant air may cause vapors to accumulate and travel along the ground to an ignition source which may result in a flashback to the source of the vapors.

UNUSUAL FIRE OR EXPLOSION HAZARDS: With excessive heat, the cans will rupture from internal pressure and discharge flammable contents. Vapors may ignite explosively. Keep away from heat, sparks and flame. Do not smoke. Extinguish all flames and pilot lights, and turn off stoves, heaters, electric motors and other sources of ignition during the use and until all vapors are gone. Prevent build up of vapors by opening all windows and doors to achieve cross-ventilation.

6 - Accidental Release Measures

SPILL OR LEAK PROCEDURES: Evacuate non-essential personnel. Remove all sources of ignition and ventilate the area. Notify appropriate authorities if necessary. Put on personal protective equipment. Dike or impound spilled material and control further spillage if feasible. Use vermiculite, Fuller's Earth or other absorbent material. Pour decontamination solution over spill area and allow to react for at least 10 minutes. Collect material in open containers and add further amounts of decontamination solution. Remove containers to a safe place, cover loosely, and allow to stand for 24 to 48 hours. Wash down spill area with decontamination solutions.

Decontamination solutions: Non-ionic Surfactant Union Carbide's Tergitol TMN-10 (20%) and water (80%); concentrated ammonia (3-8%), detergent (2%) and water (90-95%).

7 - Handling and Storage

Do not handle or use product until safety precautions recommended in this data sheet have been read and fully understood.

Precautions: Keep away from heat. Keep away from sparks, flames and other sources of ignition. Store in a cool, dry place. Keep container closed when not in use. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Use with adequate ventilation.

Waste Disposal Method: Waste must be disposed of in accordance with federal, state and local environmental control regulations. Incineration is the preferred method. Empty containers must be handled with care due to product residue. Decontaminate prior to disposal. DO NOT HEAT OR CUT EMPTY CONTAINER WITH ELECTRIC OR GAS TORCH.

8 - Personal Protection/Exposure Controls

EYE PROTECTION REQUIREMENTS: Splash proof eye goggles. In emergency situations, use eye goggles with a full face shield.

SKIN PROTECTION REQUIREMENTS: Impermeable gloves to prevent skin contact.

RESPIRATORY REQUIREMENTS: A respirator that is recommended or approved for use in isocyanate containing environments (air purifying or fresh air supplied) may be necessary for spray applications or other situations such as high temperature use which may produce 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 isocyanate monomer, polymeric isocyanate and organic solvent. During non-spray operations such as mixing, brushing and rolling applications, etc., at elevated temperatures (for example, heating of material or application to a hot substrate), it is possible to be exposed to airborne isocyanate vapors. Therefore, when the coatings system contains solvents and will be applied in a non-spray manner, a supplied-air (either positive pressure or continuous flow type) respirator may be appropriate or mandatory.

VENTILATION: Good industrial hygiene practice dictates that worker protection should be achieved through engineering controls such as ventilation whenever feasible. When such controls are not feasible to achieve full protection, the use of respirators and other personal protective equipment is mandated. Exhaust air may need to be cleaned by scrubbers or filters to reduce environmental contamination. Curing ovens must be ventilated to prevent emissions into the workplace. If oven off-gases are not vented properly, it is possible to be exposed to airborne monomeric isocyanates.

OTHER PROTECTIVE EQUIPMENT: Safety showers and eyewash stations should be available. Educate and train employees in safe use of product. Promote frequent hand washing with soap and water.

MEDICAL SURVEILLANCE: Medical supervision of all employees who handle or come in contact with TDI is recommended. This should include pre-employment and periodic medical examinations with respiratory function tests (FEV, FVC as minimum). Persons with asthmatic-type conditions, chronic bronchitis, other chronic respiratory diseases or recurrent skin eczema or sensitization should be excluded from working with TDI. Once a person is diagnosed as being sensitized to TDI, no further exposure can be permitted.

9 - Physical and Chemical Properties

PHYSICAL FORM:	Liquid
COLOR:	Clear
ODOR:	
ODOR THRESHOLD:	
WEIGHT PER GALLON:	9.87 lbs.
BOILING POINT:	244°-356° F
% VOLATILE BY VOLUME:	9.24 %
VAPOR DENSITY	heavier than air
EVAPORATION RATE (N-BUTYL ACETATE=1):	* slower than ether *
ACTUAL VOC CONTENT (lb/gal):	0.67
EPA VOC (lb/gal):	0.67
EPA VOC (g/L):	80.29

10 - Stability and Reactivity

STABILITY: Normally stable

HAZARDOUS POLYMERIZATION: Will not occur.

INCOMPATIBILITY: Material can react violently with strong bases, strong oxidizing agents, strong reducing agents, water, amines, alcohols, and surface active compounds.

CONDITIONS TO AVOID: In the absence of catalyst, the reaction with water is slow and non-violent, generating carbon dioxide gas. This gas can cause sealed containers to expand and possibly rupture. Elevated temperatures will increase the reaction rate of this material with water. This material should be stored in tightly closed containers to prevent moisture contamination. Do not reseal containers if moisture contamination is suspected.

HAZARDOUS DECOMPOSITION PRODUCTS: Burning will product toxic fumes. CO, Nitric Oxide, Isocyanate-containing vapors.

11 - Transportation Information

PROPER SHIPPING NAME:	UN-1263 Paint
UN/NA :	UN1263
DOT HAZARD CLASS:	3
DOT HAZARDOUS MATERIALS:	*Flammable liquid *
PACKAGING GROUP:	III

All information, recommendations, and suggestions appearing herein concerning our product are based upon tests and data believed to be reliable. However, it is the user's responsibility to determine the safety, toxicity, and suitability for his own use of the product described herein. Since the actual use by others is beyond our control, no guarantee, express or implied, is made by Raven as to the effects of such use, the results obtained, or the safety and toxicity of the product nor does raven assume any liability arising out of use, by others, of the product referred to herein. The information herein is not to be construed as absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstance exist or because of applicable laws or government regulations.



Material Safety Data Sheet

Raven 563 B Side

MANUFACTURER
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Issued: October 2013

1 - Chemical Product Identification

Product Code: 563BGrey
Product Name: Raven 563 B Side
Product Description: Component B
Synonyms:
Formula: Not applicable

2 - Composition / Information on Ingredients

CHEMICAL/CAS#	EXPOSURE LIMITS		(Wt.%)
Methyl Amyl Ketone (1) CAS # 110-43-0	ACGIH TLV: 50 ppm TWA OSHA PEL: 100 ppm TWA	ACGIH STEL: OSHA Ceiling: OSHA Peak: LEL%: 1.1	5-20
Butyl Acetate (1) CAS # 123-86-4	Vapor Pressure: 2.14 mm ACGIH TLV: 150 ppm TWA OSHA PEL: 150 ppm TWA	ACGIH STEL: 200 ppm OSHA Ceiling: OSHA Peak: LEL%: 1.7	5-20
Oxo-Hexyl Acetate (1) CAS # 88230-35-7	Vapor Pressure: 7.8 mm Hg@20°C ACGIH TLV: OSHA PEL:	ACGIH STEL: OSHA Ceiling: OSHA Peak:	1-5
PropylGlycolMethylEtherAcet (1) CAS # 108-65-6	ACGIH TLV: N/E OSHA PEL: N/E	ACGIH STEL: N/E OSHA Ceiling: OSHA Peak: LEL%: 1.6	1-5
Ethyl Benzene CAS # 100-41-4	Vapor Pressure: 3.7 mm Hg@20°C ACGIH TLV: 100 ppm TWA OSHA PEL: 100 ppm TWA	ACGIH STEL: 125 ppm OSHA Ceiling: OSHA Peak:	0.498

Warning message: 1. Reports have associated repeated and prolonged occupational over-exposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal. Chronic exposure may cause damage to the central nervous system, respiratory system, lung, eye, skin, liver, gastrointestinal tract, spleen, kidneys, and blood.

2. See section IX for reportable hazardous air pollutants.

3 - Hazards Identification

Emergency Overview! **Danger**

Ethyl benzene is classified as "possibly" carcinogenic to humans, Class 2Bm by the International Agency for Research on Cancer (IARC), on the basis of sufficient evidence of carcinogenicity in laboratory animals but inadequate evidence for cancer in humans. Prolonged or repeated over-exposure to ethyl benzene may cause the following: kidney effects, liver effects, lung effects, thyroid effects, testicular effects, pituitary effects.

Medical conditions prone to aggravation by exposure: consult physician.

Primary Route (s) of Entry: Skin and Inhalation.

SKIN CONTACT:

Acute: Severe irritant, corrosion to tissue, possible skin burns.

Chronic: Causes burns to exposed tissue.

EYE CONTACT: Acute: Severe irritant, chemical burn possible, possible tissue damage.

INHALATION:

Acute: Moderate to severe irritant.

Chronic: Slightly toxic with repeated inhalation.

INGESTION:

Acute: Severe irritation, possible gastrointestinal tract.

Chronic: Slightly toxic with repeated ingestion.

Medical Conditions Generally Aggravated by Exposure: Eye disease, kidney and liver disorders, skin disorders and allergies.

4 - First Aid Measures

Emergency and First Aid Procedures:

Skin Contact: Immediately flush with water for at least 15 minutes while removing contaminated clothing. Wash the contaminated skin with soap and water. If clothing comes in contact with the product, the clothing should be laundered before reuse.

Eye Contact: Immediately flush with large amounts of water for at least 15 minutes occasionally lifting the upper and lower eyelids. Call a physician for medical treatment.

Inhalation: Remove to fresh air. Restore breathing. Treat symptomatically. Consult a physician.

Ingestion: If swallowed, call a physician immediately. Remove stomach contents by gastric suction or induce vomiting only as directed by medical personnel. Never give anything by mouth to an unconscious person.

5 - Fire Fighting Measures

FLASH POINT: 27°C - 80°F

LEL: See Section II

FLAMMABILITY CLASSIFICATION: Class 1C

HAZARD CLASSIFICATION: *Flammable Liquid*

RECOMMENDED EXTINGUISHING MEDIA: Carbon Dioxide (CO₂), fire foam, dry chemical.

SPECIAL FIRE FIGHTING PROCEDURES: Burning will product toxic fumes. Wear self-contained breathing apparatus and full turn-out gear to fight fires. USE WATER WITH CAUTION. Material will float and may ignite on surface of water. Use water spray to keep fire exposed containers cool. Water may be ineffective in fighting the fire.

UNUSUAL FIRE OR EXPLOSION HAZARDS: With excessive heat, cans will rupture from internal pressure and discharge flammable contents. Vapors may ignite explosively. Keep away from heat, sparks and flame. Do not smoke. Extinguish all flames and pilot lights, and turn off stoves, heaters, electric motors and other sources of ignition during use and until all vapors are gone. Prevent build up of vapors by opening all windows and doors to achieve cross-ventilation.

6 - Accidental Release Measures

SPILL OR LEAK PROCEDURES: Remove all sources of ignition (flames, hot surfaces and electrical, static or frictional sparks). Avoid breathing vapors. Ventilate area. Use non-sparking tools. Remove with inert absorbent.

7 - Handling and Storage

Do not handle or use product until safety precautions recommended in this data sheet have been read and fully understood. This product contains no reportable Hazardous Air Pollutants.

Precautions: Keep away from heat. Keep away from sparks, flames and other sources of ignition. Store in a cool, dry place. Keep container closed when not in use. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Use with adequate ventilation.

Waste Disposal Method: Waste must be disposed of in accordance with federal, state and local environmental control regulations.

8 - Personal Protection/Exposure Controls

EYE PROTECTION REQUIREMENTS: Wear splash proof eye goggles or safety glasses if there is a danger of splashing or if product is applied by spraying.

SKIN PROTECTION REQUIREMENTS: Impermeable gloves to prevent skin contact.
RESPIRATORY REQUIREMENTS: In confined areas of poor ventilation, use chemical cartridge respirator or self-contained breathing apparatus.
VENTILATION: Provide general dilution or local exhaust ventilation in volume and pattern to keep TLV and LEL of most hazardous ingredient in section II, below acceptable limit.
OTHER PROTECTIVE EQUIPMENT: Safety showers and eyewash stations should be available. Educate and train employees in safe use of product. Promote frequent hand washing with soap and water.

9 - Physical and Chemical Properties

PHYSICAL FORM: Liquid	COLOR: Grey	ODOR:	ODOR THRESHOLD:
WEIGHT PER GALLON	11.96 lbs.		
BOILING POINT	244°-308° F		
% VOLATILE BY VOLUME:	51.81 %		
VAPOR DENSITY	heavier than air		
EVAPORATION RATE:	* slower than ether *		
ACTUAL VOC CONTENT (lb/gal):	3.76 %		
EPA VOC (lb/gal):	3.76 %		
EPA VOC (g/L):	450.6 %		
Flash Point	80°F		

10 - Stability and Reactivity

STABILITY: Stable
HAZARDOUS POLYMERIZATION: Will not occur.
INCOMPATIBILITY: Material can react violently with strong oxidizing agents, strong bases, and strong reducing agents.
CONDITIONS TO AVOID: Fire, burning and welding.
HAZARDOUS DECOMPOSITION PRODUCTS: Fire, burning, and welding may generate carbon monoxide.

11 - Transportation Information

PROPER SHIPPING NAME: UN-1263 Paint
UN/NA : UN1263
DOT HAZARD CLASS: 3
DOT HAZARDOUS MATERIALS: *Flammable Liquid*
PACKAGING GROUP: III

12 - Other Information

HMIS RATINGS:

Health	Flammability	Reactivity
3	3	1

0 = Minimal 1 = slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic Health Hazard

All information, recommendations, and suggestions appearing herein concerning our product are based upon tests and data believed to be reliable. However, it is the user's responsibility to determine the safety, toxicity, and suitability for his own use of the product described herein. Since the actual use by others is beyond our control, no guarantee, express or implied, is made by Raven as to the effects of such use, the results obtained, or the safety and toxicity of the product nor does Raven assume any liability arising out of use, by others, of the product referred to herein. The information herein is not to be construed as absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstance exist or because of applicable laws or government regulations.