

SAFETY DATA SHEET

RENCAST® 6402-1 US

Section 1. Identification

GHS product identifier : RENCAS^T® 6402-1 US
Product code : 00072165
Other means of identification : Not available.
Product type : Liquid.
Material uses : Urethane resin
Supplier's details : Huntsman Advanced Materials Americas LLC
P.O. Box 4980
The Woodlands, TX 77387

Non-Emergency phone: (800) 257-5547

e-mail address of person responsible for this SDS : MSDS@huntsman.com


Emergency telephone number (24h/7day) : Chemtrec: (800) 424-9300 or (703) 527-3887

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : ACUTE TOXICITY (inhalation) - Category 4
SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2B
RESPIRATORY SENSITIZATION - Category 1
SKIN SENSITIZATION - Category 1
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
AQUATIC HAZARD (ACUTE) - Category 3
AQUATIC HAZARD (LONG-TERM) - Category 3

GHS label elements

Hazard pictograms : 

Signal word : Danger

Hazard statements : Harmful if inhaled.
Causes skin and eye irritation.
May cause allergy or asthma symptoms or breathing difficulties if inhaled.
May cause an allergic skin reaction.
May cause respiratory irritation.
Harmful to aquatic life with long lasting effects.

Section 2. Hazards identification

Precautionary statements : Wear protective gloves. Wear eye or face protection. In case of inadequate ventilation wear respiratory protection. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Avoid breathing vapor. Wash hands thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. If experiencing respiratory symptoms: Call a POISON CENTER or physician. IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing. Wash contaminated clothing before reuse. If skin irritation or rash occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention. Store locked up. Dispose of contents and container in accordance with all local, regional, national and international regulations.

Other hazards which do not result in classification : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Ingredient name	%	CAS number
4,4'-Methylenediphenyl diisocyanate	60 - 100	101-68-8
Diphenylmethane diisocyanate, homopolymer	13 - 30	39310-05-9
Methylenediphenyldiisocyanate (mixed isomers)	3 - 7	26447-40-5
Triethyl phosphate	1 - 3	78-40-0
Terphenyl	0.1 - 1	26140-60-3

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

- Eye contact** : Get medical attention immediately. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Check for and remove any contact lenses.
- Inhalation** : Get medical attention immediately. Remove victim 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 respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If necessary, call a poison center or physician. 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. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours. In the event of any complaints or symptoms, avoid further exposure. Treatment is symptomatic for primary irritation or bronchospasm.
- Skin contact** : After contact with skin, wash immediately with plenty of warm soapy water: Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Get medical attention. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse. An MDI study has demonstrated that a polyglycol-based skin cleanser (such as D-Tam™, PEG-400) or corn oil may be more effective than soap and water.

Section 4. First aid measures

- Ingestion** : Get medical attention immediately. Provided the patient is conscious, wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person. 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.

Most important symptoms/effects, acute and delayed

Potential acute health effects

- Eye contact** : Causes serious eye irritation.
- Inhalation** : Harmful if inhaled. Exposure to decomposition products may cause a health hazard. This product is a respiratory irritant and potential respiratory sensitiser: repeated inhalation of vapour or aerosol at levels above the occupational exposure limit could cause respiratory sensitisation. 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. 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 sensitised persons.
- Skin contact** : Causes skin irritation. May cause an allergic skin reaction. Animal studies have shown that respiratory sensitisation can be induced by skin contact with known respiratory sensitisers including diisocyanates. These results emphasize the need for protective clothing including gloves to be worn at all times when handling these chemicals or in maintenance work.
- Ingestion** : Irritating to mouth, throat and stomach. Low oral toxicity. Ingestion may cause irritation of the gastrointestinal tract.

Over-exposure signs/symptoms

- Eye contact** : Adverse symptoms may include the following:
pain or irritation
watering
redness
- Inhalation** : Adverse symptoms may include the following:
respiratory tract irritation
coughing
wheezing and breathing difficulties
asthma
- Skin contact** : Adverse symptoms may include the following:
irritation
redness
- Ingestion** : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

- Notes to physician** : No specific treatment. Treat symptomatically. Call medical doctor or poison control center immediately if large quantities have been ingested.

Section 4. First aid measures

- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

- Flash point** : Closed cup: >110°C (>230°F)

Extinguishing media

- Suitable extinguishing media** : Foam, CO₂ or dry powder.

- Unsuitable extinguishing media** : Water may be used if no other available and then in copious quantities. Reaction between water and hot isocyanate may be vigorous. Prevent washings from entering water courses, keep fire exposed containers cool by spraying with water.

- Specific hazards arising from the chemical** : In a fire or if heated, a pressure increase will occur and the container may burst. This material is harmful to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides
phosphorus oxides

- Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Due to reaction with water producing CO₂-gas, a hazardous build-up of pressure could result if contaminated containers are re-sealed.

- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. PVC boots, gloves, safety helmet and protective clothing should be worn.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

- For emergency responders** : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

Section 6. Accidental release measures

Methods and materials for containment and cleaning up : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal. If the product is in its solid form: Spilled MDI flakes should be picked up carefully. The area should be vacuum cleaned to remove remaining dust particles completely. If the product is in its liquid form: Absorb spillages onto sand, earth or any suitable absorbent material. Leave to react for at least 30 minutes. Shovel into open-top drums for further decontamination. Wash the spillage area with water. Test atmosphere for MDI vapour.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitization problems or asthma, allergies or chronic or recurrent respiratory disease should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor or mist. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
4,4'-Methylenediphenyl diisocyanate	ACGIH TLV (United States, 3/2012). TWA: 0.005 ppm 8 hours. OSHA PEL (United States, 6/2010). CEIL: 0.02 ppm CEIL: 0.2 mg/m ³

Appropriate engineering controls :

Section 8. Exposure controls/personal protection

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective occupational exposure limits. MDI can only be smelled if the occupational exposure limit has been exceeded considerably.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

Hand protection : Protective gloves should be worn when handling freshly made polyurethane products to avoid contact with trace residual materials which may be hazardous in contact with skin. Use chemical resistant gloves classified under Standard EN374: protective gloves against chemicals and microorganisms. Examples of glove materials that might provide suitable protection include :Butyl rubber, Chlorinated polyethylene, Polyethylene, Ethyl vinyl alcohol copolymers laminated ("EVAL"), Polychloroprene (Neoprene*), Nitrile/butadiene rubber ("nitrile" or "NBR"), Polyvinyl chloride ("PVC" or "vinyl"), Fluoroelastomer (Viton*).

When prolonged or frequently repeated contact may occur, a glove with protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN374) is recommended.

When only brief contact is expected, a glove with protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN374) is recommended. Contaminated gloves should be decontaminated and disposed of.

Notice: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all requisite workplace factors such as, but not limited to : other chemicals that may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), as well as instructions/specifications provided by the glove supplier.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Recommended: Overall (preferably heavy cotton) or Tyvek-Pro Tech 'C' , Tyvek-Pro 'F' disposable coverall.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Thermal hazards : Not available.

Section 9. Physical and chemical properties

Appearance

Physical state	: Liquid.
Color	: Amber.
Odor	: Aromatic.
Odor threshold	: Not available.
pH	: Not available.
Melting point/Freezing point	: Not available.
Boiling/condensation point	: Not available.
Flash point	: Closed cup: >110°C (>230°F)
Evaporation rate	: Not available.
Flammability (solid, gas)	: Not available.
Lower and upper explosive (flammable) limits	: Not available.
Vapor pressure	: Not available.
Vapor density	: >0.01 [Air = 1]
Relative density	: 1.17 to 1.21
Solubility in water	: Reacts with water
Partition coefficient: n-octanol/water	: Not available.
Auto-ignition temperature	: Not available.
Decomposition temperature	: Not available.
Density	: 1.17 to 1.21 g/cm ³
Viscosity	: Not available.

Section 10. Stability and reactivity

Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	: The product is stable.
Possibility of hazardous reactions	: Reaction with water (moisture) produces CO ₂ -gas. Exothermic reaction with materials containing active hydrogen groups. The reaction becomes progressively more vigorous and can be violent at higher temperatures if the miscibility of the reaction partners is good or is supported by stirring or by the presence of solvents. MDI is insoluble with, and heavier than water and sinks to the bottom but reacts slowly at the interface. A solid water-insoluble layer of polyurea is formed at the interface by liberating carbon dioxide gas.
Conditions to avoid	: Avoid high temperatures.
Incompatible materials	: Water, alcohols, amines, bases, and acids.
Hazardous decomposition products	: Combustion products may include: carbon oxides (CO, CO ₂) nitrogen oxides (NO, NO ₂ etc.) hydrocarbons HCN

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Test	Endpoint	Species	Result
4,4'-Methylenediphenyl diisocyanate	OECD 403 Acute Inhalation Toxicity	LC50 Inhalation Dusts and mists	Rat - Male, Female	0.49 mg/l
	OECD 402 Acute Dermal Toxicity	LD50 Dermal	Rabbit - Male, Female	>9400 mg/kg
	OECD 401 Acute Oral Toxicity	LD50 Oral	Rat - Male	>10000 mg/kg
Diphenylmethane diisocyanate, homopolymer	OECD 403 Acute Inhalation Toxicity	LC50 Inhalation Dusts and mists	Rat - Male, Female	0.49 mg/l
	OECD 402 Acute Dermal Toxicity	LD50 Dermal	Rabbit - Male, Female	>9400 mg/kg
	OECD 425 Acute Oral Toxicity: Up-and-Down Procedure	LD50 Oral	Rat - Female	>5000 mg/kg
Methylenediphenyldiisocyanate (mixed isomers)	OECD 403 Acute Inhalation Toxicity	LC50 Inhalation Dusts and mists	Rat - Male, Female	>2.24 mg/l
	OECD 403 Acute Inhalation Toxicity	LC50 Inhalation Dusts and mists	Rat - Male, Female	0.49 mg/l
	OECD 402 Acute Dermal Toxicity	LD50 Dermal	Rabbit - Male, Female	>9400 mg/kg
	No official guidelines	LD50 Oral	Rat - Male, Female	>2000 mg/kg
Triethyl phosphate	OECD 403 Acute Inhalation Toxicity	LC50 Inhalation Dusts and mists	Rat - Male, Female	>8817 mg/m ³
	-	LD50 Dermal	Rabbit	>20000 mg/kg
	-	LD50 Oral	Rat	1600 mg/kg

Conclusion/Summary :

4,4'-Methylenediphenyl diisocyanate Irritating to respiratory system.

Irritation/Corrosion

Product/ingredient name	Test	Species	Result
4,4'-Methylenediphenyl diisocyanate	OECD 404 Acute Dermal Irritation/Corrosion	Rabbit	Skin - Irritant
	OECD 405 Acute Eye Irritation/Corrosion	Rabbit	Eyes - Non-irritant.
Diphenylmethane diisocyanate, homopolymer	OECD 405 Acute Eye Irritation/Corrosion	Rabbit	Eyes - Non-irritant.
	-	Rabbit	Skin - Irritant
Triethyl phosphate	OECD 404 Acute Dermal Irritation/Corrosion	Rabbit	Skin - Non-irritant.
	OECD 405 Acute Eye Irritation/Corrosion	Rabbit	Eyes - Moderate irritant

Conclusion/Summary

Skin :

Section 11. Toxicological information

4,4'-Methylenediphenyl diisocyanate Irritating to skin.
 Diphenylmethane diisocyanate, homopolymer Irritating to skin.
 Methylenediphenyldiisocyanate (mixed isomers) No additional information.
 Triethyl phosphate Non-irritating to the skin.
 Terphenyl No additional information.

Eyes :

- 4,4'-Methylenediphenyl diisocyanate Based on the human occupational exposure data, this substance is considered as irritating to eyes.
- Diphenylmethane diisocyanate, homopolymer Based on the human occupational exposure data, this substance is considered as irritating to eyes.
- Methylenediphenyldiisocyanate (mixed isomers) No additional information.
- Triethyl phosphate Irritating to eyes.
- Terphenyl No additional information.

Respiratory :

- 4,4'-Methylenediphenyl diisocyanate No additional information.
- Diphenylmethane diisocyanate, homopolymer No additional information.
- Methylenediphenyldiisocyanate (mixed isomers) No additional information.
- Triethyl phosphate No additional information.
- Terphenyl No additional information.

Sensitization

Product/ingredient name	Test	Route of exposure	Species	Result
4,4'-Methylenediphenyl diisocyanate	-	skin	Mouse	Sensitizing
		skin Respiratory	Guinea pig Guinea pig	Not sensitizing Sensitizing
Diphenylmethane diisocyanate, homopolymer	-	skin	Guinea pig	Sensitizing
		Respiratory	Guinea pig	Not sensitizing
Methylenediphenyldiisocyanate (mixed isomers)	-	skin	Guinea pig	Sensitizing
		Respiratory	Guinea pig	Not sensitizing
Triethyl phosphate	-	skin	Guinea pig Mouse	Sensitizing Sensitizing
		skin	Mouse	Not sensitizing

Mutagenicity

Product/ingredient name	Test	Result
4,4'-Methylenediphenyl diisocyanate	Experiment: In vitro Subject: Bacteria Metabolic activation: +/-	Negative
	Experiment: In vivo Subject: Mammalian-Animal	Negative
Diphenylmethane diisocyanate, homopolymer	Experiment: In vitro Subject: Bacteria Metabolic activation: +/-	Negative
	Experiment: In vivo Subject: Mammalian-Animal	Negative
Methylenediphenyldiisocyanate	Experiment: In vitro	Negative

Section 11. Toxicological information

(mixed isomers)	Subject: Bacteria Metabolic activation: +/- Experiment: In vivo	Negative
Triethyl phosphate	Subject: Mammalian-Animal Experiment: In vitro	Negative
	Subject: Bacteria Experiment: In vitro	Negative
	Subject: Mammalian-Animal Metabolic activation: +/- Experiment: In vitro	Negative
	Subject: Mammalian-Animal Cell: Somatic Experiment: In vivo	Negative
	Subject: Mammalian-Animal	Negative

Conclusion/Summary :

4,4'-Methylenediphenyl diisocyanate No mutagenic effect.
Triethyl phosphate No mutagenic effect.

Carcinogenicity

Product/ingredient name	Test	Species	Dose	Exposure	Result/Result type
4,4'-Methylenediphenyl diisocyanate	OECD 453 Combined Chronic Toxicity/ Carcinogenicity Studies	Rat - Male, Female	1 mg/m ³	2 years; 5 days per week	Positive - Inhalation - NOAEL
Diphenylmethane diisocyanate, homopolymer	OECD 453 Combined Chronic Toxicity/ Carcinogenicity Studies	Rat - Male, Female	1 mg/m ³	2 years; 5 days per week	Negative - Inhalation - NOAEL
Methylenediphenyldiisocyanate (mixed isomers)	OECD 453 Combined Chronic Toxicity/ Carcinogenicity Studies	Rat - Male, Female	1 mg/m ³	2 years; 5 days per week	Negative - Inhalation - NOAEL

Carcinogenic class

Product/ingredient name	IARC	OSHA
4,4'-Methylenediphenyl diisocyanate	3	-

Reproductive toxicity

Product/ingredient name	Test	Species	Maternal toxicity	Fertility	Developmental effects
Methylenediphenyldiisocyanate (mixed isomers)	OECD 414 Prenatal Developmental Toxicity Study	Rat - Male, Female	Negative	Negative	Negative

Section 11. Toxicological information

Conclusion/Summary :

4,4'-Methylenediphenyl diisocyanate	No known significant effects or critical hazards.
Triethyl phosphate	In accordance with column 2 of Annex VII - X of Regulation (EC) No 1907/2006, the test for this property of the substance does not need to be conducted.

Teratogenicity

Product/ingredient name	Test	Species	Result/Result type
4,4'-Methylenediphenyl diisocyanate	OECD 414 Prenatal Developmental Toxicity Study	Rat - Female	Negative - Inhalation
Diphenylmethane diisocyanate, homopolymer	OECD 414 Prenatal Developmental Toxicity Study	Rat - Female	Negative - Inhalation
Methylenediphenyldiisocyanate (mixed isomers)	OECD 414 Prenatal Developmental Toxicity Study	Rat - Female	Negative - Inhalation
Triethyl phosphate	OECD 414 Prenatal Developmental Toxicity Study	Rat	Negative - Oral

Conclusion/Summary :

4,4'-Methylenediphenyl diisocyanate	No known significant effects or critical hazards.
Triethyl phosphate	No known significant effects or critical hazards.

Specific target organ toxicity (single exposure)

Product/ingredient name	Category	Route of exposure	Target organs
4,4'-Methylenediphenyl diisocyanate	Category 3	Not applicable.	Respiratory tract irritation
Diphenylmethane diisocyanate, homopolymer	Category 3	Not applicable.	Respiratory tract irritation
Methylenediphenyldiisocyanate (mixed isomers)	Category 3	Not applicable.	Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Causes serious eye irritation.

Section 11. Toxicological information

- Inhalation** : Harmful if inhaled. Exposure to decomposition products may cause a health hazard. This product is a respiratory irritant and potential respiratory sensitiser: repeated inhalation of vapour or aerosol at levels above the occupational exposure limit could cause respiratory sensitisation. 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. 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 sensitised persons.
- Skin contact** : Causes skin irritation. May cause an allergic skin reaction. Animal studies have shown that respiratory sensitisation can be induced by skin contact with known respiratory sensitisers including diisocyanates. These results emphasize the need for protective clothing including gloves to be worn at all times when handling these chemicals or in maintenance work.
- Ingestion** : Irritating to mouth, throat and stomach. Low oral toxicity. Ingestion may cause irritation of the gastrointestinal tract.

Symptoms related to the physical, chemical and toxicological characteristics

- Eye contact** : Adverse symptoms may include the following:
pain or irritation
watering
redness
- Inhalation** : Adverse symptoms may include the following:
respiratory tract irritation
coughing
wheezing and breathing difficulties
asthma
- Skin contact** : Adverse symptoms may include the following:
irritation
redness
- Ingestion** : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

- Potential immediate effects** : Not available.
- Potential delayed effects** : Not available.

Long term exposure

- Potential immediate effects** : Not available.
- Potential delayed effects** : Not available.

Potential chronic health effects

Product/ingredient name	Test	Endpoint	Species	Result
Diphenylmethane diisocyanate, homopolymer	OECD 453 Combined Chronic Toxicity/ Carcinogenicity Studies	Chronic NOEC Inhalation Dusts and mists	Rat - Male, Female	0.2 mg/m ³
Methylenediphenyldiisocyanate (mixed isomers)	OECD 453 Combined Chronic Toxicity/ Carcinogenicity Studies	Chronic NOEC Inhalation Dusts and mists	Rat - Male, Female	0.2 mg/m ³

Section 11. Toxicological information

Triethyl phosphate	EU -	Sub-acute NOAEL Oral Sub-chronic NOEC Inhalation Dusts and mists	Rat - Male, Female Rat - Male	1000 mg/kg 366 mg/m ³
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- General** : Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
- Carcinogenicity** : Rats have been exposed for two years to a respirable aerosol of polymeric MDI which resulted in chronic pulmonary irritation at high concentrations. Only at the top level (6 mg/m³), there was a significant incidence of a benign tumour of the lung (adenoma) and one malignant tumour (adenocarcinoma). There were no lung tumours at 1 mg/m³ and no effects at 0.2 mg/m³. Overall, the tumour incidence, both benign and malignant, and the number of animals with the tumours were not different from controls. The increased incidence of lung tumours is associated with prolonged respiratory irritation and the concurrent accumulation of yellow material in the lung, which occurred throughout the study. In the absence of prolonged exposure to high concentrations leading to chronic irritation and lung damage, it is highly unlikely that tumour formation will occur.
- Mutagenicity** : No known significant effects or critical hazards.
- Teratogenicity** : No known significant effects or critical hazards.
- Developmental effects** : 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, which are well in excess of defined occupational exposure limits.
- Fertility effects** : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
Oral	84210.5 mg/kg
Inhalation (vapors)	289.5 mg/l
Inhalation (dusts and mists)	1.68 mg/l

Other information : Not available.

Section 12. Ecological information

Toxicity

Product/ingredient name	Test	Endpoint	Exposure	Species	Result
4,4'-Methylenediphenyl diisocyanate	OECD 202 <i>Daphnia</i> sp. Acute Immobilisation Test	Acute EC50	24 hours Static	Daphnia	>1000 mg/l
	OECD 203 Fish, Acute Toxicity Test	Acute LC50	96 hours Static	Fish	>1000 mg/l
	OECD 211 <i>Daphnia Magna</i> Reproduction Test	Chronic NOEC	21 days Semi-static	Daphnia	>=10 mg/l
	OECD 201 Alga, Growth Inhibition Test	Chronic NOECr	72 hours Static	Algae	1640 mg/l
Diphenylmethane diisocyanate, homopolymer	OECD 201 Alga, Growth Inhibition	Acute EC50	72 hours Static	Algae	>1640 mg/l

Section 12. Ecological information

Methylenediphenyldiisocyanate (mixed isomers)	Test OECD 209 Activated Sludge, Respiration Inhibition Test	Acute	EC50	3 hours Static	Bacteria	>100	mg/l
	OECD 202 <i>Daphnia</i> sp. Acute Immobilisation Test	Acute	EC50	24 hours Static	Daphnia	>1000	mg/l
	OECD 203 Fish, Acute Toxicity Test	Acute	LC50	96 hours Static	Fish	>1000	mg/l
	OECD 211 <i>Daphnia</i> <i>Magna</i> Reproduction Test	Chronic	NOEC	21 days Semi-static	Daphnia	>=10	mg/l
	OECD 201 Alga, Growth Inhibition Test	Chronic	NOECr	72 hours Static	Algae	1640	mg/l
	OECD 201 Alga, Growth Inhibition Test	Acute	EC50	72 hours Static	Algae	>1640	mg/l
	OECD 209 Activated Sludge, Respiration Inhibition Test	Acute	EC50	3 hours Static	Bacteria	>100	mg/l
	OECD 202 <i>Daphnia</i> sp. Acute Immobilisation Test	Acute	EC50	24 hours Static	Daphnia	>1000	mg/l
	OECD 203 Fish, Acute Toxicity Test	Acute	LC50	96 hours Static	Fish	>1000	mg/l
	OECD 211 <i>Daphnia</i> <i>Magna</i> Reproduction Test	Chronic	NOEC	21 days Semi-static	Daphnia	>10	mg/l
Triethyl phosphate	OECD 201 Alga, Growth Inhibition Test	Chronic	NOECr	72 hours Static	Algae	1640	mg/l
	No official guidelines	Acute	EC50	72 hours Static	Algae	901	mg/l
	EPA OPPTS	Acute	LC50	96 hours Static	Daphnia	>100	mg/l
	EPA OPPTS	Acute	LC50	96 hours Static	Fish	>100	mg/l
	No official guidelines	Chronic	EC10	72 hours Static	Algae	127	mg/l
	No official guidelines	Chronic	EC10	30 minutes Static	Bacteria	2985	mg/l
OECD 211 <i>Daphnia</i> <i>Magna</i> Reproduction Test	Chronic	NOEC	21 days	Daphnia	31.6	mg/l	

Conclusion/Summary : Triethyl phosphate Not toxic or harmful to aquatic organisms.

Persistence and degradability

Section 12. Ecological information

Product/ingredient name	Test	Period	Result
4,4'-Methylenediphenyl diisocyanate	OECD 302C Inherent Biodegradability: Modified MITI Test (II)	28 days	0 %
Diphenylmethane diisocyanate, homopolymer	OECD 302C Inherent Biodegradability: Modified MITI Test (II)	28 days	0 %
Methylenediphenyldiisocyanate (mixed isomers)	OECD 302C Inherent Biodegradability: Modified MITI Test (II)	28 days	0 %
Triethyl phosphate	EPA OPPTS 302B Inherent Biodegradability: Zahn-Wellens/EMPA Test	28 days	98 %
	OECD 301C Ready Biodegradability - Modified MITI Test (I)	28 days	0 %

Conclusion/Summary : 4,4'-Methylenediphenyl diisocyanate Not biodegradable
Triethyl phosphate Inherently biodegradable

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
4,4'-Methylenediphenyl diisocyanate	Fresh water 0.83 days	-	Not readily
Diphenylmethane diisocyanate, homopolymer	-	-	Not readily
Methylenediphenyldiisocyanate (mixed isomers)	-	-	Not readily
Triethyl phosphate	Fresh water 2007.5 days	-	Not readily

Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
4,4'-Methylenediphenyl diisocyanate	4.51	200	low
Diphenylmethane diisocyanate, homopolymer	8.56	200	low
Methylenediphenyldiisocyanate (mixed isomers)	4.51	439	low
Triethyl phosphate	1.11	0.5 to 0.8	low

Mobility in soil

Not available.

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

Other ecological information

BOD5 : Not determined.

COD : Not determined.

TOC : Not determined.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or

Section 13. Disposal considerations

landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Section 14. Transport information

Proper shipping name

DOT : Not regulated.

TDG : Not regulated.

IMDG : Not regulated.

IATA : Not regulated.

Regulatory information	UN number	Classes	PG*	Label	Additional information
DOT Classification	Not regulated.	-	-		Reportable quantity 7974.5 lbs / 3620.4 kg [803.71 gal / 3042.4 L] Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.
TDG Classification	Not regulated.	-	-		-
IMDG Classification	Not regulated.	-	-		-
IATA Classification	Not regulated.	-	-		-

PG* : Packing group

Section 15. Regulatory information

Safety, health and environmental regulations specific for the product

United States Regulations

TSCA 8(b) inventory : All components are listed or exempted.

Section 15. Regulatory information

TSCA 5(a)2 final significant new use rule (SNUR) : No ingredients listed.

TSCA 5(e) substance consent order : No ingredients listed.

TSCA 12(b) export notification : No ingredients listed.

SARA 311/312 : Immediate (acute) health hazard

	<u>Product name</u>	<u>Concentration %</u>
Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs)	: 4,4'-Methylenediphenyl diisocyanate	62.7

Clean Air Act - Ozone Depleting Substances (ODS) : EPCRA Section 313 (40 CFR 372) 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).

This product does not contain nor is it manufactured with ozone depleting substances.

	<u>Product name</u>	<u>Concentration %</u>
SARA 313 Form R - Reporting requirements	: 4,4'-Methylenediphenyl diisocyanate	62.7

	<u>Ingredient name</u>	<u>%</u>	<u>Section 304 CERCLA Hazardous Substance</u>	<u>CERCLA Reportable Quantity (Lbs)</u>	<u>Product Reportable Quantity (Lbs)</u>
CERCLA Hazardous substances	: 4,4'-Methylenediphenyl diisocyanate	62.7	Listed	5000	7974

State regulations

PENNSYLVANIA - RTK : 4,4'-Methylenediphenyl diisocyanate, Terphenyl, hydrogenated

California Prop 65 : This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

Canadian regulations

CEPA DSL : All components are listed or exempted.

WHMIS Classes : Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Brazil Regulations

Section 15. Regulatory information

Classification system used : Norma ABNT-NBR 14725-2:2012

International lists :

- Australia inventory (AICS)**: All components are listed or exempted.
- China inventory (IECSC)**: All components are listed or exempted.
- Japan inventory**: At least one component is not listed.
- Korea inventory**: All components are listed or exempted.
- Malaysia Inventory (EHS Register)**: Not determined.
- New Zealand Inventory of Chemicals (NZIoC)**: All components are listed or exempted.
- Philippines inventory (PICCS)**: All components are listed or exempted.
- Taiwan inventory (CSNN)**: Not determined.

Section 16. Other information

Hazardous Material Information System (U.S.A.) :

Health	2
Flammability	1
Physical hazards	1
Personal protection	

The customer is responsible for determining the PPE code for this material.

Caution: HMIS[®] ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS[®] ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS[®] ratings are to be used with a fully implemented HMIS[®] program. HMIS[®] is a registered mark of the National Paint & Coatings Association (NPCA). HMIS[®] materials may be purchased exclusively from J. J. Keller (800) 327-6868.

National Fire Protection Association (U.S.A.) :



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Further information :

- Liquid decontaminants (percentages by weight or volume) :
- Decontaminant 1 : *- sodium carbonate : 5 - 10 % *- liquid detergent : 0.2 - 2 % *- water : to make up to 100 %
- Decontaminant 2 : *- concentrated ammonia solution : 3 - 8 % *- liquid detergent : 0.2 - 2 % *- water : to make up to 100 %
- Decontaminant 1 reacts slower with diisocyanates but is more environmentally friendly than decontaminant 2.
- Decontaminant 2 contains ammonia. Ammonia presents health hazards. (See supplier safety information.)
- Literature reference: PU 193-1 : 'MDI-Based Compositions : Hazards and Safe Handling Procedures.'

Section 16. Other information

PU 181-15 : Recommended melting procedures for MDI-based isocyanates.
 ISOPA Guidelines for safe Loading/Unloading, Transportation, Storage of TDI and MDI , Ref.03-96 PSC-0005-GUIDL.
 SPI PMDI User Guidelines for the Chemical Protective Clothing Selection.
 References of methods used in the Physico-Chemical Properties section are reported in Annex V part A to Commission Directive 92/69/EEC of 31 July 1992 adapting to technical progress for the Seventeenth time Council Directive 67/548/EEC.

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