1. Identification

Product identifier used on the label

LUPRANATE®8020 ISOCYANATE

Recommended use of the chemical and restriction on use

Recommended use*: Chemical, Raw material
Recommended use*: polyurethane component; industrial chemicals
Unsuitable for use: Uses other than recommended
Suitable for use in industrial sector: Polymers industry; chemical industry

* The “Recommended use” identified for this product is provided solely to comply with a Federal requirement and is not part of the seller's published specification. The terms of this Safety Data Sheet (SDS) do not create or infer any warranty, express or implied, including by incorporation into or reference in the seller's sales agreement.

Details of the supplier of the safety data sheet

Company:
BASF Canada Inc.
5025 Creekbank Road
Building A, Floor 2
Mississauga, ON, L4W 0B6, CANADA

Telephone: +1 289 360-1300

Emergency telephone number

24 Hour Emergency Response Information
CHEMTREC: 1-800-424-9300
BASF HOTLINE: (800) 454-COPE (2673)

Other means of identification

Chemical family:	Preparation based on: aromatic isocyanates
Synonyms:	TOLUENE DIISOCYANATE/POLYMETHYLENE POLYPHENYLISOCYANATE TDI/MDI BLEND

2. Hazards Identification

According to Hazardous Products Regulations (HPR) (SOR/2015-17)

Classification of the product

Acute Tox.	1 (Inhalation - vapour)	Acute toxicity
Skin Corr./Irrit.	2	Skin corrosion/irritation
Eye Dam./Irrit.	2A	Serious eye damage/eye irritation
Resp. Sens.	1	Respiratory sensitization
Skin Sens.	1	Skin sensitization
Carc.	2	Carcinogenicity
STOT SE	3 (irritating to respiratory system)	Specific target organ toxicity — single exposure
STOT RE	2 (by inhalation)	Specific target organ toxicity — repeated exposure
Aquatic Acute	3	Hazardous to the aquatic environment - acute
Aquatic Chronic	3	Hazardous to the aquatic environment - chronic

Label elements

Pictogram:

Signal Word:
Danger

Hazard Statement:

H319	Causes serious eye irritation.
H315	Causes skin irritation.
H330	Fatal if inhaled.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317	May cause an allergic skin reaction.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
H373	May cause damage to organs (Olfactory organs) through prolonged or repeated exposure (inhalation).
H402	Harmful to aquatic life.
H412	Harmful to aquatic life with long lasting effects.

Precautionary Statements (Prevention):

P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves, protective clothing and eye protection or face protection.
P260	Do not breathe mist or vapour or spray.
P201	Obtain special instructions before use.
P284	In case of inadequate ventilation wear respiratory protection.
P273	Avoid release to the environment.
P202	Do not handle until all safety precautions have been read and understood.
P272	Contaminated work clothing should not be allowed out of the workplace.
P264	Wash contaminated body parts thoroughly after handling.

Precautionary Statements (Response):

P310	Immediately call a POISON CENTER or physician.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P304 + P341 + P311	IF INHALED: If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician.
P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P333 + P313	If skin irritation or rash occurs: Get medical attention.
P342 + P311	If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.
P337 + P313	If eye irritation persists: Get medical attention.
P308 + P313	IF exposed or concerned: Get medical attention.
P362 + P364	Take off contaminated clothing and wash it before reuse.

Precautionary Statements (Storage):

P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.

Precautionary Statements (Disposal):

P501	Dispose of contents and container to hazardous or special waste collection point.

Hazards not otherwise classified

No specific dangers known, if the regulations/notes for storage and handling are considered.

Labeling of special preparations (GHS):
CONTAINS ISOCYANATES. INHALATION OF ISOCYANATE MISTS OR VAPORS MAY CAUSE RESPIRATORY IRRITATION, BREATHLESSNESS, CHEST DISCOMFORT AND REDUCED PULMONARY FUNCTION. OVEREXPOSURE WELL ABOVE THE PEL MAY RESULT IN BRONCHITIS, BRONCHIAL SPASMS AND PULMONARY EDEMA. LONG-TERM EXPOSURE TO ISOCYANATES HAS BEEN REPORTED TO CAUSE LUNG DAMAGE, INCLUDING REDUCED LUNG FUNCTION WHICH MAY BE PERMANENT. ACUTE OR CHRONIC OVEREXPOSURE TO ISOCYANATES MAY CAUSE SENSITIZATION IN SOME INDIVIDUALS, RESULTING IN ALLERGIC RESPIRATORY REACTIONS INCLUDING WHEEZING, SHORTNESS OF BREATH AND DIFFICULTY BREATHING. ANIMAL TESTS INDICATE THAT SKIN CONTACT MAY PLAY A ROLE IN CAUSING RESPIRATORY SENSITIZATION.

3. Composition / Information on Ingredients

According to Hazardous Products Regulations (HPR) (SOR/2015-17)

toluene-2,4-diisocyanate
CAS Number: 584-84-9
Content (W/W): >= 50.0 - < 75.0%
Synonym: 2,4-Diisocyanatotoluene; 2,4-Toluene diisocyanato, 2,4-TDI

toluene-2,6-diisocyanate
CAS Number: 91-08-7
Content (W/W): >= 15.0 - < 20.0%
Synonym: 1,3-Diisocyanato-2-methylbenzene

P-MDI
CAS Number: 9016-87-9

Content (W/W): >= 10.0 - < 15.0%
Synonym: Isocyanic acid polymethylenepolyphenylene ester; Polymethylene polyphenylene isocyanate

Diphenylmethane-4,4'-diisocyanate (MDI)
CAS Number: 101-68-8
Content (W/W): >= 7.0 - < 10.0%
Synonym: Diphenylmethane diisocyanate; 4,4'-Methylenediphenyl diisocyanate

Methylenediphenyl diisocyanate
CAS Number: 26447-40-5
Content (W/W): >= 0.3 - < 3.0%
Synonym: 1,1'-Methylenebis[isocyanatobenzene]; Methylenediphenyl diisocyanate

Isocyanic acid, polymethylenepolyphenylene ester, polymer with.alpha.-hydro-.omega.-hydroxypoly(oxy-1,2-ethanediyl)
CAS Number: 57636-09-6
Content (W/W): >= 0.3 - < 1.0%
Synonym: Isocyanic acid, polymethylenepolyphenylene ester, polymer with .alpha.-hydro-.omega.-hydroxypoly(oxy-1,2-ethanediyl)

1,3-Diazetidine-2,4-dione, 1,3-bis[4-[(4- isocyanatophenyl)methyl]phenyl]-
CAS Number: 17589-24-1
Content (W/W): >= 0.2 - < 0.3%
Synonym: 1,3-Diazetidine-2,4-dione, 1,3-bis[4-[(4-isocyanatophenyl)methyl]phenyl]-

4. First-Aid Measures

Description of first aid measures

General advice:
First aid personnel should pay attention to their own safety. If the patient is likely to become unconscious, place and transport in stable sideways position (recovery position). Immediately remove contaminated clothing.

If inhaled:
Keep patient calm, remove to fresh air, seek medical attention.

If on skin:
Immediately wash thoroughly with soap and water, seek medical attention.

If in eyes:
Wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist.

Remove contact lenses, if present.

If swallowed:
Rinse mouth and then drink 200-300 ml of water. Do not induce vomiting. Never induce vomiting or give anything by mouth if the victim is unconscious or having convulsions. Immediate medical attention required.

Most important symptoms and effects, both acute and delayed

Symptoms: The most important known symptoms and effects are described in section 2 and/or in section 11., eczema, asthma, lung oedema

Information on: toluene-2,4-diisocyanate
Symptoms: Overexposure may cause:, Eye irritation, skin irritation, erythema, nausea, headache, vomiting, dizziness, diarrhea, abdominal cramps

Information on: toluene-2,6-diisocyanate
Symptoms: Overexposure may cause:, Eye irritation, skin irritation, erythema, nausea, headache, vomiting, dizziness, diarrhea, abdominal cramps

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)
Symptoms: Overexposure may cause:, Eye irritation, skin irritation, erythema, chest discomfort, dyspnea, asthma, nausea, headache, vomiting, dizziness, diarrhea, abdominal cramps, Inhalation may provoke the following symptoms:, irritation of respiratory tract, coughing, wheezing

Information on: Methylenediphenyl diisocyanate
Symptoms: Overexposure may cause:, Eye irritation, skin irritation, erythema, nausea, headache, vomiting, dizziness, diarrhea, abdominal cramps, Inhalation may provoke the following symptoms:, irritation of respiratory tract, coughing

Information on: P-MDI
Symptoms: No data available.

Hazards: Symptoms can appear later. In sensitized individuals, sensitization reactions may be elicited by structurally similar substances. Respiratory sensitization may result in allergic (asthma-like) signs in the lower respiratory tract including wheezing, shortness of breath and difficulty breathing, the onset of which may be delayed. Repeated inhalation of high concentrations may cause lung damage, including reduced lung function, which may be permanent. Substances eliciting lower respiratory tract irritation may worsen the asthma-like reactions that may be produced by product exposures.

Information on: TDI
Hazards: In sensitized individuals, sensitization reactions may be elicited by structurally similar substances. Respiratory sensitization may result in allergic (asthma-like) signs in the lower respiratory tract including wheezing, shortness of breath and difficulty breathing, the onset of which may be delayed. Repeated inhalation of high concentrations may cause lung damage, including reduced lung function, which may be permanent. Substances eliciting lower respiratory tract irritation may worsen the asthma-like reactions that may be produced by product exposures.

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)
Hazards: Respiratory sensitization may result in allergic (asthma-like) signs in the lower respiratory tract including wheezing, shortness of breath and difficulty breathing, the onset of which may be delayed. Repeated inhalation of high concentrations may cause lung damage, including reduced lung function, which may be permanent. Substances eliciting lower respiratory tract irritation may worsen the asthma-like reactions that may be produced by product exposures.

Indication of any immediate medical attention and special treatment needed

Note to physician

Antidote:	Specific antidotes or neutralizers to isocyanates do not exist.
Treatment:	Treatment should be supportive and based on the judgement of the physician in response to the reaction of the patient.

5. Fire-Fighting Measures

Extinguishing media

Suitable extinguishing media:
water spray, foam, carbon dioxide

Unsuitable extinguishing media for safety reasons:
water jet

Special hazards arising from the substance or mixture

Hazards during fire-fighting:
nitrous gases, fumes/smoke, isocyanate, vapour

Advice for fire-fighters

Protective equipment for fire-fighting:
Firefighters should be equipped with self-contained breathing apparatus and turn-out gear.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Clear area. Ensure adequate ventilation. Wear suitable personal protective clothing and equipment.

Environmental precautions

Do not discharge into drains/surface waters/groundwater.

Methods and material for containment and cleaning up

For small amounts: Absorb isocyanate with suitable absorbent material (see § 40 CFR, sections 260, 264 and 265 for further information). Shovel into open container. Spill area can be decontaminated with the following recommended decontamination solution: Mixture of 90 % water, 5-8 % household ammonia, 2-5 % detergent. Allow solution to stand for at least 10 minutes. Pick up with suitable absorbent material. Place into appropriately labeled waste containers. Do not make container pressure tight. Move container to a well-ventilated area (outside). Allow to stand for at least 48 hours to allow escape of evolved carbon dioxide. Dispose of absorbed material in accordance with regulations.
For large amounts: For spills, stop leaks and provide diking to contain the material. Prevent entry into sewage systems, ground and surface waters. If temporary control of isocyanate vapor is required, a blanket of protein foam or other suitable foam (available from most fire departments) may be placed over the spill. Transfer as much liquid as possible via pump or vacuum device into closed but not sealed containers for disposal.
For residues: The following measures should be taken for final cleanup: Spill area can be decontaminated with the following recommended decontamination solution: Mixture of 90 % water, 5-8 % household ammonia, 2-5 % detergent. Wash down spill area with decontamination solution. Allow solution to stand for at least 10 minutes. Pick up with suitable absorbent material. Place into appropriately labeled waste containers. Do not make container pressure tight. Move container to a well-ventilated area (outside). Allow to stand for at least 48 hours to allow escape of evolved carbon dioxide. Dispose of absorbed material in accordance with regulations.

7. Handling and Storage

Precautions for safe handling

Mix thoroughly before use. If bulging of drum occurs, transfer to well ventilated area, puncture to relieve pressure, open vent and let stand for 48 hours before resealing.

Protection against fire and explosion:
No special precautions necessary.

Conditions for safe storage, including any incompatibilities
Keep away from water. Segregate from foods and animal feeds. Segregate from acids and bases.

Suitable materials for containers: Carbon steel (Iron), High density polyethylene (HDPE), Low density polyethylene (LDPE), Stainless steel 1.4301 (V2)

Further information on storage conditions: Formation of CO2 and build up of pressure possible. Keep container tightly closed and in a well-ventilated place. Outage of containers should be filled with dry inert gas at atmospheric pressure to avoid reaction with moisture.

Storage stability:
Storage temperature: 16 - 27 °C
Protect against moisture.
The stated storage temperature is noted for health and safety in the workplace. With regard to Quality, please refer to the product specific Technical Bulletin.

8. Exposure Controls/Personal Protection

Components with occupational exposure limits

toluene-2,6-diisocyanate	ACGIH TLV	STEL value 0.005 ppm Inhalable fraction and vapor ; Skin Designation Inhalable fraction and vapor ; The substance can be absorbed through the skin. TWA value 0.001 ppm Inhalable fraction and vapor ; Skin Designation Inhalable fraction and vapor ; Danger of cutaneous absorption
Diphenylmethane-4,4'-diisocyanate (MDI)	OSHA PEL	CLV 0.02 ppm 0.2 mg/m3 ; CLV 0.02 ppm 0.2 mg/m3 ;
	ACGIH TLV	TWA value 0.005 ppm ;
toluene-2,4-diisocyanate	OSHA PEL	CLV 0.02 ppm 0.14 mg/m3 ;
	ACGIH TLV	TWA value 0.001 ppm Inhalable fraction and vapor ; Skin Designation Inhalable fraction and vapor ; The substance can be absorbed through the skin. STEL value 0.005 ppm Inhalable fraction and vapor ; Skin Designation Inhalable fraction and vapor ; Danger of cutaneous absorption

Advice on system design:
Provide local exhaust ventilation to control vapours/mists.

Personal protective equipment

Respiratory protection:
Respiratory protection in case of vapour/aerosol release. Gas filter for gases/vapours of organic compounds (boiling point >65 °C, e. g. EN 14387 Type A) Particle filter with high efficiency for solid and liquid particles (e.g. EN 143 or 149, Type P3 or FFP3).

When workers are facing concentrations above the occupational exposure limits they must use appropriate certified respirators. When atmospheric levels may exceed the occupational exposure limit (PEL or TLV) NIOSH-certified air-purifying respirators equipped with an organic vapor sorbent and particulate filter can be used as long as appropriate precautions and change out schedules are in place. Wear a NIOSH-certified (or equivalent) TC19C positive pressure air supplied respirator. For emergency or non-routine, high exposure situations, including confined space entry, use a NIOSH-certified full facepiece pressure demand self-contained breathing apparatus (SCBA) or a full facepiece pressure demand supplied-air respirator (SAR) with escape provisions.

Suitable respiratory protection for higher concentrations or long-term effect: Self-contained breathing apparatus.

Hand protection:
Chemical resistant protective gloves should be worn to prevent all skin contact., Suitable materials may include, chloroprene rubber (Neoprene), nitrile rubber (Buna N), chlorinated polyethylene, polyvinylchloride (Pylox), butyl rubber, fluoroelastomer (Viton), depending upon conditions of use.

Eye protection:
Tightly fitting safety goggles (chemical goggles). Wear face shield if splashing hazard exists.

Body protection:
Cover as much of the exposed skin as possible to prevent all skin contact., Suitable materials may include, saran-coated material, depending upon conditions of use.

General safety and hygiene measures:
Wear protective clothing as necessary to prevent contact. Eye wash fountains and safety showers must be easily accessible. Observe the appropriate PEL value. Wash soiled clothing immediately. Remove contaminated clothing immediately and clean before re-use or dispose it if necessary.

9. Physical and Chemical Properties

Form:	liquid	
Odour:	strong, pungent odour, faintly aromatic	
Odour threshold:	not applicable	
Colour:	dark brown	
pH value:	not applicable	
Freezing point:	10.00 °C	
Melting point:	No data available.	
Boiling point:	> 250.00 °C (760.000000 mmHg)	
Sublimation point:	No applicable information available.	
Flash point:	132.00 °C	(open cup)
Flammability:	not flammable	(derived from flash point)
Lower explosion limit:	0.90 %(V)	
Upper explosion limit:	9.50 %(V)	
Autoignition:	> 470.00 °C	
Vapour pressure:	0.025 mmHg (25.00 °C)	
Density:	1.2200 g/cm3 (25.00 °C)	

Bulk density:	1.2222 g/cm3
Vapour density:	not applicable
Partitioning coefficient n-octanol/water (log Pow):	Unspecified
Refractive index:	1.5666 (25 °C)
Self-ignition temperature:	Based on its structural properties the product is not classified as self-igniting.
Thermal decomposition:	No decomposition if stored and handled as prescribed/indicated.
Viscosity, dynamic:	7 mPa.s (25.00 °C)
Viscosity, kinematic:	No applicable information available.
Solubility in water:	Reacts with water.
Miscibility with water:	Reacts with water.
Solubility (quantitative):	No applicable information available.
Solubility (qualitative):	No applicable information available.
Molar mass:	No data available.
Evaporation rate:	Value can be approximated from Henry's Law Constant or vapor pressure.
Other Information:	If necessary, information on other physical and chemical parameters is indicated in this section.

10. Stability and Reactivity

Reactivity

Corrosion to metals:
No corrosive effect on metal.

Oxidizing properties:
Not an oxidizer.

Formation of flammable gases:	Remarks:	Forms no flammable gases in the presence of water.

Chemical stability
The product is stable if stored and handled as prescribed/indicated.

Possibility of hazardous reactions
Reacts with water, with formation of carbon dioxide. Risk of bursting. Reacts with alcohols. Reacts with acids. Reacts with alkalies. Reacts with amines. Risk of exothermic reaction. Risk of polymerization. Contact with certain rubbers and plastics can cause brittleness of the substance/product with subsequent loss in strength.

Conditions to avoid
> 40 degrees Celsius

Incompatible materials
copper, zinc, Tin, acids, alcohols, amines, water, Alkalines, copper alloys, aluminum compounds, strong oxidizing agents

Hazardous decomposition products

Decomposition products:
toluene-2,4-diisocyanate, carbon monoxide, hydrogen cyanide, toluene-2,6-diisocyanate, nitrogen oxides, aromatic isocyanates, gases/vapours

Thermal decomposition:
No decomposition if stored and handled as prescribed/indicated.

11. Toxicological information

Primary routes of exposure

Routes of entry for solids and liquids are ingestion and inhalation, but may include eye or skin contact. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquefied gases.

Acute Toxicity/Effects

Acute toxicity
Assessment of acute toxicity: Of very high toxicity after short-term inhalation. Virtually nontoxic after a single ingestion. Virtually nontoxic after a single skin contact.

Oral
Type of value: LD50
Species: rat (male/female)
Value: > 2,000 mg/kg (Directive 84/449/EEC, B.1)

Inhalation
Type of value: LC50
Species: rat
Value: 0.1 mg/l
Exposure time: 4 h
Highly toxic.

Dermal
Type of value: LD50
Species: rabbit (male/female)
Value: > 9,400 mg/kg
Practically nontoxic.

Assessment other acute effects
Assessment of STOT single:
Causes temporary irritation of the respiratory tract.

Irritation / corrosion
Assessment of irritating effects: Irritating to eyes, respiratory system and skin. Skin contact may result in dermatitis, either irritative or allergic.

Skin
Species: rabbit
Result: Irritant.
Literature data.

Information on: toluene-2,6-diisocyanate
Species: rabbit
Result: Irritant.

Method: other
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition. Literature data.

Information on: toluene-2,4-diisocyanate
Species: rabbit
Result: Irritant.
Method: OECD Guideline 404
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)
Species: rabbit
Result: Irritating.
Method: Draize test

Eye
Species: rabbit
Result: Irritant.
Literature data.

Information on: toluene-2,6-diisocyanate
Species: rabbit
Result: Irritant.
Method: other
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition. Literature data.

Information on: toluene-2,4-diisocyanate
Species: rabbit
Result: Irritant.
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)
Species: rabbit
Result: Irritating.
Method: Draize test

Sensitization
Assessment of sensitization: Sensitization after skin contact possible. The substance may cause sensitization of the respiratory tract. As a result of previous repeated overexposures or a single large dose, certain individuals will develop isocyanate sensitization (chemical asthma) which will cause them to react to a later exposure to isocyanate at levels well below the PEL/TLV. These symptoms, which include chest tightness, wheezing, cough, shortness of breath, or asthmatic attack, could be immediate or delayed up to several hours after exposure. Similar to many non-specific asthmatic responses, there are reports that once sensitized an individual can experience these symptoms upon exposure to dust, cold air, or other irritants. This increased lung sensitivity can persist for weeks and in severe cases for several years. Chronic overexposure to isocyanates has also been reported to cause lung damage, including a decrease in lung function, which may be permanent. Prolonged contact can cause reddening, swelling, rash, scaling, or blistering. In those who have developed a skin sensitization, these symptoms can develop as a result of contact with very small amounts of liquid material, or even as a result of vapour-only exposure. Animal tests indicate that skin contact may play a role in causing respiratory sensitization.

Information on: toluene-2,6-diisocyanate

Assessment of sensitization:
The substance may cause sensitization of the respiratory tract. Sensitization after skin contact possible.

Information on: toluene-2,4-diisocyanate
Assessment of sensitization:
The substance may cause sensitization of the respiratory tract. Sensitization after skin contact possible. The product has not been fully tested. The statements have been derived in parts from products of a similar structure or composition.

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)
Assessment of sensitization:
Sensitization after skin contact possible. The substance may cause sensitization of the respiratory tract. As a result of previous repeated overexposures or a single large dose, certain individuals will develop isocyanate sensitization (chemical asthma) which will cause them to react to a later exposure to isocyanate at levels well below the PEL/TLV. These symptoms, which include chest tightness, wheezing, cough, shortness of breath, or asthmatic attack, could be immediate or delayed up to several hours after exposure. Similar to many non-specific asthmatic responses, there are reports that once sensitized an individual can experience these symptoms upon exposure to dust, cold air, or other irritants. This increased lung sensitivity can persist for weeks and in severe cases for several years. Chronic overexposure to isocyanates has also been reported to cause lung damage, including a decrease in lung function, which may be permanent. Prolonged contact can cause reddening, swelling, rash, scaling, or blistering. In those who have developed a skin sensitization, these symptoms can develop as a result of contact with very small amounts of liquid material, or even as a result of vapour-only exposure. Animal tests indicate that skin contact may play a role in causing respiratory sensitization.

Guinea pig maximization test
Species: guinea pig
Result: sensitizing
Literature data.

Information on: toluene-2,6-diisocyanate
Information on: toluene-2,4-diisocyanate
Species: guinea pig
Result: sensitizing
Method: other

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)
Buehler test
Species: guinea pig
Result: sensitizing

Mouse Local Lymph Node Assay (LLNA)
Species: mouse
Result: sensitizing
Can cause skin sensitization

other
Species: guinea pig
Result: sensitizing
Studies in animals suggest that dermal exposure may lead to pulmonary sensitization. However, the relevance of this result for humans is unclear.

Aspiration Hazard
No aspiration hazard expected.

Chronic Toxicity/Effects

Repeated dose toxicity
Assessment of repeated dose toxicity: The substance may cause damage to the lung even after repeated inhalation of low doses, as shown in animal studies.

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)
Assessment of repeated dose toxicity: The substance may cause damage to the olfactory epithelium after repeated inhalation. The substance may cause damage to the lung after repeated inhalation. These effects are not relevant to humans at occupational levels of exposure.

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)
Experimental/calculated data: rat (Wistar) (male/female) Inhalation 2 yrs, 6 hr/day 0, 0.2, 1, 6 mg/m3 , olfactory epithelium
NOAEL: 0.2 mg/m3
LOAEL: 1 mg/m3
The substance may cause damage to the olfactory epithelium after repeated inhalation. These effects are not relevant to humans at occupational levels of exposure. Repeated inhalative uptake of the substance did not cause damage to the reproductive organs.

Genetic toxicity
Assessment of mutagenicity: The substance was mutagenic in various test systems with bacterias and cell cultures; however, these results could not be confirmed in tests with mammals.

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)
Genetic toxicity in vitro: OECD Guideline 471 Ames-test Salmonella typhimurium:with and without metabolic activation ambiguous
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Information on: Diphenylmethane-4,4'-diisocyanate (MDI)
Genetic toxicity in vivo: OECD Guideline 474 Micronucleus assay rat (male) Inhalation negative
No clastogenic effect reported.

Carcinogenicity
Assessment of carcinogenicity: IARC (International Agency for Research on Cancer) has classified this substance as group 2B (The agent is possibly carcinogenic to humans). NTP listed carcinogen

Information on: toluene-2,4-diisocyanate
Assessment of carcinogenicity: IARC (International Agency for Research on Cancer) has classified this substance as group 2B (The agent is possibly carcinogenic to humans). NTP listed carcinogen

Information on: toluene-2,6-diisocyanate
Assessment of carcinogenicity: Indication of possible carcinogenic effect in animal tests.

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)
Assessment of carcinogenicity: A carcinogenic potential cannot be excluded after prolonged exposure to severely irritating concentrations. These effects are not relevant to humans at occupational levels of exposure. IARC Group 3 (not classifiable as to human carcinogenicity).

Information on: P-MDI

Information on: Methylenediphenyl diisocyanate

Assessment of carcinogenicity: A carcinogenic potential cannot be excluded after prolonged exposure to severely irritating concentrations. These effects are not relevant to humans at occupational levels of exposure. IARC Group 3 (not classifiable as to human carcinogenicity).

Information on: Isocyanic acid, polymethylenepolyphenylene ester, polymer with.alpha.-hydro-.omega.-hydroxypoly(oxy-1,2-ethanediyl)

Information on: 1,3-Diazetidine-2,4-dione, 1,3-bis[4-[(4- isocyanatophenyl)methyl]phenyl]-
Assessment of carcinogenicity: The product has not been tested. The statement has been derived from substances/products of a similar structure or composition. A carcinogenic potential cannot be excluded after prolonged exposure to severely irritating concentrations. These effects are not relevant to humans at occupational levels of exposure.

Reproductive toxicity
Assessment of reproduction toxicity: The results of animal studies gave no indication of a fertility impairing effect. Literature data.

Teratogenicity
Assessment of teratogenicity: No indications of a developmental toxic / teratogenic effect were seen in animal studies. The product has not been tested. A mixture of isomers has been tested.

Medical conditions aggravated by overexposure
Medical supervision of all employees who handle or come into contact with isocyanates is recommended. The isocyanate component is a respiratory sensitizer. It may cause allergic reaction leading to asthma-like spasms of the bronchial tubes and difficulty in breathing. Preemployment and periodic medical examinations with respiratory function tests (FEV, FVC as a minimum) are suggested. Persons with history of respiratory disease or hypersensitivity should not be exposed to this product. Persons with asthmatic conditions, chronic bronchitis, other chronic respiratory diseases, recurrent eczema or pulmonary sensitization should be excluded from working with isocyanates. Once a person is diagnosed as having pulmonary sensitization (allergic asthma) to isocyanates, further exposure is not recommended.

12. Ecological Information

Toxicity

Aquatic toxicity
Assessment of aquatic toxicity:
Acutely harmful for aquatic organisms. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The inhibition of the degradation activity of activated sludge is not anticipated when introduced to biological treatment plants in appropriate low concentrations. The product may hydrolyse. The test result maybe partially due to degradation products. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Toxicity to fish
LC50 (96 h) 164.5 mg/l, Pimephales promelas (static)
The details of the toxic effect relate to the nominal concentration. Literature data.

Aquatic invertebrates
EC50 (48 h) 12.5 mg/l, Daphnia magna (OECD Guideline 202, part 1, static)
The details of the toxic effect relate to the nominal concentration. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Toxicity to fish

Information on: toluene-2,4-diisocyanate
LC50 (96 h) 133 mg/l, Oncorhynchus mykiss (OECD Guideline 203, static)
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition. The product has not been tested. The statement has been derived from the properties of the hydrolysis products.

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)
LC0 (96 h) > 1,000 mg/l, Brachydanio rerio (OECD Guideline 203, static)

Aquatic invertebrates

Information on: toluene-2,4-diisocyanate
EC50 (48 h) 12.5 mg/l, Daphnia magna (OECD Guideline 202, part 1, static)
The details of the toxic effect relate to the nominal concentration. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition. The product has not been tested. The statement has been derived from the properties of the hydrolysis products.

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)
EC50 (24 h) > 1,000 mg/l, Daphnia magna (OECD Guideline 202, part 1, static)

Aquatic plants

Information on: toluene-2,4-diisocyanate
EC50 (96 h) 3,230 mg/l (growth rate), Skeletonema costatum (OECD Guideline 201)
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition. The product has not been tested. The statement has been derived from the properties of the hydrolysis products.
EC50 (96 h) 1,790 mg/l (biomass), Skeletonema costatum (OECD Guideline 201)
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition. The product has not been tested. The statement has been derived from the properties of the hydrolysis products.

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)
EC0 (72 h) 1,640 mg/l (growth rate), Scenedesmus subspicatus (OECD Guideline 201, static)

Chronic toxicity to fish

Information on: toluene-2,4-diisocyanate
Study does not need to be conducted. *The product has not been tested. The statement has been derived from the properties of the hydrolysis products.*

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)
Study scientifically not justified.

Chronic toxicity to aquatic invertebrates

Information on: toluene-2,4-diisocyanate
No observed effect concentration (21 d) 1.1 mg/l, Daphnia magna (OECD Guideline 211, static)
Nominal concentration. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition. The product has not been tested. The statement has been derived from the properties of the hydrolysis products.

Microorganisms/Effect on activated sludge

Toxicity to microorganisms
OECD Guideline 209 static
activated sludge/EC20 (180 min): > 100 mg/l
Nominal concentration. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Information on: toluene-2,4-diisocyanate
OECD Guideline 209 static
activated sludge/EC50 (3 h): > 100 mg/l
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)
OECD Guideline 209 aquatic
aerobic bacteria from a domestic water treatment plant/EC50 (3 h): > 100 mg/l
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Persistence and degradability

Assessment biodegradation and elimination (H2O)
Poorly biodegradable. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition. The product is unstable in water. The elimination data also refer to products of hydrolysis.

Elimination information

0 - 10 % BOD of the ThOD (28 d) (OECD Guideline 302 C) (aerobic, activated sludge, domestic)

Assessment biodegradation and elimination (H2O)

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)

Poorly biodegradable. The product is unstable in water. The elimination data also refer to products of hydrolysis.

Assessment of stability in water
In contact with water the substance will hydrolyse rapidly.

Information on Stability in Water (Hydrolysis)
50 - 90 % (2 h)
In contact with water the substance will hydrolyse rapidly.

Bioaccumulative potential

Bioaccumulation potential
Bioconcentration factor: < 50 (42 d), Cyprinus carpio (OECD Guideline 305 C)
Does not significantly accumulate in organisms. The product has not been tested. The statement has been derived from the properties of the hydrolysis products.

Mobility in soil

Assessment transport between environmental compartments
Adsorption to solid soil phase is not expected.

Additional information

Adsorbable organically-bound halogen (AOX):
This product contains no organically-bound halogen.

Other ecotoxicological advice:
Do not release untreated into natural waters. Do not allow to enter soil, waterways or waste water channels. The product has not been tested. The statement has been derived from the properties of the individual components.

13. Disposal considerations

Waste disposal of substance:
Incinerate or dispose of in a licensed facility. Dispose of isocyanate waste in dry containers and never mix together with other wastes (reaction, dangerous pressure build up). Observe all local regulations.

Container disposal:
Steel drums must be emptied and can be sent to a licensed drum reconditioner for reuse, a scrap metal dealer or an approved landfill. Do not attempt to refill or clean containers since residue is difficult to remove. Under no circumstances should empty drums be burned or cut open with gas or electric torch as toxic decomposition products may be liberated. Do not reuse empty containers.

14. Transport Information

Land transport
TDG

Hazard class:	6.1
Packing group:	II
ID number:	UN 2078
Hazard label:	6.1
Proper shipping name:	TOLUENE DIISOCYANATE

Sea transport
IMDG

Hazard class:	6.1
Packing group:	II
ID number:	UN 2078
Hazard label:	6.1
Marine pollutant:	NO
Proper shipping name:	TOLUENE DIISOCYANATE

Air transport
IATA/ICAO

Hazard class:	6.1
Packing group:	II
ID number:	UN 2078
Hazard label:	6.1
Proper shipping name:	TOLUENE DIISOCYANATE

15. Regulatory Information

Federal Regulations

Registration status:
Chemical DSL, CA released / listed

NFPA Hazard codes:
Health: 3 Fire: 1 Reactivity: 1 Special:

16. Other Information

SDS Prepared by:
BASF NA Product Regulations
SDS Prepared on: 2020/10/29

We support worldwide Responsible Care® initiatives. We value the health and safety of our employees, customers, suppliers and neighbors, and the protection of the environment. Our commitment to Responsible Care is integral to conducting our business and operating our facilities in a safe and environmentally responsible fashion, supporting our customers and suppliers in ensuring the safe and environmentally sound handling of our products, and minimizing the impact of our operations on society and the environment during production, storage, transport, use and disposal of our products.

END OF DATA SHEET