Safety Data Sheet according to Regulation (EC) No 1907/2006 (REACH)

0. Data Sheet Information

Revision date: 19.06.2018
Supersedes edition: 22.11.2016

1. Identification of the substance / mixture and of the company / undertaking

1.1. Product identifier:

Chemical name: Diphenylmethane diisocyanate, isomers and homologues
CAS No: 9016-87-9
EC No: 618-498-9
REACH **Registration number:** ---
Trade name: **RAPID 44-14/ 44-03/ 4400 D Component B – hardener (liquid part)**

1.2. Relevant identified uses of the substance or mixture and uses advised against:

Designated use: **Three-components PUR-resin for potting, casting or coating**
Uses advised against: Spraying or generation of aerosols.

1.3. Details of the supplier of the safety data sheet:

Company: **Tyco Electronics Raychem GmbH** **Tel.: +49 6151 607 1999**

Address: **Tyco Electronics Raychem GmbH**
A company of TE Connectivity Group
Finsinger Feld 1
85521 Ottobrunn/München
Germany **E-mail Support:** **www.te.com/support-center**

1.4. Emergency telephone number:

24-hour emergency telephone number: **Tel.: +49 (0) 30 30686 700**
Giftnotruf Berlin (poison control centre)

2. Hazards identification

2.1. Classification of the substance or mixture:

2.1.1. Classification according to Regulation (EC) No. 1272/2008 [CLP]:

Hazard class and category (code):

Acute toxicity (inhalation)	Category 4	H332	Harmful if inhaled.
Skin irritation	Category 2	H315	Causes skin irritation.
Eye irritation	Category 2	H319	Causes serious eye irritation.
Respiratory sensitisation	Category 1	H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Skin sensitisation	Category 1	H317	May cause an allergic skin reaction.
Carcinogenicity	Category 2	H351	Suspected of causing cancer.
Specific target organ toxicity single exposure	Category 3	H335	May cause respiratory irritation.
Specific target organ toxicity, (Inhalation) - repeated exposure	Category 2	H373	May cause damage to organs (respiratory organs) through prolonged or repeated exposure if inhaled.
Supplementary information (CLP VO Annex 2, paragraph 2.4.)		EUH204	Contains isocyanates. May produce an allergic reaction.

2.2. Label elements:

2.2.1. Labelling according to Regulation (EC) No. 1272/2008 [CLP/GHS]:

Hazardous components which must be listed on the label:

Diphenylmethane diisocyanate, isomers and homologues (CAS No: 9016-87-9)

Hazard pictograms:

(GHS08 + GHS07)

Signal word:

Danger

Hazard statements:

H332	Harmful if inhaled.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317	May cause an allergic skin reaction.
H351	Suspected of causing cancer.
H335	May cause respiratory irritation.
H373	May cause damage to organs (respiratory organs) through prolonged or repeated exposure if inhaled.
EUH204	Contains isocyanates. May produce an allergic reaction.

Precautionary statements:

P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P280	Wear protective gloves/eye protection/face protection.
P302+P352	IF ON SKIN: Wash with plenty of soap and water.
P304+P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P308+P313	IF exposed or concerned: Get medical advice/attention.

2.3. Other hazards:
People with hypersensitivity or history of respiratory diseases (e.g. asthma, chronic bronchitis) should avoid handling this product for safety reasons. The onset of symptoms in the respiratory tract may be delayed for several hours after overexposure. Vapours and aerosols are the main hazards to the respiratory tract.

3. Composition / information on ingredients

3.1. Substances / mixtures:

3.1.1. Description:
Diphenylmethane diisocyanate, isomers and homologues;
techn. ("polymeric") MDI (pMDI)

3.1.2. Hazardous ingredients:

Substance / mixture:	CAS No:	EC No:	Weight %:	Classification according to 1272/2008/EC:
Polymeric MDI	9016-87-9	618-498-9	≤ 100 %	Acute Tox. 4 (inhalation), H332 Skin Irrit. 2, H315 Eye Irrit. 2, H319 Resp. Sens. 1, H334 Skin Sens. 1, H317 Carc. 2, H351 STOT SE 3, H335 STOT RE 2 (inhalation), H373

The substance/mixture contains:

				Classification according to 1272/2008/EC:
4,4'-Methylene diphenyl diisocyanate	101-68-8	202-966-0	25%- 60%	Acute Tox. 4 (inhalation), H332 Skin Irrit. 2, H315 Eye Irrit. 2, H319 Resp. Sens. 1, H334 Skin Sens. 1, H317 Carc. 2, H351 STOT SE 3, H335 STOT RE 2 (inhalation), H373

REACH Registration number: 01-2119457014-47
Index No: 615-005-00-9

3.1.3. Additional information:
See section 8, exposure control and personal protective equipment.

4. First aid measures

4.1. Description of first aid measures:

4.1.1. General information: Remove contaminated clothing immediately and wash thoroughly before reuse.

4.1.2. Following inhalation of aerosols or vapour in high concentration: Move victim to fresh air, keep warm and allow to rest. If the victim has difficulty breathing, medical attention is required.

4.1.3. Following skin contact: Immediately wipe off, then wash affected areas thoroughly with soap and water for at least 15 minutes. Apply skin cream carefully afterwards.

4.1.4. Following eye contact: Immediately flush eyes by hold eyelids apart and rinsing thoroughly with plenty of water for at least 15 minutes. Then seek medical attention from an eye specialist.

4.1.5. Following ingestion: Rinse mouth thoroughly; drink plenty of water. Do not induce vomiting. Immediate medical attention required.

4.2. Most important symptoms and effects, both acute and delayed:

Health status, which aggravates by exposure: Excessive exposure may aggravate existing asthma and other respiratory disorders (e.g. emphysema, bronchitis, reactive airways dysfunction syndrome).

4.3. Indication of any immediate medical attention and special treatment needed:

Note to physician: Specific antidotes do not exist. Medical treatment should focus on controlling symptoms and the patient's clinical condition. May cause respiratory sensitisation and asthma-like symptoms; broncholytics, expectorants and antitussives may be useful.
Treat asthma-like bronchospasm with beta2-agonists (inhaled) and oral or parenteral corticosteroids. Respiratory symptoms, including pulmonary oedema, may occur delayed. Individuals who have experienced significant exposure should be kept under observation for 24-48 hours to check for signs of respiratory distress. Sufficient ventilation and oxygen supply must be ensured. In case of existing sensitisation to isocyanates, a physician should be consulted with regard to contact with other sensitising or respiratory irritating substances in the working environment.

5. Firefighting measures

5.1. Extinguishing media: Dry powder, foam, CO_2. In cases of larger fires, water spray should be used. Do not use direct water jet. May spread fire.

5.2. Special hazards arising from the substance or mixture:
Special exposure hazards caused by resulting gases:
Carbon monoxide, carbon dioxide, nitrous oxides, icocyanate vapours and traces of hydrocyanic acid may be released in case of fire.

5.3. Advice for fire-fighters:
Protective measures: Wear self-contained breathing apparatus. Fire-fighters must wear fire-resistant personal protective equipment and chemical protection. Do not inhale fumes.

5.4. Other precautions: Dispose of fire residues and contaminated fire fighting water in accordance with local regulations. Do not empty into drains. Fire in vicinity poses risk of pressure build-up and rupture. Containers at risk from fire should be cooled with water and, if possible, removed from danger area.

6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures:
Applicable procedures: Provide ventilation. In case of gases/vapours, respirator and full chemical protective suit are required.

6.2. Environmental precautions: Prevent discharges into soil, water courses, sewers or drains.

6.3. Methods and material for containment and cleaning up:
Cover with moist, absorbent material (e.g. sand, sawdust, calcium silicate hydrate-based chemical absorber). After 1 hour, transfer to a container but do not seal container (generation of carbon dioxide). Keep damp and store in a safe place in open air for 7-14 days.
Cleaning products: Gasoline, kerosene, paint thinner

6.4. Reference to other sections: ---

7. Handling and storage

7.1. Precautions for safe handling:

The product must not come into contact with water.
Ensure there is good ventilation in the storage and working areas. The work space should be provided with adequate air extraction. Avoid inhalation of vapour/spray. It is recommended to periodically check the concentration of diisocyanates in the air. Contact with copper, copper alloys or galvanised surfaces must be avoided. It is recommended to use stainless steel or soft steel with a suitable lining. Do not store in open containers; keep product in containers with airtight seals. Do not use damaged containers or drums; damaged and punctured drums should be emptied and disposed of properly.
Depending on the production parameters, any uncovered surfaces of polyurethane mouldings produced using this raw material may contain traces of substances (e.g. starting and reaction products, catalysts, release agents) with hazardous characteristics. Skin contact with traces of these substances must be avoided. When demoulding or otherwise handling freshly moulded polyurethane parts, protective textile gloves must be worn as a minimum. The palm and finger areas of such gloves should preferably be coated on the outside with nitrile rubber, PVC or PUR. Protective gloves should be changed daily. The wearing of protective clothing suited to the conditions normally encountered when handling freshly moulded polyurethane parts is recommended.

Fire and explosion protection:

Keep away from ignition sources. Do not smoke.

7.2. Conditions for safe storage, including any incompatibilities:

Storage: Keep in tightly closed containers in a cool, dry and well-ventilated place. Products based on isocynatates react with water and generate carbon dioxide.
This can cause dangerous pressure build-up in closed containers.

Storage conditions: Prevent frost and heating above 40°C. Short-time warming up to 50°C is possible.

Storage temperatures: +5°C to +40°C

Recommended Storage temperature: ~ +20 °C

Storage class: 10 (flammable liquids, flash point > 60°C)

7.3. Specific end uses:

Three-component PUR-resin for potting. Consult technical guidelines for the use of this substance/mixture.

8. Exposure controls / personal protection

8.1. Control parameters:

8.1.1. Occupational exposure limits (OEL) for respirable aerosols:

Substance/ mixture	CAS No:	Source	Occupational exposure limit value	Peak limit	Remarks
Polymeric MDI	9016-87-9	TRGS 900	0.05 mg/m³	1;=2=(I)	Respirable fraction, absorbed through the skin, respiratory sensitiser
4,4'-Methylene diphenyl diisocyanate	101-68-8	TRGS 900	0.05 mg/m³	1;=2=(I)	

United Kingdom (UK):
UK Workplace Exposure Limits (WEL), as per EH40 document (Health & Safety Executive).

Substance/mixture	CAS No:	Bases	Type	Value	Remarks
Polymeric MDI	9016-87-9	EH40 WEL	TWA	0.02 mg/m³	measured as NCO, SEN
Polymeric MDI	9016-87-9	EH40 WEL	STEL	0.07 mg/m³	measured as NCO, SEN
4,4'-Methylene diphenyl diisocyanate	101-68-8	EH40 WEL	TWA	0.02 mg/m³	measured as NCO, SEN
4,4'-Methylene diphenyl diisocyanate	101-68-8	EH40 WEL	STEL	0.07 mg/m³	measured as NCO, SEN

8.1.2. Biological limit values (BGW , DE):

4,4'- Methylene diphenyl diisocyanate (CAS No: 101-68-8):
As per TRGS 903:

Investigation parameter	BGW (DE)	Test-material	Time of sampling
4,4'-Diaminodiphenyl-methane	10 µg/g Creatinine	Urine	End of exposure/end of shift

8.1.3. Exposure limits at intended use: ---

8.1.4. DNEL/PNEC-values:

4,4'-Methylene diphenyl diisocyanate (CAS No: 101-68-8):

DNEL Worker:

DNEL type	DNEL value	Remark
DNEL acute dermal, short-term (local)	28.7 mg/cm²	
DNEL acute dermal, short-term (systemic)	50 mg/kg bw/day	
DNEL acute inhalation (local)	0.1 mg/m³	
DNEL acute inhalation (systemic)	0.1 mg/m³	
DNEL long-term inhalation (local)	0.05 mg/m³	
DNEL long-term inhalation (systemic)	0.05 mg/m³	

DNEL Consumer:

DNEL type	DNEL value	Remark
DNEL short-term oral (acute, systemic)	20 mg/kg bw/day	
DNEL acute dermal, short-term (local)	17.2 mg/cm²	
DNEL acute dermal, short-term (systemic)	25 mg/kg bw/day	
DNEL acute inhalation (local)	0.05 mg/m³	
DNEL acute inhalation (systemic)	0.05 mg/m³	
DNEL long-term inhalation (local)	0.025 mg/m³	
DNEL long-term inhalation (systemic)	0.025 mg/m³	

PNEC

PNEC type	PNEC value	Remark
PNEC aquatic, freshwater	1 mg/l	
PNEC aquatic, marine water	0.1 mg/l	
PNEC soil	1 mg/kg	
PNEC wastewater treatment plant (WWTP)	1 mg/l	

8.2. Exposure controls:

8.2.1. Technical protective measures:

For use at high temperatures ensure adequate ventilation and/or use closed filling, transfer, metering and mixing equipment if possible.

8.2.2. Personal protective equipment:

Eye protection: Tightly fitting safety goggles. Eye washes should be provided.

Hand protection: In case of potential skin contact the use of polyethylene (PE) gloves for single use give sufficient protection. These gloves resist penetration > 30 min. Damaged gloves should be replaced. In case of prolonged or recurrent contact, choose appropriate gloves as per EN 374-3:

Polychloroprene – CR:	Thickness >= 0.5 mm	Breakthrough time >= 480 min.
Nitrile rubber – NBR:	Thickness >= 0.35 mm	Breakthrough time >= 480 min.
Butyl rubber – IIR:	Thickness >= 0.5 mm	Breakthrough time >= 480 min.
Fluorocarbon rubber– FKM:	Thickness >= 0.4 mm	Breakthrough time >= 480 min.

Recommendation: dispose of contaminated gloves.

Body protection: For this material, use impervious protective clothing. The selection of specific items such as face shield, gloves, boots, apron or full suit depends on the activity and the work process.

Respiratory protection: In workplaces that are not ventilated sufficiently and at increased temperatures, the following respiratory protection is required: protective mask with an appropriate glass filter – type A1 according to standard EN 14387.

General protection and hygiene measures:

Only handle product if there is adequate ventilation. Provide general or local exhaust ventilation to control airborne levels of harmful vapors below the limits.
The odour and irritation effect of this product are not intense enough to alert at overexposure. Keep separated from food. Do not eat, drink or smoke during work. Wash hands thoroughly before breaks and at the end of the workday. Avoid contact with eyes, skin and clothing. Keep work clothes separate from street clothes. Decontaminate and dispose of soiled clothing (see section 13).

8.2.3. Environmental exposure controls:

	The mixture should not be allowed to enter drains, water courses or soil.

9. Physical and chemical properties

9.1. Information on basic physical and chemical properties:

9.1.1. Appearance:

Physical state:	liquid (at 1013 mbar/ 20°C)
Colour:	dark brown
Odour:	earthy, musty

9.1.2. Safety relevant basic data:

Melting point:	crystallisation < 10°C
Boiling point:	> 200°C (DIN 53171)
Flash point:	> 200°C (DIN EN 22719)
Ignition temperature:	> 400°C (DIN 51794)
Lower explosion limit:	N/A
Upper explosion limit:	N/A
Vapour pressure (20°C):	< 0.00001 mbar
Density at 23°C (EN ISO 1183-1):	Approx. 1.24 g/cm³
Viscosity at 20°C (DIN 53019):	Approx. 200 mPa·s
Solubility:	Insoluble in water, reacts with water at the interface releasing CO_2 and forming solid, insoluble high melting polyurea.

N/A: not applicable

9.1.3. Physical hazards: Not known.

9.2. Other information: None.

10. Stability and reactivity

10.1. Reactivity:

No dangerous reaction known under conditions of normal use. Products based on diisocyanates like TDI and MDI react with many materials to release heat. The reaction rate increases with temperature as well as with increased contact; these reactions can become violent. Contact is increased by stirring or if the other
material acts as a solvent. Products based on diisocyanates such
as TDI and MDI are not soluble in water and will sink to the bottom, but react slowly at the interface to solid polyurea. Reaction with water will generate carbon dioxide and heat.

10.2. Chemical stability:

Stable under recommended storage conditions. Polymerises at around 200°C with evolution of CO_2.

10.3. Possibility of hazardous reactions:

Exothermic reaction with amines, amine-containing products, heavy metal salts and alcohols. Formation of CO_2 with water. This can cause pressure build-up in closed containers.

10.4. Conditions to avoid:

Do not overheat.
Avoid temperatures exceeding 40°C. Temperatures above 160°C can cause it to react with itself. Decomposition begins at temperatures above 200°C. The formation of gases during decomposition can build up pressures in closed systems.

10.5. Incompatible materials:

Acids, alcohols, amines, ammoniac, alkaline substances, water, metal compounds, humid air, strong oxidizing agents. Isocyanates react with many substances. The speed of reaction increases with temperature and contact area. Reactions may become violent. The reaction between isocyanates and polyoles generates heat.

10.6. Hazardous decomposition products:

No hazardous decomposition products if handled and stored correctly.

11. Toxicological information

11.1. Information on toxicological effects:

Acute toxicity:
Animal data:

Polymeric MDI (CAS No: 9016-87-9):
LD_{50} (oral, rat): > 10000 mg/kg (Method: OECD Test Guideline 401)
LD_{50} (skin contact, rabbit): > 9400 mg/kg (Method: OECD Test Guideline 402)
LD_{50} (inhalation, rat): ~ 310 mg /m³ (aerosol); 4-hr exposure (Method: OECD Test Guideline 403)

4,4'-Methylene diphenyl diisocyanate (CAS No: 101-68-8):
LD_{50} (oral, rat): > 10000 mg/kg (Method: OECD Test Guideline 401)
LD_{50} (skin contact, rabbit): > 9400 mg/kg (Method: OECD Test Guideline 402)
LD_{50} (inhalation, rat): ~ 0.49 mg /l (aerosol); 4-hr exposure (Method: OECD Test Guideline 403)

Skin corrosion/skin irritation:
Polymeric MDI (CAS No: 9016-87-9):
Primary skin irritation: Rabbit: **slightly irritating** (Method: OECD Test Guideline 404)

4,4'-Methylene diphenyl diisocyanate (CAS No: 101-68-8):
Primary skin irritation: Rabbit: **irritating** (Method: OECD Test Guideline 404)

Assessment/classification: irritating to skin.

Eye damage/irritation:
Polymeric MDI (CAS No: 9016-87-9) and 4,4'-Methylene diphenyl diisocyanate (CAS No:: 101-68-8):
Primary mucosal irritation: Rabbit: **not an irritant** (Method: OECD Test Guideline 405)

Other information:
Based on the human occupational exposure data, this mixture is considered as irritating to eyes.

Assessment/classification: irritating to eyes.

Sensitisation:
Polymeric MDI (CAS No: 9016-87-9) and 4,4'-Methylene diphenyl diisocyanate (CAS No: 101-68-8):
Respiratory sensitisation:
Rat: **sensitisation by inhalation possible.**
Guinea pigs: **sensitising.**

Skin sensitisation: Guinea pigs: **negative** (Method: OECD Test Guideline 406)
Skin sensitisation according to Magnusson-Kligman.

Mouse**: positive** (Method: OECD Test Guideline 429)
Skin sensitisation (local lymph node assay (LLNA))
Toxicological study of a similar product.

Assessment/classification: Sensitisation of respiratory tract and skin possible.

Subacute, subchronic and long-term toxicity:
Polymeric MDI (CAS No: 9016-87-9):
Method: **OECD Test Guideline 453**
Application: Inhalation of an aerosol; species: rat, male/female;
Dosage: 0 – 0.2 – 1 – 6 mg/m³, time: 6 h/d, 5 d/w, for 2 yrs.
NOAEL: 0.2 mg/m³ (max. concentration at which no adverse effects observed.)
LOAEL: 1 mg/m³ (Lowest concentration at which adverse effects observed, demonstrated in animal experiments.)

Assessment/classification: irritation of the nasal cavities and lungs.

CMR effects (carcinogenicity, mutagenicity and toxicity for reproduction):
Germ cell mutagenicity:
Polymeric MDI (CAS No: 9016-87-9):
Genotoxicity in vitro: **negative** (Method OECD Test Guideline 471)
Salmonella/microsome assay (Ames test)

Polymeric MDI (CAS No: 9016-87-9) and 4,4'-Methylene diphenyl diisocyanate (CAS No: 101-68-8):
Genotoxicity in vivo: **negative** (Method OECD Test Guideline 474)
Micronucleus test; species: rat, male, inhalation, 3x1 h/d for 3 w

4,4'-Methylene diphenyl diisocyanate (CAS No: 101-68-8):
Mutagenicity: EU EC B. 13/14 Mutagenicity – Reverse Mutation Test using bacteria: **negative**

Assessment/classification: No mutagenic effects.

Carcinogenicity:
Method: **OECD Test Guideline 453**
Application: inhalation of an aerosol; species: rat, male/female;
Dosage: 0 – 0.2 – 1 – 6 mg/m³, time: 6 h/d, 5 d/w, for 2 yrs.

Polymeric MDI (CAS No: 9016-87-9): negative

4,4'-Methylene diphenyl diisocyanate (CAS No: 101-68-8): positive
In the animal group, at the maximum dose of 6 mg/m³ there was an increased number of lung tumours, chronic inflammatory changes in the nose, respiratory tract and lungs and yellowish deposits in the respiratory tract.

Assessment/classification: Potential occurrence of tumours.

Reproductive toxicity:

Method: **OECD Test Guideline 414**
Application: inhalation of an aerosol; species: rat, female;
Dosage: 0 – 1 – 4 – 12 mg/m³, time: 6 h/d, for 10 d

Prenatal developmental toxicity study:
Polymeric MDI (CAS No: 9016-87-9):
NOAEL: 4 mg/m³
4,4'-Methylene diphenyl diisocyanate (CAS No: 101-68-8):
NOAEL: 12 mg/m³

Assessment/classification: did not show teratogenic effects in animal experiments.

Specific target organ toxicity (single exposure):
STOT SE3:
Polymeric MDI (CAS No: 9016-87-9) and 4,4'-Methylene diphenyl diisocyanate (CAS No: 101-68-8):
Exposure route: Inhalation
Target organ: Respiratory tract
Category: Category 3 (SE 3)

Specific target organ toxicity (repeated exposure):
STOT RE 2:
Polymeric MDI (CAS No: 9016-87-9) and 4,4'- Methylene diphenyl diisocyanate (CAS No: 101-68-8):
Exposure route: Inhalation
Target organ: Respiratory tract
Category: Category 2 (RE 2)

Potential acute health effects:

LC50 (rat): approx. 490 mg/m³ (4 hours), using experimentally produced respirable aerosol with an aerodynamic diameter of < 5 microns.

Inhalation: 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, chest tightness and difficulty 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.

Ingestion: Low oral toxicity. Ingestion may cause irritation of the gastrointestinal tract.

Skin contact: Irritating to skin. May cause sensitisation by skin contact. Animal studies have shown that respiratory sensitisation can be induced by skin contact with known respiratory sensitisers including diisocyanates. These results emphasise the need for protective clothing, including gloves, to be worn at all times when handling these chemicals or during maintenance work.

Eye contact: Irritating to eyes.

Symptoms related to the physical, chemical and toxicological characteristics:

Inhalation: Adverse symptoms may include the following:
respiratory tract irritation, coughing, wheezing and breathing difficulties, asthma

Ingestion: No specific data.

Skin contact: Adverse symptoms may include the following:
irritation, redness

Eye contact: Adverse symptoms may include the following:
pain or irritation, watering, redness

Potential chronic health effect:

Polymeric MDI (CAS No: 9016-87-9):

Method: OECD Test Guideline 453
0.2 mg/m³ NOEC (dust and mists)
(Highest dose with no significant effects.)

Summary toxicity:

May cause damage to organs through prolonged or repeated exposure if inhaled. Once sensitised, a severe allergic reaction may occur when subsequently exposed to very low levels.
The product causes irritation of eyes, skin and mucous membranes.
May cause sensitisation by inhalation and skin contact.

Summary assessment of the CMR properties:

Carcinogenicity: May cause cancer by inhalation. Based on the data, this is therefore classified as carcinogenic.

Mutagenicity: In vivo and in vitro tests showed no mutagenic effects.

Teratogenicity: Did not show teratogenic effects in animals.

Reproductive toxicity: The classification criteria are not met with the available data bank.

11.2. Other information: Not available.

12. Ecological information

12.1. Toxicity:

Aquatic toxicity:

Acute (short-term) toxicity:

Polymeric MDI (CAS No: 9016-87-9):

Effect dose	Exposure time	Species	Method	Evaluation
LC50	96 hours	Fish	OECD 203; Fish, Acute Toxicity Test, Zebrafish	> 1000 mg/l
EC50	24 hours	Daphnia	OECD 202; Acute Immobilisation Test	> 1000 mg/l
EC50	3 hours	Bacteria	OECD 209; Activated Sludge, Respiration Inhibition Test	> 100 mg/l
EC50	72 hours	Alga (Scenedesmus subspicatus)	OECD 201; Alga, Growth Inhibition Test	> 1640 mg/l

4,4'-Methylene diphenyl diisocyanate (CAS No: 101-68-8):

Effect dose	Exposure time	Species	Method	Evaluation
LC50	96 hours	Fish	OECD 203; Fish, Acute Toxicity Test	> 1000 mg/l
EC50	24 hours	Daphnia	OECD 202; Acute Immobilisation Test	> 1000 mg/l

Chronic (long-term) toxicity:

Polymeric MDI (CAS No: 9016-87-9):

Effect dose	Exposure time	Species	Method	Evaluation
NOEC	112 days	Fish	No official method.	> 10000 mg/l
NOEC	112 days	Daphnia	No official method.	> 10000 mg/l
NOEC	21 days	Daphnia	OECD 211; Daphnia magna Reproduction Test	> 10 mg/l

4,4'-Methylene diphenyl diisocyanate (CAS No: 101-68-8):

Effect dose	Exposure time	Species	Method	Evaluation
NOEC	21 days	Daphnia	OECD 211; Daphnia magna, Reproduction Test	> 10 mg/l

Terrestrial toxicity:

Toxicity to soil organisms:

Polymeric MDI (CAS No: 9016-87-9):

Effect dose	Exposure time	Species	Method	Evaluation
NOEC	14 days	Eisenia fetida (Earthworm)	OECD 207, Earthworm, Acute Toxicity tests, mortality 50%	> 1000 mg/kg

Toxicity to terrestrial plants:

Polymeric MDI (CAS No: 9016-87-9):

Effect dose	Exposure time	Species	Method	Evaluation
NOEC	14 days	Avena sativa (oats)	OECD 208, Terrestrial Plant test, Seedling emergence	> 1000 mg/kg
NOEC	14 days	Avena sativa (oats)	OECD 208, Terrestrial Plant test, Seedling growth	> 1000 mg/kg
NOEC	14 days	Lactuca sativa (lettuce)	OECD 208, Terrestrial Plant test, Seedling emergence	> 1000 mg/kg
NOEC	14 days	Lactuca sativa (lettucs)	OECD 208, Terrestrial Plant test, Seedling growth	> 1000 mg/kg

Ecotoxicity assessment:

Acute aquatic toxicity: Based on available data, the classification criteria are not applicable.

Chronic aquatic toxicity: There is no evidence of chronic aquatic toxicity.

The mixture is classified as uncritical with respect to **soil organisms**.

Due to low bacterial toxicity, there is no danger of compromising cleaning performance in biological wastewater treatment plants.

12.2. Persistence and degradability:

Polymeric MDI (CAS No: 9016-87-9):

Reacts with water at the interface, with slow release of CO_2 into solid, insoluble, high-melting polyurea. According to previous experiences polyurea is inert and non-degradable.

	Exposure time	Medium/ test type	Method	Evaluation
Biological degradation	28 days	Activated sludge	OECD 302 C, Inherent biodegradability: modified MITI Test (II)	0% (not readily biodegradable)
Stability in water	20 hr (25°C)	Hydrolysis		Half-life (rapidly hydrolyzed in water)
Photodegra-dation	0.92 days (25°C)	Phototrans-formation in air; (indirect photolysis)	SRC-AOP (calculation) Sensitiser: OH radicals Sensitiser concentration: 500,000 1/cm³	Half-life (moderate photochemical degradation of the substance with exposure to air)

12.3. Bioaccumulative potential:
Polymeric MDI (CAS No: 9016-87-9):

	Exposure time	Species	Method	Evaluation
Bioaccumu-lation	42 days	Cyprinus carpio (carp)	OECD 305 C, Conc.: 0.2 mg/l	BCF: < 14 (no significant accumulation in organisms, rapidly hydrolyzed in water)

4,4'-Methylene diphenyl diisocyanate (CAS No: 101-68-8):

	Exposure time	Species	Method	Evaluation
Bioaccumu-lation	28 days	Cyprinus carpio (carp, 6 cm)	OECD 305 E, 25°C Freshwater flow-through, Conc.: 0.8 µg/l	BCF: 92
Bioaccumu-lation	28 days	Cyprinus carpio (carp, 6 cm)	OECD 305 E, 25°C Freshwater flow-through, Conc.: 0.08 µg/l	BCF: 200 4.52% lipid content, at end of exposure.

12.4. Mobility in soil:
Partition coefficient soil/water (Koc): not available

12.5. Results of PBT and vPvB assessment:
Polymeric MDI (CAS No: 9016-87-9) does not meet the criteria for classification as PBT or vPvB.

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

13. Disposal considerations

13.1. Waste treatment methods:

Recommendation: Dispose in compliance with local/federal regulations.
Do not release into sewers, on the ground or into bodies of water.

Accountability: Observe local regulations.

Residues/empty containers (recommendation): Mix residues of hardener with resin in order to cure. Cured material and empty containers may be added to domestic waste.

13.1.1. Product/ Packaging disposal:

European waste codes/waste designations according to EWC/AVV:

The defined EWC keys are intended only to be recommendations for users.

The EWC waste code for the product cannot be specified. It is only possible to assign a code based on the intended use by the consumer.
The assignment must be requested from the disposer.

Products in liquid state:

08 05 01*	Waste isocyanates.
08 04 09*	Waste adhesives and sealants containing organic solvents or other dangerous substances.
15 01 10*	Packaging containing residues of or contaminated by dangerous substances. (Double-bag/metal containers).

Products in moulded state:

08 04 10	Waste adhesives and sealants other than those mentioned in 08 04 09.

14. Transport information

Land transport (ADR/RID/GGVSE):	No dangerous goods.
Inland waterways transport (ADN/ADNR):	No dangerous goods.
Sea transport (IMDG Code/GGVSee):	No dangerous goods.
Air transport (ICAO/IATA DGR):	No dangerous goods.

Shipment within the USA:
According to § 172.101, appendix A, DOT (Department of Transportation):
MDI Reportable Quantity (RQ): 5000 lbs (2270 kg)

ISOPA guideline for safe loading/unloading, transporting and storage of TDI and MDI.
ISOPA Order Number: PSC-0005-GUIDL-D

14.1. UN number:	None.
14.2. UN proper shipping name:	None.
14.3. Transport hazard class(es):	None.
14.4. Packing group:	None.
14.5. Environmental hazards:	None.

14.6. Special precautions for use:
Sensitive to low temperatures < 5°C. Sensitive to high temperatures > +40°C. Protect from moisture. Keep away from foodstuffs, acids and alkalis.

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: inapplicable

15. Regulatory information

15.1. Safety, health and environmental regulations/legislations specific for the substance or mixture:

15.1.1. EU regulations:

Regulation (EC) No 1907/2006 (REACH) Annex XIV – List of substances subject to authorisation/SVHC: None of the components is listed.

Regulation (EC) No 552/2009 amending Regulation (EC) No 1907/2006 in Annex XVII No 56
The restriction conditions for placing Methylene diphenyl diisocyanate (MDI) mixtures on the market.

Regulation (EC) No 790/2009 Table 3.1. (Page 32) contains the identification of the substance 4,4'-Methylene diphenyl diisocyanate (CAS No: 101-68-8).

Does not fall under the **Directive 20012/18/EU (Seveso III)**.

Other guidelines:
ISOPA (Association of the European manufacturers of aromatic diisocyanates and polyols) **guideline for safe loading/unloading, transporting and storage of TDI and MDI**.

Regulations in other countries:
US Toxic Substances Control Act (TSCA)
All components of this product are listed in TSCA or are exempt from this list under 40 CFR 720.30.

15.1.2. National Regulations (Germany):

TRGS 900 Occupational Exposure Limits (OEL value):

	4,4'-Methylene diphenyl diisocyanate (total of vapours and aerosols) CAS No: 101-68-8
AGW (Workplace Limit):	0.005 ppm = 0.05 mg/m³ Peak limit/excess factor 1. Hazard of sensitisation.

TRGS 401 Hazardous by skin contact.
TRGS 406 Respiratory sensitizing substances.
TRGS 430 Isocyanates – Risk assessment and safety measures.
TRGS 930 Biological limits.
TRGS 905 List of carcinogenic, mutagenic or toxic for reproduction substances – classification.

If the product is destined for supply to third parties, the Regulation on the Prohibition of chemicals (Chem VerbotsV) must be observed.

Storage class:	10 (flammable liquids, flash point > 60°C)
TA Air:	Type: Organic substances, percentage class 1: 100 %
Water Hazard Class:	1 (slightly hazardous to water, in accordance with Annex 4 to the Directive on Water-Hazardous Substances)

15.2. Chemical Safety Assessment:
A chemical safety assessment for this substance / mixture is not applicable.

Contains isocyanate. Observe the manufacturer's instructions. The instructions for use must be followed in order to prevent risks to humans and the environment.

16. Other information

Abbreviations:
DNEL: Derived no effect level.
PNEC: Predicted no effect concentration.
NOEC: No observed effect concentration.
BCF: Bioconcentration factor (concentration in biological material).
PBT: Persistent, bioaccumulative, toxic substance.
vPvB: Very persistent and very bioaccumulative substance.

The information given in this Safety Data Sheet is correct to the best of our knowledge, experience and belief at the date of its publication. The information provided is designated only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as warranty or quality specification. The information only relates to the specific material and use designated and may not be valid for combinations with any other materials or in any process, unless specified in the text.