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

Section 0: Data Sheet Information

Revision date: 03.11.2021 **Version: 3**
Supersedes edition: 22.03.2021 **according VO (EU) 2020/878**

Section 1: Identification of the substance / mixture and of the company / undertaking

1.1. Product identifier:

Chemical name: Polymeric MDI contains diphenylmethane diisocyanate, isomers and homologues
Substance type: Polymer
CAS No: 9016-87-9
EC No: not applicable, Polymer
REACH Registration number: not applicable, Polymer
UFI: ---

Trade names: **RAPID Y16/ Y16HT/ FY15/ FY15A/ FY15A-2/ FY18A/ 4300B & C & E/ 4200A/ 3010B/ P1/ P1SD/ P1-16/ P1-17/ C0/ FR/ FY-N/ R1/ R2 Component B - hardener**

1.2. Relevant identified uses of the substance or mixture and uses advised against:
Designated use: **Two-component PUR-resin for potting, casting or Coating. For industrial or commercial users only.**
(As from 24 August 2023 adequate training is required before industrial or professional use.)
Uses advised against: **Professional use of aprotic polar solvents for cleaning., Consumer spray applications., Consumer products requiring heating above 40°C.**

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)

Section 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:

I	**H315**	Causes skin irritation.
I	**H317**	May cause an allergic skin reaction.
I	**H319**	Causes serious eye irritation.
I	**H332**	Harmful if inhaled.
I	**H334**	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
	H335	May cause respiratory irritation.
	H351	Suspected of causing cancer.
	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/protective clothing/eye protection/face protection.
P302+P352	IF ON SKIN: Wash with plenty of water and soap.
P304+P340	IF INHALED: Remove person to fresh air and keep 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:

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher. This substance/mixture has no endocrine disrupting properties and contains no nanoforms.

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.

Section 3: Composition / information on ingredients

3.1. Substances:

3.1.1. Description: Polymeric MDI contains
Diphenylmethane diisocyanate, isomers and homologues

3.1.2. Hazardous ingredients:

Substance / mixture:	CAS No:	EC No:	Weight %:	Classification according to 1272/2008/EC:
Polymeric MDI	9016-87-9	n.a.	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

Used for classification:

			Classification according to 1272/2008/EC:
4,4'-Methylene diphenyl diisocyanate	101-68-8	202-966-0	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

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

Section 4: First aid measures

4.1. Description of first aid measures:

4.1.1. General information: Get medical attention immediately if symptoms occur. Show this safety data sheet to the doctor in attendance.
Remove contaminated clothing immediately and wash thoroughly before reuse.

4.1.2. Following inhalation of aerosols or vapour:
Move victim to fresh air, keep warm and allow to rest. If the victim has difficulty breathing, medical attention is required. Consult a physician immediately if symptoms such as shortness of breath or asthma are observed. A hyper-reactive response to even minimal concentrations of diisocyanate may develop in sensitised persons. The exposed person may need to be kept under medical surveillance for 48 hours.

4.1.3. Following skin contact: Immediately wipe off, then wash affected areas thoroughly with soap and water for at least 15 minutes. (A polyglycol-based skin cleanser or corn oil may be more effective.) Apply skin cream carefully afterwards. Call a physician if irritation develops or persists.

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:

Symptoms: Excessive exposure may aggravate existing asthma and other respiratory disorders. Allergic skin reactions can occur. It can irritating and sensitizing when inhaled.

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.

Section 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, isocyanate vapours and traces of hydrocyanic acid may be released in case of fire. In the event of extreme heat (> 500°C) aniline is suspected to being formed.

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.

Section 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. Elimination of the pollution by qualified personnel with appropriate protective equipment (see 8.2.2.).

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). Close container for disposal.
Cleaning products: The compositions of liquid decontaminants are 5 – 10% sodium carbonate, 0,2 – 2% liquid detergent and water.

6.4. Reference to other sections: See section 1 for emergency contact information and section 13 for waste disposal. Put on appropriate personal protective equipment: see section 8.

Section 7: Handling and storage

7.1. Precautions for safe handling:

7.1.1. General protective measures:

Personal protection equipment, see section 8. Do not get product in eyes, mouth, on skin, or on clothing. Eye wash bottle recommended near the workplace.
Contact of the product with water should be avoided.
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. People who have skin sensitization problems, asthma, allergies, chronic or recurrent breathing difficulties should not work with this product. Use no industrial cleaning applications with aprotic polar solvents, it can lead to the formation of dangerous primary aromatic amines >0.1%.

Fire and explosion protection:

Keep away from ignition sources. Do not smoke.

7.1.2. General hygiene measures at the workplace:

You should neither eat, drink nor smoke in the workplace.
Hands and any exposed skin should be washed thoroughly after use. Contaminated clothing and equipment should be removed before entering any eating area.

7.2. Conditions for safe storage, including any incompatibilities:

Storage: Keep in tightly closed, upright standing containers in a cool, dry and well-ventilated place. Products based on isocyanates react with water, therefore close the container tightly again immediately after use. Suitable containers: stainless steel or mild steel with a suitable lining. Unsuitable container material: copper, copper alloys and galvanized surfaces. Do not use damaged containers or drums; damaged and punctured drums should be emptied and disposed of properly.

Storage conditions: Prevent frost and heating above 40°C.

Storage temperatures: +5°C to +40°C

Recommended Storage temperature: ~ +20 °C

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

Advice on common storage: For information on incompatible materials, see Section 10.

7.3. Specific end uses: Two-component PUR-resin for potting. Consult technical guidelines for the use of this substance/mixture.
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.

Section 8: Exposure controls / personal protection

8.1. Control parameters:

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

Germany (DE) :

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

International:

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

Countries	Limit value (8 hours)		Limit value (short term)	
	ppm	mg/m³	ppm	mg/m³
Austria	**0,005**	**0,05**	**0,01**	**0,1**
Belgium	**0,005**	**0,052**	**-**	**-**
Denmark	**0,005**	**0,05**	**0,01**	**0,1**
France	**0,01**	**0,1**	**0,02**	**0,2**
Germany	**-**	**0,05**	**-**	**0,05**
Hungary	**-**	**0,05**	**-**	**0,05**
Poland	**-**	**0,05**	**-**	**0,2**
Spain	**0,005**	**0,052**	**-**	**-**
Sweden	**0,002**	**0,03**	**0,05**	**0,05**

Source: http://limitvalue.ifa.dguv.de

8.1.2. Recommended monitoring procedures: Measurement of inhalation exposure.

8.1.3. Exposure limits at intended use: see 8.1.1.

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:

Pictograms:

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 or 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.

Section 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/freezing point:	< 0°C (DIN 51556), crystallisation < 10°C
Initial boiling point:	> 300°C (Read-across based on MDI mixed isomers-CAS 26447-40-5)
Flammability:	Not flammable. (EU Method A.12, Read-across based on 4,4`-MDI CAS 101-68-8)
Lower explosion limit:	No data.
Upper explosion limit:	No data.
Flash point:	> 200°C (DIN EN 22719)
Auto-ignition temperature:	> 600°C (1013 hPa, EU Method A.15, Read-across based on 4,4`-MDI CAS 101-68-8)
Decomposition temperature	No data**.**
pH	Not applicable, no aqueous solution.
Kinematic viscosity:	161 mm²/s (calculated)
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.
Partition coefficient n-octanol/water (log value):	4,51 (20°C, Read-across based on MDI mixed isomers-CAS 26447-40-5)
Vapour pressure (20°C):	< 0.00001 mbar
Density at 23°C (ISO 2811):	Approx. 1.24 g/cm³
Relative vapour density:	No data.
Particle characterstics:	Not applicable, applies to solids.

9.2. Other information: None

9.2.1. Information with regard to physical hazard classes: Unknown.

9.2.2. Other safety characteristics: Unknown.

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Section 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 possible. When it comes into contact with water, the product reacts to form predominantly solid, insoluble polyurea.

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. Polymerization possible at high temperatures.

10.4. Conditions to avoid:

High temperature, moisture, strong sunlight
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 polyols generates heat.

10.6. Hazardous decomposition products:

No hazardous decomposition products if handled and stored correctly.

Section 11: Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008:

11.1.1. Acute toxicity:

Animal data:

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

LD_{50} (oral, rat): > 10000 mg/kg body weight (Method: OECD Test Guideline 401)

LD_{50} (oral, rat): > 2000 mg/kg body weight (Method 84/449/EEC)

(Read-across based on methylenediphenyl diisocyanate - CAS 26447-40-5)

LD_{50} (skin contact, rabbit): > 9400 mg/kg body weight (Method: OECD Test Guideline 402)

LC_{50} (inhalation, rat): ~ 0,37 mg /l (dust/mist); 4-hr exposure (Method: OECD Test Guideline 403,

Evaluation The test atmosphere generated in the animal study is not representative of workplace environments, how the substance is placed on the market, and how it can reasonably be expected to be used. Therefore, the test result cannot be directly applied for the purpose of assessing hazard. Based on expert judgment and the weight of the evidence, a modified classification for acute inhalation toxicity is justified. Converted acute toxicity (dust/mist) point estimate: 1.5 mg/l.

(Read-across based on 4,4'-methylenediphenyl diisocyanate - CAS 101-68-8.)

11.1.2. Skin corrosion/skin irritation:

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

Read-across based on methylenediphenyl diisocyanate - CAS 26447-40-5:

Species: Rabbit: Method: OECD Test Guideline 404 (4h/14 days)

Result: Skin irritation

11.1.3. Serious eye damage/irritation:

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

Species: Rabbit: Method: OECD Test Guideline 405

Result: Mild irritation to eyes, reversing within 7 days

Additional information:

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

Evaluation: Irritating to eyes.

11.1.4. Respiratory or skin sensitisation:

Polymeric MDI (CAS No: 9016-87-9) and 4,4'-Methylene diphenyl diisocyanate (CAS No: 101-68-8):

Respiratory sensitisation:

Species: Rat (male); Method: OECD-GD 39

Result: Respiratory **s**ensitising.

Skin sensitisation:

Species: Mice Method: OECD Guideline 429 (LLNA-local lymph node assay)

Result: Skin sensitisation.

(Read-across based on 4,4'-methylenediphenyl diisocyanate - CAS 101-68-8.)

Assessment/classification: Sensitisation of respiratory tract and skin possible.
May cause an allergic skin reaction.
May cause allergy or asthma symptoms or breathing difficulties if inhaled.

CMR effects (carcinogenicity, mutagenicity and toxicity for reproduction):
Germ cell mutagenicity:

11.1.5. Germ cell mutagenicity:

Polymeric MDI (CAS No: 9016-87-9) and 4,4'-Methylene diphenyl diisocyanate (CAS No: 101-68-8):
Genotoxicity in vitro:
Species: Salmonella typhimurium; Method Directive 67/548/EEC, Annex V, B13/14 Concentration 200 µg/plate, Metabolic activation: with and without metabolic activation.
Result: negative

Chromosome aberration in vivo:
Species: Rat (male, inhalation); Method: OECD Test Guideline 474 (3 weeks, 1/week, 1h/day, dose: 113 mg/m³
Result: negative

Evaluation: No evidence of mutagenic effects.

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

Result: Polymeric MDI (CAS No: 9016-87-9)
NOAEC= 1 mg/m³ air (2 years; 6 h/day, 5 days/week)
LOAEC= 6 mg/m³ air (2 years; 6 h/day, 5 days/week)

In the animal group, at the maximum dose of 6 mg/m³ there was an increased number of lung tumours.

Evaluation: Potential occurrence of tumours.

11.1.7. Reproductive toxicity:
Species: **Rat (female); Method: OECD Test Guideline 414 (**Application: inhalation of an aerosol; Dosage: 0 – 1 – 4 – 12 mg/m³, time: 6 h/d, for 10 d)
Polymeric MDI (CAS No: 9016-87-9):
NOAEC (Developmental toxicity and maternal toxicity): 4 mg/m³ Air
NOAEC (Teratogenicity): 12 mg/m³

Evaluation: did not show teratogenic effects in animal experiments.

11.1.8. STOT-single exposure:
(Specific target organ toxicity (single exposure)

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

Result: May cause respiratory irritation.
Category: Category 3 (SE 3)

11.1.9. STOT-repeated exposure:
(**Specific target organ toxicity (repeated exposure)**

Polymeric MDI (CAS No: 9016-87-9) and 4,4'- Methylene diphenyl diisocyanate (CAS No: 101-68-8):
Species: Rat (male/female, inhalation: aerosol); Method: OECD Guideline 453
Exposure route: Inhalation
Target organ: Respiratory tract
NOAEC= 0,2 mg/m³ Air (2 Years, 6h/day, 5days/week)

Result: May cause damage to respiratory tract through prolonged or repeated exposure.
Category: Category 2 (RE 2)

11.1.10. Aspiration hazard: **No data available.**

Information on possible routes of exposure and Symptoms related to the physical, chemical and toxicological characteristics:

Inhalation: This product is a respiratory irritant and potential respiratory sensitizer: 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.
Eye contact: Irritating to eyes.

In order to avoid adverse health effects, the product should not be heated above 40 ° C and recommended protective equipment should be worn to avoid direct contact.

Summary assessment of the CMR properties:
Mutagenicity: In vivo and in vitro tests showed no mutagenic effects.
Carcinogenicity: May cause cancer by inhalation. Based on the data, this is therefore classified as carcinogenic.
Teratogenicity: Did not show teratogenic effects in animals.
Reproductive toxicity: The classification criteria are not met with the available data bank.

11.2. Information on other hazards:

11.2.1. Endocrine disrupting properties: Not known.

11.2.2. Other information:
Industrial use of aprotic polar solvents for cleaning can release hazardous primary aromatic amines (>0.1%).

Section 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

Chronic (long-term) toxicity:

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

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

Since the PEC / PNEC data are less than 1, long-term toxicity measurements in fish (according to Annex IX Column 2 REACH) are not carried out.

Terrestrial toxicity:

Toxicity to soil organisms:

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

Effect dose	Exposure time	Species	Method	Evaluation
EC50	14 days	Eisenia fetida (Earthworm)	OECD 207, Earthworm, Acute Toxicity tests, mortality 50%	> 1000 mg/kg Soil dry weight

Toxicity to terrestrial plants:

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

Effect dose	Exposure time	Species	Method	Evaluation
EC50	14 days	Avena sativa (oats)	OECD 208, Plant growth test,	> 1000 mg/kg Soil dry weight
EC50	14 days	Lactuca sativa (lettuce)	OECD 208, Plant growth test,	> 1000 mg/kg Soil dry weight

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:

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.

The product itself reacts quickly with water, which makes a bioaccumulation study unnecessary.

12.4. Mobility in soil:

Partition coefficient soil/water (Koc): not available

In the case of rapidly degradable substances, this test does not have to be carried out (REACH Annex VIII).

The PEC / PNEC share is <1.

12.5. Results of PBT and vPvB assessment (according to REACH Annex XIII):
Persistence: The product is not persistent with its half-life period of 20 hours.
Bioaccumulation: The product cannot bioaccumulate.
Toxicity: As the product meets the criteria for specific target organ toxicity with repeated if STOT RE Category 2 (H373) is exposed, it is classified as toxic.

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

12.6. Endocrine disrupting properties: Not known

12.7. Other adverse effects:
There are no known special effects or hazards, such as global warming or the depletion of the ozone layer.

Section 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.

Section 14: Transport information

Land transport (ADR/RID/GGVSEB): No dangerous goods.
Inland waterways transport (ADN/ADNR): No dangerous goods.
Sea transport (IMDG Code/GGVSee): No dangerous goods.
Air transport (ICAO-TI//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 or ID 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: See section 6 – 8.
Sensitive to low temperatures < 5°C. Sensitive to high temperatures > +40°C. Protect from moisture. Keep away from foodstuffs, acids and alkalis.
14.7. Maritime transport in bulk according to IMO instruments: inapplicable

Section 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.

Storage class:	10 (flammable liquids, flash point > 60°C)
TA Air:	Not applicable.
Water Hazard Class: (Germany)	1 (slightly hazardous to water, classification according AwSV, Identification number: 9393)

15.2. Chemical Safety Assessment:

A chemical safety assessment for this substance / mixture is not applicable. The product Falls under the EU-polymer definition.

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

Section 16: Other information

Abbreviations:

DNEL:	Derived no effect level.
LD50:	Median lethal dose.
LC50:	Lethal concentration, 50%.
LOAEC:	Lowest observed adverse effect concentration.
NOAEC:	No observed adverse effect concertration.
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.
TRGS:	Technical rules for hazardous substances (Germany)

From 24 August 2023 adequate, successful training is required before industrial or professional use.

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.