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Rapid Silicate Resin (Comp. B)

Pipe Doctor Patch Repair

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier:

Rapid Silicate Resin (Comp. B) - TYVcure 3PX B

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

"B" component for water glass – polyisocyanate based two-component synthetic resin. The synthetic resin (components "A" + "B") is used for the lining of sewer pipes and manholes. The application has to be carried out under professional or industrial conditions by persons having proper previous training.

1.3 Details of the supplier of the safety data sheet:

S1E Ltd, Copper House, Unit 2, Spring Hill Road, Grimethorpe, Barnsley, S72 2BQ.

Telephone: +44 (0)1226 397 015

E-mail address: contact@s1e.co.uk

1.3.1. Responsible Person

E-mail address for a competent person responsible for the safety data sheet: contact@s1e.co.uk

1.4 Emergency telephone number

NHS: 111

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture:

Classification according to Regulation (EC) No 1272/2008 (CLP)

Hazard classes / categories	Hazard statements
Acute Tox. 4	H302 Harmful if swallowed.
Skin Irrit. 2	H315 Causes skin irritation.
Skin Sens. 1B	H317 May cause an allergic skin reaction.
Eye Irrit. 2	H319 Causes serious eye irritation.
Acute Tox. 4	H332 Harmful if inhaled.
Resp. Sens. 1	H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled

Hazard classes / categories	Hazard statements
STOT SE 3	H335 May cause respiratory irritation.
Carc. 2	H351 Suspected of causing cancer.
STOT RE 2	H373 May cause damage to organs through prolonged or repeated exposure: respiratory system, inhalation.

2.2. Label elements:

Labelling according to Regulation (EC) No 1272/2008 (CLP)

Hazard pictograms:



Signal word: Danger

Hazard statements:

H302 Harmful if swallowed.

H315 Causes skin irritation.

H317 May cause an allergic skin reaction.

H319 Causes serious eye irritation.

H332 Harmful if inhaled.

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 through prolonged or repeated exposure: respiratory system, inhalation.

Precautionary statements:

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P284 Wear respiratory protection.

P302+P352 IF ON SKIN: Wash with plenty of soap and water.

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: Call a POISON CENTER or doctor/physician.

Hazard determining component(s) for labelling:

Isocyanic acid, polymethylenepolyphenylene ester; Reaction products of phosphoryl trichloride and 2-methyloxirane

2.3. Other hazards

The mixture does not meet persistent (P) and bioaccumulation (B) criteria, but it meets the criteria for toxicity (T). The mixture is not PBT or vPvB.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.2. Mixtures:

Chemical characterization

Name	EC No.	CAS No.	REACH Reg. No.	Content (%)	Classification according to Regulation (EC) No 1272/2008 (CLP)	
					Hazard categories ¹	H-phrases ¹
Isocyanic acid, polymethylene-polyphenylene ester (Polymeric MDI) ²	(poly-mer)	9016-87-9	(polymer)	>60	Acute Tox. 4 Skin Irrit. 2 Eye Irrit. 2 Resp. Sens. 1 Skin Sens. 1B Carc. 2 STOT SE 3 STOT RE 2	H332 H315 H319 H334 H317 H351 H335 H373
Reaction products of phosphoryl trichloride and 2-methyloxirane	807-935-0	1244733-77-4	01-2119486772-26	>10	Acute Tox. 4 Carc. 2 Aquatic Chronic 3	H302 H351 H412
3/14 4,4'-Methylenediphenyl diisocyanate, oligomeric reaction products with 2,4'-diisocyanatodiphenylmethane, 2,2'-methylenediphenyl diisocyanate and α-hydro-ω-hydroxy-poly[oxy(methyl-1,2-ethanediyl)] ³	951-860-7	158885-25-7	(polymer)	≤ 10	Acute Tox. 4 Skin Irrit. 2 Eye Irrit. 2 Resp. Sens. 1 Skin Sens. 1B Carc. 2 STOT SE 3 STOT RE 2	H332 H315 H319 H334 H317 H351 H335 H373
Triisobutyl phosphate	204-798-3	126-71-6	01-2119957118-32	>10	Skin Sens. 1B	H317

1 – See Section 16 for the full text of the abbreviations declared above.

2 – Contains < 35% 4,4'-MDI (4,4'-methylenediphenyl diisocyanate) (CAS: 101-68-8).

3 – Contains ca. 10% 4,4'-MDI (4,4'-methylenediphenyl diisocyanate) (CAS: 101-68-8).

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures:

General advice: Soiled, fairly soaked clothing and shoes must be immediately removed.

4.1.1. In case of inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. Get medical attention immediately.

4.1.2. In case of skin contact:

In the event of contact with the skin, at first wipe off with a paper towel/textile, then wash alternately with polyethylene glycol (if available) and water, or with plenty of warm water and soap for several minutes. Consult a doctor in the event of a skin reaction. Wash the less contaminated clothing before reuse. Clean shoes thoroughly before reuse.

4.1.3. In case of eye contact:

Hold the eyes open and rinse with water for a sufficiently long period of time (at least 10 minutes). Get medical attention immediately.

4.1.4. In case of ingestion:

DO NOT induce the patient to vomit, medical advice is required. Never give anything by mouth to an unconscious person. Provided the patient is conscious, wash out mouth with water.

4.1.5. Information to physician:

The product irritates the respiratory tract and may trigger sensitisation of the skin and respiratory tract. Treatment of acute irritation or bronchial constriction is primarily symptomatic. Following severe exposure the patient should be kept under medical review for at least 48 hours.

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

Headache, nausea, shortness of breath, sore throat, redness on the skin. Repeated or prolonged contact may cause skin sensitization. Repeated or prolonged inhalation exposure may cause asthma.

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

Depending on the degree of exposure, periodic medical examination is suggested.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media:

Suitable extinguishing media: Foam, CO₂ or dry powder. Water spray may be used if no other available and then in copious quantities.

Unsuitable extinguishing media: High volume water jet.

5.2. Special hazards arising from the substance or mixture:

Carbon dioxide, carbon monoxide, hydrogen cyanide, nitrogen oxides, isocyanate vapours. The substances/groups of substances mentioned can be released in case of fire.

5.3. Advice for firefighters:

Reaction between water and hot isocyanate may be vigorous (strongly exothermic). Prevent washings from entering watercourses. Keep fire-exposed containers cool by spraying with water.

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

Further information: In the event of fire and/or explosion do not breathe fumes. 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 the danger area. Due to reaction with water producing CO₂ gas, a hazardous build-up of pressure could result if contaminated containers are re-sealed. Containers may burst if overheated. Do not allow contaminated extinguishing water to enter the soil, groundwater or surface waters.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures:

Immediately contact emergency personnel. Evacuate the area. Keep upwind to avoid inhalation of vapours. Clean-up should only be performed by trained personnel. Keep unauthorized persons away.

6.1.1. For non-emergency personnel:

Remove not affected people. Inform the relevant emergency services and authorities.

6.1.2. For emergency responders:

People dealing with major spillages should wear full protective clothing including respiratory protection. Use suitable protective equipment.

6.2. Environmental precautions:

Do not allow contaminated extinguishing water to enter the soil, groundwater or surface waters. Avoid dispersal of spilt material and runoff and contact with drains and sewers.

6.3. Methods and material for containment and cleaning up:

Absorb spillages onto sand, earth or any suitable adsorbent material. Leave to react for at least 30 minutes. Do not absorb onto sawdust or other combustible materials. Contaminated adsorbent material shall be disposed according to Section 13. Wash the spillage area with water.

6.4. Reference to other sections:

Information regarding exposure controls/personal protection and disposal considerations can be found in Section 8 and 13.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling:

7.1.1. Protective measures:

Provide sufficient air exchange and/or exhaust in work rooms. In all workplaces of the plant where high concentrations of isocyanate aerosols and/or vapours may be generated (e.g. during pressure release, mould venting or when cleaning mixing heads with an air blast), appropriately located exhaust ventilation must be provided in order to prevent occupational exposure limits from being exceeded. The air should be drawn away from the personnel handling the product. The efficiency of the ventilation system must be monitored regularly because of the possibility of blockage. Atmospheric concentrations should be minimised and kept as low as reasonably practicable below the occupational exposure limit.

7.1.2. Advice on general occupational hygiene:

No eating, drinking, smoking or tobacco use at the place of work. Contact with skin and eyes and inhalation of vapours must be avoided under all circumstances. Keep equipment clean. A basic essential in sampling, handling and storage is the prevention of contact with water. Keep stocks of decontaminant readily available.

7.2. Conditions for safe storage, including any incompatibilities:

Store and transport in separate, airtight vessels, between +10 °C and +25 °C. The containers and vessels shall be protected from direct sunshine and other weather impacts. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate container to avoid environmental contamination.

7.3. Specific end use(s):

For the relevant identified use(s) listed in Section 1 the advice mentioned in this section is to be observed.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters:

8.1.1. Occupational exposure limits in air

A workplace exposure limit (WEL) of 0.02 mg/m³ for total isocyanates (as NCO) as an 8-hour TWA, and a short term WEL (15 min) of 0.07 mg/m³ have been assigned in the United Kingdom. A BMGV for isocyanates, based on the measurement of urinary diamines, has been set at 1 µmol diamine/mol creatinine.

8.1.2. DNEL/PNEC values

The risk characterization of PMDI (CAS: 9016-87-9) is the following:

Workers:

Acute/short-term exposure – systemic effects (dermal): DNEL = 50 mg/kg bw/day

Acute/short-term exposure – systemic effects (inhalation): DNEL = 0.1 mg/m³

Acute/short-term exposure – local effects (dermal): DNEL = 28.7 mg/cm²

Acute/short-term exposure – local effects (inhalation): DNEL = 0.1 mg/m³

Long-term exposure – systemic effects (inhalation): DNEL = 0.05 mg/m³

Long-term exposure – systemic effects (dermal): Not applicable.

Long-term exposure – local effects (inhalation): DNEL = 0.05 mg/m³

Long-term exposure – local effects (dermal): Not applicable.

PNEC sediment: As PMDI is a reactant with water, access of water to PMDI and vice versa is strictly controlled.

Furthermore, PMDI polymerizes in the presence of water and thus exposure of PMDI to sediment is highly likely to be negligible. Therefore, PNEC sediment cannot be derived for PMDI.

PNEC soil: 1 mg/kg soil dw

PNEC oral: There are no data on effects of oral PMDI to birds. Exposure to birds is not expected and data from experimental animals show PMDI to be of low oral toxicity.

8.2. Exposure controls

Respiratory protection: Respiratory protection in case of vapour/aerosol release. Combination filter for organic, inorganic, acid inorganic, and basic gases/vapours (e.g. EN 14387 Type ABEK) shall be used.

Hand protection: Chemical resistant protective gloves (EN 374)

Suitable materials also with prolonged, direct contact (Recommended: Protective index 6, corresponding > 480 minutes of permeation time according to EN 374):

- butyl rubber (butyl) – 0.7 mm coating thickness
- nitrile rubber (NBR) – 0.4 mm coating thickness
- chloroprene rubber (CR) – 0.5 mm coating thickness

Unsuitable materials

- polyvinylchloride (PVC) – 0.7 mm coating thickness
- polyethylene (PE) laminate – ca. 0.1 mm coating thickness

Eye protection: Safety glasses with side shields (frame goggles) (e.g. EN 166).

Body protection: Safety shoes (e.g. according to EN 20346) and closed workwear.

General safety and hygiene measures:

Do not breathe vapour/spray. With products freshly manufactured from isocyanates body protection and chemical resistant protective gloves is recommended. Wearing of closed workwear is required additionally to the personal protective equipment. No eating, drinking, smoking or tobacco use at the place of work. Take off immediately all contaminated clothing. Hands and/or face should be washed before breaks and at the end of the shift. After work the skin should be cleaned and skin-care agents applied.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

- a) Appearance: liquid, dark-brown
- b) Odour: damp
- c) Odour threshold: not known
- d) pH-value: not applicable (reacts with water)
- e) Melting point/freezing point: not defined (mixture)
- f) Boiling range: > 200 °C
- g) Flash point: > 200 °C (MDI)
- h) Evaporation rate: not defined (mixture)
- i) Flammability (solid, gaseous): not applicable (liquid)
- j) Ignitable, explosive range: not defined (mixture)
- k) Vapour pressure: < 0.00001 mbar (at 20 °C)
- l) Vapour density: not defined (mixture)
- m) Density: 1.19 ± 0.01 g/cm³ (at 25 °C)
- n) Solubility: reacts with water with slow CO₂ appearance at the border area into non-soluble, high melting point or not melting polyurea
- o) Partition coefficient n-octanol/water: not applicable (mixture)
- p) Self-ignition temperature: 4,4'-MDI does not ignite till 601 °C
- q) Decomposition temperature: not applicable (mixture)
- r) Viscosity: 160–220 mPas (at 25 °C)
- s) Explosive properties: non-explosive
- t) Oxidising properties: non-oxidizing

9.2. Other information

No data.

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity:

Reacts with water, acids, alcohols, amines, bases, and oxidants.

10.2. Chemical stability:

The main removal mechanism of MDIs in the environment is hydrolysis. MDI reacts quickly with water to form predominantly solid, insoluble polyureas. Under conditions typical of many types of environmental contact, i.e. with relatively poor dispersion of the isocyanate, the interfacial reaction leads to the formation of a solid crust encasing partially reacted product. This crust restricts ingress of water and egress of amine, and hence slows and modifies hydrolysis.

Stability in organic solvents: All MDI isomers and forms are highly unstable in dimethyl sulphoxide (DMSO) solvent, water content of the DMSO is increasing breakdown. MDI is more stable in EGDE (ethylene glycol dimethyl ether) solvent.

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

10.3. Possibility of hazardous reactions:

Reaction is slow with cold or warm water (< 50 °C), with hot water or steam the reaction is faster, producing carbon-dioxide causing pressure increase. Acids, alcohols, amines, bases, and oxidants may cause fire and explosion hazard.

10.4. Conditions to avoid:

High temperature, moisture, strong light.

10.5. Incompatible materials:

Substances to avoid: water, acids, alkalis, alcohols, amines.

10.6. Hazardous decomposition products:

No hazardous decomposition products if stored and handled as prescribed/indicated.

SECTION 11: TOXICOLOGICAL INFORMATION

The mixture has not been tested. Information is related to 4,4'-methylenediphenyl diisocyanate if no other is mentioned.

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

11.1.1.

Acute toxicity – oral:	Harmful
Rats	LD50 > 2000 mg/kg bw Method: 84/449/EEC
(Read-across based on methylenediphenyl diisocyanate, isomer mixture CAS 26447-40-5)	

Rats (female)	LD50 = 632 mg/kg Reaction products of phosphoryl trichloride and 2-methyloxirane (CAS 1244733-77-4)
Rats	LD50 > 5000 mg/kg US EPA Test Guideline OPP 81-1 Triisobutyl phosphate (CAS 126-71-6)
Acute toxicity – inhalation (aerosol):	Harmful
Rats	LC50 = 0.49 mg/l air (4 h) OECD Guideline 403
Rats	LC50 > 7 mg/l air (4 h), dust/mist OECD 403 Acute Inhalation Toxicity Reaction products of phosphoryl trichloride and 2-methyloxirane (CAS 1244733-77-4)
Rats	LC50 > 5.14 mg/l (4 h), dust/mist OECD 403 Acute Inhalation Toxicity Triisobutyl phosphate (CAS 126-71-6)
Acute toxicity – dermal:	Not classified. Based on available data, the classification criteria are not met.
Rabbit	LD50 > 9400 mg/kg bw (24 h) OECD Guideline 402
Rabbit	LD50 > 2000 mg/kg Reaction products of phosphoryl trichloride and 2-methyloxirane (CAS 1244733-77-4)
Rabbit	LD50 > 5000 mg/kg US EPA Test Guideline OPP 81-2 Acute Dermal Toxicity Triisobutyl phosphate (CAS 126-71-6)

11.1.2. Irritation/Corrosion

Summarized the results of the studies together with human occupational case reports support the official classification.

Skin corrosion/Skin irritation: Irritating

- Irritating in rabbits. (4 h / 14 days)
- OECD Guideline 404

Eye damage/Irritation:

- Not irritating in rabbits. (24 h / 21 days)
- OECD Guideline 405

(Read-across based on methylenediphenyl diisocyanate, isomer mixture – CAS 26447-40-5.)

Summarized the available animal data would not support classification of MDI as an eye irritant. But together with human occupational case reports in which symptoms of eye irritation were reported the legal classification as eye irritant should be applied. Summarized the available animal data would not support classification of MDI as an eye irritant. But together with human occupational case reports in which symptoms of eye irritation were reported the legal classification as eye irritant should be applied.

Skin sensitisation: Mice Sensitizing OECD Guideline 429 (LLNA)

Ingredient name: Triisobutyl phosphate (CAS 126-71-6)

Route of exposure: Skin

Species: Guinea pig
Result: Sensitizing
Test description: OECD 406 Skin Sens.

Respiratory sensitisation: Rats (male) Sensitizing OECD Guideline 39

11.1.4. Germ cell mutagenicity

Not classified. Based on available data, the classification criteria are not met.

11.1.5. Carcinogenicity Carc. 2

Rats (inhalation, aerosol):

- NOAEC = 0.2 mg/m³ air (toxicity) (2 years; 6 h/day, 5 days/week)
- NOAEC = 1 mg/m³ air (carcinogenicity) (2 years; 6 h/day, 5 days/week)
- LOAEC = 6 mg/m³ air (carcinogenicity) (2 years; 6 h/day, 5 days/week)
- OECD Guideline 453

Reaction products of phosphoryl trichloride and 2-methyloxirane (CAS 1244733-77-4): Suspected of causing cancer. Limited evidence of carcinogenicity in animal studies.

11.1.6. Reproductive toxicity

Not classified. Based on available data, the classification criteria are not met.

Effects on fertility: No fertility, nor multigeneration studies are available.

Rats (inhalation):

- NOAEL = 4 mg/m³ air (developmental toxicity) (10 days; 1/day, 6 h)
- NOAEL = 4 mg/m³ air (maternal toxicity) (10 days; 1/day, 6 h)
- OECD Guideline 414

11.1.7. STOT – single exposure

MDI is irritant to the respiratory tract.

11.1.8. STOT – repeated exposure Harmful

Rats (inhalation, aerosol):

- NOAEC = 0.2 mg/m³ air (2 years; 6 h/day, 5 days/week)
- LOAEC = 1.0 mg/m³ air (2 years; 6 h/day, 5 days/week)
- Target organs: respiratory – lung
- OECD Guideline 453

11.1.9. Aspiration hazard

Not classified due to lack of data.

11.1.10. Toxicokinetics

No data.

11.1.11. Genetic toxicity

No data.

11.2. Information on other hazards

No data available.

SECTION 12: ECOLOGICAL INFORMATION

The mixture has not been tested. Information is related to 4,4'-methylenediphenyl diisocyanate if no other is mentioned.

12.1. Toxicity:

12.1.1. Aquatic toxicity

Short-term toxicity to fish:

- Freshwater fish (Danio rerio): LC50 > 1000 mg/l (96 h)
- OECD Guideline 203
- Danio rerio (zebrafish): LC50 = 56.2 mg/l (96 h)
- Pimephales promelas (fathead minnow): LC50 = 51 mg/l (96 h)
- Reaction products of phosphoryl trichloride and 2-methyloxirane (CAS 1244733-77-4)
- Leuciscus idus (golden orfe): LC50 = 17.8–21.5 mg/l (96 h); DIN 38412
- Triisobutyl phosphate (CAS 126-71-6)

Long-term toxicity to fish:

Data waiving. In accordance with column 2 of REACH Annex IX the long-term toxicity testing on fish shall be proposed if the chemical safety assessment according to Annex I indicates the need to investigate further the effects on aquatic organisms. The corresponding PEC/PNEC ratios would be less than 1. Taking into account the scientific and exposure arguments, it appears appropriate to waive the long-term fish/plant/soil and sediment toxicity studies.

Short-term toxicity to aquatic invertebrates:

- Freshwater invertebrates (Daphnia magna): EC50 > 1000 mg/l (24 h)
- OECD Guideline 202
- Daphnia magna (large water flea): EC50 = 131 mg/l (48 h)
- Reaction products of phosphoryl trichloride and 2-methyloxirane (CAS 1244733-77-4)
- Daphnia magna: Acute EC50 = 11 mg/l (48 h); DIN 38412
- Triisobutyl phosphate (CAS 126-71-6)

Long-term toxicity to aquatic invertebrates:

- Freshwater invertebrates (Daphnia magna): NOEC >= 10 mg/l (21 days)
- OECD Guideline 211
- Daphnia magna: NOEC = 32 mg/l (21 days)
- Reaction products of phosphoryl trichloride and 2-methyloxirane (CAS 1244733-77-4)

Toxicity to aquatic algae and cyanobacteria:

- Freshwater algae (Desmodesmus subspicatus) EC50 > 1640 mg/l (72 h)
- OECD Guideline 201
- Freshwater algae (Pseudokirchneriella subcapitata) EC50 = 82 mg/l (72 h) NOEC = 13 mg/l (72 h)
- Reaction products of phosphoryl trichloride and 2-methyloxirane (CAS 1244733-77-4)
- Algae (Desmodesmus subspicatus) ErC50 = 34.1 mg/l (72 h); DIN 38412
- Triisobutyl phosphate (CAS 126-71-6)

Toxicity to aquatic plants other than algae: Data waiving. Not required by REACH annexes. However, a (soil) mesocosm study with PMDI exists in which the toxicity towards macrophytes (*Potamogeton crispus* and *Zannichellia palustris*) was assessed. No toxicity was observed at a loading of 1000 and 10000 mg/l, approximately 100% of the substance was found in the sediment as hardened material.

Toxicity to microorganisms:

- Microorganisms (activated sludge) EC50 > 100 mg/l (3 h)
- OECD Guideline 209
- Activated sludge EC50 = 784 mg/l (3 h) EC10 = 191 mg/l (3 h)
- Reaction products of phosphoryl trichloride and 2-methyloxirane (CAS 1244733-77-4)
- Bacteria – Activated sludge Chronic EC50 = 37.2 mg/l (28 days)
- OECD 301B Ready Biodegradability – CO2 Evolution Test
- Triisobutyl phosphate (CAS 126-71-6)

Toxicity to other aquatic organisms: This information is not available, but not required under REACH.

12.1.2. Sediment toxicity

Data waiving. Annex X states that this study need not be conducted if the chemical safety assessment does not indicate a need to further investigate the effects on sediment organisms.

12.1.3. Terrestrial toxicity

Toxicity to soil macroorganisms except arthropods:

- *Eisenia fetida* LC50 > 1000 mg/kg soil dw (14 days)
- OECD Guideline 207

Toxicity to terrestrial arthropods: Data waiving. Based on the chemical safety assessment and the risk assessment, there is no need to further investigate the terrestrial arthropods toxicity as there is no risk for the terrestrial environment as indicated by the PEC/PNEC ratio being < 0.239. Direct/indirect exposure to soil is unlikely.

Toxicity to terrestrial plants:

- *Avena sativa* EC50 > 1000 mg/kg soil dw (14 days)
- *Lactuca sativa* EC50 > 1000 mg/kg soil dw (14 days)
- OECD Guideline 208

Toxicity to soil microorganisms: Data waiving. Annex X states that this study need not be conducted if the chemical safety assessment does not indicate a need to further investigate the effects on sediment organisms.

Toxicity to other above-ground organisms: Data waiving. Not required by REACH annexes.

12.1.4. Conclusion on classification

Hazardous to the aquatic environment (acute): Based on available data, the classification criteria are not met. (EC/LC50 for fish, invertebrates and algae > 1000 mg/l)

Hazardous to the aquatic environment (chronic): Based on available data, the classification criteria are not met. (NOEC for algae > 1640 mg/L; NOEC for invertebrates > 10 mg/l)

12.2. Persistence and degradability

Phototransformation in air:

- Half-life (DT50): 0.92 days

Hydrolysis: MDI reacts with water to form predominantly inert polyurea.

- Half-life (DT50): ca. 20 h (at 25 °C)

(Read-across based on oligomeric MDI – CAS 32055-14-4)

Phototransformation in water and soil: No data is available.

Biodegradation in water: Under test conditions no biodegradation was observed. (28 days)
OECD Guideline 302C

Biodegradation in water and sediment:

Data waiving. In accordance with Annex XI, simulation biodegradation tests are technically not feasible as the test substance reacts quickly with water. The corresponding PEC/PNEC ratios would be less than 1. Taking into account the scientific and exposure arguments, it appears appropriate to waive the long-term fish/plant/soil and sediment toxicity studies.

Biodegradation in soil: Data waiving. See at Biodegradation in water and sediment.

12.3. Bioaccumulative potential

Bioaccumulation – aquatic/sediment: Due to the high reactivity of the substances of the MDI category with water, bioaccumulation tests can in principle not be performed with these substances. However, one bioaccumulation test with 4,4'-MDI and a mesocosm study with PMDI with an indication of bioaccumulation potential have been performed. As no analytical measurements were done, it cannot be determined if the values are truly related to MDI. However, based on the available information and the reactivity of MDI substances of the category approach, no new bioaccumulation study is deemed necessary.

- BCF (Cyprinus carpio) 200 (28 days)
- Method: OECD Guideline 305E

Terrestrial bioaccumulation: No data is available on terrestrial bioaccumulation, but it is not required under REACH.

12.4. Mobility in soil

Adsorption/desorption: Data waiving. According to Annex VIII the study need not be done if the test substance degrades rapidly. The corresponding PEC/PNEC ratios would be less than 1. Taking into account the scientific and exposure arguments, it appears appropriate to waive the long-term fish/plant/soil and sediment toxicity studies.

Volatilisation: The Henry's Law Constant, estimated from the measured vapour pressure and the calculated water solubility, is 2.263×10^{-7} atm-m³/mole. Hence, volatilization is unlikely to be a significant removal mechanism for MDI substances of the category approach.

12.5. Results of PBT and vPvB assessment

Conclusion for the P criterion: The results from the biodegradation test indicate that PMDI is not biodegradable. Based on experimental hydrolysis and indirect photolysis half-lives, PMDI is not considered to be persistent in the environment and is identified as not P. Based on the justification in the category approach, it is assumed that all MDI analogues included in the category are not P.

Conclusion for the B criterion: Although MDI has a high measured log Pow value (4.51), a full bioaccumulation test with 4,4'-MDI indicated that the bioaccumulation potential is low. Due to the fast hydrolysis, exposure of the environment to the substance is unlikely or very low, there is no potential for significant bioaccumulation possible. Hence, 4,4'-MDI does not fulfil the requirements for the B criterion and is not identified as B. Based on the justification in the category approach, it is assumed that all MDI analogues included in the category are not B.

Conclusion for the T criterion: The concentrations tested were far above the water solubility of the MDI substances (7.5 mg/l). However, the water solubility limit of MDI is far above the criteria for T and on the basis of aquatic toxicity tests MDI is identified as not T. However, according to Annex I of 67/548/EEC MDI is classified as Xn, R48, which automatically triggers a T. Based on this classification MDI is identified as T.

12.6. Endocrine disrupting properties

No data available.

12.7. Other adverse effects

It is not expected that substance has an effect on global warming, ozone depletion in the stratosphere or ozone formation in the troposphere.

Secondary poisoning: Based on the available information, there is no indication of a bioaccumulation potential and, hence, secondary poisoning is not considered relevant.

Exposure to birds is not expected and data from experimental animals show MDI to be of low oral toxicity.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

The products becoming useless and the contaminated containers not suitable for product storage must be handled as hazardous waste in accordance with EU and regional hazardous waste regulations.

European Waste Catalogue code: 08 05 01

13.1.1. Product / Packaging disposal:

Contaminated packaging should be emptied as far as possible; then it can be passed on for recycling after being thoroughly cleaned. Wrappings cleaned from contamination with suitable cleaning process (e.g. by steaming, treating with washing fluid, etc.) must be considered as non-hazardous waste.

13.1.2. Waste treatment options:

Incinerate in suitable incineration plant, observing local authority regulations.

SECTION 14: TRANSPORT INFORMATION

Land transport (ADR/RID/GGVSE)
Sea transport (IMDG Code/GGVSee)
Air transport (ICAO-IATA/DGR)

14.1. UN number or ID number:

Not dangerous goods

14.2. UN proper shipping name:

Not dangerous goods

14.3. Transport hazard class(es):

Not dangerous goods

14.4. Packing group:

Not dangerous goods

14.5. Environmental hazards:

Marine pollutant: no

14.6. Special precautions for user:

EmS number: Not dangerous goods

14.7. Maritime transport in bulk according to IMO instruments:

Not relevant

SECTION 15: REGULATORY INFORMATION

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

15.1.1. Information regarding relevant EU safety, health and environmental provisions

ISOPA, the European Diisocyanate & Polyol Producers Association has elaborated a Guideline document for the safe treatment of MDI containing products. The Guidelines have been built into this data sheet.

National regulatory information

Water contaminating class (WGK, Germany): 2 – obviously hazardous to water

15.2. Chemical safety assessment:

In accordance with REACH chemical safety assessment (CSA) has not been carried out for the product. However, the results from the CSA for 4,4'-MDI were transposed into this SDS.

SECTION 16: OTHER INFORMATION

The information given corresponds with our actual knowledge and experience. This information is meant to describe our product in view of possible safety requirements. Classification of the mixture is based on the classification of components.

16.1. Indication of changes

This is the second modified version of the first edition of the datasheet.

16.2. Abbreviations and acronyms

BCF: Bioconcentration factor
BMGV: Biological monitoring guidance value
bw: bodyweight
CAS No.: Chemical Abstracts Service number
CLP: Regulation on classification, labelling and packaging
DIN: Deutsches Institut für Normung (German Institute for Standardization)
DNEL: Derived no effect level
dw: dry weight
EC No.: EINECS and ELINCS number
EC10: Concentration at which 10% of the organisms tested exhibit a statistically significant effect of the chemical
EC50: Half maximal effective concentration
EEC: European Economic Community
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
EPA: Environmental Protection Agency, USA
ErC50: EC50 based on growth rate
EU: European Union
LC50: Lethal concentration, 50%
LD50: Median lethal dose
LLNA: Local lymph node assay
LOAEC: Lowest Observed Adverse Effect Concentration
NOAEC: No Observed Adverse Effect Concentration
NOAEL: No Observed Adverse Effect Level
NOEC: No Observed Effect Concentration
OECD: Organisation for Economic Cooperation and Development
PBT: Persistent, Bioaccumulative and Toxic
PEC: Predicted Environmental Concentration
PMDI: Polymeric MDI (CAS: 9016-87-9)
PNEC: Predicted No Effect Concentration
REACH: The Registration, Evaluation, Authorisation and Restriction of Chemicals
SDS: Safety Data Sheet
TWA: Time-weighted average
vPvB: Very Persistent and Very Bioaccumulative
WEL: Workplace exposure limit

16.3. Key literature references and sources for data

Safety data sheets, received from the raw materials suppliers.

16.4. Full text of abbreviations

H-Phrases

H302 Harmful if swallowed.

H315 Causes skin irritation.

H317 May cause an allergic skin reaction.

H319 Causes serious eye irritation.

H332 Harmful if inhaled.

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 through prolonged or repeated exposure: respiratory system, inhalation.

H412 Harmful to aquatic life with long-lasting effects.

P-Phrases

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P284 Wear respiratory protection.

P302+P352 IF ON SKIN: Wash with plenty of soap and water.

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: Call a POISON CENTER or doctor/physician.

Hazard classes

Acute Tox. Acute toxicity

Aquatic Chronic Hazardous to the aquatic environment, chronic

Carc. Carcinogenicity

Eye Irrit. Serious eye irritation

Resp. Sens. Respiratory sensitization

Skin Irrit. Skin irritation

Skin Sens. Skin sensitization

STOT RE Specific target organ toxicity – repeated exposure

STOT SE Specific target organ toxicity – single exposure

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