

SAFETY DATA SHEET

According to Regulation (EC) No 1907/2006 and Regulation (EU) 2015/830

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

1.1 Product identifier: ALPHA Flume

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, industrial conditions by persons having proper previous training.

1.3 Details of the supplier of the safety data sheet

Producer/Supplier	Scott & Fyfe Ltd.
Street/POB	Tayport Works, Links Road
Postcode/City/Country	DD6 9EE, Tayport, United Kingdom
E-mail address for a competent person responsible for the safety data sheet	info@scott-fyfe.com
Phone	+44 (0) 1382 554 000 (GMT)

1.4 Emergency telephone number

Emergency telephone number	+44 (0) 1382 554 000
Opening hours	08.30am – 5.00pm - Monday-Thursday 08.30am – 12pm - Friday

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 classes / categories	Hazard statements
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 of breathing difficulties if inhaled
STOT SE 3	H335 May cause respiratory irritation
Carc. 2	H351 Suspected of causing cancer
Repr. 2	H361 Suspected of damaging fertility or the unborn child
STOT RE 2	H373 May cause damage to organs through prolonged or repeated exposure: respiratory system, inhalation
Aquatic Chronic 3	H412 Harmful to aquatic life with long lasting effects

2.2 Label Elements

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

Hazard pictograms:



Signal word: Danger

Hazard statements:

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 of breathing difficulties if inhaled
H335	May cause respiratory irritation
H351	Suspected of causing cancer
H361	Suspected of damaging fertility or the unborn child
H373	May cause damage to organs through prolonged or repeated exposure: respiratory system, inhalation
H412	Harmful to aquatic life with long lasting effects

Precautionary statements:

- P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P285 In case of inadequate ventilation wear respiratory 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.
P309+P311 IF exposed or if you feel unwell: Call a POISON CENTER or doctor/physician.

Hazard determining component(s) for labelling:

Diphenylmethan diisocyanate, isomers and homologes (CAS: 9016-87-9); Tris(2-chloro-1-methylethyl) phosphate (CAS: 13674-84-5).

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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-Nr.	CAS-Nr.	REACH Reg. Nr.	Content (%)	Classification according to Directive 67/548/EEC		Classification according to Regulation (EC) No 1272/2008 (CLP)	
					Hazard symbol (s) ¹	R-phrase(s) ¹	Hazard categories ¹	H-phrase(s) ¹
Polymer MDI ²	(polymer)	9016-87-9	(polymer)	≥65	Xn Xi Carc. 3 Xn	R20 R36/37/38 R40 R42/43 R48/20	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
Phenol isopropylated phosphate (3:1) ³	273-066-3	68937-41-7	⁴	≤20	Xn Repr. 3 Repr. 3 N	R48/22 R62 R63 R51/53	Repr. 2 STOT RE 2 Aquatic Chronic 2	H361 H373 H411
Tris(2-chloro-1-methyl-ethyl) phosphate	237-158-7	13674-84-5	⁵	<10	Xn	R22	Acute Tox. 4	H302
Triisobutyl phosphate	204-798-3	126-71-6	⁶	<10	Xi	R43	Skin Sens. 1B	H317
2,4,6-triallyloxy-1,3,5-triazine	202-936-7	101-37-1	⁷	≤5	Xn N	R22 R51/53	Akut Tox. 4 Aquatic Chronic 2	H302 H411

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

² – Contains <25% 4,4'-MDI (4,4'-methylenediphenyl diisocyanate)(CAS: 101-68-8).

³ – The mixture contains <1% Triphenyl phosphate (CAS: 115-86-6).

⁴ – We have still not received the data from our suppliers.

⁵ – 01-2119486772-26-0000

⁶ – 01-2119957118-32-0003

⁷ – 01-2119489756-17-0000

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, preferably wash alternately with a cleanser based on polyethylene glycol and with plenty of warm water and soap. Consult a doctor in the event of a skin reaction. Wash the less 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 (atleast 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. The substances/groups of substances mentioned can be released in case of fire.

5.3 Advice for firefighter

Reaction between water and hot isocyanate may be vigorous. Prevent washings from entering water courses, 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.

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, ground-water 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 absorbent 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 in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials and food and drink. 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 containment to avoid environmental contamination. Suitable containers: steel, stainless steel. Unsuitable containers: copper, copper alloy and galvanised surfaces.

7.3 Specific end use(s)

For the relevant identified use(s) listed in Section 1 the advice mentioned in this section 7 is to be observed.

SECTION 8. Exposure controls/personal protection

8.1 Control parameters

8.1.1 A workplace exposure level (WEL) of 0.02mg/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.

(<http://www.hse.gov.uk/foi/internalops/sectors/manuf/03-10-07.htm>)

8.1.2 DNEL/PNEC-values

The risk characterization of MDI (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 (dry weight).

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.

The risk characterization of 2,4,6-triallyloxy-1,3,5-triazine (CAS: 101-37-1) is the

following: DNEL/DMEL values:

End Use: Worker
Routes of exposure: Inhalation
Value: 134,4 mg/m³
Remarks: Acute – systemic effects

Routes of exposure: Dermal
Value: 1,5 mg/kg bodyweight/day
Remarks: Long term – systemic effects

Routes of exposure: Inhalation
Value: 2,12 mg/m³
Remarks: Long term – systemic effects

PNEC values:

Freshwater 0,00705 mg/l
Marine water 0,0007 mg/l
Water – intermittent releases 0,0705 mg/l
Fresh water sediment 0,1729 mg/kg
Marine sediment 0,01729 mg/kg
Soil 0,057 mg/kg
Sewage treatment plant 10 mg/l
Oral (secondary poisoning) 0,119 mg/kg

8.2 Exposure controls

Respiratory

protection:

Respiratory protection in case of vapour/aerosol release. Combination filter for gases/vapours of organic, inorganic, acid inorganic particles (f. e. 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-Laminate (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)

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 work clothing is required additionally to the stated personal protection 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. At the end of the shift 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

Appearance:	liquid, dark-brown
Odour:	damp
Odour threshold:	no data
pH-value:	not applicable
Melting point/freezing point:	no data
Boiling range:	no data
Flash point:	>200 °C MDI
Evaporation rate:	no data
Flammability (solid, gaseous):	no data
Ignitable, explosive range:	no data
Vapour pressure:	< 0.00001 mbar (at 20°C)
Vapour density:	no data
Density:	1,18±0,01 g/cm ³ (at 25°C)
Solubility:	Reacts with water at the border area with slow CO ₂ appearance into non soluble, high melting point or not melting polyurea
Partition coefficient n-octanol/water:	not applicable
Self-ignition temperature:	no data
Decomposition temperature:	no data
Viscosity:	150 - 210 mPa.s (at 25°C)
Explosive properties:	non-explosive
Oxidising properties:	no data

9.2 Other information

Not applicable.

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 dimethylsulphoxide solvent, water content of the DMSO is increasing breakdown. MDI is more stable in EGDE (ethyleneglycoldimethylether) as 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 cause fire and explosion hazard.

10.4 Conditions to avoid

High temperature, moisture, strong light.

10.5 Incompatible materials

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

10.6 Hazardous decomposition products

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

SECTION 11. Toxicological information

Information is related to 4,4-Methylenediphenyldiisocyanate if no other is mentioned.

11.1 Information on toxicological

effects Acute toxicity – oral:

Rats (female) LD50 = 632 mg/kg
Tris (2-chloro-1-methylethyl) phosphate CAS-Number: 13674-84-5

Rats (male, female) LD50 = 753 mg/kg
OECD Guideline 401
2,4,6-triallyloxy-1,3,5-triazine CAS: 101-37-1

Acute toxicity – inhalation: Harmful

Rats LC50 > 2,24 mg/l air (1 h)
OECD Guideline 403

Rats LC50 > 7 mg/l air (4 h), dusts and
mists OECD 403 Acute Inhalation
Toxicity /
433 Acute Inhalation Toxicity-Fixed Dose Procedure
Tris(2-chloro-1-methylethyl) phosphate CAS 13674-84-5

Rats LC50 > 5,14 g/m³ (4 h) Dusts and mists
OECD 403 Acute Inhalation Toxicity Triisobutyl phosphate (CAS: 126-71-6)

Rats (male) LC50 > 0,333 mg/l (1 h) OECD Guideline 403
On saturation vapour pressure nominal concentration no fatalities
(limit test) 2,4,6-triallyloxy-1,3,5-triazine CAS: 101-37-1

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

11.2 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

Ingredient name	Result	Species	Score	Exposure	Test
Triisobutyl phosphate (CAS: 126-71-6)Eschar	Skin - Erythema/ Acute Derm. Irrit./Corr.	Rabbit		0,67	OECD 404



Eye damage/Irritation:

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

(Read-across based on methylenediphenyl diisocyanate - 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.

11.3 Sensitisation:

Animal data as well as studies in humans provide evidence of possible skin sensitisation, and of respiratory sensitisation due to MDI. Animal studies indicate that MDI is a strong allergen. Human case reports describe the occurrence of allergic contact dermatitis due to MDI exposure.

Skin

sensitisation: **Mice Sensitizing.**
OECD Guideline 429 (LLNA)

Ingredient name	Route of exposure	Species	Result Test description
Triisobutyl phosphate (CAS: 126-71-6)	Skin	Guinea pig	Sensitising OECD 406 Skin Sens

Respiratory sensitisation: Guinea pig Sensitizing.

11.4 Mutagenicity:

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

11.5 Carcinogenicity:

Carc.Cat. 2

Rats (inhalation) 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 414

11.6 Reproductive toxicity:

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

Effects on fertility: No fertility nor multigeneration studies are available for MDI.
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 453

11.7 STOT-single exposure:

MDIs are irritant to the respiratory tract.

11.8 STOT-repeated exposure:

Rats (inhalation)

LOAEC = 1.0 mg/m³ air (2 years; 6 h/day, 5 days/week)

Target organs: respiratory – lung.

OECD Guideline 453

11.9 Aspiration hazard:

Not classified due to lack of data.

SECTION 12. Ecological information

Information is related to 4,4-Methylenediphenyldiisocyanate if no other is mentioned.

12.1 Toxicity

12.1.1 Aquatic toxicity

Short-term toxicity to

fish:

Freshwater fish (Brachydanio rerio) LC50 > 1000 mg/l (96 h)

OECD Guideline 203

Fish: LC50 = 56,2 mg/l (96 h)

Tris(2-chloro-1-methylethyl) phosphate, CAS: 13674-84-5

Fish: LC50 = 17,8-21,5 mg/l (96 h)

Triisobutyl phosphate, CAS: 126-71-6

Static test danio rerio: LC50 = 7,05 mg/l (96 h) OECD TG 203

2,4,6-triallyloxy-1,3,5-triazine CAS: 101-37-1

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: EC50 = 131 mg/l (48 h)

Tris(2-chloro-1-methylethyl) phosphate, CAS: 13674-84-5

Daphnia - Daphnia magna Acute EC50 = 11 mg/l (48 h)

DIN 38412, Part 11

Triisobutyl phosphate, CAS: 126-71-6

Immobilization Daphnia magna: EC50 = 40 mg/l (48

h) OECD TG 202

2,4,6-triallyloxy-1,3,5-triazine CAS: 101-37-1

Long-term toxicity to aquatic invertebrates:

Freshwater invertebrates (Daphnia magna) NOEC >= 10 mg/l (21 days)

OECD Guideline 211

Toxicity to aquatic algae and cyanobacteria:

Freshwater algae (Desmodesmus subspicatus) EC50 > 1640 mg/l (72 h)
OECD Guideline 201
Freshwater algae (Desmodesmus subspicatus) EC50 = 82 mg/l (72 h)
Tris(2-chloro-1-methylethyl) phosphate, CAS: 13674-84-5
Algae (Desmodesmus subspicatus) Acute IC50 = 34,1 mg/l (72 h) growth rate
DIN3812, Part 9
Triisobutyl phosphate, CAS: 126-71-6
Algae (Desmodesmus subspicatus): Acute IC50 = 33,2 mg/l (72 h) growth rate, biomass
DIN 3812, Part 9
Triisobutyl phosphate, CAS: 126-71-6
Bacteria – Activated sludge Chronic EC50=37,2 mg/l (28 days)
OECD 301B Ready Biodegradability – CO2 Evolution Test
Triisobutyl phosphate, CAS: 126-71-6
NOEC Growth inhibition Desmodesmus subspicatus IC50= 10,52 mg/l (72 h)
OECD TG 201
End point: growth rate
2,4,6-triallyloxy-1,3,5-triazine CAS: 101-37-1
NOEC Growth inhibition Desmodesmus subspicatus NOEC= 2,50 mg/l (72 h)
OECD TG 201
End point: growth rate
2,4,6-triallyloxy-1,3,5-triazine CAS: 101-37-1

Toxicity to aquatic plants other than algae:

Data waiving. Not required by REACH annexes. However, a 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 10,000 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

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): 1 day

Hydrolysis:

MDI reacts with water to form predominantly inert polyurea.

Half-life (DT50): 20 h (at 25°C)
(Read-across based on Oligomer MDI – CAS 32055-14-4)

Phototransformation in water and soil:

There are no phototransformation data in water and soil for the test substance.

Biodegradation in water:

Under test conditions no biodegradation 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 305 E

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 estimated Henry's Law Constant, calculated 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 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 14. Transport information

Land transport (ADR/RID/GGVSE)

**Sea transport (IMDG-
Code/GGVSee) Air transport
(ICAO-IATA/DGR)**

- 14.1 UN number: Not dangerous goods
 - 14.2 UN proper shipping name: Not dangerous goods
 - 14.3 Transport hazard class(es): Not dangerous goods
 - 14.4 Packaging group: Not dangerous goods
 - 14.5 Environmental hazards: Marine pollutant: no
 - 14.6 Special precautions for users: EmS number: Not dangerous goods
 - 14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not relevant.
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SECTION 15. Regulatory information

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

15.1.1 Information regarding relevant Community 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.

15.2 Chemical Safety Assessment:

In accordance with REACH Chemical Safety Assessment 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:

Due to the transition to the classification according to CLP, the safety data sheet shall be regarded as fully new.

16.2 Abbreviations and acronyms:

bw: bodyweight

DNEL: Derived no effect level

CAS number: Chemical Abstracts Service number

dw: dry weight

CLP: Regulation on classification, labelling and packaging EC number: EINECS and ELINCS number

EC50: Half maximal effective concentration

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances LC50: Lethal concentration, 50 %

LD50: Median Lethal dose

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 Polymeric MDI: Polymethylene polyphenyl poliisocyanate

PEC: Predicted Environmental Concentration PNEC: Predicted No Effect Concentration

REACH: The Registration, Evaluation, Authorisation and Restriction of Chemicals

vPvB: Very Persistent and Very Bioaccumulative

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

H361 Suspected of damaging fertility or the unborn child

H373 May cause damage to organs through prolonged or repeated exposure:

respiratory system, inhalation H411 Toxic to aquatic life with long lasting effects

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.
P285	In case of inadequate ventilation wear respiratory 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.
P309+P311	IF exposed or if you feel unwell: Call a POISON CENTER or doctor/physician.

Hazard classes

Acute Tox.	Acute Toxicity
Aquatic Chronic environment Carc.	Hazardous to the aquatic Carcinogenity
Eye irrit.	Serious eye irritation
Repr.	Reproductive toxicity
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
