SAFETY DATA SHEET

Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II

Product name: DD-Härter VL
Date of printing: 07.10.2023

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

1.1 Product identifier

Product name: DD-Härter VL for DD-Fussbodenbeschichtung, mixing rate 4:1

Unique Formula Identifier (UFI-Code): SVR2-A01J-Y001-AHWE

Product type: Curing agent

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

Field of application: metal industry

Identified uses: Industrial applications, Professional applications, Used by spraying.

1.3 Details of the supplier of the safety data sheet:

Producer/Supplier: Bisdorf GmbH
Industriestraße 49-51
D-52224 Stolberg

Telephone: +49 (0) 2402 / 71048
Telefax: +49 (0) 2402 / 75465
E-Mail adress: bisdorf-lacke@arcor.de

1.4 Emergency telephone number

Emergency information: Information Center against Poisons
University Bonn
Telephone number: +49 (0)228 / 19240

Date of issue: 07.10.2023

Date of previous issue: 01.10.2021

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Product definition: Mixture

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

Classification acc. to GHS

Section	Hazard class	Hazard class and category	Hazard statement
2.6	flammable liquid	Flam. Liq. 3	H226
3.1D	acute toxicity (dermal)	Acute Tox. 4	H312
3.1I	acute toxicity (inhal.)	Acute Tox. 4	H332
3.2	skin corrosion/irritation	Skin Irrit. 2	H315
3.3	serious eye damage/eye irritation	Eye Irrit. 2	H319
3.4R	skin sensitisation	Resp. Sens. 1	H334
3.4S	skin sensitisation	Skin Sens. 1	H317

See Section 11 for more detailed information on health effects and symptoms.

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Product name: DD-Härter VL
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Classification acc. to GHS

Section	Hazard class	Hazard class and category	Hazard statement
3.6	carcinogenicity	Carc. 2	H351
3.8R	specific target organ toxicity - single exposure (respiratory tract irritation)	STOT SE 3	H335
3.9	specific target organ toxicity - repeated exposure	STOT RE 2	H373
3.10	aspiration hazard	Asp. Tox. 1	H304

2.2 Label elements

Hazard pictograms:

Signal word: Danger

Hazard statements:
H226 - Flammable liquid and vapor.
H304 - May be fatal if swallowed and enters airways.
H312 - Harmful in contact with skin.
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.
EUH066 - Repeated exposure may cause skin dryness or cracking.
EUH204 - Contains isocyanates. May produce an allergic reaction.

Precautionary statements:

Prevention:
P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P260 - Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P271 - Use only outdoors or in a well-ventilated area.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.

Response:
P301 + P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P303 + P361 + P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P314 - Get medical advice/attention if you feel unwell.
P331 - Do NOT induce vomiting.

Storage:
P403 + P233 - Store in a well-ventilated place. Keep container tightly closed.
P403 + P235 - Store in a well-ventilated place. Keep cool.
P405 - Store locked up.

Disposal: P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.

Supplemental label elements: Contains isocyanates. May produce an allergic reaction.

Indication at Labelling:
The pictogram GHS 02 (flame) can according GHS/CLP Art. 33 (3) substituted to label of ADR.

2.3 Other hazards
Endocrine disrupting properties (human health):
The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Endocrine disrupting properties (environment):
The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

PBT and vPvB assessment:
This substance/mixture contains components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB).

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Product/ingredient name	Identifiers	%	**Classification** 1272/2008/EC (CLP)	Type
xylene (mixture of isomers)	REACH: 01-2119488216-32 CAS: 1330-20-7 EG: 215-535-7	15-20	Flam. Liq. 3, H226 C Acute Tox. 4, H312 Acute Tox. 4, H332 Asp. Tox. 1, H304 Skin Irrit. 2, H315 Eye Irrit. 2, H319 STOT SE 3, H335 STOT RE 2, H373 (hearing organs)	[1] [2]
ethylbenzene	REACH: 01-2119489370-35 CAS: 100-41-4 EG: 202-849-4	1-5	Flam. Liq. 2, H225 - Asp. Tox. 1, H304 Acute Tox. 4, H332 STOT SE 3, H335 STOT RE 2, H373 (hearing organs)	[1] [2]
diphenylmethane-diisocyanate (isomers,homologues, oligomers)	REACH: Polymer CAS: 9016-87-9 EG: -	60-70	Acute Tox. 4, H332 - Eye Irrit. 2, H319 Skin Irrit. 2, H315 Skin Sens. 1 H317 Resp. Sens. 1, H334 STOT SE 3, H335 Carc. 2 H351 STOT RE 2, H373	[1] [2]
diphenylmethane-4,4'-diisocyanate	REACH: 01-2119457014-47 CAS: 101-68-8 EG: 202-966-0	5-10	Acute Tox. 4, H332 - Eye Irrit. 2, H319 Skin Irrit. 2, H315 Skin Sens. 1 H317 Resp. Sens. 1, H334 STOT SE 3, H335 Carc. 2 H351 STOT RE 2, H373	[1] [2]

Product/ingredient name	Identifiers	%	**Classification** 1272/2008/EC (CLP)	Type
2,2'-methylenediphenyl - diisocyanate	REACH: 01-2119927323-43 CAS: 2536-05-2 EG: 219-799-4	5-10	Acute Tox. 4, H332 - Eye Irrit. 2, H319 Skin Irrit. 2, H315 Skin Sens. 1 H317 Resp. Sens. 1, H334 STOT SE 3, H335 Carc. 2 H351 STOT RE 2, H373	[1] [2]
diphenylmethane-2,4'-diisocyanate	REACH: 01-2119480143-45 CAS: 5873-54-1 EG: 227-534-9	<0,1	Acute Tox. 4, H332 - Eye Irrit. 2, H319 Skin Irrit. 2, H315 Skin Sens. 1 H317 Resp. Sens. 1, H334 STOT SE 3, H335 Carc. 2 H351 STOT RE 2, H373	[1] [2]

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Type
[1] Substance classified with a health or environmental hazard
[2] Substance with a workplace exposure limit
[3] Substance meets the criteria for PBT according to Regulation (EC) No. 1907/2006, Annex XIII
[4] Substance does not meet the criteria for vPvB according to Regulation (EC) No. 1907/2006, Annex XIII.
[5] Substance of equivalent conce.

Occupational exposure limits, if available, are listed in Section 8.

SECTION 4: First aid measures

4.1. Description of first aid measures

General information: In all cases of doubt, or when symptoms persist, seek medical attention. If unconscious, place in recovery position and get medical attention immediately. Never give anything by mouth to an unconscious person. In any case show the physician the Safety Data Sheet.

Inhalation: Remove affected persons from dangerous area by observing suitable respiratory Protection measures. Remove the casualty into fresh air and keep at rest. After intensive inhalation consult a doctor in every case, even if no symptoms occur.

Skin contact: Take off immediately all contaminated clothing. Wash contaminated clothing before reusing. Do not allow the product to dry on the skin. Wash skin thoroughly with soap and water or use recognised skin cleanser. Consult a doctor in case of persisting skin irritation.

Eye contact: Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Begin with medical treatment.

Ingestion: If swallowed, rinse mouth with water (only if the person is conscious). Do not induce vomiting unless directed to do so by medical personnel. Seek medical attention.

4.2 Most important symptoms and effects, both acute and delayed

General information: When inhaled or swallowed depending on the time and amount, it can give rise to the following symptoms: headaches, giddiness, tiredness, nausea, vomiting, irregular heart beat, intoxication, unconsciousness, asphyxiation and fatality.

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4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician: Symptomatic treatment.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable: Extinguishing measures to suit surroundings. In case of fire, use water spray jet, dry extinguishing powder, foam or carbon dioxide.
Not suitable: water jet.

5.2 Special hazards arising from the substance or mixture

Hazardous combustion Products: Fire will produce dense black smoke containing hazardous combustion products. In a fire, the following may be released: carbon dioxide, carbon monoxide, not combusted hydrocarbons.

5.3 Advice for firefighters

Special protective equipment for fire-fighters: During fire-fighting wear self-contained breathing apparatus and protective clothing.

Additional information: The product is flammable. Use water spray to keep fire-exposed containers cool. Use extinguishing media suitable for surrounding materials. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

General information: To avoid fire, eliminate ignition sources. Provide adequate ventilation. Use personal protective equipment. Avoid contact with eyes, skin and clothing. Avoid breathing vapours, spray or mists.

6.2 Environmental precautions

General information: Do not discharge into the drains / surface waters / groundwater. Prevent spread over a wide area e.g. by containment or oil barriers.

6.3 Methods and material for containment and cleaning up

General information: Absorb with liquid-binding material (sand, diatomite, universal binders etc.) or use a spill kit. Containers in which spilt substance has been collected must be adequately labelled. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements.

6.4 Reference to other sections

General information: See Section 1 for emergency contact information.
See Section 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Protective measures: Keep away from sources of ignition - No smoking. Vapours may form explosive mixtures with air.
Take precautionary measures against electrostatic discharges. Provide good ventilation of working area. The working procedure should be planned as far as allowed by state-of-the-art technology so as to avoid release of hazardous substances or prevent skin contact. The level of risk involved in product handling must be reduced to a minimum by means of protective and preventive measures.

7.2 Conditions for safe storage, including any incompatibilities

General information: Store in a dry, cool and well-ventilated area. 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. Store in accordance with local regulations.

German storage class: 10 - Combustible liquids neither in Storage Class 3

7.3 Specific end use(s)

See separate Product Data Sheet for recommendations or industrial sector specific solutions.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limit values (Workplace Exposure Limits)

Product/ingrediet name	CAS-Nr.	Nota -tion	Identi-fier	TWA [ppm]	TWA [mg/m³]	STEL [ppm]	STEL [mg/m³]	Source
xylene (mixture of isomers)	1330-20-7	skin	IOELV	50	221	100	442	2017/164/EU
ethylbenzene	100-41-4	skin	IOELV	100	442	200	884	2017/164/EU
2-methoxy-1-methyl-ethylacetate (PMA)	108-65-6		IOLEV	50	275	270	550	2000/39/EG
n-butyl acetate	123-86-4	skin	MAK	2	11	4	22	DFG/GER
diphenylmethane-diisocyanate (isomers,homologues, oligomers)	9016-87-9			0,005	0,05			ACGIH
diphenylmethane-4,4'-diisocyanate	101-68-8			0,005	0,05			ACGIH
2,2'-methylenediphenyl–diisocyanate	2536-05-2			0,005	0,05			ACGIH
diphenylmethane-2,4'-diisocyanate	5873-54-1			0,005	0,05			ACGIH

Notation
STEL Short-term exposure limit: a limit value above which exposure should not occur and which is related to a 15-minute period unless otherwise specified
TWA Time-weighted average (long-term exposure limit): measured or calculated in relation to a reference period of 8 hours time-weighted average

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DNELs/DMELs

Product/ingredient name		
xylene (mixture of isomers)		
Oral	DNEL (population)	1,6 mg/kg bw/day (Long-term - systemic effects)
Dermal	DNEL (worker)	180 mg/kg bw/day (Long-term - systemic effects)
	DNEL (population)	108 mg/kg bw/day (Long-term - systemic effects)
Inhalation	DNEL (worker)	77 mg/m³ (Long-term - systemic effects)
		289 mg/m³ (Acute - systemic and local effects)
	DNEL (population)	14,8 mg/m³ (Long-term - systemic effects)
		174 mg/m³ (Acute - systemic and local effects)

Product/ingredient name		
ethylbenzene		
Dermal	DNEL (worker)	180 mg/kg bw/day (Long-term - systemic effects)
Inhalation	DNEL (worker)	77 mg/m³ (Long-term - systemic effects)
		289 mg/m³ (Acute - systemic and local effects)

Product/ingredient name		
diphenylmethane-4,4'-diisocyanate		
Oral	DNEL (population)	20 mg/kg bw/day (Long-term - systemic effects)
Dermal	DNEL (worker)	50 mg/kg bw/day (Long-term - systemic effects)
		28,7 mg/kg bw/day (Short-term - local effects)
Inhalation	DNEL (population)	25 mg/kg bw/day (Long-term - systemic effects)
		17,2 mg/kg bw/day (Short-term - local effects)
	DNEL (worker)	0,05 mg/m³ (Long-term - systemic and local effects)
		0,1 mg/m³ (Acute - systemic and local effects)
	DNEL (population)	0,025 mg/m³ (Long-term - systemic and local effects)
		0,05 mg/m³ (Acute - systemic and local effects)

Product/ingredient name		
2,2'-methylenediphenyl–diisocyanate		
Oral	DNEL (population)	20 mg/kg bw/day (Long-term - systemic effects)
Dermal	DNEL (worker)	50 mg/kg bw/day (Long-term - systemic effects)
		28,7 mg/kg bw/day (Short-term - local effects)
Inhalation	DNEL (population)	25 mg/kg bw/day (Long-term - systemic effects)
		17,2 mg/kg bw/day (Short-term - local effects)
	DNEL (worker)	0,05 mg/m³ (Long-term - systemic and local effects)
		0,1 mg/m³ (Acute - systemic and local effects)
	DNEL (population)	0,025 mg/m³ (Long-term - systemic and local effects)
		0,05 mg/m³ (Acute - systemic and local effects)

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Product/ingredient name		
diphenylmethane-2,4'-diisocyanate		
Oral Dermal Inhalation	DNEL (population) DNEL (worker) DNEL (population) DNEL (worker) DNEL (population)	20 mg/kg bw/day (Long-term - systemic effects) 50 mg/kg bw/day (Long-term - systemic effects) 28,7 mg/kg bw/day (Short-term - local effects) 25 mg/kg bw/day (Long-term - systemic effects) 17,2 mg/kg bw/day (Short-term - local effects) 0,05 mg/m³ (Long-term - systemic and local effects) 0,1 mg/m³ (Acute - systemic and local effects) 0,025 mg/m³ (Long-term - systemic and local effects) 0,05 mg/m³ (Acute - systemic and local effects)

PNECs

Product/ingredient name	
xylene (mixture of isomers)	
PNEC aqua PNEC PNEC sediment	0,327 mg/l (fresh water) 0,327 mg/l (marine water) 6,58 mg/l (STP (sewage treatment plant)) 2,31 mg/kg dw (soil) 12,46 mg/kg dw (fresh water) 12,46 mg/kg dw (marine water)

Product/ingredient name	
ethylbenzole	
PNEC aqua PNEC PNEC sediment	0,1 mg/l (fresh water) 0,01 mg/l (marine water) 6,58 mg/l (STP (sewage treatment plant)) 2,68 mg/kg dw (soil) 13,7 mg/kg dw (fresh water) 1,37 mg/kg dw (marine water)

Product/ingredient name	
diphenylmethane-4,4'-diisocyanate	
PNEC aqua PNEC PNEC sediment	>1 mg/l (fresh water) >0,1 mg/l (marine water) >1 mg/l (STP (sewage treatment plant)) >1 mg/kg dw (soil) Not relevant. (fresh water) Not relevant. (marine water)

Product/ingredient name	
2,2'-methylenediphenyl–diisocyanate	
PNEC aqua	>1 mg/l (fresh water) >0,1 mg/l (marine water)
PNEC	>1 mg/l (STP (sewage treatment plant)) >1 mg/kg dw (soil)
PNEC sediment	Not relevant. (fresh water) Not relevant. (marine water)

8.2 Exposure controls / personal protection

Engineering measures

Refer to protective measures listed in sections 7.

Personal protective equipment:

Respiratory protection

Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. If working areas have insufficient ventilation: When the product is applied by means that will not generate an aerosol such as, brush or roller wear half or totally covering mask equipped with gas filter of type A, when grinding use particle filter of type P. Be sure to use an approved/certified respirator or equivalent.

Hand protection

If there is a potential for product skin contact, use of gloves tested to e.g. EN 374 will provide sufficient protection. Protective gloves should in any case be tested for workplace-specific suitability (e.g. mechanical resistance, product compatibility, antistatic properties). Comply with instructions and information provided by the glove manufacturer concerning use, care and replacement of the gloves. Replace protective gloves immediately upon damage or at the first signs of wear. As far as possible, plan work procedures so that wearing gloves will not be necessary.

	Long term exposure	Short term exposure
Recommended gloves should be made of	Viton®	Nitril.
Material thickness	>0,7 mm	>0,4 mm
Permeation time	>480 min	>480 min

Eye protection

Safety goggles with lateral shielding (DIN EN 166)

Body protection

Usual working clothes for the chemical industry, suitable for the job.

Environmental exposure controls:

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

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SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance
Physical state: Fluid **Colour:** Brownish

Odor: earthy, musty

Odor threshold: Not relevant for the hazard classification of the product.

Security-relevant basic data

Parameter	
pH-value	Not applicable.
Melting point/Melting range	<-25 °C
Boiling point/Boiling range	136 - 145 °C
Flash point	~23-27 °C (IP 170 (ABEL))
Flammability (solid / gas)	Not applicable.
Ignition temperature	~460 ° C (lowest value of the individual components)
Decomposition temperature	Not determined.
Auto-ignition temperature	The product is not self-igniting.
Explosive properties	Product is not explosive. However, formation of explosive air/steam mixtures as possible.
Explosion limits Lower Upper Oxidizing properties	 1 %(Vol) 7 %(Vol) Not determined
Vapour pressure	11 hPa (20 °C) 20 hPa (50 °C) 22 hPa (55 °C)
Density	~1,22 g/cm³ (20 °C)
Vapor density	Not determined
Evaporation rate	No data available.
Solubility in Miscibility with water	Organic solvents (see point 3) 0.175 g/l
Partition coefficient: (n-octanol/water)	Testing not relevant or not possible due to nature of the product.
Viscosity (expiry time after DIN 53211) Dynamic: Kinematic:	 <60 s DIN 4mm (20°C)
Solvent separation test	< 3% (20°C)

9.2. Other information

No additional information.

SECTION 10: Stability and reactivity

10.1 Reactivity
General information: No specific test data related to reactivity available for this product or its ingredients.

10.2 Chemical stability
General information: The product is stable.

10.3 Possibility of hazardous reactions
General information: Rubber and other synthetic material can be affected.

10.4 Conditions to avoid
General information: The product is flammable. Keep away from excessive heat, sparks or open fire.

10.5 Incompatible materials
General information: oxidising agents, acids

10.6 Hazardous decomposition products
General information: Thermal disintegration depends to a great extent on the external conditions. A complex mixture of solids, liquids and gases forms in the air, including among other substances carbon dioxide, carbon monoxide and other organic compounds, when this material is burnt or is thermally or oxidatively degraded.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Product/ingredient name	Result	Species	Dose	Exposure
xylene (mixture of isomers)	LC50 Inhalation Gas	Rat	5000 ppm	4 hours
	LC50 Inhalation Vapour	Rat	6350 ppm	4 hours
	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	4300 mg/kg	-
ethylbenzene	LC50 Inhalation Vapour	Rat	17,2 mg/l	4 hours
	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	3500 mg/kg	-
diphenylmethane-diisocyanate	LC50 Inhalation Vapour	Rat	0,31 mg/l*	4 hours
(isomers,homologues, oligomers)	LD50 Dermal	Rabbit	> 9.400 mg/kg	-
	LD50 Oral	Rat	> 10.000 mg/kg	-
diphenylmethane-4,4'-diisocyanate	LC50 Inhalation Vapour	Rat	0,368 mg/l*	4 hours
	LD50 Dermal	Rabbit	> 9.400 mg/kg	-
	LD50 Oral	Rat	> 2.000 mg/kg	-
2,2'-methylenediphenyl–diisocyanate	LC50 Inhalation Vapour	Rat	> 2,24 mg/l*,	4 hours
	LD50 Dermal	Rabbit	> 9.400 mg/kg	-
	LD50 Oral	Rat	> 2.000 mg/kg	-
diphenylmethane-2,4'-diisocyanate	LC50 Inhalation Vapour	Rat	0,387 mg/l*	4 hours
	LD50 Dermal	Rabbit	> 9.400 mg/kg	-
	LD50 Oral	Rat	> 2.000 mg/kg	-

* The substance was tested in a form (i.e. specific particle size distribution) that is different from the forms in which the substance is placed on the market and in which it can reasonably be expected to be used. Therefore, a modified classification for acute inhalation toxicity is justified.

Acute toxicity estimates

Route	ATE-Value
Oral	not rated
Dermal	not rated
Inhalation (vapors)	11,160 mg/l/4h

Corrosion/Irritation

Product/ingredient name	Result	Species	Score	Exposure
xylene (mixture of isomers)	Eyes - Severe irritant	Rabbit	-	24 hours 5 milligrams
	Skin - Moderate irritant	Rabbit	-	24 hours 500 milligrams
ethylbenzene	Skin - Mild irritant	Rabbit	-	24 hours 15 milligrams
	Respiratory - Mild irritant	Rabbit	-	-
	Eyes - Mild irritant	Rabbit	-	-
diphenylmethane-diisocyanate (isomers,homologues, oligomers)	Skin - Mild irritant	Rabbit	-	-
diphenylmethane-4,4'-diisocyanate	Causes skin irritation.	Rabbit	-	-
2,2'-methylenediphenyl–diisocyanate	Skin - Not irritant	Rabbit	-	-
diphenylmethane-2,4'-diisocyanate	Causes skin irritation.	Rabbit	-	-

Sensitiser

Product/ingredient name	Route of exposure	Species	Result
diphenylmethane-diisocyanate	Skin	Guinea pig	Negative
(isomers,homologues, oligomers)	Skin	Mouse	Sensitising
	Respiratory tract	Rat	Sensitising
diphenylmethane-4,4'-diisocyanate	Skin	Mouse	Sensitising
	Respiratory tract	Guinea pig	Sensitising
2,2'-methylenediphenyl–diisocyanate	Skin	Mouse	Sensitising
	Respiratory tract	Guinea pig	Sensitising
diphenylmethane-2,4'-diisocyanate	Skin	Mouse	Sensitising
	Respiratory tract	Guinea pig	Sensitising

Respiratory sensitization:
Classification: May cause sensitization by inhalation. Classification according to Directive 2006/121/EC Annex VI

Mutagenicity
Remarks: No evidence of mutagenic effects.

Carcinogenicity
diphenylmethane-diisocyanate
(isomers and homologues)
Carcinogenicity: Suspected of causing cancer by inhalation (Carc. 2).
diphenylmethane-4,4'-diisocyanate
Carcinogenicity: Suspected of causing cancer by inhalation (Carc. 2).
2,2'-methylenediphenyl–diisocyanate
Carcinogenicity: Suspected of causing cancer by inhalation (Carc. 2).
diphenylmethane-2,4'-diisocyanate
Carcinogenicity: Suspected of causing cancer by inhalation (Carc. 2).

Reproductive toxicity
Remarks: No evidence that the substance is toxic for reproduction.

Teratogenicity
Remarks: No evidence that the substance may cause birth defects.

Specific target organ toxicity (single exposure)

Product/ingredient name	Category	Route of exposure	Target organs
xylene (mixture of isomers)	Category 3	Not applicable.	Respiratory tract Irritation
diphenylmethane-diisocyanate (isomers,homologues, oligomers)	Category 3	Not applicable.	Respiratory tract Irritation
diphenylmethane-4,4'-diisocyanate	Category 3	Not applicable.	Respiratory tract Irritation

Specific target organ toxicity (repeated exposure)

Product/ingredient name	Category	Route of exposure	Target organs
xylene (mixture of isomers)	Category 2	Not determined	Hearing organs
ethylbenzene	Category 2	Not determined	Hearing organs
diphenylmethane-diisocyanate (isomers, homologues, oligomers)	Category 2	Inhalation	Respiratory tract
diphenylmethane-4,4'-diisocyanate	Category 2	Inhalation	Respiratory tract
2,2'-methylenediphenyl–diisocyanate	Category 2	Inhalation	Respiratory tract
diphenylmethane-2,4'-diisocyanate	Category 2	Inhalation	Respiratory tract

Aspiration hazard

Product/ingredient name	Result
xylene (mixture of isomers)	ASPIRATION HAZARD - Category 1
ethylbenzene	ASPIRATION HAZARD - Category 1

Information on the likely routes of exposure
Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential chronic health effects
Inhaling of solvent components above the MWC-value can lead to health damage, e.g. irritation of the mucous membrane and respiratory organs, as well as damage to the liver, kidneys and the central nerve system. Indications for this are: headache, dizziness, fatigue, amyosthenia, drowsiness, in serious cases: unconsciousness. Solvents may cause some of the aforementioned effects through skin resorption. Repeated or prolonged contact with the preparation may cause removal of natural fat from the skin resulting in non-allergic contact dermatitis and/or absorption through skin. Splashing may cause eye irritation and reversible damag.

11.2 Endocrine disrupting properties
The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

11.3 Other hazards
The product is flammable. Keep away from excessive heat, sparks or open fire. In use, may form flammable/explosive vapourair mixture. Electrostatic charges may be generated during pumping, release of which may cause a fire.

SECTION 12: Ecological information

12.1 Toxicity

Product/ingredient name	Result	Species	Exposure
xylene (mixture of isomers)	Acute EC50 3,82 mg/l	Daphnie - Daphnia magna	48 hours
	Acute EC50 4,7 mg/l	Algae- Pseudokirchneriella subcapitata	72 hours
	Acute LC50 7,6 mg/l	Fish - Oncorhynchus mykiss	96 hours
ethylbenzene	Acute EC50 2,4 mg/l	Daphnie - Daphnia magna	48 hours
	Acute EC50 4,6 mg/l	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute LC50 7 mg/l	Fish - Oncorhynchus mykiss	96 hours
diphenylmethane-diisocyanate (isomers, homologues, oligomers)	Acute EC50 >1.000 mg/l	Daphnie - Daphnia magna	48 hours
	Acute EC50 1.640 mg/l	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute LC50 >1000 mg/l	Fish – Danio rerio	96 hours
diphenylmethane-4,4'-diisocyanate	Acute EC50 >1.000 mg/l	Daphnie - Daphnia magna	48 hours
	Acute EC50 1.640 mg/l	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute LC50 >1000 mg/l	Fish – Danio rerio	96 hours

Product/ingredient name	Result	Species	Exposure
2,2'-methylenediphenyl–diisocyanate	Acute EC50 >1.000 mg/l	Daphnie - Daphnia magna	48 hours
	Acute EC50 1.640 mg/l	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute LC50 >1000 mg/l	Fish – Danio rerio	96 hours
diphenylmethane-2,4'-diisocyanate	Acute EC50 >1.000 mg/l	Daphnie - Daphnia magna	48 hours
	Acute EC50 1.640 mg/l	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute LC50 >1000 mg/l	Fish – Danio rerio	96 hours

12.2 Persistence and degradability

Product/ingredient name	Result
xylene (mixture of isomers)	87,8 % - 28 days
ethylbenzene	>70 % - 28 days
diphenylmethane-diisocyanate (isomers, homologues, oligomers)	0% - 28 days
diphenylmethane-4,4'-diisocyanate	0% - 28 days
2,2'-methylenediphenyl–diisocyanate	0% - 28 days
diphenylmethane-2,4'-diisocyanate	0% - 28 days

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
xylene (mixture of isomers)	-	-	Readily
ethylbenzene	-	-	Readily
diphenylmethane-diisocyanate (isomers, homologues, oligomers)	-	-	Not potentially degradable.
diphenylmethane-4,4'-diisocyanate	-	-	Not potentially degradable.
2,2'-methylenediphenyl–diisocyanate	-	-	Not potentially degradable.
diphenylmethane-2,4'-diisocyanate	-	-	Not potentially degradable.

12.3 Bioaccumulative potential

Product/ingredient name	LogPow	BCF	Potential
xylene (mixture of isomers)	3.16	25.9	low
ethylbenzene	3.6	-	low
diphenylmethane-diisocyanate (isomers and homologues)	-	<14	low
diphenylmethane-4,4'-diisocyanate	-	200	low
2,2'-methylenediphenyl–diisocyanate	-	200	low
diphenylmethane-2,4'-diisocyanate	-	200	low

12.4 Mobility in soil

Soil/water partition coefficient (KOC): Not available.

12.5 Results of PBT and vPvB assessment

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.

12.6 Endocrine disrupting properties

The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

12.7 Other adverse effects

No known significant effects or critical hazards.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

The generation of waste should be avoided or minimised wherever possible. Residues of the product is listed as hazardous waste. Dispose of according to all state and local applicable regulations. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Spillage, remains, discarded clothes and similar should be discarded in a fireproof container.

European waste catalogue no. (EWC) is given below.
European waste catalogue (EWC): 08 01 11*

Packaging
The generation of waste should be avoided or minimised wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

SECTION 14: Transport information

Transport may take place according to national regulation or ADR for transport by road, RID for transport by train, IMDG for transport by sea, IATA for transport by air.

	14.1 UN no.	14.2 Proper shipping name	14.3 Transport hazard class(es)		14.4 PG*	14.5 Env*	Additional information
ADR/RID Class	UN1263	PAINT RELATED MATERIAL	3		III	No.	**Tunnel code** (D/E)
IMDG Class	UN1263	PAINT RELATED MATERIAL	3		III	No.	**Emergency schedules** F-E, S-E
IATA Class	UN1263	PAINT RELATED MATERIAL	3		III	No.	-

PG*.: Packing group Env.* : Environmental hazards

14.6 Special precautions for user
Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
Not applicable.

SECTION 15: Regulatory information

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

EU Regulation

Regulation (EG) Nr. 1907/2006 (REACH)
Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), with supplements.

Regulation (EG) Nr. 1272/2008 (CLP)
Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labeling and packaging of substances and mixtures (CLP), with supplements.

EU Regulation (EC) No. 1907/2006 (REACH)
Annex XIV - List of substances subject to authorisation
Substances of very high concern

Substances mentioned on the so-called "candidate list of substances of very high concern (SVHC) for authorisation" published by the EChA are not intentionally added to this product. Therefore it is not expected, that these substances are present in amounts of ≥ 0,1% in this product.

National legislation (Germany)

Water hazard class: WGK 2 (Assessment by list): hazardous for water.

VOC: 244 g/l DIN ISO 11890 (Council Directive 1999/13/EC).

Information about limitation of use: Employment restrictions concerning young persons must be observed.

15.2 Chemical Safety Assessment
Complete.

SECTION 16: Other information

Abbreviations and acronyms:

Abbr.	Descriptions of used abbreviations
ADR	Accord européen relatif au transport international des marchandises dangereuses par route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
BCF	bioconcentration factor
CAS	Chemical Abstracts Service (service that maintains the most comprehensive list of chemical substances)
CLP	Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures
CMR	Carcinogenic, Mutagenic or toxic for Reproduction
DGR	Dangerous Goods Regulations (see IATA/DGR)
DMEL	Derived Minimal Effect Level
DNEL	Derived No-Effect Level
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
EmS	Emergency Schedule
GHS	"Globally Harmonized System of Classification and Labelling of Chemicals" developed by the United Nations
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods Code
IOELV	indicative occupational exposure limit value
MARPOL	International Convention for the Prevention of Pollution from Ships (abbr. of "Marine Pollutant")
PBT	Persistent, Bioaccumulative and Toxic
PNEC	Predicted No-Effect Concentration
ppm	parts per million
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
RID	Règlement concernant le transport International ferroviaire des marchandises Dangereuses (Regulations concerning the International carriage of Dangerous goods by Rail)
STEL	short-term exposure limit
TWA	time-weighted average
VOC	Volatile Organic Compounds
vPvB	very Persistent and very Bioaccumulative

Full text of classifications [CLP/GHS]:
Acute Tox. 4, H312 ACUTE TOXICITY (dermal) - Category 4
Acute Tox. 4, H332 ACUTE TOXICITY (inhalation) - Category 4
Aquatic Chronic 2, H411 LONG-TERM AQUATIC HAZARD - Category 2

Asp. Tox. 1, H304 ASPIRATION HAZARD - Category 1
Eye Irrit. 2, H319 SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2
Flam. Liq. 3, H225 FLAMMABLE LIQUIDS - Category 2
Flam. Liq. 3, H226 FLAMMABLE LIQUIDS - Category 3
Skin Irrit. 2, H315 SKIN CORROSION/IRRITATION - Category 2
Skin Sens. 1, H317 SKIN SENSITIZATION - Category 1
STOT RE 2, H373 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2
STOT RE 2, H373 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (hearing organs) - Category 2
STOT SE 3, H335 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
STOT SE 3, H336 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3

Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

Classification	Justification
Flam. Liq. 3, H226	On basis of test data
Skin Irrit. 2, H315	Calculation method
Skin Sens. 1, H317	Calculation method
Eye Irrit. 2, H319	Calculation method
Acute Tox. 4 (Inhalation), H332	Calculation method
Resp. Sens. 1, H334	Calculation method
STOT RE 2, H373	Calculation method

Notice to reader

The information contained in this safety data sheet is based on the present state of knowledge and EU and national legislation. It provides guidance on health, safety and environmental aspects for handling the product in a safe way and should not be construed as any guarantee of the technical preformance or suitability for particular applications. It is always the duty of the user/employer to ascertain that the work is planned and carried out in accordance with the national regulations.

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xylene, mixture of isomers

Annex: Exposure scenario 1

SECTION 1: Title section

Short title of the exposure scenario *Formulation & (re)packing of substances and mixtures (Industrial)*
Sector of Use *SU3 Industrial uses: Uses of substances as such or in preparations at industrial sites*
Process category
PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4 Chemical production where opportunity for exposure arises
PROC5 Mixing or blending in batch processes
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC14 Tabletting, compression, extrusion, pelletisation, granulation
PROC15 Use as laboratory reagent
Environmental release category *ERC2 Formulation into mixture*

Description of the activities / processes covered in the Exposure Scenario

Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.

SECTION 2: Conditions of use affecting exposure

The usual precautionary measures should be adhered to in handling the chemicals.
Duration and frequency *8hrs (full working shift).*
Worker
Frequency of use:
5 workdays/week.
Physical parameters
Physical state
Fluid
Vapour pressure: 0.5-10 kPa (20 °C)
Concentration of the substance in the mixture *Covers use of substance / product up to 100%*
Used amount per time or activity
Regional use tonnage (tonnes/year): 15000, SU3
Annual site tonnage (tonnes/year): 3750, SU3
Maximum daily site tonnage (kg/day): 12500, SU3
Other operational conditions
Emission days / year: 300
Assumes use at not more than 20°C above ambient temperature (unless stated differently).
Assumes a good basic standard of occupational hygiene is implemented.
Other operational conditions affecting environmental exposure
Local freshwater dilution factor: 10
Local marine water dilution factor: 100
Release fraction to air from process (initial release prior to RMM) / wide dispersive use (regional only): 1 %.
Release fraction to wastewater from process (initial release prior to RMM) / wide dispersive use: 0.2 %.
Release fraction to soil from process (initial release prior to RMM) / wide dispersive use (regional only): 0.01 %.

Other operational conditions affecting worker exposure
Clean working place and equipment every day. Avoid splashing. Remove spilled product immediately.
Keep container tightly closed in a cool place.
Avoid contact with the skin and eyes.
Other operational conditions affecting consumer exposure during the use of the product
Not applicable.
Risk management measures *Ensure that personal protective measures are used at all activities.*
Worker protection
Storage (PROC1 / PROC2):
Store substance within a closed system.
General exposures / Use (closed systems) PROC1 / PROC2 / PROC3:
Laboratory activities (PROC15):
No other specific measures identified.
Batch processes at elevated temperatures. Operation is carried out at elevated temperature (> 20°C above ambient temperature) PROC3:
Store / Handle product in closed systems.
Provide extract ventilation to points where emissions (can) occur.
Preparation of material for application. Use in contained batch (PROC3):
General exposures / Use (open systems) PROC4:
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Process sampling (PROC3):
Provide a good standard of general ventilation.
Avoid carrying out activities involving exposure for more than 1 hour(s).
Mixing operations (open systems) PROC5:
Material transfers Drum/Batch transfer (Non-dedicated facility) PROC8a:
Material transfers Drum/batch transfers (Non-dedicated facility) PROC8b:
Material transfers Drum/batch transfers (dedicated facility) PROC8b:
Filling of drums and small containers (PROC 9):
Production or preparation or articles by tabletting, compression, extrusion or pelletisation (PROC14):
Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour).
Bulk transfers (closed systems) PROC8b:
Ensure that material transfer is avoided or provide extract ventilation. Use local exhaustion at places where emission can occur.
Equipment cleaning and maintenance (PROC 8a, 8b):
Drain or remove substance from equipment prior to break-in or maintenance.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.
Organisational protective measures
Ensure good ventilation. This can be achieved by using a local exhaustion or general exhaust system. If these measures are insufficient to keep the solvent vapour concentration below the workplace limit, wear an adequate respiratory protective device.
The employer must ensure that the necessary personal protective devices are available and applied accordingly to the instructions.
Technical protective measures
Provide explosion-proof electrical equipment.
Ensure that suitable extractors are available on processing machines
Personal protective measures
Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
Do not inhale gases / fumes / aerosols.
Safety glasses
Measures for consumer protection *Not relevant for this Exposure Scenario.*
Environmental protection measures
Air
Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation.
Treat air emission to provide a typical removal efficiency of (%): 0

Water
Sludge treatment: Incineration or in a landfill
Prevent discharge of undissolved substance to or recover from onsite wastewater.
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 93.6
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/day): 6.31
Assumed domestic sewage treatment plant flow (m3/d): 2000
Soil *Use bunds or dykes around storage facilities to prevent soil and water pollution in the event of a spill.*
Disposal measures
External treatment and disposal of waste should comply with applicable local and/or national regulations.
External recovery and recycling of waste should comply with applicable local and/or national regulations.
Waste type *Partially emptied and uncleaned packaging*
Notes *Disposal must be made according to official regulations.*

SECTION 3: Exposure estimation
Worker (oral) *No significant oral exposure.*
Worker (dermal)
PROC 1 / 3 / 15:
Exposure estimate: 0.34 mg/kg/day
RCR: 0
PROC 2:
Exposure estimate: 1.37 mg/kg/day
RCR: 0.01
PROC 4 / 8b / 9:
Exposure estimate: 6.86 mg/kg/day
RCR: 0.04
PROC 5 / 8a:
Exposure estimate: 13.71 mg/kg/day
RCR: 0.04
PROC 14:
Exposure estimate: 3.43 mg/kg/day
RCR: 0.02
Worker (inhalation)
PROC 1:
Exposure estimate: 0.01 ppm
RCR: 0
PROC 2 / 15:
Exposure estimate: 10 ppm
RCR: 0.56
PROC 3:
Exposure estimate: 17.5 ppm
RCR: 0.99
PROC 4:
Exposure estimate: 14 ppm
RCR: 0.79
PROC 5 / 8a / 8b / 9 / 14:
Exposure estimate: 15 ppm
RCR: 0.85
Environment *The calculated value is smaller than the PNEC.*
Consumer *Not relevant for this Exposure Scenario.*

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SECTION 4: Guidance for downstream users

The exposure estimation was carried out in accordance with ECETOC TRA.
Version 3. http://www.ecetoc.org/tra
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/ Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/ Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Annex: Exposure scenario 2

SECTION 1: Title section

Short title of the exposure scenario *Uses in Coatings - Industrial*
Sector of Use *SU3 Industrial uses: Uses of substances as such or in preparations at industrial sites*
Process category
PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4 Chemical production where opportunity for exposure arises
PROC5 Mixing or blending in batch processes
PROC7 Industrial spraying
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC10 Roller application or brushing
PROC13 Treatment of articles by dipping and pouring
PROC14 Tabletting, compression, extrusion, pelletisation, granulation
PROC15 Use as laboratory reagent
Environmental release category
ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
Description of the activities / processes covered in the Exposure Scenario
Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, spreader, dip, flow, fluidised bed on production lines and film formation) and equipment cleaning, maintenance and associated laboratory activities.

SECTION 2: Conditions of use affecting exposure

The usual precautionary measures should be adhered to in handling the chemicals.
Duration and frequency *8hrs (full working shift).*
Worker
Frequency of use:
5 workdays/week.
Physical parameters
Physical state
Fluid
Vapour pressure: 0.5-10 kPa (20 °C)
Concentration of the substance in the mixture *Covers use of substance / product up to 100%*
Used amount per time or activity
Regional use tonnage (tonnes/year): 5000, SU3
Annual site tonnage (tonnes/year): 5000, SU3
Maximum daily site tonnage (kg/day): 17000, SU3
Other operational conditions
Continuous release.
Emissiondays /year: 300
Assumes use at not more than 20°C above ambient temperature (unless stated differently).
Assumes a good basic standard of occupational hygiene is implemented.
Other operational conditions affecting environmental exposure
Local freshwater dilution factor: 10
Local marine water dilution factor: 100
Release fraction to air from process (initial release prior to RMM) / wide dispersive use (regional only): 98 %.

Release fraction to wastewater from process (initial release prior to RMM) / wide dispersive use: 0.7 %.
Release fraction to soil from process (initial release prior to RMM) / wide dispersive use (regional only): 0 %.

Other operational conditions affecting worker exposure
Clean working place and equipment every day. Avoid splashing. Remove spilled product immediately.
Keep container tightly closed in a cool place.
Avoid contact with the skin and eyes.

Other operational conditions affecting consumer exposure during the use of the product
Not applicable.

Risk management measures
Ensure that personal protective measures are used at all activities.
Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.

Worker protection
Storage (PROC1 / PROC2):
Store substance within a closed system.
General exposures / Use (closed systems) PROC1 / PROC2 / PROC3:
Laboratory activities (PROC15):
No other specific measures identified.
Film formation - force drying, stoving and other technologies (closed systems).
Operation is carried out at elevated temperature (> 20°C above ambient temperature) PROC2:
Store / Handle product in closed systems.
Provide extract ventilation to points where emissions (can) occur.
*Mixing operations (closed systems) PROC**:***
Film formation - air drying (PROC4):
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Preparation of material for application (PROC5):
Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).
Avoid manual contact with wet work pieces.
Transfer from/pouring from containers (PROC8a,8b,9):
Apply by Rolling or Brushing (PROC10):
Treatment by dipping and pouring (PROC13):
Production or preparation or articles by tabletting, compression, extrusion or pelletisation (PROC14):
Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour).
Material transfers Drum/Batch transfer (Non-dedicated facility) PROC8a:
Material transfers Drum/batch transfers (Non-dedicated facility) PROC8b:
Material transfers Drum/batch transfers (dedicated facility) PROC8b:
Ensure that material transfer is avoided or provide extract ventilation.
Spraying (automatic/robotic) PROC7:
Carry out in a vented booth or extracted enclosure.
Spraying (PROC 7 (manuell)):
Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour).
Wear a respirator conforming to EN140 with Type A filter or better.
Equipment cleaning and maintenance (Non-dedicated facility) PROC 8a:
Drain or remove substance from equipment prior to break-in or maintenance.

Organisational protective measures
Ensure good ventilation. This can be achieved by using a local exhaustion or general exhaust system. If these measures are insufficient to keep the solvent vapour concentration below the workplace limit, wear an adequate respiratory protective device.
The employer must ensure that the necessary personal protective devices are available and applied accordingly to the instructions.

Technical protective measures
Provide explosion-proof electrical equipment.
Ensure that suitable extractors are available on processing machines

Personal protective measures
Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
Do not inhale gases / fumes / aerosols.
Safety glasses
Measures for consumer protection *Not relevant for this Exposure Scenario.*
Environmental protection measures
Air
Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation.
Treat air emission to provide a typical removal efficiency of (%): 90
Water
Sludge treatment: Incineration or in a landfill
Prevent discharge of undissolved substance to or recover from onsite wastewater.
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 93.6
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/day): 69000
Assumed domestic sewage treatment plant flow (m3/d): 2000
Soil *Use bunds or dykes around storage facilities to prevent soil and water pollution in the event of a spill.*
Notes *In case of unintended release of the product: See section 6 of the Safety Data Sheet.*
Disposal measures
External treatment and disposal of waste should comply with applicable local and/or national regulations.
External recovery and recycling of waste should comply with applicable local and/or national regulations.
Waste type *Partially emptied and uncleaned packaging*
Notes *Disposal must be made according to official regulations.*

SECTION 3: Exposure estimation
Worker (oral) *No significant oral exposure.*
Worker (dermal)
PROC 1 / 3 / 15:
Exposure estimate: 0.34 mg/kg/day
RCR: 0
PROC 2 / 8a:
Exposure estimate: 1.37 mg/kg/day
RCR: 0.01
PROC 4 / 13:
Exposure estimate: 13.71 mg/kg/day
RCR: 0.08
PROC 5:
Exposure estimate: 0.07 mg/kg/day
RCR: 0
PROC 7 (automatisch):
Exposure estimate: 2.14 mg/kg/day
RCR: 0.01
PROC 7 (manuell):
Exposure estimate: 42.86 mg/kg/day
RCR: 0.24
PROC 8a (Anlagenr.):
Exposure estimate: 0.69 mg/kg/day
RCR: 0
PROC 8b / 9:
Exposure estimate: 6.86 mg/kg/day
RCR: 0.04
PROC 10:
Exposure estimate: 27.43 mg/kg/day
RCR: 0.15

PROC 14:
Exposure estimate: 3.43 mg/kg/day
RCR: 0.02
Worker (inhalation)
PROC 1:
Exposure estimate: 0.01 ppm
RCR: 0
PROC 2 / 8a (Anlagenr.) / 15:
Exposure estimate: 10 ppm
RCR: 0.56
PROC 3:
Exposure estimate: 17.5 ppm
RCR: 0.99
PROC 4 / 5 / 9 / 13 / 14:
Exposure estimate: 15 ppm
RCR: 0.85
PROC 7 (automatisch):
Exposure estimate: 12.5 ppm
RCR: 0.71
PROC 7 (manuell):
Exposure estimate: 7.5 ppm
RCR: 0.42
PROC 8a / 10:
Exposure estimate: 5 ppm
RCR: 0.28
PROC 8b:
Exposure estimate: 1.5 ppm
RCR: 0.08
Environment *The calculated value is smaller than the PNEC.*
Consumer *Not relevant for this Exposure Scenario.*

SECTION 4: Guidance for downstream users
The exposure estimation was carried out in accordance with ECETOC TRA.
Version 3. http://www.ecetoc.org/tra
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/ Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/ Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Annex: Exposure scenario 3

SECTION 1: Title section
Short title of the exposure scenario *Uses in Coatings - Professional*
Sector of Use
SU22 Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process category
PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4 Chemical production where opportunity for exposure arises
PROC5 Mixing or blending in batch processes
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC10 Roller application or brushing
PROC11 Non industrial spraying
PROC13 Treatment of articles by dipping and pouring
PROC15 Use as laboratory reagent
PROC19 Manual activities involving hand contact
Environmental release category
ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8d Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
Description of the activities / processes covered in the Exposure Scenario
Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, spreader, dip, flow, fluidised bed on production lines and film formation) and equipment cleaning, maintenance and associated laboratory activities.

SECTION 2: Conditions of use affecting exposure
The usual precautionary measures should be adhered to in handling the chemicals.
Duration and frequency *8hrs (full working shift).*
Worker
Frequency of use:
5 workdays/week.
Physical parameters
Physical state
Fluid
Vapour pressure: 0.5-10 kPa (20 °C)
Concentration of the substance in the mixture
Covers use of substance / product up to 100% (unless stated otherwise).
Used amount per time or activity
Regional use tonnage (tonnes/year): 5000, SU22
Annual site tonnage (tonnes/year): 10, SU22
Maximum daily site tonnage (kg/day): 27.4, SU22
Other operational conditions
Continuous release.
Emissiondays /year: 365
Assumes use at not more than 20°C above ambient temperature (unless stated differently).
Assumes a good basic standard of occupational hygiene is implemented.
Other operational conditions affecting environmental exposure
Local freshwater dilution factor: 10
Local marine water dilution factor: 100
Release fraction to air from process (initial release prior to RMM) / wide dispersive use (regional only): 98

%.
Release fraction to wastewater from process (initial release prior to RMM) / wide dispersive use: 1 %.
Release fraction to soil from process (initial release prior to RMM) / wide dispersive use (regional only): 1 %.
Other operational conditions affecting worker exposure
Clean working place and equipment every day. Avoid splashing. Remove spilled product immediately.
Keep container tightly closed in a cool place.
Avoid contact with the skin and eyes.
Other operational conditions affecting consumer exposure during the use of the product
Not applicable.
Risk management measures
Ensure that personal protective measures are used at all activities.
Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.
Worker protection
Storage (PROC1 / PROC2):
Store substance within a closed system.
General exposures / Use (closed systems) PROC1 / PROC2 / PROC3:
Filling / preparation of equipment from drums or containers (Use in closed systems) PROC2:
Ensure material transfers are under containment or extract ventilation.
Preparation of material for application. Use in contained batch (PROC3):
Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).
Use drum pumps or carefully pour from container.
Film formation - air drying Indoor (PROC4):
Provide a good standard of general ventilation.
Provide extract ventilation to points where emissions (can) occur.
Avoid manual contact with wet work pieces.
Film formation - air drying Outdoors (PROC 4):
Ensure operation is undertaken outdoors. Avoid manual contact with wet work pieces. Clear spills immediately.
Avoid carrying out activities involving exposure for more than 1 hour(s).
Preparation of material for application Indoor PROC 5:
Provide a good standard of general ventilation (10 to 15 air changes per hour).
Controlled ventilation means air is supplied or removed by a powered fan.
Avoid carrying out activities involving exposure for more than 1 hour(s).
Preparation of material for application Outdoor (PROC 5):
Ensure operation is undertaken outdoors.
Avoid carrying out activities involving exposure for more than 1 hour(s).
Material transfers Drum/Batch transfer (Non-dedicated facility) PROC8a:
Material transfers Drum/batch transfers (Non-dedicated facility) PROC8b:
Material transfers Drum/batch transfers (dedicated facility) PROC8b:
Transfer via enclosed lines.
Clear transfer lines prior to de-coupling.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Equipment cleaning and maintenance (Non-dedicated facility) PROC 8a:
Drain down system prior to equipment break-in or maintenance.
Avoid carrying out activities involving exposure for more than 4 hour(s).
Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour).
Roller, spreader, flow application Indoor (PROC 10):
Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour).
Wear a respirator conforming to EN140 with Type A filter or better.
Roller, spreader, flow application Outdoor (PROC 10):
Dipping, immersion and pouring Outdoor (PROC 13):
Ensure Operation is undertaken outdoors. Wear a respirator conforming to EN140 with Type A filter or better. Automate activity where possible.
Spraying Manual (PROC 11):
Carry out in a vented booth or extracted enclosure.

Spraying (PROC 11, außen):
Ensure operation is undertaken outdoors.
Avoid carrying out activities involving exposure for more than 4 hour(s).
Wear a respirator conforming to EN140 with Type A filter or better.
Dipping, immersion and pouring Indoor (PROC 13):
Use local exhaustion at places where emission can occur.
Avoid carrying out activities involving exposure for more than 4 hour(s).
Laboratory activities (PROC15):
Handle substance within a predominantly closed system provided with extract ventilation.
Hand application - fingerpaints, pastels, adhesives PROC19 Indoor:
Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour).
Limit the substance content in the product to 5%.
Hand application - fingerpaints, pastels, adhesives PROC19 Outdoor:
Ensure operation is undertaken outdoors.
Limit the substance content in the product to 5%.
Avoid carrying out activities involving exposure for more than 4 hour(s).
Organisational protective measures
Ensure good ventilation. This can be achieved by using a local exhaustion or general exhaust system. If these measures are insufficient to keep the solvent vapour concentration below the workplace limit, wear an adequate respiratory protective device.
The employer must ensure that the necessary personal protective devices are available and applied accordingly to the instructions.
Technical protective measures
Provide explosion-proof electrical equipment.
Ensure that suitable extractors are available on processing machines
Personal protective measures
Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
Do not inhale gases / fumes / aerosols.
Safety glasses
Measures for consumer protection *Not relevant for this Exposure Scenario.*
Environmental protection measures
Air
Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation.
Treat air emission to provide a typical removal efficiency of (%): 0
Water
Sludge treatment: Incineration or in a landfill
Prevent discharge of undissolved substance to or recover from onsite wastewater.
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 93.6
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/day): 4600
Assumed domestic sewage treatment plant flow (m3/d): 2000
Soil *Use bunds or dykes around storage facilities to prevent soil and water pollution in the event of a spill.*
Disposal measures
External treatment and disposal of waste should comply with applicable local and/or national regulations.
External recovery and recycling of waste should comply with applicable local and/or national regulations.
Waste type *Partially emptied and uncleaned packaging*
Notes *Disposal must be made according to official regulations.*
SECTION 3: Exposure estimation
Worker (oral) *No significant oral exposure.*
Worker (dermal)
PROC 1:
Exposure estimate: 0.34 mg/kg/day
RCR: 0

PROC 2:
Exposure estimate: 0.14 mg/kg/day
RCR: 0
PROC 3 / 15:
Exposure estimate: 0.03 mg/kg/day
RCR: 0
PROC 4 (innen) / 8b:
Exposure estimate: 6.86 mg/kg/day
RCR: 0.04
PROC 4 (außen):
Exposure estimate: 1.37 mg/kg/day
RCR: 0.01
PROC 5 / 8a:
Exposure estimate: 13.71 mg/kg/day
RCR: 0.08
PROC 10:
Exposure estimate: 27.43 mg/kg/day
RCR: 0.15
PROC 11 (innen):
Exposure estimate: 2.14 mg/kg/day
RCR: 0.01
PROC 11 (außen):
Exposure estimate: 21.43 mg/kg/day
RCR: 0.12
PROC 13:
Exposure estimate: 0.69 mg/kg/day
RCR: 0
PROC 19:
Exposure estimate: 28.29 mg/kg/day
RCR: 0.16
Worker (inhalation)
PROC 1:
Exposure estimate: 0.1 ppm
RCR: 0.01
PROC 2:
Exposure estimate: 4 ppm
RCR: 0.23
PROC 3:
Exposure estimate: 7.5 ppm
RCR: 0.42
PROC 4 (innen):
Exposure estimate: 3.5 ppm
RCR: 0.2
PROC 4 + 10 + 13 (jew. außen):
Exposure estimate: 7 ppm
RCR: 0.39
PROC 5 (innen) / 19 (innen):
Exposure estimate: 6 ppm
RCR: 0.34
PROC 5 (außen) / 8a:
Exposure estimate: 14 ppm
RCR: 0.79
PROC 8b:
Exposure estimate: 15 ppm
RCR: 0.85
PROC 10 (innen):
Exposure estimate: 3 ppm
RCR: 0.17

PROC 11 (innen):
Exposure estimate: 5 ppm
RCR: 0.28
PROC 11 (außen):
Exposure estimate: 10.5 ppm
RCR: 0.59
PROC 13 (innen):
Exposure estimate: 12 ppm
RCR: 0.68
PROC 15:
Exposure estimate: 0.6 ppm
RCR: 0.03
PROC 19 (außen):
Exposure estimate: 8.4 ppm
RCR: 0.47
Environment *The calculated value is smaller than the PNEC.*
Consumer *Not relevant for this Exposure Scenario.*

SECTION 4: Guidance for downstream users
The exposure estimation was carried out in accordance with ECETOC TRA.
Version 3. http://www.ecetoc.org/tra
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/ Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/ Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

diphenylmethane-diisocyanate, isomers, homologues, etc.; diphenylmethane-4,4'-diisocyanate

Annex: Exposure scenario 1

1. Short title of Exposure Scenario: - Industrial use for rigid foam, coatings and adhesives and sealants

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Process category	:	**PROC1:** Use in closed process, no likelihood of exposure **PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC4:** Use in batch and other process (synthesis) where opportunity for exposure arises **PROC5:** Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) **PROC7:** Industrial spraying **PROC8a:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **PROC9:** Transfer of substance or preparation into small containers (dedicated filling line, including weighing) **PROC10:** Roller application or brushing **PROC13:** Treatment of articles by dipping and pouring **PROC14:** Production of preparations or articles by tabletting, compression, extrusion, pelletisation **PROC15:** Use as laboratory reagent
Environmental release category	:	**ERC2:** Formulation of preparations **ERC3:** Formulation in materials **ERC5:** Industrial use resulting in inclusion into or onto a matrix **ERC6c:** Industrial use of monomers for manufacture of thermoplastics
Further information	:	Only the uses defined in the short title and the use descriptors listed above are regarded as safe/covered within this Exposure Scenario. In case of mixtures the other chapters may also contain additional information about further uses that are not safe/covered within this scenario.

2.1 Contributing scenario controlling worker exposure for:
PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC21
[MDI]
- Industrial use for rigid foam, coatings and adhesives and sealants

Product characteristics

Concentration of the Substance in Mixture/Article

Remarks	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid substance (unless stated differently) Substance is a unique structure, OR, Substance of unknown or variable composition, complex reaction products or biological material (UVCB)

Frequency and duration of use

Exposure duration	:	8 hours/day
Frequency of use	:	daily

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor/Outdoor use

Technical conditions and measures

These measures are for all contributing scenarios at product temperatures BELOW 40 °C for pure MDI or BELOW 45 °C for other MDI based substances:

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

These measures are for all contributing scenarios at product temperatures ABOVE 40 °C for pure MDI or ABOVE 45 °C for other MDI based substances:

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Provide extraction ventilation at points where emissions occur. Provide extract ventilation to material transfer points and other openings. Handle in a fume cupboard or under extract ventilation.

Additional measures are specific for the following contributing scenarios:

PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)

Provide extraction ventilation at points where emissions occur.

PROC7: Industrial spraying

Carry out in a vented booth provided with laminar airflow. Carry out in a vented booth or extracted enclosure. Minimise exposure by extracted full enclosure for the operation or equipment. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.

Conditions and measures related to personal protection, hygiene and health evaluation

These measures are for all contributing scenarios at product temperatures BELOW 40 °C for pure MDI or BELOW 45 °C for other MDI based substances:

Avoid all skin contact with product, clean up contamination/spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely, wash off any skin contamination immediately. Provide basic employee training to prevent / minimize exposures and to report any skin problems that may develop. Use suitable eye protection and gloves. Wear suitable coveralls to prevent exposure to the skin.

These measures are for all contributing scenarios at product temperatures ABOVE 40 °C for pure MDI or ABOVE 45 °C for other MDI based substances:

Avoid all skin contact with product, clean up contamination/spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely, wash off any skin contamination immediately. Provide basic employee training to prevent / minimize exposures and to report any skin problems that may develop. Use suitable eye protection and gloves. Wear suitable coveralls to prevent exposure to the skin. If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A filter or better. OR: Demonstrate, e.g. by workplace monitoring, that exposures are below the relevant worker DNEL values for acute and long-term.

Additional measures are specific for the following contributing scenarios:

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PROC7: Industrial spraying

If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A/P2 filter or better.

PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities: **solid**

Wear a respirator conforming to EN140 with Type A/P2 filter or better.

3. Exposure estimation and reference to its source

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterisation ratio (Exposure value/DNEL)
2.1 PROC 1	Measured value	LEV: Reflected in measured data	short term, inhalation	0,026 mg/m³	0,260
2.1 PROC 2	Measured value	LEV: Reflected in measured data	short term, inhalation	0,026 mg/m³	0,260
2.1 PROC 3	Measured value	LEV: Reflected in measured data	short term, inhalation	0,018 mg/m³	0,184
2.1 PROC 4	Measured value	LEV: Reflected in measured data	short term, inhalation	0,016 mg/m³	0,164
2.1 PROC 5	Measured value	LEV: Reflected in measured data	short term, inhalation	0,058 mg/m³	0,582
2.1 PROC 7 Hotmelt	Measured value	LEV: Reflected in measured data	short term, inhalation	0,022 mg/m³	0,224
2.1 PROC 7 Indoor Excluding hotmelt	Measured value	LEV: Reflected in measured data	short term, inhalation	0,020 mg/m³	0,204
2.1 PROC 8a	Measured value	LEV: Reflected in measured data	short term, inhalation	0,058 mg/m³	0,582
2.1 PROC 8b	Measured value	LEV: Reflected in measured data	short term, inhalation	0,058 mg/m³	0,582
2.1 PROC 9	Measured value	LEV: Reflected in measured data	short term, inhalation	0,009 mg/m³	0,094
2.1 PROC 10	Measured value	LEV: Reflected in measured data	short term, inhalation	0,034 mg/m³	0,344
2.1 PROC 13	Measured value	LEV: Reflected in measured data	short term, inhalation	0,034 mg/m³	0,344
2.1 PROC 14	Measured value	LEV: Reflected in measured data	short term, inhalation	0,012 mg/m³	0,116
2.1 PROC 15	Measured value	LEV: Reflected in measured data	short term, inhalation	0,011 mg/m³	0,112
2.1 PROC 21	Measured value	LEV: Reflected in measured data	short term, inhalation	0,013 mg/m³	0,128
2.1 All PROCs	Qualitative assessment		short term, dermal	*	
2.1 PROC 1	Measured value	LEV: Reflected in measured data	long term, inhalation	0,013 mg/m³	0,260
2.1 PROC 2	Measured value	LEV: Reflected in measured data	long term, inhalation	0,013 mg/m³	0,260
2.1 PROC 3	Measured value	LEV: Reflected in measured data	long term, inhalation	0,009 mg/m³	0,184
2.1 PROC 4	Measured value	LEV: Reflected in measured data	long term, inhalation	0,008 mg/m³	0,164
2.1 PROC 5	Measured value	LEV: Reflected in measured	long term,	0,029 mg/m³	0,582

*Due to the applied RMMs it is considered that the risks of dermal exposure are sufficiently controlled. Based on the applied RMMs the risk towards humans and the environment is sufficiently controlled (RCR ≤ 1).

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

		data	inhalation		
2.1 PROC 7 Hotmelt	Measured value	LEV: Reflected in measured data	long term, inhalation	0,011 mg/m³	0,224
2.1 PROC 7 Indoor Excluding hotmelt	Measured value	LEV: Reflected in measured data	long term, inhalation	0,010 mg/m³	0,204
2.1 PROC 8a	Measured value	LEV: Reflected in measured data	long term, inhalation	0,029 mg/m³	0,582
2.1 PROC 8b	Measured value	LEV: Reflected in measured data	long term, inhalation	0,029 mg/m³	0,582
2.1 PROC 9	Measured value	LEV: Reflected in measured data	long term, inhalation	0,005 mg/m³	0,094
2.1 PROC 10	Measured value	LEV: Reflected in measured data	long term, inhalation	0,017 mg/m³	0,344
2.1 PROC 13	Measured value	LEV: Reflected in measured data	long term, inhalation	0,017 mg/m³	0,344
2.1 PROC 14	Measured value	LEV: Reflected in measured data	long term, inhalation	0,006 mg/m³	0,116
2.1 PROC 15	Measured value	LEV: Reflected in measured data	long term, inhalation	0,006 mg/m³	0,112
2.1 PROC 21	Measured value	LEV: Reflected in measured data	long term, inhalation	0,006 mg/m³	0,112
2.1 All PROCs	Qualitative assessment		long term, dermal	*	

MDI

Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
Further information on the assumptions contained in this Exposure Scenario can be found at: www.ISOPA.org - "ISOPA interpretation on selection of Use Descriptors"

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Annex: Exposure scenario 2

1. Short title of Exposure Scenario: - Professional end use in rigid foam, coatings, adhesives and sealants and other composite material

Main User Groups	:	**SU 22:** Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Sector of use	:	**SU 22:** Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process category	:	**PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC4:** Use in batch and other process (synthesis) where opportunity for exposure arises **PROC5:** Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) **PROC8a:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **PROC10:** Roller application or brushing **PROC11:** Non industrial spraying **PROC13:** Treatment of articles by dipping and pouring **PROC14:** Production of preparations or articles by tabletting, compression, extrusion, pelletisation **PROC15:** Use as laboratory reagent
Environmental release category	:	**ERC8c:** Wide dispersive indoor use resulting in inclusion into or onto a matrix **ERC8f:** Wide dispersive outdoor use resulting in inclusion into or onto a matrix
Further information	:	Only the uses defined in the short title and the use descriptors listed above are regarded as safe/covered within this Exposure Scenario. In case of mixtures the other chapters may also contain additional information about further uses that are not safe/covered within this scenario.

2.1 Contributing scenario controlling worker exposure for:
PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC14, PROC15, PROC21
[MDI]
- Professional end use in rigid foam, coatings, adhesives and sealants and other composite material

Product characteristics

Concentration of the Substance in Mixture/Article

Remarks	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid substance (unless stated differently) Substance is a unique structure, OR, Substance of unknown or variable composition, complex reaction products or biological material (UVCB)

Frequency and duration of use

Frequency of use : daily

General exposures	:	8 hours/day
PROC 11	:	< 4 hours/day
Remarks	:	Indoor

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor/Outdoor use

Technical conditions and measures

These measures are for all contributing scenarios at product temperatures BELOW 40 °C for pure MDI or BELOW 45 °C for other MDI based substances:

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

These measures are for all contributing scenarios at product temperatures ABOVE 40 °C for pure MDI or ABOVE 45 °C for other MDI based substances:

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Provide extraction ventilation at points where emissions occur. Provide extract ventilation to material transfer points and other openings. Handle in a fume cupboard or under extract ventilation.

Additional measures are specific for the following contributing scenarios:

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises: **Close to the former line, Composite Material Based on Wood/Man-made/Mineral/Natural Fibres**

Provide extract ventilation to material transfer points and other openings.

PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact): **Adhesives and sealings and other composite material**

Provide extraction ventilation at points where emissions occur.

PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation

Provide extraction ventilation at points where emissions occur.

PROC21: Low energy manipulation of substances bound in materials and/ or articles

Provide extraction ventilation at points where emissions occur.

Conditions and measures related to personal protection, hygiene and health evaluation

These measures are for all contributing scenarios at product temperatures BELOW 40 °C for pure MDI or BELOW 45 °C for other MDI based substances:

Avoid all skin contact with product, clean up contamination/spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely, wash off any skin contamination immediately. Provide basic employee training to prevent / minimize exposures and to report any skin problems that may develop. Use suitable eye protection and gloves. Wear suitable coveralls to prevent exposure to the skin.

These measures are for all contributing scenarios at product temperatures ABOVE 40 °C for pure MDI or ABOVE 45 °C for other MDI based substances:

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Avoid all skin contact with product, clean up contamination/spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely, wash off any skin contamination immediately. Provide basic employee training to prevent / minimize exposures and to report any skin problems that may develop. Use suitable eye protection and gloves. Wear suitable coveralls to prevent exposure to the skin. If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A filter or better. OR: Demonstrate, e.g. by workplace monitoring, that exposures are below the relevant worker DNEL values for acute and long-term.

Additional measures are specific for the following contributing scenarios:

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises: **Close to the former line, Composite Material Based on Wood/Man-made/Mineral/Natural Fibres**

Wear a respirator conforming to EN140 with Type A/P2 filter or better.

PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities: **solid**

Wear a respirator conforming to EN140 with Type A/P2 filter or better.

PROC11: Non industrial spraying

Wear a full face respirator conforming to EN136 with Type A/P2 filter or better. Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.

3. Exposure estimation and reference to its source

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterisation ratio (Exposure value/DNEL)
2.1 PROC 2	Measured value	LEV: Reflected in measured data	short term, inhalation	0,026 mg/m³	0,260
2.1 PROC 3	Measured value	LEV: Reflected in measured data	short term, inhalation	0,018 mg/m³	0,184
2.1 PROC 3 Composite Material Based on Wood/Man-made/Mineral/Natural Fibres	Measured value	LEV: Reflected in measured data	short term, inhalation	0,004 mg/m³	0,038
2.1 PROC 4	Measured value	LEV: Reflected in measured data	short term, inhalation	0,012 mg/m³	0,116
2.1 PROC 4 Composite Material Based on Wood/Man-made/Mineral/Natural Fibres	Measured value	LEV: Reflected in measured data	short term, inhalation	0,023 mg/m³	0,227
2.1 PROC 5	Measured value	LEV: Reflected in measured data	short term, inhalation	0,058 mg/m³	0,582
2.1 PROC 5	Measured value	LEV: Reflected in measured	short term,	0,025 mg/m³	0,246

Closed system		data	inhalation		
2.1 PROC 8a	Measured value	LEV: Reflected in measured data	short term, inhalation	0,058 mg/m³	0,582
2.1 PROC 8b	Measured value	LEV: Reflected in measured data	short term, inhalation	0,058 mg/m³	0,582
2.1 PROC 8b Composite Material Based on Wood/Man-made/Mineral/Natural Fibres	Measured value	LEV: Reflected in measured data	short term, inhalation	0,003 mg/m³	0,034
2.1 PROC 10	Measured value	LEV: Reflected in measured data	short term, inhalation	0,034 mg/m³	0,328
2.1 PROC 11 Indoor	Measured value	LEV: Reflected in measured data	short term, inhalation	0,08 mg/m³	0,80
2.1 PROC 11 Outdoor	Measured value		short term, inhalation	0,087 mg/m³	0,87
2.1 PROC 13	Measured value	LEV: Reflected in measured data	short term, inhalation	0,034 mg/m³	0,344
2.1 PROC 14	Measured value	LEV: Reflected in measured data	short term, inhalation	0,012 mg/m³	0,116
2.1 PROC 15	Measured value	LEV: Reflected in measured data	short term, inhalation	0,011 mg/m³	0,112
2.1 PROC 21	Measured value	LEV: Reflected in measured data	short term, inhalation	0,001 mg/m³	0,008
2.1 All PROCs	Qualitative assessment		short term, dermal	*	
2.1 PROC 2	Measured value	LEV: Reflected in measured data	long term, inhalation	0,013 mg/m³	0,260
2.1 PROC 3	Measured value	LEV: Reflected in measured data	long term, inhalation	0,009 mg/m³	0,184
2.1 PROC 3 Composite Material Based on Wood/Man-made/Mineral/Natural Fibres	Measured value	LEV: Reflected in measured data	long term, inhalation	0,002 mg/m³	0,038
2.1 PROC 4	Measured value	LEV: Reflected in measured data	long term, inhalation	0,006 mg/m³	0,116
2.1 PROC 4 Composite Material Based on Wood/Man-made/Mineral/Natural Fibres	Measured value	LEV: Reflected in measured data	long term, inhalation	0,011 mg/m³	0,227
2.1 PROC 5	Measured value	LEV: Reflected in measured data	long term, inhalation	0,029 mg/m³	0,582
2.1 PROC 5 Closed system	Measured value	LEV: Reflected in measured data	long term, inhalation	0,012 mg/m³	0,246
2.1 PROC 8a	Measured value	LEV: Reflected in measured data	long term, inhalation	0,029 mg/m³	0,582
2.1 PROC 8b	Measured value	LEV: Reflected in measured data	long term, inhalation	0,029 mg/m³	0,582
2.1 PROC 8b Composite Material Based on Wood/Man-made/Mineral/Natural Fibres	Measured value	LEV: Reflected in measured data	long term, inhalation	0,002 mg/m³	0,034
2.1 PROC 10	Measured value	LEV: Reflected in measured data	long term, inhalation	0,017 mg/m³	0,328
2.1 PROC 11 Indoor	Measured value	LEV: Reflected in measured data	long term, inhalation	0,04 mg/m³	0,80
2.1 PROC 11 Outdoor	Measured value		long term, inhalation	0,043 mg/m³	0,87
2.1 PROC 13	Measured value	LEV: Reflected in measured data	long term, inhalation	0,017 mg/m³	0,344

2.1 PROC 14	Measured value	LEV: Reflected in measured data	long term, inhalation	0,006 mg/m³	0,116
2.1 PROC 15	Measured value	LEV: Reflected in measured data	long term, inhalation	0,006 mg/m³	0,112
2.1 PROC 21	Measured value	LEV: Reflected in measured data	long term, inhalation	0,0004 mg/m³	0,008

*Due to the applied RMMs it is considered that the risks of dermal exposure are sufficiently controlled. Based on the applied RMMs the risk towards humans and the environment is sufficiently controlled (RCR ≤ 1).

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

MDI

Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
Further information on the assumptions contained in this Exposure Scenario can be found at:
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Annex: Exposure scenario 3

1. Short title of Exposure Scenario: - Consumer end use in rigid foam, coatings and adhesives and sealants (ES5)

Main User Groups	:	**SU 21:** Consumer uses: Private households (= general public = consumers)
Sector of use	:	**SU 21:** Consumer uses: Private households (= general public = consumers)
Product category	:	**PC1:** Adhesives, sealants **PC9a:** Coatings and paints, thinners, paint removers **PC32:** Polymer preparations and compounds
Environmental release category	:	**ERC8c:** Wide dispersive indoor use resulting in inclusion into or onto a matrix **ERC8f:** Wide dispersive outdoor use resulting in inclusion into or onto a matrix
Further information	:	Only the uses defined in the short title and the use descriptors listed above are regarded as safe/covered within this Exposure Scenario. In case of mixtures the other chapters may also contain additional information about further uses that are not safe/covered within this scenario.

2.1 Contributing scenario controlling consumer exposure for:
PC1, PC9a, PC32

[MDI]
- Consumer end use in rigid foam, coatings and adhesives and sealants

Product characteristics

Physical Form (at time of use)	:	Liquid substance (unless stated differently)
Physical Form (at time of use)	:	Substance is a unique structure, OR, Substance of unknown or variable composition, complex reaction products or biological material (UVCB)

PC1: Adhesives and sealants: Sealant : joint	75 g//activity
Remarks	Substance concentration 2%
PC1: Adhesives and sealants: Sealant: assembly	390 g/activity
Remarks	Substance concentration 2%
PC1: Adhesives and sealants : Adhesive hotmelt	65 g/activity
PC9a: Coatings, paints: Use of 2-component paint, high solids	150g/activity
Remarks	Substance concentration 30%
PC9a: Coatings, paints: Use of 2-component paint, solvent rich	195 g/activity
Remarks	Substance concentration 30%
PC9a: Coatings, paints: Mixing and loading of 2-component solvent rich paint	150 g/activity
Remarks	Substance concentration 100%

PC9a: Coatings, paints: Mixing and loading of 2-component high solid paint	195 g/activity
Remarks	Substance concentration 100%
PC9a: Coatings, paints: Floor coating: high solid	3000 g/activity
Remarks	Substance concentration 10%
PC32: Rigids, insulation foams	825 g/activity

Frequency and duration of use

PC1: Adhesives and sealants: Sealant joint	45 min.
PC1: Adhesives and sealants: Sealant assembly	4 h
PC1: Adhesives and sealants: Adhesive hotmelt	0,5 h
PC9a: Coatings, paints: Use of 2-component paint, high solids	2h
PC9a: Coatings, paints: Use of 2-component paint, solvent rich	5 min.
PC9a: Coatings, paints: Mixing and loading of 2-component solvent rich paint	5 min.
PC9a: Coatings, paints: Mixing and loading of 2-component high solid paint	1 h
PC9a: Coatings, paints: Floor coating high solid	
PC32: Rigids, insulation foams	0,5 h

Human factors not influenced by risk management

Exposed skin area

PC1: Adhesives and sealants: Sealant Joint	2 cm²
PC1: Adhesives and sealants: Sealant assembly	43 cm²
PC1: Adhesives and sealants: Adhesive hotmelt	43 cm²

Substance concentration :

PC1: Adhesives and sealants: Sealant Joint	30%

Other given operational conditions affecting consumers exposure

Outdoor / Indoor:	Indoor/Outdoor use

Room size

PC1: Adhesives and sealants: Sealant joint	10 m³
PC1: Adhesives and sealants: Sealant assembly	20 m³
PC1: Adhesives and sealants: Adhesive hotmelt	20 m³
PC9a: Coatings, paints: Use of 2-component paint, high solids	20 m³
PC9a: Coatings, paints: Use of 2-component paint, solvent rich	20 m³
PC9a: Coatings, paints: Floor coating high solid	34 m³
PC32: Rigids, insulation foams	57,5 m³

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Application Route	:	General advice
Consumer Measures	:	Avoid using without gloves.
Application Route	:	PC9a: Coatings, paints: Use of 2-component paint, solvent rich
Consumer Measures	:	Recommend: Not using in small, enclosed areas/rooms without ventilation. Ensure good ventilation when using indoors e.g. open windows.
Application Route	:	PC9a: Coatings, paints: Use of 2-component paint, high solids
Consumer Measures	:	Recommend: Not using in small, enclosed areas/rooms without ventilation. Ensure good ventilation when using indoors e.g. open windows.
Application Route	:	PC9a: Coatings, paints: Floor coating high solid
Consumer Measures	:	Recommend: Not using in small, enclosed areas/rooms without ventilation. Ensure good ventilation when using indoors e.g. open windows.
Application Route	:	PC1: Adhesives and sealants: Sealant assembly
Consumer Measures	:	Recommend: Not using in small, enclosed areas/rooms without ventilation. Ensure good ventilation when using indoors e.g. open windows.

3. Exposure estimation and reference to its source

Consumers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterisation ratio (Exposure value/DNEL)
2.1 PC9a Use of 2-component paint, solvent rich	Consexpo		long term, inhalation	0,000822 mg/m³/day	0,03
2.1 PC9a Mixing and loading of 2-component solvent rich paint	Consexpo		long term, inhalation	0,000000192 mg/m³/day	< 0,01
2.1 PC9a Mixing and loading of 2-component high solid paint	Consexpo		long term, inhalation	0,000000192 mg/m³/day	< 0,01
2.1 PC9a Floor coating high solid	Consexpo		long term, inhalation	0,00193 mg/m³/day	0,06
2.1 PC32	Consexpo		long term, inhalation	0,0000254 mg/m³/day	0,01
2.1	Qualitative assessment		Dermal exposure		

Based on the applied RMMs the risk towards humans and the environment is sufficiently controlled (RCR ≤ 1).

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

MDI

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