

Safety Data Sheet according to Regulation (EU) No. 1907/2006

FOAM KIT/ Isocyanate (brown colour)

112000041178

Version 7.0

Revision Date 30.10.2018

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

1.1 Product identifier

FOAM KIT/ Isocyanate (brown colour)

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

Use:

Isocyanate for the production of polyurethanes.

For details of the identified uses according to REACH-Regulation (EU) No. 1907/2006 refer to the annex of this safety data sheet.

1.3 Details of the supplier of the safety data sheet

Covestro Deutschland AG
COV-CTO-HSEQ-PSRA-PSI
51365 Leverkusen

Tel.: +49 214 6009 4068
Email: ProductSafetyEMLA@covestro.com

1.4 Emergency telephone number

+49 214 30 99300 (Sicherheitszentrale Currenta)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Acute toxicity, Inhalative, Category 4 (H332)
Skin irritation, Category 2 (H315)
Eye irritation, Category 2 (H319)
Sensitization of the respiratory airways, Category 1 (H334)
Sensitization of the skin, Category 1 (H317)
Carcinogenicity, Category 2 (H351)
Specific target organ toxicity (single exposure), Category 3 (H335)
Specific target organ toxicity (repeated exposure), Category 2 (H373)

2.2 Label elements



Danger

Hazardous components which must be listed on the label

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers
aromatic isocyanate-prepolymer
diphenylmethane-4,4'-diisocyanate
Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene
Diphenylmethane-2,4'-diisocyanate
2,2'-Methylenediphenyl diisocyanate

Hazard statements:

H315 Causes skin irritation.

H317 May cause an allergic skin reaction.
 H319 Causes serious eye irritation.
 H332 Harmful if inhaled.
 H334 May cause allergy or asthma symptoms 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.

Precautionary statements:

P201 Obtain special instructions before use.
 P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
 P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
 P284 Wear respiratory protection.
 P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
 P308 + P313 IF exposed or concerned: Get medical advice/ attention.

2.3 Other hazards

In case of hypersensitivity of the respiratory tract (e.g. asthmatics and those who suffer from chronic bronchitis) it is inadvisable to work with the product.
 Symptoms affecting the respiratory tract can also occur several hours after overexposure.
 Dust, vapors and aerosols are the primary risk to the respiratory tract.

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.

SECTION 3: Composition/information on ingredients

Type of product: Mixture

3.2 Mixtures

Mixture based on diphenylmethane-diisocyanate, isomers and homologues

Hazardous components

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

Concentration [wt.-%]: ≥ 25 - < 50

EC-No.: 500-040-3

REACH Registration Number: 01-2119457013-49-0005, 01-2119457013-49-0006

CAS-No.: 25686-28-6

Classification (1272/2008/CE): Skin Irrit. 2 H315 Skin Sens. 1 H317 Eye Irrit. 2 H319 Acute Tox. 4

Inhalative H332 Resp. Sens. 1 H334 STOT SE 3 H335 Carc. 2 H351 STOT RE 2 H373

Specific threshold concentration:

Resp. Sens. 1	H334	$\geq 0,1 \%$
Eye Irrit. 2	H319	$\geq 5 \%$
Skin Irrit. 2	H315	$\geq 5 \%$
STOT SE 3	H335	$\geq 5 \%$

aromatic isocyanate-prepolymer

Concentration [wt.-%]: ≥ 20 - < 25

CAS-No.: 67423-05-6

Classification (1272/2008/CE): Acute Tox. 4 Inhalative H332 Skin Irrit. 2 H315 Eye Irrit. 2 H319 Resp.

Sens. 1 H334 Skin Sens. 1 H317 STOT SE 3 H335 STOT RE 2 Inhalative H373

diphenylmethane-4,4'-diisocyanate

Concentration [wt.-%]: ≥ 10 - < 20

Index-No.: 615-005-00-9

EC-No.: 202-966-0

REACH Registration Number: 01-2119457014-47-0006, 01-2119457014-47-0007, 01-2119457014-47-0008, 01-2119457014-47-0009, 01-2119457014-47-0031

CAS-No.: 101-68-8

Classification (1272/2008/CE): Acute Tox. 4 Inhalative H332 Skin Irrit. 2 H315 Eye Irrit. 2 H319 Resp.

Sens. 1 H334 Skin Sens. 1 H317 Carc. 2 H351 STOT SE 3 H335 STOT RE 2 Inhalative H373

Specific threshold concentration:

Eye Irrit. 2	H319	$\geq 5 \%$
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Skin Irrit. 2	H315	>= 5 %
Resp. Sens. 1	H334	>= 0,1 %
STOT SE 3	H335	>= 5 %

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

Concentration [wt.-%]: >= 10 - < 20

EC-No.: 500-079-6

REACH Registration Number: 01-2119457024-46-0006, 01-2119457024-46-0007

CAS-No.: 32055-14-4

Classification (1272/2008/CE): Acute Tox. 4 Inhalative H332 Skin Irrit. 2 H315 Eye Irrit. 2 H319 Resp. Sens. 1 H334 Skin Sens. 1 H317 Carc. 2 H351 STOT SE 3 H335 STOT RE 2 Inhalative H373

Specific threshold concentration:

Resp. Sens. 1	H334	>= 0,1 %
Eye Irrit. 2	H319	>= 5 %
Skin Irrit. 2	H315	>= 5 %
STOT SE 3	H335	>= 5 %

Diphenylmethane-2,4'-diisocyanate

Concentration [wt.-%]: >= 5 - < 10

Index-No.: 615-005-00-9

REACH Registration Number: 01-2119480143-45-0000, 01-2119480143-45-0001, 01-2119480143-45-0002

CAS-No.: 5873-54-1

Classification (1272/2008/CE): Acute Tox. 4 Inhalative H332 Skin Irrit. 2 H315 Eye Irrit. 2 H319 Resp. Sens. 1 H334 Skin Sens. 1 H317 Carc. 2 H351 STOT SE 3 H335 STOT RE 2 Inhalative H373

Specific threshold concentration:

Eye Irrit. 2	H319	>= 5 %
Skin Irrit. 2	H315	>= 5 %
Resp. Sens. 1	H334	>= 0,1 %
STOT SE 3	H335	>= 5 %

2,2'-Methylenediphenyl diisocyanate

Concentration [wt.-%]: >= 0,1 - < 0,3

Index-No.: 615-005-00-9

EC-No.: 219-799-4

REACH Registration Number: 01-2119927323-43-0000, 01-2119927323-43-0001

CAS-No.: 2536-05-2

Classification (1272/2008/CE): Acute Tox. 4 Inhalative H332 Skin Irrit. 2 H315 Eye Irrit. 2 H319 Resp. Sens. 1 H334 Skin Sens. 1 H317 Carc. 2 H351 STOT SE 3 H335 STOT RE 2 Inhalative H373

Specific threshold concentration:

Eye Irrit. 2	H319	>= 5 %
Skin Irrit. 2	H315	>= 5 %
Resp. Sens. 1	H334	>= 0,1 %
STOT SE 3	H335	>= 5 %

Candidate List of Substances of Very High Concern for Authorisation

This product contains no substances of very high concern in concentrations where an information obligation applies (REACH Regulation (EC) No. 1907/2006, Article 59).

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice: Soiled, soaked clothing and shoes must be immediately removed, decontaminated and disposed of.

If inhaled: Take the person into the fresh air and keep him warm, let him rest; if there is difficulty in breathing, medical advice is required.

In case of skin contact: In the event of contact with the skin, preferably wash with a cleanser based on polyethylene glycol or with plenty of warm water and soap. Consult a doctor in the event of a skin reaction.

In case of eye contact: Hold the eyes open and rinse with preferably lukewarm water for a sufficiently long period of time (at least 10 minutes). Contact an ophthalmologist.

If swallowed: DO NOT induce vomiting. Wash/clean mouth with water. Medical advice is required.

4.2 Most important symptoms and effects, both acute and delayed

Notes to physician: The product irritates the respiratory tract and may trigger sensitisation of the skin and respiratory tract. Treatment of acute irritation or bronchial constriction is primarily symptomatic. Extended medical treatment may be required depending on the degree of exposure and the severity of the symptoms.

4.3 Indication of any immediate medical attention and special treatment needed

Therapeutic measures: No information available.

SECTION 5: Firefighting measures**5.1 Extinguishing media**

Suitable extinguishing media: Carbon dioxide (CO₂), Foam, extinguishing powder, in cases of larger fires, water spray should be used.

Unsuitable extinguishing media: High volume water jet

5.2 Special hazards arising from the substance or mixture

Burning releases carbon monoxide, carbon dioxide, oxides of nitrogen, isocyanate vapors and traces of hydrogen cyanide. In the event of fire and/or explosion do not breathe fumes.

Fire in vicinity poses risk of pressure build-up and rupture. Containers at risk from fire should be cooled with water and, if possible, removed from the danger area.

5.3 Advice for fire-fighters

For firefighting, self-contained breathing apparatus is required, plus a gas-tight chemical hazmat suit. Firemen must wear self-contained breathing apparatus.

Do not allow contaminated extinguishing water to enter the soil, ground-water or surface waters.

SECTION 6: Accidental release measures**6.1 Personal precautions, protective equipment and emergency procedures**

Put on protective equipment (see section 8). Ensure adequate ventilation/exhaust extraction. Keep unauthorized persons away.

6.2 Environment related measures

Do not allow to escape into waterways, wastewater or soil.

6.3 Methods and material for containment and cleaning up

Remove mechanically; cover the remainder with wet, absorbent material (e.g. sawdust, chemical binder based on calcium silicate hydrate, sand). After approx. one hour transfer to waste container and do not seal (evolution of CO₂!). Keep damp in a safe ventilated area for several days.

Spill area can be decontaminated with the following recommended decontamination solution:

Decontamination solution 1: 8-10% sodium carbonate and 2% of liquid soap in water

Decontamination solution 2: Liquid/yellow soap (potassium soap with ~15% anionic tenside): 20ml;
Water: 700ml; Polyethylenglycol (PEG 400): 350ml

Decontamination solution 3: 30 % commercial laundry detergent containing monoethanolamine, 70 % water

6.4 Reference to other sections

For further disposal measures see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

General conditions of use are further specified in the annex according to REACH-Regulation (EU) No. 1907/2006.

Provide sufficient air exchange and/or exhaust in work rooms. The precautions required in the handling of isocyanates must be taken.

Solid products: Avoid formation and deposition of dust.

Contact with skin and eyes and inhalation of dust/vapor must be avoided.

In all workplaces or parts of the plant where high concentrations of isocyanate aerosols and/or vapors may be generated (e.g. during pressure release, mold venting or when cleaning mixing heads with an air blast), appropriately located exhaust ventilation must be provided in order to prevent occupational exposure limits from being exceeded. The air should be drawn away from the personnel handling the product. The efficiency of the exhaust equipment should be periodically checked. The threshold limit values noted in section 8 must be monitored.

The personal protective measures described in section 8 must be observed. Contact with skin and eyes and inhalation of vapors must be avoided under all circumstances.

Keep away from foodstuffs, drinks and tobacco. Wash hands before breaks and at end of work and use skin-protecting ointment. Keep working clothes separately. Take off all contaminated clothing immediately. Decontaminate, destroy and dispose of soiled protective clothing (see Section 13)

7.2 Conditions for safe storage, including any incompatibilities

Cleaning with Aprotic Polar Solvents (meeting the IUPAC definition) may lead to formation of (hazardous) primary aromatic amines (> 0,1 %). See section 11.

Keep container tightly closed and dry. Further information on the storage conditions which must be observed to preserve quality can be found in our product information sheet.

Storage class (TRGS 510) : 10: Combustible liquids

7.3 Specific end use(s)

For details of the identified uses according to REACH-Regulation (EU) No. 1907/2006 refer to the annex of this safety data sheet.

SECTION 8: Exposure controls/personal protection

Risk management measures are further specified in the annex according to REACH-Regulation (EU) No. 1907/2006.

Provide general ventilation.

Provide suitable exact ventilation.

Inspect and maintain equipment.

Hygiene measures:

Avoid skin and eye contact.

Wash off skin contamination immediately

Clear spills immediately

Provide hazard information and training to personnel

8.1 Control parameters

Components with workplace control parameters

Substance	CAS-No.	Basis	Type	Value	Ceiling Limit Value	Remarks
diphenylmethane-4,4'-diisocyanate	101-68-8	TRGS 900	STEL CL			Category I: substances for which the localized effect has an assigned OEL or for substances with a sensitizing effect in respiratory passages.
diphenylmethane-4,4'-diisocyanate	101-68-8	TRGS 900				Listed.
diphenylmethane-4,4'-diisocyanate	101-68-8	TRGS 900		0,05 mg/m3	=2=	Y
diphenylmethane-4,4'-diisocyanate	101-68-8	TRGS 900	STEL FAC		1	Substance listed with both Peak factor and STEL factor. The Peak factor is supplied with the AGW values.
diphenylmethane-4,4'-diisocyanate	101-68-8	TRGS 900				Dermal absorption possible
Diphenylmethane-2,4'-diisocyanate	5873-54-1	TRGS 900				Listed.
Diphenylmethane-2,4'-diisocyanate	5873-54-1	TRGS 900		0,05 mg/m3	=2=	
Diphenylmethane-2,4'-diisocyanate	5873-54-1	TRGS 900	STEL FAC		1	Substance listed with both Peak factor and STEL factor. The Peak factor is supplied with the AGW values.
Diphenylmethane-2,4'-diisocyanate	5873-54-1	TRGS 900	STEL CL			Category I: substances for which the localized effect has an assigned OEL or for substances with a sensitizing effect in respiratory passages.
diphenylmethane-diisocyanate, isomers and homologues	9016-87-9	TRGS 900				Listed., measured as MDI
diphenylmethane-diisocyanate, isomers and homologues	9016-87-9	TRGS 900		0,05 mg/m3	=2=	Y, measured as MDI
diphenylmethane-diisocyanate, isomers and homologues	9016-87-9	TRGS 900	STEL FAC		1	Substance listed with both Peak factor and STEL factor. The Peak factor is supplied with the AGW values., measured as MDI
diphenylmethane-diisocyanate, isomers and homologues	9016-87-9	TRGS 900				Dermal absorption possible, measured as MDI
diphenylmethane-diisocyanate, isomers and homologues	9016-87-9	TRGS 900	STEL CL			Category I: substances for which the localized effect has an assigned OEL or for substances with a sensitizing effect in respiratory passages., measured as MDI

The product may contain traces of phenylisocyanate.

Substance	CAS-No.	Basis	Type	Value	Ceiling Limit Value	Remarks
Phenyl isocyanate	103-71-9	TRGS 900				Listed.
Phenyl isocyanate	103-71-9	TRGS 900		0,01 ppm 0,05 mg/m3	1	

Phenyl isocyanate	103-71-9	TRGS 900	STEL CL		Category I: substances for which the localized effect has an assigned OEL or for substances with a sensitizing effect in respiratory passages.
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Derived No Effect Level (DNEL)**Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers**

Value type	Route of exposure	Health Effects	Value	Remarks
Workers	Inhalation	Long-term systemic effects		No hazard identified
Workers	Inhalation	Acute systemic effects		No hazard identified
Workers	Inhalation	Long-term local effects	0,05 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Workers	Inhalation	Acute local effects	0,1 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Workers	Dermal	Long-term systemic effects		No hazard identified
Workers	Dermal	Acute systemic effects		No hazard identified
Workers	Dermal	Long-term local effects		Medium hazard Most sensitive endpoint: Sensitisation (skin)
Workers	Dermal	Acute local effects		Medium hazard Most sensitive endpoint: Sensitisation (skin)
Workers	Eye contact	Local effects		Medium hazard
Consumers	Inhalation	Long-term systemic effects		No hazard identified
Consumers	Inhalation	Acute systemic effects		No hazard identified
Consumers	Inhalation	Long-term local effects	0,025 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Consumers	Inhalation	Acute local effects	0,05 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Consumers	Dermal	Long-term systemic effects		No hazard identified
Consumers	Dermal	Acute systemic effects		No hazard identified
Consumers	Dermal	Long-term local effects		Medium hazard Most sensitive endpoint: Sensitisation (skin)
Consumers	Dermal	Acute local effects		Medium hazard Most sensitive endpoint: Sensitisation (skin)
Consumers	Oral	Long-term systemic effects		No hazard identified
Consumers	Oral	Acute systemic effects		No hazard identified
Consumers	Eye contact	Local effects		Medium hazard

aromatic isocyanate-prepolymer

Value type	Route of exposure	Health Effects	Value	Remarks
				not required

diphenylmethane-4,4'-diisocyanate

Workers	Inhalation	Long-term systemic effects		No hazard identified
Workers	Inhalation	Acute systemic effects		No hazard identified
Workers	Inhalation	Long-term local effects	0,05 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Workers	Inhalation	Acute local effects	0,1 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Workers	Dermal	Long-term systemic effects		No hazard identified
Workers	Dermal	Acute systemic effects		No hazard identified
Workers	Dermal	Long-term local effects		Medium hazard Most sensitive endpoint: Sensitisation (skin)
Workers	Dermal	Acute local effects		Medium hazard Most sensitive endpoint: Sensitisation (skin)
Workers	Eye contact	Local effects		Medium hazard
Consumers	Inhalation	Long-term systemic effects		No hazard identified
Consumers	Inhalation	Acute systemic effects		No hazard identified
Consumers	Inhalation	Long-term local effects	0,025 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Consumers	Inhalation	Acute local effects	0,05 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Consumers	Dermal	Long-term systemic effects		No hazard identified
Consumers	Dermal	Acute systemic effects		No hazard identified
Consumers	Dermal	Long-term local effects		Medium hazard Most sensitive endpoint: Sensitisation (skin)
Consumers	Dermal	Acute local effects		Medium hazard Most sensitive endpoint: Sensitisation (skin)
Consumers	Oral	Long-term systemic effects		No hazard identified
Consumers	Oral	Acute systemic effects		No hazard identified
Consumers	Eye contact	Local effects		Medium hazard

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

Value type	Route of exposure	Health Effects	Value	Remarks
Workers	Inhalation	Long-term systemic effects		No hazard identified
Workers	Inhalation	Acute systemic effects		No hazard identified
Workers	Inhalation	Long-term local effects	0,05 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Workers	Inhalation	Acute local effects	0,1 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Workers	Dermal	Long-term systemic effects		No hazard identified
Workers	Dermal	Acute systemic effects		No hazard identified
Workers	Dermal	Long-term local		Medium hazard Most sensitive

		effects		endpoint: Sensitisation (skin)
Workers	Dermal	Acute local effects		Medium hazard Most sensitive endpoint: Sensitisation (skin)
Workers	Eye contact	Local effects		Medium hazard
Consumers	Inhalation	Long-term systemic effects		No hazard identified
Consumers	Inhalation	Acute systemic effects		No hazard identified
Consumers	Inhalation	Long-term local effects	0,025 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Consumers	Inhalation	Acute local effects	0,05 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Consumers	Dermal	Long-term systemic effects		No hazard identified
Consumers	Dermal	Acute systemic effects		No hazard identified
Consumers	Dermal	Long-term local effects		Medium hazard Most sensitive endpoint: Sensitisation (skin)
Consumers	Dermal	Acute local effects		Medium hazard Most sensitive endpoint: Sensitisation (skin)
Consumers	Oral	Long-term systemic effects		No hazard identified
Consumers	Oral	Acute systemic effects		No hazard identified
Consumers	Eye contact	Local effects		Medium hazard

Diphenylmethane-2,4'-diisocyanate

Value type	Route of exposure	Health Effects	Value	Remarks
Workers	Inhalation	Long-term systemic effects		No hazard identified
Workers	Inhalation	Acute systemic effects		No hazard identified
Workers	Inhalation	Long-term local effects	0,05 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Workers	Inhalation	Acute local effects	0,1 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Workers	Dermal	Long-term systemic effects		No hazard identified
Workers	Dermal	Acute systemic effects		No hazard identified
Workers	Dermal	Long-term local effects		Medium hazard Most sensitive endpoint: Sensitisation (skin)
Workers	Dermal	Acute local effects		Medium hazard Most sensitive endpoint: Sensitisation (skin)
Workers	Eye contact	Local effects		Medium hazard
Consumers	Inhalation	Long-term systemic effects		No hazard identified
Consumers	Inhalation	Acute systemic effects		No hazard identified
Consumers	Inhalation	Long-term local effects	0,025 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Consumers	Inhalation	Acute local effects	0,05 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)

Consumers	Dermal	Long-term systemic effects		No hazard identified
Consumers	Dermal	Acute systemic effects		No hazard identified
Consumers	Dermal	Long-term local effects		Medium hazard Most sensitive endpoint: Sensitisation (skin)
Consumers	Dermal	Acute local effects		Medium hazard Most sensitive endpoint: Sensitisation (skin)
Consumers	Oral	Long-term systemic effects		No hazard identified
Consumers	Oral	Acute systemic effects		No hazard identified
Consumers	Eye contact	Local effects		Medium hazard

2,2'-Methylenediphenyl diisocyanate

Value type	Route of exposure	Health Effects	Value	Remarks
Workers	Inhalation	Long-term systemic effects		No hazard identified
Workers	Inhalation	Acute systemic effects		No hazard identified
Workers	Inhalation	Long-term local effects	0,05 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Workers	Inhalation	Acute local effects	0,1 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Workers	Dermal	Long-term systemic effects		No hazard identified
Workers	Dermal	Acute systemic effects		No hazard identified
Workers	Dermal	Long-term local effects		Medium hazard Most sensitive endpoint: Sensitisation (skin)
Workers	Dermal	Acute local effects		Medium hazard Most sensitive endpoint: Sensitisation (skin)
Workers	Eye contact	Local effects		Medium hazard
Consumers	Inhalation	Long-term systemic effects		No hazard identified
Consumers	Inhalation	Acute systemic effects		No hazard identified
Consumers	Inhalation	Long-term local effects	0,025 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Consumers	Inhalation	Acute local effects	0,05 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Consumers	Dermal	Long-term systemic effects		No hazard identified
Consumers	Dermal	Acute systemic effects		No hazard identified
Consumers	Dermal	Long-term local effects		Medium hazard Most sensitive endpoint: Sensitisation (skin)
Consumers	Dermal	Acute local effects		Medium hazard Most sensitive endpoint: Sensitisation (skin)
Consumers	Oral	Long-term systemic effects		No hazard identified
Consumers	Oral	Acute systemic effects		No hazard identified
Consumers	Eye contact	Local effects		Medium hazard

Predicted No Effect Concentration (PNEC)**Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers**

Compartment	Value	Remarks
Fresh water	1 mg/l	
Marine water	0,1 mg/l	
Sewage treatment plant	1 mg/l	
Soil	1 mg/kg dry weight	
Intermittent use/release	10 mg/l	

diphenylmethane-4,4'-diisocyanate

Compartment	Value	Remarks
Fresh water	1 mg/l	
Marine water	0,1 mg/l	
Sewage treatment plant	1 mg/l	
Soil	1 mg/kg dry weight	
Intermittent use/release	10 mg/l	

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

Compartment	Value	Remarks
Fresh water	1 mg/l	
Marine water	0,1 mg/l	
Sewage treatment plant	1 mg/l	
Soil	1 mg/kg dry weight	
Intermittent use/release	10 mg/l	

Diphenylmethane-2,4'-diisocyanate

Compartment	Value	Remarks
Fresh water	1 mg/l	
Marine water	0,1 mg/l	
Sewage treatment plant	1 mg/l	
Soil	1 mg/kg dry weight	
Intermittent use/release	10 mg/l	

2,2'-Methylenediphenyl diisocyanate

Compartment	Value	Remarks
Fresh water	1 mg/l	
Marine water	0,1 mg/l	
Sewage treatment plant	1 mg/l	
Soil	1 mg/kg dry weight	
Intermittent use/release	10 mg/l	

8.2 Exposure controls**Respiratory protection**

Respiratory protection required in insufficiently ventilated working areas and during spraying. An air-fed mask, or for short periods of work, a combination of charcoal filter and particulate filter A2-P2 (EN529) is recommended.

If applicable, further recommendations regarding respiratory protection can be found in the annex.

In case of hypersensitivity of the respiratory tract (e.g. asthmatics and those who suffer from chronic bronchitis) it is inadvisable to work with the product.

Hand protection

Suitable materials for safety gloves; EN 374:

Butyl rubber, nitrile rubber, chloroprene rubber (neoprene).

Notice: suitable materials that provide sufficient protection for industrial cleaning with Aprotic Polar Solvents (meeting the IUPAC definition): butyl rubber.

When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN374) is recommended. When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN374) is recommended.

Glove thickness alone is not a good indicator of the level of protection a glove provides against a chemical substance as this level of protection is also highly dependent of the specific composition of the material a glove is fabricated from. The thickness of the glove must depending on model and type of material, generally be more than 0,35 mm to offer sufficient protection for prolonged and frequent contact with the substance. As an exception to this general rule it is known that multilayer laminate gloves may offer prolonged protection at thicknesses less than 0,35 mm. Other glove materials with a thickness of less than 0,35 mm may offer sufficient protection when only brief contact is expected.

Example:

Polychloroprene - CR: thickness $\geq 0,5\text{mm}$; breakthrough time $\geq 480\text{min}$.

Nitrile rubber - NBR: thickness $\geq 0,35\text{mm}$; breakthrough time $\geq 480\text{min}$.

Butyl rubber - IIR: thickness $\geq 0,5\text{mm}$; breakthrough time $\geq 480\text{min}$.

Fluorinated rubber - FKM: thickness $\geq 0,4\text{mm}$; breakthrough time $\geq 480\text{min}$.

Recommendation: contaminated gloves should be disposed of.

Eye protection

Use safety glasses with side shields, conforming to EN 166.

Skin and body protection

Use protective clothing (chemically resistant).

In case of hypersensitivity of the skin it is inadvisable to work with the product.

Safety precautions for handling freshly molded polyurethane parts: see section 16

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance:	liquid	
Colour:	colourless to brown	
Odour:	weak aromatic	
Odour Threshold:	not established	
pH:	not applicable	
Pour point:	8 °C	calculated
Boiling point/boiling range:	> 300 °C	calculated
Flash point:	180 °C at 1.013 hPa	calculated
Evaporation rate:	not established	
Flammability (solid, gas):	not applicable	
Burning number:	not applicable	
Vapour pressure:	< 1 hPa at 20 °C	calculated
	< 1 hPa at 50 °C	calculated
	< 1 hPa at 55 °C	calculated
Vapour density:	not established	
Density:	1,18 g/cm ³ at 20 °C	calculated
Miscibility with water:	immiscible at 15 °C	
Surface tension:	not established	
Partition coefficient (n-octanol/water):	not established	

Auto-ignition temperature:	not applicable	
Ignition temperature:	470 °C	calculated
Decomposition temperature:	not established	
Viscosity, dynamic:	230 mPa.s at 25 °C	DIN 53019
Explosive properties:	not established	
Dust explosion class:	not applicable	
Oxidising properties:	not established	

9.2 Other information

The indicated values do not necessarily correspond to the product specification. Please refer to the technical information sheet for specification data.

SECTION 10: Stability and reactivity

10.1 Reactivity

This information is not available.

10.2 Chemical stability

Polymerises at about 200 °C with evolution of CO₂.

10.3 Possibility of hazardous reactions

Exothermic reaction with amines and alcohols; reacts with water forming CO₂; in closed containers, risk of bursting owing to increase of pressure.

10.4 Conditions to avoid

This information is not available.

10.5 Incompatible materials

This information is not available.

10.6 Hazardous decomposition products

No hazardous decomposition products when stored and handled correctly.

SECTION 11: Toxicological information

Toxicological studies on the product are not yet available.

Please find below the toxicological data available to us for the components (hazardous components).

11.1 Information on toxicological effects

Acute toxicity, oral

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

LD50 rat, female: > 5.000 mg/kg

Method: OECD Test Guideline 425

aromatic isocyanate-prepolymer

LD50 rat, male/female: > 2.000 mg/kg

Method: Directive 84/449/EEC, B.1

Toxicological studies of a comparable product.

diphenylmethane-4,4'-diisocyanate

LD50 rat, male/female: > 2.000 mg/kg

Method: Directive 84/449/EEC, B.1

Toxicological studies of a comparable product.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

LD50 rat, male: > 10.000 mg/kg

Method: OECD Test Guideline 401

Toxicological studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate

LD50 rat, male/female: > 2.000 mg/kg

Method: Directive 84/449/EEC, B.1

Toxicological studies of a comparable product.

2,2'-Methylenediphenyl diisocyanate

LD50 rat, male/female: > 2.000 mg/kg

Method: Directive 84/449/EEC, B.1

Toxicological studies of a comparable product.

Acute toxicity, dermal

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

LD50 rabbit, male/female: > 9.400 mg/kg

Method: OECD Test Guideline 402

Studies of a comparable product.

aromatic isocyanate-prepolymer

LD50 rabbit, male/female: > 9.400 mg/kg

Method: OECD Test Guideline 402

Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate

LD50 rabbit, male/female: > 9.400 mg/kg

Method: OECD Test Guideline 402

Studies of a comparable product.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

LD50 rabbit, male/female: > 9.400 mg/kg

Method: OECD Test Guideline 402

Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate

LD50 rabbit, male/female: > 9.400 mg/kg

Method: OECD Test Guideline 402

Studies of a comparable product.

2,2'-Methylenediphenyl diisocyanate

LD50 rabbit, male/female: > 9.400 mg/kg

Method: OECD Test Guideline 402

Studies of a comparable product.

Acute toxicity, inhalation

ATEmix (inhal.): 1,5 mg/l, 4 h

Test atmosphere: dust/mist

Method: Calculation method

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

LC50 rat, male: 0,368 mg/l, 4 h

Test atmosphere: dust/mist

Method: OECD Test Guideline 403

Toxicological studies of a comparable product. The test atmosphere generated in the animal study is not representative of workplace environments, how the substance is placed on the market, and how it can reasonably be expected to be used. Therefore the test result cannot be directly applied for the purpose of assessing hazard. Based on expert judgment and the weight of the evidence, a modified classification for acute inhalation toxicity is justified.

LC50 rat, male/female: > 2,24 mg/l, 1 h

Test atmosphere: dust/mist

Method: OECD Test Guideline 403

Toxicological studies of a comparable product. The test atmosphere generated in the animal study is not representative of workplace environments, how the substance is placed on the market, and how it can reasonably be expected to be used. Therefore the test result cannot be directly applied for the purpose of assessing hazard. Based on expert judgment and the weight of the evidence, a modified classification for acute inhalation toxicity is justified.

Assessment: Harmful if inhaled.

Converted acute toxicity point estimate 1,5 mg/l

Test atmosphere: dust/mist

Method: Expert judgement

aromatic isocyanate-prepolymer

Assessment: Harmful if inhaled.

Studies of a comparable product.

Converted acute toxicity point estimate 1,5 mg/l

Test atmosphere: dust/mist

Method: Expert judgement

diphenylmethane-4,4'-diisocyanate

LC50 rat, male: 0,368 mg/l, 4 h

Test atmosphere: dust/mist

Method: OECD Test Guideline 403

The test atmosphere generated in the animal study is not representative of workplace environments, how the substance is placed on the market, and how it can reasonably be expected to be used. Therefore the test result cannot be directly applied for the purpose of assessing hazard. Based on expert judgment and the weight of the evidence, a modified classification for acute inhalation toxicity is justified.

Assessment: Harmful if inhaled.

Converted acute toxicity point estimate 1,5 mg/l

Test atmosphere: dust/mist

Method: Expert judgement

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

LC50 rat, male/female: 0,31 mg/l, 4 h

Test atmosphere: dust/mist

Method: OECD Test Guideline 403

Toxicological studies of a comparable product. The test atmosphere generated in the animal study is not representative of workplace environments, how the substance is placed on the market, and how it can reasonably be expected to be used. Therefore the test result cannot be directly applied for the purpose of assessing hazard. Based on expert judgment and the weight of the evidence, a modified classification for acute inhalation toxicity is justified.

Assessment: Harmful if inhaled.

Converted acute toxicity point estimate 1,5 mg/l

Test atmosphere: dust/mist

Method: Expert judgement

Diphenylmethane-2,4'-diisocyanate

LC50 rat, male: 0,387 mg/l, 4 h

Test atmosphere: dust/mist

The test atmosphere generated in the animal study is not representative of workplace environments, how the substance is placed on the market, and how it can reasonably be expected to be used. Therefore the test result cannot be directly applied for the purpose of assessing hazard. Based on expert judgment and the weight of the evidence, a modified classification for acute inhalation toxicity is justified.

Assessment: Harmful if inhaled.

Converted acute toxicity point estimate 1,5 mg/l

Test atmosphere: dust/mist

Method: Expert judgement

2,2'-Methylenediphenyl diisocyanate

LC50 rat, male: 0,527 mg/l, 4 h

Test atmosphere: dust/mist

Method: OECD Test Guideline 403

The test atmosphere generated in the animal study is not representative of workplace environments, how the substance is placed on the market, and how it can reasonably be expected to be used. Therefore the test result cannot be directly applied for the purpose of assessing hazard. Based on expert judgment and the weight of the evidence, a modified classification for acute inhalation toxicity is justified. Studies at the product.

Assessment: Harmful if inhaled.

Converted acute toxicity point estimate 1,5 mg/l

Test atmosphere: dust/mist

Method: Expert judgement

Primary skin irritation

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

Species: rabbit

Result: irritating

Classification: Causes skin irritation.

Method: OECD Test Guideline 404

Toxicological studies of a comparable product.

aromatic isocyanate-prepolymer

Classification: Causes skin irritation.

diphenylmethane-4,4'-diisocyanate

Species: rabbit

Result: irritating

Classification: Causes skin irritation.

Method: OECD Test Guideline 404

Toxicological studies of a comparable product.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

Species: rabbit

Result: slight irritant

Method: OECD Test Guideline 404

Toxicological studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate

Species: rabbit

Result: irritating

Classification: Causes skin irritation.

Method: OECD Test Guideline 404

Toxicological studies of a comparable product.

2,2'-Methylenediphenyl diisocyanate

Species: rabbit

Result: slight irritant

Method: OECD Test Guideline 404

Toxicological studies at the product

Classification: Causes skin irritation.

Regulation (EC) No 1272/2008

Primary mucosae irritation

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

Species: rabbit

Result: non-irritant

Classification: No eye irritation

Method: OECD Test Guideline 405

Toxicological studies of a comparable product.

aromatic isocyanate-prepolymer

Classification: Causes serious eye irritation.

diphenylmethane-4,4'-diisocyanate

Species: rabbit

Result: non-irritant

Method: OECD Test Guideline 405

Toxicological studies of a comparable product.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

Species: rabbit

Result: non-irritant

Method: OECD Test Guideline 405

Toxicological studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate

Species: rabbit

Result: non-irritant

Method: OECD Test Guideline 405

Toxicological studies of a comparable product.

2,2'-Methylenediphenyl diisocyanate

Species: rabbit

Result: slight irritant

Method: OECD Test Guideline 405

Toxicological studies at the product

Classification: Causes serious eye irritation.

Regulation (EC) No 1272/2008

Sensitisation

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

Skin sensitisation according to Magnusson/Kligmann (maximizing test):

Species: Guinea pig

Result: positive

Classification: May cause sensitization by skin contact.

Method: OECD Test Guideline 406

Respiratory sensitization

Species: Guinea pig

Result: positive

Classification: May cause sensitization by inhalation.

Toxicological studies of a comparable product.

aromatic isocyanate-prepolymer

Classification according to Directive 2006/121/EC Annex VI

Classification: May cause sensitization by inhalation and skin contact.

Skin sensitization (local lymph node assay (LLNA)):

Species: Mouse

Result: positive

Classification: May cause sensitization by skin contact.

Method: OECD Test Guideline 429

Studies of a comparable product.

Respiratory sensitization

Species: Guinea pig

Result: positive

Classification: May cause sensitization by inhalation.

Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate

Skin sensitisation according to Buehler (epicutaneous test):

Species: Guinea pig

Result: negative

Classification: Does not cause skin sensitization.

Method: OECD Test Guideline 406

Skin sensitization (local lymph node assay (LLNA)):

Species: Mouse

Result: positive

Classification: May cause sensitization by skin contact.

Method: OECD Test Guideline 429

Respiratory sensitization

Species: Guinea pig

Result: positive

Classification: May cause sensitization by inhalation.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

Skin sensitisation according to Magnusson/Kligmann (maximizing test):

Species: Guinea pig

Result: negative

Method: OECD Test Guideline 406

Toxicological studies of a comparable product.

Respiratory sensitization

Species: rat

Result: positive

Classification: May cause sensitization by inhalation.

Toxicological studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate

Skin sensitisation according to Buehler (epicutaneous test):

Species: Guinea pig

Result: negative

Classification: Does not cause skin sensitization.

Method: OECD Test Guideline 406

Toxicological studies of a comparable product.

Skin sensitization (local lymph node assay (LLNA)):

Species: Mouse

Result: positive

Classification: May cause sensitization by skin contact.

Method: OECD Test Guideline 429

Toxicological studies of a comparable product.

Respiratory sensitization

Species: Guinea pig

Result: positive

Classification: May cause sensitization by inhalation.

Toxicological studies of a comparable product.

2,2'-Methylenediphenyl diisocyanate

Skin sensitization (local lymph node assay (LLNA)):

Species: Mouse

Result: positive

Classification: May cause sensitization by skin contact.

Method: OECD Test Guideline 429

Studies at the product.

Respiratory sensitization

Species: Guinea pig

Result: positive

Classification: May cause sensitization by inhalation.

Toxicological studies of a comparable product.

Subacute, subchronic and prolonged toxicity

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

NOAEL: 0,2 mg/m³

LOAEL (Lowest observable adverse effect level): 1 mg/m³

Application Route: Inhalative

Species: rat, male/female

Dose Levels: 0 - 0,2 - 1 - 6 mg/m³

Exposure duration: 2 a

Frequency of treatment: 6 hours a day, 5 days a week

Target Organs: Lungs, Nasal inner lining
Test substance: as aerosol
Method: OECD Test Guideline 453
Findings: Irritation to nasal cavity and to lungs.
Studies of a comparable product.

aromatic isocyanate-prepolymer
NOAEL: 0,2 mg/m³
LOAEL (Lowest observable adverse effect level): 1 mg/m³
Application Route: Inhalative
Species: rat, male/female
Dose Levels: 0 - 0,2 - 1 - 6 mg/m³
Exposure duration: 2 a
Frequency of treatment: 6 hours a day, 5 days a week
Target Organs: Lungs, Nasal inner lining
Test substance: as aerosol
Method: OECD Test Guideline 453
Findings: Irritation to nasal cavity and to lungs.
Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate
NOAEL: 0,2 mg/m³
LOAEL (Lowest observable adverse effect level): 1 mg/m³
Application Route: Inhalative
Species: rat, male/female
Dose Levels: 0 - 0,2 - 1 - 6 mg/m³
Exposure duration: 2 a
Frequency of treatment: 6 hours a day, 5 days a week
Target Organs: Lungs, Nasal inner lining
Test substance: as aerosol
Method: OECD Test Guideline 453
Findings: Irritation to nasal cavity and to lungs.
Studies of a comparable product.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene
NOAEL: 0,2 mg/m³
LOAEL (Lowest observable adverse effect level): 1 mg/m³
Application Route: Inhalative
Species: rat, male/female
Dose Levels: 0 - 0,2 - 1 - 6 mg/m³
Exposure duration: 2 a
Frequency of treatment: 6 hours a day, 5 days a week
Target Organs: Lungs, Nasal inner lining
Test substance: as aerosol
Method: OECD Test Guideline 453
Findings: Irritation to nasal cavity and to lungs.
Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate
NOAEL: 0,2 mg/m³
LOAEL (Lowest observable adverse effect level): 1 mg/m³
Application Route: Inhalative
Species: rat, male/female
Dose Levels: 0 - 0,2 - 1 - 6 mg/m³
Exposure duration: 2 a
Frequency of treatment: 6 hours a day, 5 days a week
Target Organs: Lungs, Nasal inner lining
Test substance: as aerosol
Method: OECD Test Guideline 453
Findings: Irritation to nasal cavity and to lungs.
Studies of a comparable product.

2,2'-Methylenediphenyl diisocyanate
NOAEL: 0,2 mg/m³
LOAEL (Lowest observable adverse effect level): 1 mg/m³
Application Route: Inhalative
Species: rat, male/female
Dose Levels: 0 - 0,2 - 1 - 6 mg/m³

Exposure duration: 2 a
Frequency of treatment: 6 hours a day, 5 days a week
Target Organs: Lungs, Nasal inner lining
Test substance: as aerosol
Method: OECD Test Guideline 453
Findings: Irritation to nasal cavity and to lungs.
Studies of a comparable product.

Carcinogenicity

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers
Species: rat, male/female
Application Route: Inhalative
Dose Levels: 0 - 0,2 - 1 - 6 mg/m³
Test substance: as aerosol
Exposure duration: 2 a
Frequency of treatment: 6 hours/day, 5 days/week
Method: OECD Test Guideline 453
Occurrence of tumors in the highest dose group.
Studies of a comparable product.

aromatic isocyanate-prepolymer
No data available.

diphenylmethane-4,4'-diisocyanate
Species: rat, male/female
Application Route: Inhalative
Dose Levels: 0 - 0,2 - 1 - 6 mg/m³
Test substance: as aerosol
Exposure duration: 2 a
Frequency of treatment: 6 hours/day, 5 days/week
Method: OECD Test Guideline 453
Occurrence of tumors in the highest dose group.
Studies of a comparable product.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene
Species: rat, male/female
Application Route: Inhalative
Dose Levels: 0 - 0,2 - 1 - 6 mg/m³
Test substance: as aerosol
Exposure duration: 2 a
Frequency of treatment: 6 hours/day, 5 days/week
Method: OECD Test Guideline 453
Occurrence of tumors in the highest dose group.
Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate
Species: rat, male/female
Application Route: Inhalative
Dose Levels: 0 - 0,2 - 1 - 6 mg/m³
Test substance: as aerosol
Exposure duration: 2 a
Frequency of treatment: 6 hours/day, 5 days/week
Method: OECD Test Guideline 453
Occurrence of tumors in the highest dose group.
Studies of a comparable product.

2,2'-Methylenediphenyl diisocyanate
Species: rat, male/female
Application Route: Inhalative
Dose Levels: 0 - 0,2 - 1 - 6 mg/m³
Test substance: as aerosol
Exposure duration: 2 a
Frequency of treatment: 6 hours/day, 5 days/week
Method: OECD Test Guideline 453
Occurrence of tumors in the highest dose group.
Studies of a comparable product.

Reproductive toxicity/Fertility

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers
No data available.

aromatic isocyanate-prepolymer
No data available.

diphenylmethane-4,4'-diisocyanate
No data available.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene
No data available.

Diphenylmethane-2,4'-diisocyanate
No data available.

2,2'-Methylenediphenyl diisocyanate
No data available.

Reproductive toxicity/Teratogenicity

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

NOAEL (teratogenicity): 12 mg/m³

NOAEL (maternal): 4 mg/m³

NOAEL (developmental toxicity): 4 mg/m³

Species: rat, female

Application Route: Inhalative

Dose Levels: 0 - 1 - 4 - 12 mg/m³

Frequency of treatment: 6 hours/day (Exposure duration: 10 days (day 6 - 15 p.c.))

Test period: 20 d

Test substance: as aerosol

Method: OECD Test Guideline 414

Did not show teratogenic effects in animal experiments.

Studies of a comparable product.

aromatic isocyanate-prepolymer

NOAEL (teratogenicity): 12 mg/m³

NOAEL (maternal): 4 mg/m³

NOAEL (developmental toxicity): 4 mg/m³

Species: rat, female

Application Route: Inhalative

Dose Levels: 0 - 1 - 4 - 12 mg/m³

Frequency of treatment: 6 hours/day (Exposure duration: 10 days (day 6 - 15 p.c.))

Test period: 20 d

Test substance: as aerosol

Method: OECD Test Guideline 414

NOAEL (developmental toxicity): 4 mg/m³

Did not show teratogenic effects in animal experiments.

Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate

NOAEL (teratogenicity): 12 mg/m³

NOAEL (maternal): 4 mg/m³

NOAEL (developmental toxicity): 4 mg/m³

Species: rat, female

Application Route: Inhalative

Dose Levels: 0 - 1 - 4 - 12 mg/m³

Frequency of treatment: 6 hours/day (Exposure duration: 10 days (day 6 - 15 p.c.))

Test period: 20 d

Test substance: as aerosol

Method: OECD Test Guideline 414

NOAEL (developmental toxicity): 4 mg/m³

Did not show teratogenic effects in animal experiments.

Studies of a comparable product.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

NOAEL (teratogenicity): 12 mg/m³

NOAEL (maternal): 4 mg/m³

NOAEL (developmental toxicity): 4 mg/m³

Species: rat, female

Application Route: Inhalative
Dose Levels: 0 - 1 - 4 - 12 mg/m³
Frequency of treatment: 6 hours/day (Exposure duration: 10 days (day 6 - 15 p.c.))
Test period: 20 d
Test substance: as aerosol
Method: OECD Test Guideline 414
Did not show teratogenic effects in animal experiments.
Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate
NOAEL (teratogenicity): 12 mg/m³
NOAEL (maternal): 4 mg/m³
NOAEL (developmental toxicity): 4 mg/m³
Species: rat, female
Application Route: Inhalative
Dose Levels: 0 - 1 - 4 - 12 mg/m³
Frequency of treatment: 6 hours/day (Exposure duration: 10 days (day 6 - 15 p.c.))
Test period: 20 d
Test substance: as aerosol
Method: OECD Test Guideline 414
NOAEL (developmental toxicity): 4 mg/m³
Did not show teratogenic effects in animal experiments.
Studies of a comparable product.

2,2'-Methylenediphenyl diisocyanate
NOAEL (teratogenicity): 12 mg/m³
NOAEL (maternal): 4 mg/m³
NOAEL (developmental toxicity): 4 mg/m³
Species: rat, female
Application Route: Inhalative
Dose Levels: 0 - 1 - 4 - 12 mg/m³
Frequency of treatment: 6 hours/day (Exposure duration: 10 days (day 6 - 15 p.c.))
Test period: 20 d
Test substance: as aerosol
Method: OECD Test Guideline 414
Did not show teratogenic effects in animal experiments.
Studies of a comparable product.

Genotoxicity in vitro

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers
Test type: Salmonella/microsome test (Ames test)
Test system: Salmonella typhimurium
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 471

aromatic isocyanate-prepolymer
Test type: Salmonella/microsome test (Ames test)
Test system: Salmonella typhimurium
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 471
Toxicological studies of a comparable product.

diphenylmethane-4,4'-diisocyanate
Test type: Salmonella/microsome test (Ames test)
Test system: Salmonella typhimurium
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 471
Toxicological studies of a comparable product.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

Test type: Salmonella/microsome test (Ames test)

Test system: Salmonella typhimurium

Metabolic activation: with/without

Result: negative

Method: OECD Test Guideline 471

Toxicological studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate

Test type: Salmonella/microsome test (Ames test)

Test system: Salmonella typhimurium

Metabolic activation: with/without

Result: negative

Method: OECD Test Guideline 471

2,2'-Methylenediphenyl diisocyanate

Test type: Salmonella/microsome test (Ames test)

Test system: Salmonella typhimurium

Metabolic activation: with/without

Result: negative

Method: OECD Test Guideline 471

Studies at the product.

Genotoxicity in vivo

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

Test type: Micronucleus test

Species: rat, male

Application Route: Inhalative (exposure period: 3x1h/day over 3 weeks)

Result: negative

Method: OECD Test Guideline 474

Toxicological studies of a comparable product.

aromatic isocyanate-prepolymer

Test type: Micronucleus test

Species: rat, male

Application Route: Inhalative (exposure period: 3x1h/day over 3 weeks)

Result: negative

Method: OECD Test Guideline 474

Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate

Test type: Micronucleus test

Species: rat, male

Application Route: Inhalative (exposure period: 3x1h/day over 3 weeks)

Result: negative

Method: OECD Test Guideline 474

Test type: comet assay

Species: rat, male

Application Route: Inhalative

Dose: 2 - 5 - 11 mg/m³

Result: negative

Method: OECD Test Guideline 489

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

Test type: Micronucleus test

Species: rat, male

Application Route: Inhalative (exposure period: 3x1h/day over 3 weeks)

Result: negative

Method: OECD Test Guideline 474

Toxicological studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate

Test type: Micronucleus test

Species: rat, male

Application Route: Inhalative (exposure period: 3x1h/day over 3 weeks)

Result: negative

Method: OECD Test Guideline 474

Toxicological studies of a comparable product.

2,2'-Methylenediphenyl diisocyanate

Test type: Micronucleus test

Species: rat, male

Application Route: Inhalative (exposure period: 3x1h/day over 3 weeks)

Result: negative

Method: OECD Test Guideline 474

Toxicological studies of a comparable product.

STOT evaluation – one-time exposure

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

Route of exposure: Inhalative

Target Organs: Respiratory Tract

May cause respiratory irritation.

aromatic isocyanate-prepolymer

Route of exposure: Inhalative

Target Organs: Respiratory Tract

May cause respiratory irritation.

diphenylmethane-4,4'-diisocyanate

Route of exposure: Inhalative

Target Organs: Respiratory Tract

May cause respiratory irritation.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

Route of exposure: Inhalative

Target Organs: Respiratory Tract

May cause respiratory irritation.

Diphenylmethane-2,4'-diisocyanate

Route of exposure: Inhalative

Target Organs: Respiratory Tract

May cause respiratory irritation.

2,2'-Methylenediphenyl diisocyanate

Route of exposure: Inhalative

Target Organs: Respiratory Tract

May cause respiratory irritation.

STOT evaluation – repeated exposure

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

Route of exposure: Inhalative

Target Organs: Respiratory Tract

May cause damage to organs through prolonged or repeated exposure.

aromatic isocyanate-prepolymer

Route of exposure: Inhalative

Target Organs: Respiratory Tract

May cause damage to organs through prolonged or repeated exposure.

diphenylmethane-4,4'-diisocyanate

Route of exposure: Inhalative

Target Organs: Respiratory Tract

May cause damage to organs through prolonged or repeated exposure.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

Route of exposure: Inhalative

Target Organs: Respiratory Tract

May cause damage to organs through prolonged or repeated exposure.

Diphenylmethane-2,4'-diisocyanate

Route of exposure: Inhalative

Target Organs: Respiratory Tract

May cause damage to organs through prolonged or repeated exposure.

2,2'-Methylenediphenyl diisocyanate

Route of exposure: Inhalative

Target Organs: Respiratory Tract

May cause damage to organs through prolonged or repeated exposure.

Aspiration toxicity

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

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

aromatic isocyanate-prepolymer

No data available.

diphenylmethane-4,4'-diisocyanate

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

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

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

Diphenylmethane-2,4'-diisocyanate

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

2,2'-Methylenediphenyl diisocyanate

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

CMR Assessment

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

Carcinogenicity: Suspected of causing cancer by inhalation (Carc. 2).

Mutagenicity: In vitro an in vivo tests did not show mutagenic effects. Based on available data, the classification criteria are not met.

Teratogenicity: Did not show teratogenic effects in animal experiments. Based on available data, the classification criteria are not met.

Reproductive toxicity/Fertility: Based on available data, the classification criteria are not met.

aromatic isocyanate-prepolymer

Carcinogenicity: No data available.

Mutagenicity: Based on available data, the classification criteria are not met.

Teratogenicity: Based on available data, the classification criteria are not met.

Reproductive toxicity/Fertility: Based on available data, the classification criteria are not met.

diphenylmethane-4,4'-diisocyanate

Carcinogenicity: Suspected of causing cancer by inhalation (Carc. 2).

Mutagenicity: In vitro an in vivo tests did not show mutagenic effects. Based on available data, the classification criteria are not met.

Teratogenicity: Did not show teratogenic effects in animal experiments. Based on available data, the classification criteria are not met.

Reproductive toxicity/Fertility: Based on available data, the classification criteria are not met.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

Carcinogenicity: Suspected of causing cancer by inhalation (Carc. 2).

Mutagenicity: In vitro an in vivo tests did not show mutagenic effects. Based on available data, the classification criteria are not met.

Teratogenicity: Did not show teratogenic effects in animal experiments. Based on available data, the classification criteria are not met.

Reproductive toxicity/Fertility: Based on available data, the classification criteria are not met.

Diphenylmethane-2,4'-diisocyanate

Carcinogenicity: Suspected of causing cancer by inhalation (Carc. 2).

Mutagenicity: In vitro and in vivo tests did not show mutagenic effects. Based on available data, the classification criteria are not met.

Teratogenicity: Did not show teratogenic effects in animal experiments. Based on available data, the classification criteria are not met.

Reproductive toxicity/Fertility: Based on available data, the classification criteria are not met.

2,2'-Methylenediphenyl diisocyanate

Carcinogenicity: Suspected of causing cancer by inhalation (Carc. 2).

Mutagenicity: In vitro and in vivo tests did not show mutagenic effects. Based on available data, the classification criteria are not met.

Teratogenicity: Did not show teratogenic effects in animal experiments. Based on available data, the classification criteria are not met.

Reproductive toxicity/Fertility: Based on available data, the classification criteria are not met.

Toxicology Assessment

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

Acute effects: Harmful if inhaled. The product causes irritation of eyes, skin and mucous membranes.

Sensitization: May cause sensitization by inhalation and skin contact.

diphenylmethane-4,4'-diisocyanate

Acute effects: Harmful if inhaled. The product causes irritation of eyes, skin and mucous membranes.

Sensitization: May cause sensitization by inhalation and skin contact.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

Acute effects: Harmful if inhaled. The product causes irritation of eyes, skin and mucous membranes.

Sensitization: May cause sensitization by inhalation and skin contact.

Diphenylmethane-2,4'-diisocyanate

Acute effects: Harmful if inhaled. The product causes irritation of eyes, skin and mucous membranes.

Sensitization: May cause sensitization by inhalation and skin contact.

2,2'-Methylenediphenyl diisocyanate

Acute effects: Harmful if inhaled. The product causes irritation of eyes, skin and mucous membranes.

Sensitization: May cause sensitization by inhalation and skin contact.

Additional information

Special properties/effects: Over-exposure entails the risk of concentration-dependent irritating effects on eyes, nose throat, and respiratory tract. Delayed appearance of the complaints and development of hypersensitivity (difficult breathing, coughing, asthma) are possible. Hypersensitive persons may suffer from these effects even at low isocyanate concentrations, including concentrations below the occupational exposure limit. Prolonged contact with the skin may cause tanning and irritant effects.

Industrial cleaning with Aprotic Polar Solvents (meeting the IUPAC definition) may lead to formation of (hazardous) primary aromatic amines (> 0.1 %). Primary aromatic amines are chemicals that are regarded as potentially carcinogenic for humans based on animal testing. Some of these chemicals are known human carcinogens. Compliance with the control measures recommended in the exposure scenario is expected to protect against these effects.

Animal tests and other research indicate that skin contact with diisocyanates can play a role in causing isocyanate sensitization and respiratory reaction.

SECTION 12: Ecological information

Ecotoxicological studies of the product are not available.

Do not allow to escape into waterways, wastewater or soil.

Please find below the ecotoxicological data available to us for the components.

12.1 Toxicity

Acute Fish toxicity

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

LC50 > 1.000 mg/l

Test type: Acute Fish toxicity

Species: Danio rerio (zebra fish)

Exposure duration: 96 h

Method: OECD Test Guideline 203

Studies of a comparable product.

aromatic isocyanate-prepolymer

LC50 > 1.000 mg/l

Test type: Acute Fish toxicity

Species: Danio rerio (zebra fish)

Exposure duration: 96 h

Method: OECD Test Guideline 203

Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate

LC50 > 1.000 mg/l

Test type: Acute Fish toxicity

Species: Danio rerio (zebra fish)

Exposure duration: 96 h

Method: OECD Test Guideline 203

Studies of a comparable product.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

LC50 > 1.000 mg/l

Species: Danio rerio (zebra fish)

Exposure duration: 96 h

Method: OECD Test Guideline 203

Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate

LC50 > 1.000 mg/l

Test type: Acute Fish toxicity

Species: Danio rerio (zebra fish)

Exposure duration: 96 h

Method: OECD Test Guideline 203

Studies of a comparable product.

2,2'-Methylenediphenyl diisocyanate

LC50 > 1.000 mg/l

Test type: Acute Fish toxicity

Species: Danio rerio (zebra fish)

Exposure duration: 96 h

Method: OECD Test Guideline 203

Studies of a comparable product.

Chronic Fish toxicity

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

Study scientifically not justified.

diphenylmethane-4,4'-diisocyanate

Study scientifically not justified.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

Study scientifically not justified.

Diphenylmethane-2,4'-diisocyanate

Study scientifically not justified.

2,2'-Methylenediphenyl diisocyanate

Study scientifically not justified.

Acute toxicity for daphnia

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

EC50 > 1.000 mg/l

Species: Daphnia magna (Water flea)

Exposure duration: 24 h

Method: OECD Test Guideline 202

Studies of a comparable product.

aromatic isocyanate-prepolymer

EC50 > 1.000 mg/l

Species: Daphnia magna (Water flea)

Exposure duration: 24 h

Method: OECD Test Guideline 202

Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate

EC50 > 1.000 mg/l

Species: Daphnia magna (Water flea)

Exposure duration: 24 h

Method: OECD Test Guideline 202

Studies of a comparable product.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

EC50 > 1.000 mg/l

Species: Daphnia magna (Water flea)

Exposure duration: 24 h

Method: OECD Test Guideline 202

Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate

EC50 > 1.000 mg/l

Species: Daphnia magna (Water flea)

Exposure duration: 24 h

Method: OECD Test Guideline 202

Studies of a comparable product.

2,2'-Methylenediphenyl diisocyanate

EC50 > 1.000 mg/l

Species: Daphnia magna (Water flea)

Exposure duration: 24 h

Method: OECD Test Guideline 202

Studies of a comparable product.

Chronic toxicity to daphnia

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

NOEC (Reproduction) > 10 mg/l

Species: Daphnia magna (Water flea)

Exposure duration: 21 d

Method: OECD Test Guideline 202

Studies of a comparable product.

aromatic isocyanate-prepolymer

NOEC (Reproduction) > 10 mg/l

Species: Daphnia magna (Water flea)

Exposure duration: 21 d

Method: OECD Test Guideline 202

Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate

NOEC (Reproduction) > 10 mg/l

Species: Daphnia magna (Water flea)

Exposure duration: 21 d

Method: OECD Test Guideline 202

Studies of a comparable product.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

NOEC (Reproduction) > 10 mg/l

Species: *Daphnia magna* (Water flea)

Exposure duration: 21 d

Method: OECD Test Guideline 202

Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate

NOEC (Reproduction) > 10 mg/l

Species: *Daphnia magna* (Water flea)

Exposure duration: 21 d

Method: OECD Test Guideline 202

Studies of a comparable product.

2,2'-Methylenediphenyl diisocyanate

NOEC (Reproduction) > 10 mg/l

Species: *Daphnia magna* (Water flea)

Exposure duration: 21 d

Method: OECD Test Guideline 202

Studies of a comparable product.

Acute toxicity for algae

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

ErC50 > 1.640 mg/l

Test type: Growth inhibition

Species: *scenedesmus subspicatus*

Exposure duration: 72 h

Method: OECD Test Guideline 201

Studies of a comparable product.

aromatic isocyanate-prepolymer

ErC50 > 1.640 mg/l

Test type: Growth inhibition

Species: *scenedesmus subspicatus*

Exposure duration: 72 h

Method: OECD Test Guideline 201

Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate

ErC50 > 1.640 mg/l

Test type: Growth inhibition

Species: *scenedesmus subspicatus*

Exposure duration: 72 h

Method: OECD Test Guideline 201

Studies of a comparable product.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

ErC50 > 1.640 mg/l

Test type: Growth inhibition

Species: *scenedesmus subspicatus*

Exposure duration: 72 h

Method: OECD Test Guideline 201

Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate

ErC50 > 1.640 mg/l

Test type: Growth inhibition

Species: *scenedesmus subspicatus*

Exposure duration: 72 h

Method: OECD Test Guideline 201

Studies of a comparable product.

2,2'-Methylenediphenyl diisocyanate

EC50 > 1.640 mg/l

Test type: Growth inhibition

Species: *scenedesmus subspicatus*

Exposure duration: 72 h

Method: OECD Test Guideline 201

Studies of a comparable product.

Acute bacterial toxicity

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

EC50 > 100 mg/l

Test type: Respiration inhibition

Species: activated sludge

Exposure duration: 3 h

Method: OECD Test Guideline 209

Studies of a comparable product.

aromatic isocyanate-prepolymer

EC50 > 100 mg/l

Test type: Respiration inhibition

Species: activated sludge

Exposure duration: 3 h

Method: OECD Test Guideline 209

Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate

EC50 > 100 mg/l

Test type: Respiration inhibition

Species: activated sludge

Exposure duration: 3 h

Method: OECD Test Guideline 209

Studies of a comparable product.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

EC50 > 100 mg/l

Test type: Respiration inhibition

Species: activated sludge

Exposure duration: 3 h

Method: OECD Test Guideline 209

Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate

EC50 > 100 mg/l

Test type: Respiration inhibition

Species: activated sludge

Exposure duration: 3 h

Method: OECD Test Guideline 209

Studies of a comparable product.

2,2'-Methylenediphenyl diisocyanate

EC50 > 100 mg/l

Test type: Respiration inhibition

Species: activated sludge

Exposure duration: 3 h

Method: OECD Test Guideline 209

Studies of a comparable product.

Toxicity to soil dwelling organisms

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

NOEC (mortality) > 1.000 mg/kg

Species: Eisenia fetida (earthworms)

Exposure duration: 14 d

Method: OECD Test Guideline 207

Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate

NOEC (mortality) > 1.000 mg/kg

Species: Eisenia fetida (earthworms)

Exposure duration: 14 d

Method: OECD Test Guideline 207

Studies of a comparable product.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

NOEC (mortality) > 1.000 mg/kg

Species: Eisenia fetida (earthworms)

Exposure duration: 14 d

Method: OECD Test Guideline 207

Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate

NOEC (mortality) > 1.000 mg/kg

Species: Eisenia fetida (earthworms)

Exposure duration: 14 d

Method: OECD Test Guideline 207

Studies of a comparable product.

2,2'-Methylenediphenyl diisocyanate

NOEC (mortality) > 1.000 mg/kg

Species: Eisenia fetida (earthworms)

Exposure duration: 14 d

Method: OECD Test Guideline 207

Studies of a comparable product.

Toxicity to terrestrial plants

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

NOEC (seedling emergence) > 1.000 mg/kg

Species: Avena sativa (oats)

Exposure duration: 14 d

Method: OECD Test Guideline 208

Studies of a comparable product.

NOEC (Growth rate) > 1.000 mg/kg

Species: Avena sativa (oats)

Exposure duration: 14 d

Method: OECD Test Guideline 208

Studies of a comparable product.

NOEC (seedling emergence) > 1.000 mg/kg

Species: Lactuca sativa (lettuce)

Exposure duration: 14 d

Method: OECD Test Guideline 208

Studies of a comparable product.

NOEC (Growth rate) > 1.000 mg/kg

Species: Lactuca sativa (lettuce)

Exposure duration: 14 d

Method: OECD Test Guideline 208

Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate

NOEC (seedling emergence) > 1.000 mg/kg

Species: Avena sativa (oats)

Exposure duration: 14 d

Method: OECD Test Guideline 208

Studies of a comparable product.

NOEC (Growth rate) > 1.000 mg/kg

Species: Avena sativa (oats)

Exposure duration: 14 d

Method: OECD Test Guideline 208

Studies of a comparable product.

NOEC (seedling emergence) > 1.000 mg/kg

Species: Lactuca sativa (lettuce)

Exposure duration: 14 d

Method: OECD Test Guideline 208

Studies of a comparable product.

NOEC (Growth rate) > 1.000 mg/kg
Species: Lactuca sativa (lettuce)
Exposure duration: 14 d
Method: OECD Test Guideline 208
Studies of a comparable product.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene
NOEC (seedling emergence) > 1.000 mg/kg
Species: Avena sativa (oats)
Exposure duration: 14 d
Method: OECD Test Guideline 208
Studies of a comparable product.

NOEC (Growth rate) > 1.000 mg/kg
Species: Avena sativa (oats)
Exposure duration: 14 d
Method: OECD Test Guideline 208
Studies of a comparable product.

NOEC (seedling emergence) > 1.000 mg/kg
Species: Lactuca sativa (lettuce)
Exposure duration: 14 d
Method: OECD Test Guideline 208
Studies of a comparable product.

NOEC (Growth rate) > 1.000 mg/kg
Species: Lactuca sativa (lettuce)
Exposure duration: 14 d
Method: OECD Test Guideline 208
Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate
NOEC (seedling emergence) > 1.000 mg/kg
Species: Avena sativa (oats)
Exposure duration: 14 d
Method: OECD Test Guideline 208
Studies of a comparable product.

NOEC (Growth rate) > 1.000 mg/kg
Species: Avena sativa (oats)
Exposure duration: 14 d
Method: OECD Test Guideline 208
Studies of a comparable product.

NOEC (seedling emergence) > 1.000 mg/kg
Species: Lactuca sativa (lettuce)
Exposure duration: 14 d
Method: OECD Test Guideline 208
Studies of a comparable product.

NOEC (Growth rate) > 1.000 mg/kg
Species: Lactuca sativa (lettuce)
Exposure duration: 14 d
Method: OECD Test Guideline 208
Studies of a comparable product.

2,2'-Methylenediphenyl diisocyanate
NOEC (seedling emergence) > 1.000 mg/kg
Species: Avena sativa (oats)
Exposure duration: 14 d
Method: OECD Test Guideline 208
Studies of a comparable product.

NOEC (Growth rate) > 1.000 mg/kg
Species: Avena sativa (oats)
Exposure duration: 14 d
Method: OECD Test Guideline 208
Studies of a comparable product.

NOEC (seedling emergence) > 1.000 mg/kg
Species: Lactuca sativa (lettuce)
Exposure duration: 14 d
Method: OECD Test Guideline 208
Studies of a comparable product.

NOEC (Growth rate) > 1.000 mg/kg
Species: Lactuca sativa (lettuce)
Exposure duration: 14 d
Method: OECD Test Guideline 208
Studies of a comparable product.

Ecotoxicology Assessment

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

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

Chronic aquatic toxicity: Based on available data, the classification criteria are not met.

Toxicity Data on Soil: Not expected to adsorb on soil. The substance is graded as non-critical to soil-dwelling organisms.

Impact on Sewage Treatment: Because of the low bacterial toxicity, there is no risk of an adverse effect on the performance of biological waste water treatment plants.

diphenylmethane-4,4'-diisocyanate

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

Chronic aquatic toxicity: Based on available data, the classification criteria are not met.

Toxicity Data on Soil: Not expected to adsorb on soil. The substance is graded as non-critical to soil-dwelling organisms.

Impact on Sewage Treatment: Because of the low bacterial toxicity, there is no risk of an adverse effect on the performance of biological waste water treatment plants.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

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

Chronic aquatic toxicity: Based on available data, the classification criteria are not met.

Toxicity Data on Soil: Not expected to adsorb on soil. The substance is graded as non-critical to soil-dwelling organisms.

Impact on Sewage Treatment: Because of the low bacterial toxicity, there is no risk of an adverse effect on the performance of biological waste water treatment plants.

Diphenylmethane-2,4'-diisocyanate

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

Chronic aquatic toxicity: Based on available data, the classification criteria are not met.

Toxicity Data on Soil: Not expected to adsorb on soil. The substance is graded as non-critical to soil-dwelling organisms.

Impact on Sewage Treatment: Because of the low bacterial toxicity, there is no risk of an adverse effect on the performance of biological waste water treatment plants.

2,2'-Methylenediphenyl diisocyanate

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

Chronic aquatic toxicity: Based on available data, the classification criteria are not met.

Toxicity Data on Soil: Not expected to adsorb on soil.

Impact on Sewage Treatment: Because of the low bacterial toxicity, there is no risk of an adverse effect on the performance of biological waste water treatment plants.

Toxicity Data on Soil: The substance is graded as non-critical to soil-dwelling organisms.

12.2 Persistence and degradability

Biodegradability

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

Biodegradation: 0 %, 28 d, i.e. not inherently degradable

Method: OECD Test Guideline 302 C

Studies of a comparable product.

aromatic isocyanate-prepolymer

Biodegradation: 0 %, 28 d, i.e. not inherently degradable

Method: OECD Test Guideline 302 C

Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate

Biodegradation: 0 %, 28 d, i.e. not inherently degradable

Method: OECD Test Guideline 302 C

Studies of a comparable product.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

Biodegradation: 0 %, 28 d, i.e. not inherently degradable

Method: OECD Test Guideline 302 C

Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate

Biodegradation: 0 %, 28 d, i.e. not inherently degradable

Method: OECD Test Guideline 302 C

Studies of a comparable product.

2,2'-Methylenediphenyl diisocyanate

Biodegradation: 0 %, 28 d, i.e. not inherently degradable

Method: OECD Test Guideline 302 C

Studies of a comparable product.

Stability in water

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

Test type: Hydrolysis

Half life: 20 h at 25 °C

The substance hydrolyzes rapidly in water.

Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate

Test type: Hydrolysis

Half life: 20 h at 25 °C

The substance hydrolyzes rapidly in water.

Studies of a comparable product.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

Test type: Hydrolysis

Half life: 20 h at 25 °C

The substance hydrolyzes rapidly in water.

Diphenylmethane-2,4'-diisocyanate

Test type: Hydrolysis

Half life: 20 h at 25 °C

The substance hydrolyzes rapidly in water.

Studies of a comparable product.

2,2'-Methylenediphenyl diisocyanate

Test type: Hydrolysis

Half life: 20 h at 25 °C

The substance hydrolyzes rapidly in water.

Studies of a comparable product.

Photodegradation

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

Test type: Phototransformation in air

sensitizer: OH-radicals

Concentration sensibilisator: 500.000 1/cm³

Rate constant: 1,16E-11 cm³/s

Half-life indirect photolysis: 0,92 d

Method: SRC - AOP (calculation)

After evaporation or exposure to the air, the product will be moderately degraded by photochemical processes.

Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate

Test type: Phototransformation in air

sensitizer: OH-radicals

Concentration sensibilisator: 500.000 1/cm³

Rate constant: 1,16E-11 cm³/s

Half-life indirect photolysis: 0,92 d

Method: SRC - AOP (calculation)

After evaporation or exposure to the air, the product will be moderately degraded by photochemical processes.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

Test type: Phototransformation in air

sensitizer: OH-radicals

Concentration sensibilisator: 500.000 1/cm³

Rate constant: 1,16E-11 cm³/s

Half-life indirect photolysis: 0,92 d

Method: SRC - AOP (calculation)

After evaporation or exposure to the air, the product will be moderately degraded by photochemical processes.

Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate

Test type: Phototransformation in air

sensitizer: OH-radicals

Concentration sensibilisator: 500.000 1/cm³

Rate constant: 1,16E-11 cm³/s

Half-life indirect photolysis: 0,92 d

Method: SRC - AOP (calculation)

After evaporation or exposure to the air, the product will be moderately degraded by photochemical processes.

2,2'-Methylenediphenyl diisocyanate

Test type: Phototransformation in air

sensitizer: OH-radicals

Concentration sensibilisator: 500.000 1/cm³

Rate constant: 1,16E-11 cm³/s

Half-life indirect photolysis: 0,92 d

Method: SRC - AOP (calculation)

After evaporation or exposure to the air, the product will be moderately degraded by photochemical processes.

Volatility (Henry's Law constant)

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

Calculated value = 0,0229 Pa*m³/mol

The substance has to be scored as being slightly volatile from water.

diphenylmethane-4,4'-diisocyanate

Calculated value = 0,0229 Pa*m³/mol

The substance has to be scored as being slightly volatile from water.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

Calculated value = 0,0229 Pa*m³/mol

The substance has to be scored as being slightly volatile from water.

Diphenylmethane-2,4'-diisocyanate

Calculated value = 0,0229 Pa*m³/mol

The substance has to be scored as being slightly volatile from water.

2,2'-Methylenediphenyl diisocyanate

Calculated value = 0,0229 Pa*m³/mol

The substance has to be scored as being slightly volatile from water.

12.3 Bioaccumulative potential

Bioaccumulation

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

Bioconcentration factor (BCF): 200

Species: Cyprinus carpio (Carp)

Exposure duration: 28 d

Concentration: 0,00008 mg/l

Test substance: 14C-labelled

Method: OECD Test Guideline 305 C

An accumulation in aquatic organisms is not to be expected.

Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate

Bioconcentration factor (BCF): 200

Species: Cyprinus carpio (Carp)

Exposure duration: 28 d

Concentration: 0,00008 mg/l

Test substance: 14C-labelled

Method: OECD Test Guideline 305 E

An accumulation in aquatic organisms is not to be expected.

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

Bioconcentration factor (BCF): 200

Species: Cyprinus carpio (Carp)

Exposure duration: 28 d

Concentration: 0,00008 mg/l

Test substance: 14C-labelled

Method: OECD Test Guideline 305 E

An accumulation in aquatic organisms is not to be expected.

Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate

Bioconcentration factor (BCF): 200

Species: Cyprinus carpio (Carp)

Exposure duration: 28 d

Concentration: 0,00008 mg/l

Test substance: 14C-labelled

Method: OECD Test Guideline 305 E

An accumulation in aquatic organisms is not to be expected.

Studies of a comparable product.

2,2'-Methylenediphenyl diisocyanate

Bioconcentration factor (BCF): 200

Species: Cyprinus carpio (Carp)

Exposure duration: 28 d

Concentration: 0,00008 mg/l

Test substance: 14C-labelled

Method: OECD Test Guideline 305 E

An accumulation in aquatic organisms is not to be expected.

Studies of a comparable product.

12.4 Mobility in soil**Distribution among environmental compartments**

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

Adsorption/Soil

not applicable

diphenylmethane-4,4'-diisocyanate

Adsorption/Soil

not applicable

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

Adsorption/Soil

not applicable

Diphenylmethane-2,4'-diisocyanate
Adsorption/Soil
not applicable

2,2'-Methylenediphenyl diisocyanate
Adsorption/Soil
not applicable

Environmental distribution

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers
no data available

diphenylmethane-4,4'-diisocyanate
no data available

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene
no data available

Diphenylmethane-2,4'-diisocyanate
no data available

2,2'-Methylenediphenyl diisocyanate
no data 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 Other adverse effects

Isocyanate reacts with water at the interface forming CO₂ and a solid insoluble product with high melting point (polyurea). This reaction is accelerated by surfactants (e.g. detergents) or by watersoluble solvents. Previous experience shows that polyurea is inert and non-degradable.

SECTION 13: Disposal considerations

Dispose in accordance with applicable international, national and local laws, ordinances and statutes.

For disposal within the EC, the appropriate code according to the European Waste Catalogue (EWC) should be used.

13.1 Waste treatment methods

After final product withdrawal, all residues must be removed from containers (drip-free, powder-free or paste-free). Once the product residues adhering to the walls of the containers have been rendered harmless, the product and hazard labels must be invalidated. These containers can be returned for recycling to the appropriate centres set up within the framework of the existing take-back scheme of the chemical industry. Containers must be recycled in compliance with national legislation and environmental regulations.

None disposal into waste water.

SECTION 14: Transport information

ADR/RID

14.1 UN number	:	Not dangerous goods
14.2 UN proper shipping name	:	Not dangerous goods
14.3 Transport hazard class(es)	:	Not dangerous goods
14.4 Packing group	:	Not dangerous goods
14.5 Environmental hazards	:	Not dangerous goods

ADN

14.1 UN number	:	Not dangerous goods
14.2 UN proper shipping name	:	Not dangerous goods

14.3 Transport hazard class(es) : Not dangerous goods
14.4 Packing group : Not dangerous goods
14.5 Environmental hazards : Not dangerous goods

IATA

14.1 UN number : Not dangerous goods
14.2 UN proper shipping name : Not dangerous goods
14.3 Transport hazard class(es) : Not dangerous goods
14.4 Packing group : Not dangerous goods
14.5 Environmental hazards : Not dangerous goods

IMDG

14.1 UN number : Not dangerous goods
14.2 UN proper shipping name : Not dangerous goods
14.3 Transport hazard class(es) : Not dangerous goods
14.4 Packing group : Not dangerous goods
14.5 Environmental hazards : Not dangerous goods

14.6 Special precautions for user

See section 6 - 8.

Additional information : Not dangerous cargo.
Keep dry. Avoid heat above +50 °C.
Avoid temperatures below +5 °C.
Keep away from foodstuffs, acids and alkalis.

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**

Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances.
not applicable

REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles (Annex XVII)

This product contains substances subject to EU Regulation 1907/2006 (REACH), Annex XVII.

Diphenylmethane-2,4'-diisocyanate

CAS-No.: 5873-54-1

Subject to REACH Annex XVII, No. 56

diphenylmethane-4,4'-diisocyanate

CAS-No.: 101-68-8, EC-No.: 202-966-0

Subject to REACH Annex XVII, No. 56

TA Luft List (Germany)

Type: Organic Substances

portion Class 1: 100 %

Water contaminating class (Germany)

1 slightly water endangering

Classification according to AwSV, Annex 1 (5.2)

Any existing national regulations on the handling of isocyanates must be observed.

15.2 Chemical Safety Assessment**A Chemical Safety Assessment has been carried out for:**

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

diphenylmethane-4,4'-diisocyanate

Oligomeric MDI: oligomeric reaction products of formaldehyde with aniline and phosgene

Diphenylmethane-2,4'-diisocyanate

2,2'-Methylenediphenyl diisocyanate

SECTION 16: Other information

Full text of the hazard statements of the CLP classification (1272/2008/CE) referred to under sections 2, 3 and 10.

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.

ISOPA directives for safe loading/unloading, transport and storage of TDI and MDI. See ISOPA website: www.isopa.org (Product Stewardship „Walk the Talk“).

Safety precautions for handling freshly molded polyurethane parts:

Depending on the production parameters, any uncovered surfaces of freshly molded polyurethane parts using this raw material may contain traces of substances (e. g. starting and reaction products, catalysts, release agents) with hazardous characteristics. Skin contact with traces of these substances must be avoided. Therefore, during demolding or other handling of fresh molded parts, protective gloves tested according to DIN-EN 374 (e.g. nitrile rubber $\geq 0,35$ mm thick, breakthrough time ≥ 480 min, or according to recommendations from glove makers thinner gloves that need to be changed in compliance with breakthrough times more frequently) must be used. Depending on formulation and processing conditions, the requirements may be different from handling of the pure substances. Closed protective clothing is required for the protection of other areas of skin.

Abbreviations and acronyms

ADN	Accord européen relatif au transport international des marchandises Dangereuses par voie de Navigation intérieure
ADR	Accord européen relatif au transport international des marchandises Dangereuses par Route
ANSI	American National Standards Institute
ASTM	American Society of Testing and Materials (US)
ATE	Acute Toxic Estimate
AwSv	Verordnung über Anlagen zum Umgang mit wassergefährdenden Stoffen
BCF	Bioconcentration Factor
CAS	Chemical Abstract Service
CLP	Regulation on Classification, Labelling and Packaging of Substances and Mixtures
CMR	Cancerogenic Mutagenic Reprotoxic
DIN	Deutsches Institut für Normung
DNEL	Derived No-Effect Level
EC...	Effect Concentration ... %
EWC	European Waste Catalogue
IATA	International Air Transport Association
IBC	Intermediate Bulk Container
ICAO	International Civil Aviation Organization
IMDG	International Maritime Dangerous Goods
IMO	International Maritime Organization
ISO	International Organization for Standardization
IUPAC	International Union of Pure and Applied Chemistry
LOAEL	Lowest Observable Adverse Effect Level
LC...	Lethal Concentration, ...%
LD...	Lethal Dose, ...%
MARPOL	International Convention for the Prevention of Pollution From Ships
NOAEL	No Observed Adverse Effect Level
NOEL/NOEC	No Observed Effect Level/Concentration
OECD	Organisation for Economic Co-operation and Development
PBT	persistent, bioaccumulative, toxic
PNEC	Predicted No-Effect Concentration
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
RID	Règlement concernant le transport International ferroviaire de marchandises Dangereuses
STOT	Specific Target Organ Toxicity
TRGS	Technische Regeln für Gefahrstoffe
vPvB	very Persistent, very Bioaccumulative
WGK	Wassergefährdungsklasse

Changes since the last version are highlighted in the margin. This version replaces all previous versions.

Further information

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

Annex - Exposure Scenario

The operational conditions and the implementation of Risk Management Measures (RMM) are dependent on the following priority-/lead substances for the respective exposure routes:

Lead substance(s), aquatic environment:

Not relevant

Lead substance(s), ozone layer:

Not relevant

Priority substance(s), Health:

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

Local effects, Skin:

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

Local effects, Inhalation:

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

Local effects, Eyes:

Carbodiimid modified MDI: Methylenediphenyldiisocyanate, oligomers

Summary of Exposure Scenarios

Formulation or re-packing, Distribution of substance, (including resin manufacture) (ES1)	: SU 3; PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15; ERC2
Use at industrial sites, Use as an intermediate (ES2)	: SU 3; PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15; ERC6a
Use at industrial sites, Flexible foam (ES3)	: SU 3; PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC14, PROC15, PROC21; ERC6c
Use at industrial sites, Rigid foam (ES4)	: SU 3; PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC15, PROC21; ERC6c
Use at industrial sites, Use in coatings (ES5)	: SU 3; PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC15, PROC21; ERC6c
Use at industrial sites, Adhesives, sealants (ES6)	: SU 3; PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC21; ERC6c
Use at industrial sites, Elastomers, Thermoplastic polyurethane, Polyamide, polyimide & synthetic fibres, Manufacturing of other Polymers (ES7)	: SU 3; PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC14, PROC15, PROC21; ERC6c
Use at industrial sites, Composite Material Based on Wood/Man-made/Mineral/Natural Fibres (ES8)	: SU 3; PROC1, PROC2, PROC3, PROC5, PROC7, PROC8a, PROC8b, PROC10, PROC14, PROC15, PROC24a, PROC24c; ERC5
Use at industrial sites, Foundry (ES9)	: SU 3; PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC14, PROC15, PROC21; ERC5
Use at industrial sites, Other composite material (ES10)	: SU 3; PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC14, PROC15,

	PROC21; ERC5
Use at industrial sites, Cleaning, with Aprotic Polar Solvents below 40°C (ES11)	: SU 3; PROC3, PROC4, PROC5, PROC8a, PROC10, PROC13, PROC15; ERC4
Use at industrial sites, Cleaning, with Aprotic Polar Solvents above 40°C (ES12)	: SU 3; PROC1; ERC4
Use at industrial sites, Cleaning, without Aprotic Polar Solvents (ES13)	: SU 3; PROC1, PROC3, PROC4, PROC5, PROC8a, PROC10, PROC13, PROC15; ERC4
Widespread use by professional workers, Rigid foam (ES14)	: SU 22; PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC10, PROC11, PROC21; ERC8c, ERC8f
Widespread use by professional workers, Use in coatings (ES15)	: SU 22; PROC4, PROC5, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC21; ERC8c, ERC8f
Widespread use by professional workers, Adhesives, sealants (ES16)	: SU 22; PROC4, PROC5, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC21; ERC8c, ERC8f
Widespread use by professional workers, Composite Material Based on Wood/Man-made/Mineral/Natural Fibres (ES17)	: SU 22; PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC10, PROC11, PROC14, PROC24a, PROC24c; ERC8c, ERC8f
Widespread use by professional workers, Other composite material (ES18)	: SU 22; PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC10, PROC13, PROC14, PROC21; ERC8c, ERC8f
Widespread use by professional workers, Cleaning, without Aprotic Polar Solvents (ES19)	: SU 22; PROC3, PROC4, PROC5, PROC8a, PROC10, PROC13, PROC15; ERC8a, ERC8d
Consumer use, Rigid foam (ES20)	: SU 21; PC1; ERC8c, ERC8f
Consumer use, Use in coatings (ES21)	: SU 21; PC9a; ERC8c, ERC8f
Consumer use, Adhesives, sealants (ES22)	: SU 21; PC1; ERC8c, ERC8f

1. Short title of Exposure Scenario: **Formulation or re-packing, Distribution of substance, (including resin manufacture) (ES1)**

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

Environmental release category : **ERC2: Formulation of preparations**

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

PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

PROC15: Use as laboratory reagent

2.1 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15

□
Formulation or re-packing, Distribution of substance, (including resin manufacture)

Product characteristics

Concentration of the Substance in Mixture/Article

All PROCs	: <= 100%
Molar Mass	: 250 g/mol
Vapour pressure	: 0,001 Pa at 20 °C
Physical Form (at time of use)	: Low volatile liquid

Frequency and duration of use

General exposures	: 8 hours/day
PROC 5	: 1 hours/day
PROC 8a	: 1 hours/day
Remarks	: daily or less , Short term
PROC 8b	: 1 hours/day
Remarks	: daily or less , Short term
Frequency of use	: 5 days/week

Human factors not influenced by risk management

Exposed skin area	:
PROC 1, PROC 3, PROC 15	: 240 cm ² (palm of one hand)
PROC 2, PROC 4, PROC 5, PROC 9	: 480 cm ² (palms of both hands)
PROC 8a, PROC 8b	: 960 cm ² (both hands)

Other operational conditions affecting workers exposure

Outdoor / Indoor	: Indoor
Process Temperature	:
PROC 4	: 50 °C
All other PROCs	: 23 °C

Technical conditions and measures

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

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 temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Handle substance within a predominantly closed system provided with extract ventilation. Handle in a fume cupboard or under extract ventilation.

Additional measures are specific for the following contributing scenarios:

PROC1: Use in closed process, no likelihood of exposure

Handle substance within a closed system.

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. 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)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings. Ensure control measures are regularly inspected and maintained.

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Handle substance within a closed system.

PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings. Ensure control measures are regularly inspected and maintained.

PROC15: Use as laboratory reagent: With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. OR Provide extract ventilation to material transfer points and other openings. OR Handle in a fume cupboard or under extract ventilation.

PROC15: Use as laboratory reagent: Without Local exhaust ventilation (LEV)

Ensure the ventilation system is regularly maintained and tested.

Organisational measures to prevent /limit releases, dispersion and exposure

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Ensure control measures are regularly inspected and maintained.

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

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported. Wear a full face respirator conforming to EN136. 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.

Additional measures are specific for the following contributing scenarios:

PROC15: Use as laboratory reagent: Without Local exhaust ventilation (LEV)

Wear suitable respiratory protection.

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	EasyTRA v4.1	General ventilation: 30%, Closed system, Efficiency: 90%	long term, inhalative, local	0,0013 mg/m ³	0,026
2.1 PROC 2	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,013 mg/m ³	0,26
2.1 PROC 3	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,013 mg/m ³	0,26
2.1 PROC 4	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, Respirator: 90% protection	long term, inhalative, local	0,0006 mg/m ³	0,012
2.1 PROC 5	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative, local	0,000847 mg/m ³	0,01694
2.1 PROC 8a	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,0036 mg/m ³	0,072
2.1 PROC 8b	EasyTRA v4.1	General ventilation: 30%, Closed system, 99% efficiency	long term, inhalative, local	0,00364 mg/m ³	0,0728
2.1 PROC 9	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative, local	0,004766 mg/m ³	0,095324
2.1 PROC 15	EasyTRA v4.1	General ventilation: 30%, AND, LEV: 90% efficiency, OR,	long term, inhalative,	0,00558 mg/m ³	0,1116

		Respirator: 90% protection Gloves: 90% protection	local Dermal exposure		
2.1 All PROCs	Qualitative assessment			*	< 1

Based on the applied RMMs the risk towards humans is sufficiently controlled ($RCR \leq 1$).

* Qualitative approach used to conclude safe use.

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

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in section 2. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

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

1. Short title of Exposure Scenario: Use at industrial sites, Use as an intermediate (ES2)

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) 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) PROC15: Use as laboratory reagent
Environmental release category	: ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

**2.1 Contributing scenario controlling worker exposure for:
PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15**

□

Use at industrial sites, Use as an intermediate**Product characteristics**

Concentration of the Substance in Mixture/Article

All PROCs : ≤ 100%

Molar Mass : 250 g/mol

Vapour pressure : 0,001 Pa at 20 °C

Physical Form (at time of use) : Low volatile liquid

Frequency and duration of use

General exposures : 8 hours/day

PROC 5 : 1 hours/day**PROC 8a** : 1 hours/day

Remarks : daily or less , Short term

PROC 8b : 8 hours/day

Remarks : daily or less , Short term

Frequency of use : 5 days/week

Human factors not influenced by risk management

Exposed skin area :

PROC 1, PROC 3, PROC 15 : 240 cm² (palm of one hand)**PROC 2, PROC 4, PROC 5, PROC 9** : 480 cm² (palms of both hands)**PROC 8a, PROC 8b** : 960 cm² (both hands)**Other operational conditions affecting workers exposure**

Outdoor / Indoor	: Indoor
Process Temperature	:
PROC 4	: 50 °C
All other PROCs	: 23 °C

Technical conditions and measures

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

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 temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Handle substance within a predominantly closed system provided with extract ventilation. Handle in a fume cupboard or under extract ventilation.

Additional measures are specific for the following contributing scenarios:

PROC1: Use in closed process, no likelihood of exposure

Handle substance within a closed system.

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises: With Local exhaust ventilation (LEV), AND, With respiratory protection

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. 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)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings. Ensure control measures are regularly inspected and maintained.

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

Ensure control measures are regularly inspected and maintained.

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Handle substance within a closed system.

PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings. Ensure control measures are regularly inspected and maintained.

PROC15: Use as laboratory reagent: With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. OR Provide extract ventilation to material transfer points and other openings. or Handle in a fume cupboard or under extract ventilation.

PROC15: Use as laboratory reagent: Without Local exhaust ventilation (LEV)

Ensure the ventilation system is regularly maintained and tested.

Organisational measures to prevent /limit releases, dispersion and exposure

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Ensure control measures are regularly inspected and maintained.

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

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported. Wear a full face respirator conforming to EN136. 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.

Additional measures are specific for the following contributing scenarios:

PROC15: Use as laboratory reagent: Without Local exhaust ventilation (LEV)

Wear suitable respiratory protection.

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
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					value/DNEL)
2.1 PROC 1	EasyTRA v4.1	General ventilation: 30%, Closed system, Efficiency: 90%	long term, inhalative, local	0,0013 mg/m ³	0,026
2.1 PROC 2	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,013 mg/m ³	0,26
2.1 PROC 3	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,013 mg/m ³	0,26
2.1 PROC 4	EasyTRA v4.1	General ventilation: 30%, Respirator: 98% protection	long term, inhalative, local	0,0006 mg/m ³	0,012
2.1 PROC 4	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, AND, Respirator: 90% protection	long term, inhalative, local	0,0006 mg/m ³	0,012
2.1 PROC 5	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative, local	0,000847 mg/m ³	0,01694
2.1 PROC 8a	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,0036 mg/m ³	0,072
2.1 PROC 8b	EasyTRA v4.1	General ventilation: 30%, Closed system, 99% efficiency	long term, inhalative, local	0,0036 mg/m ³	0,072
2.1 PROC 9	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative, local	0,004766 mg/m ³	0,095324
2.1 PROC 15	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, OR, Respirator: 90% protection	long term, inhalative, local	0,00558 mg/m ³	0,1116
2.1 All PROCs	Qualitative assessment	Gloves: 90% protection	Dermal exposure	*	< 1

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

* Qualitative approach used to conclude safe use.

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

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in section 2. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

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

1. Short title of Exposure Scenario: Use at industrial sites, Flexible foam (ES3)

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 PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC15: Use as laboratory reagent PROC21: Low energy manipulation of substances bound in materials and/ or articles
Environmental release category	: ERC6c: Industrial use of monomers for manufacture of thermoplastics

2.1 Contributing scenario controlling worker exposure for:**PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC14, PROC15, PROC21****Use at industrial sites, Flexible foam****Product characteristics**

Concentration of the Substance in Mixture/Article

PROC 1	: <= 100%
PROC 15	: <= 100%
PROC 21	: <= 1%
All other PROCs	: <= 60%
Molar Mass	: 250 g/mol
Vapour pressure	: 0,001 Pa at 20 °C
Physical Form (at time of use)	: PROC 21, : Solid, low dustiness
	All other PROCs, : Low volatile liquid

Frequency and duration of use

General exposures	: 8 hours/day
PROC 4	: 4 hours/day
Remarks	: Slabstock Tunnel operator and Slabstock Laydown operator
PROC 4	: 8 hours/day
Remarks	: Open Moulding/Foaming

PROC 5	: 1 hours/day
PROC 8a	: 1 hours/day
Remarks	: daily or less , Short term
PROC 8b	: 1 hours/day
Remarks	: daily or less , Short term
PROC 14	: 1 hours/day
Frequency of use	: 5 days/week

Human factors not influenced by risk management

Exposed skin area	:
PROC 1, PROC 3, PROC 15	: 240 cm ² (palm of one hand)
PROC 2, PROC 4, PROC 5, PROC 9, PROC 14	: 480 cm ² (palms of both hands)
PROC 7	: 1500 cm ² (both hands and forearms)
PROC 8a, PROC 8b	: 960 cm ² (both hands)
PROC 21	: 1980 cm ² (both hands and forearms)

Other operational conditions affecting workers exposure

Outdoor / Indoor	: Indoor
Process Temperature	:
PROC 1	: 23 °C
PROC 5	: 23 °C
PROC 8a	: 23 °C
PROC 8b	: 23 °C
PROC 15	: 23 °C
PROC 21	: 35 °C
All other PROCs	: 50 °C

Technical conditions and measures

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

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 temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Handle substance within a predominantly closed system provided with extract ventilation. Handle in a fume cupboard or under extract ventilation.

Additional measures are specific for the following contributing scenarios:

PROC1: Use in closed process, no likelihood of exposure

Handle substance within a closed system.

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises: Slabstock Tunnel operator

Local exhaust ventilation is required.

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises: Slabstock Laydown operator, Open Moulding/Foaming

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. 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)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC7: Industrial spraying

Local exhaust ventilation is required. Handle substance within a predominantly closed system provided with extract ventilation. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Handle substance within a closed system.

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

Local exhaust ventilation is required.

PROC15: Use as laboratory reagent: With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. OR Provide extract ventilation to material transfer points and other openings. OR Handle in a fume cupboard or under extract ventilation.

PROC15: Use as laboratory reagent: Without Local exhaust ventilation (LEV)

Ensure the ventilation system is regularly maintained and tested.

Organisational measures to prevent /limit releases, dispersion and exposure

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Ensure control measures are regularly inspected and maintained.

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)

Ensure control measures are regularly inspected and maintained.

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

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested

to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported. Wear a full face respirator conforming to EN136. 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.

Additional measures are specific for the following contributing scenarios:

PROC15: Use as laboratory reagent: Without Local exhaust ventilation (LEV)

Wear suitable respiratory protection.

General advice

Irrespective of the stated risk management measures respiratory protection is generally recommended for spraying applications.

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	EasyTRA v4.1	General ventilation: 30%, Closed system, Efficiency: 90%	long term, inhalative, local	0,000921 mg/m ³	0,01842
2.1 PROC 2	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 PROC 3	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 PROC 4 Slabstock Tunnel operator	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, Respirator: 90% protection	long term, inhalative, local	0,00003 mg/m ³	0,0006
2.1 PROC 4 Slabstock Laydown operator	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, Respirator: 90% protection	long term, inhalative, local	0,00029 mg/m ³	0,0058
2.1 PROC 4 Open Moulding/Foaming	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, Respirator: 90% protection	long term, inhalative, local	0,0006 mg/m ³	0,012
2.1 PROC 5	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative, local	0,00011 mg/m ³	0,0022
2.1 PROC 7	EasyTRA v4.1	General ventilation: 30%, LEV: 95% efficiency, Respirator: 90% protection	long term, inhalative, local	0,01022 mg/m ³	0,2044
2.1 PROC 8a	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,0036 mg/m ³	0,072
2.1 PROC 8b	EasyTRA v4.1	General ventilation: 30%,	long term,	0,00364 mg/m ³	0,0728

		Closed system, 99% efficiency	inhalative, local		
2.1 PROC 14	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, Respirator: 90% protection	long term, inhalative, local	0,00007 mg/m ³	0,0014
2.1 PROC 15	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, OR, Respirator: 90% protection	long term, inhalative, local	0,00558 mg/m ³	0,1116
2.1 PROC 21	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00921	0,1842
2.1 All PROCs	Qualitative assessment	Gloves: 90% protection	Dermal exposure	*	< 1

Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR $\leq$ 1).

* Qualitative approach used to conclude safe use.

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

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in section 2. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

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

1. Short title of Exposure Scenario: **Use at industrial sites, Rigid foam (ES4)**

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 PROC15: Use as laboratory reagent PROC21: Low energy manipulation of substances bound in materials and/ or articles
Environmental release category	: ERC6c: Industrial use of monomers for manufacture of thermoplastics

2.1 Contributing scenario controlling worker exposure for:

PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC15, PROC21



Use at industrial sites, Rigid foam

Product characteristics

Concentration of the Substance in Mixture/Article

PROC 1	: <= 100%
PROC 3	: <= 100%
PROC 4	: <= 100%
PROC 15	: <= 100%
PROC 21	: <= 1%
All other PROCs	: <= 60%
Molar Mass	: 250 g/mol
Vapour pressure	: 0,001 Pa at 20 °C
Physical Form (at time of use)	: PROC 21, : Solid, low dustiness All other PROCs, : Low volatile liquid

Frequency and duration of use

General exposures	: 8 hours/day
PROC 5	: 1 hours/day
PROC 8a	: 1 hours/day
Remarks	: daily or less , Short term
PROC 8b	: 1 hours/day
Remarks	: daily or less , Short term
Frequency of use	: 5 days/week

Human factors not influenced by risk management

Exposed skin area	:
PROC 1, PROC 3, PROC 15	: 240 cm ² (palm of one hand)
PROC 2, PROC 4, PROC 5, PROC 9	: 480 cm ² (palms of both hands)
PROC 7	: 1500 cm ² (both hands and forearms)
PROC 8a, PROC 8b, PROC 10	: 960 cm ² (both hands)
PROC 21	: 1980 cm ² (both hands and forearms)

Other operational conditions affecting workers exposure

Outdoor / Indoor	: Indoor
Process Temperature	:
PROC 4	: 50 °C
PROC 21	: 35 °C
All other PROCs	: 23 °C

Technical conditions and measures

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

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 temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Handle substance within a predominantly closed system provided with extract ventilation. Handle in a fume cupboard or under extract ventilation.

Additional measures are specific for the following contributing scenarios:

PROC1: Use in closed process, no likelihood of exposure

Handle substance within a closed system.

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. 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)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC7: Industrial spraying

Local exhaust ventilation is required. Handle substance within a predominantly closed system provided with extract ventilation. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer

points and other openings.

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Handle substance within a closed system.

PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC15: Use as laboratory reagent: With Local exhaust ventilation (LEV), Without respiratory protection

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. OR Provide extract ventilation to material transfer points and other openings. or Handle in a fume cupboard or under extract ventilation.

PROC15: Use as laboratory reagent: With respiratory protection, Without Local exhaust ventilation (LEV)

Ensure the ventilation system is regularly maintained and tested.

Organisational measures to prevent /limit releases, dispersion and exposure

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Ensure control measures are regularly inspected and maintained.

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)

Ensure control measures are regularly inspected and maintained.

PROC7: Industrial spraying

Ensure control measures are regularly inspected and maintained.

PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Ensure control measures are regularly inspected and maintained.

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

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported. Wear a full face respirator conforming to EN136. 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.

Additional measures are specific for the following contributing scenarios:

PROC15: Use as laboratory reagent: With respiratory protection, Without Local exhaust ventilation (LEV)

Wear suitable respiratory protection.

General advice

Irrespective of the stated risk management measures respiratory protection is generally recommended for spraying applications.

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	EasyTRA v4.1	General ventilation: 30%, Closed system, Efficiency: 90%	long term, inhalative, local	0,00092 mg/m ³	0,0184
2.1 PROC 2	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 PROC 3	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 PROC 4	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, Respirator: 90% protection	long term, inhalative, local	0,0006 mg/m ³	0,012
2.1 PROC 5	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative, local	0,00011 mg/m ³	0,0022
2.1 PROC 7	EasyTRA v4.1	General ventilation: 30%, LEV: 95% efficiency	long term, inhalative, local	0,01022 mg/m ³	0,2044
2.1 PROC 8a	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,0036 mg/m ³	0,072
2.1 PROC 8b	EasyTRA v4.1	General ventilation: 30%, Closed system, 99% efficiency	long term, inhalative, local	0,00364 mg/m ³	0,0728
2.1 PROC 9	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative,	0,004766 mg/m ³	0,095324

			local		
2.1 PROC 10	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,017 mg/m ³	0,340
2.1 PROC 15	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, OR, Respirator: 90% protection	long term, inhalative, local	0,00558 mg/m ³	0,1116
2.1 PROC 21	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 All PROCs	Qualitative assessment	Gloves: 90% protection	Dermal exposure	*	< 1

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

* Qualitative approach used to conclude safe use.

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

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in section 2. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

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

1. Short title of Exposure Scenario: Use at industrial sites, Use in coatings (ES5)

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 PROC15: Use as laboratory reagent PROC21: Low energy manipulation of substances bound in materials and/ or articles
Environmental release category	: ERC6c: Industrial use of monomers for manufacture of thermoplastics

2.1 Contributing scenario controlling worker exposure for:
PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC15, PROC21

**Use at industrial sites, Use in coatings****Product characteristics**

Concentration of the Substance in Mixture/Article

PROC 1	: <= 100%
PROC 3	: <= 100%
PROC 15	: <= 100%
PROC 21	: <= 1%
All other PROCs	: <= 60%
Molar Mass	: 250 g/mol
Vapour pressure	: 0,001 Pa at 20 °C
Physical Form (at time of use)	: PROC 21, : Solid, low dustiness All other PROCs, : Low volatile liquid

Frequency and duration of use

General exposures	: 8 hours/day
PROC 5	: 1 hours/day
PROC 8a	: 1 hours/day
Remarks	: daily or less , Short term
PROC 8b	: 1 hours/day
Remarks	: daily or less , Short term
Frequency of use	: 5 days/week

Human factors not influenced by risk management

Exposed skin area	:
PROC 1, PROC 3, PROC 15	: 240 cm ² (palm of one hand)
PROC 2, PROC 4, PROC 5, PROC 9, PROC 13	: 480 cm ² (palms of both hands)
PROC 7	: 1500 cm ² (both hands and forearms)
PROC 8a, PROC 8b, PROC 10	: 960 cm ² (both hands)
PROC 21	: 1980 cm ² (both hands and forearms)

Other operational conditions affecting workers exposure

Outdoor / Indoor	: Indoor
Process Temperature	:
PROC 4	: 50 °C
All other PROCs	: 23 °C

Technical conditions and measures

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

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 temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Handle substance within a predominantly closed system provided with extract ventilation. Handle in a fume cupboard or under extract ventilation.

Additional measures are specific for the following contributing scenarios:

PROC1: Use in closed process, no likelihood of exposure

Handle substance within a closed system.

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. 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)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC7: Industrial spraying

Local exhaust ventilation is required. Handle substance within a predominantly closed system provided with extract ventilation. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Handle in semi-closed process with occasional controlled exposure.

PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC15: Use as laboratory reagent: With Local exhaust ventilation (LEV), Without respiratory protection

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. OR Provide extract ventilation to material transfer points and other openings. or Handle in a fume cupboard or under extract ventilation.

PROC15: Use as laboratory reagent: With respiratory protection, Without Local exhaust ventilation (LEV)

Ensure the ventilation system is regularly maintained and tested.

Organisational measures to prevent /limit releases, dispersion and exposure

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Ensure control measures are regularly inspected and maintained.

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)

Ensure control measures are regularly inspected and maintained.

PROC7: Industrial spraying

Ensure control measures are regularly inspected and maintained.

PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Ensure control measures are regularly inspected and maintained.

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

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported. Wear a full face respirator conforming to EN136. 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.

Additional measures are specific for the following contributing scenarios:

PROC15: Use as laboratory reagent: With respiratory protection, Without Local exhaust ventilation (LEV)

Wear suitable respiratory protection.

General advice

Irrespective of the stated risk management measures respiratory protection is generally recommended for spraying applications.

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	EasyTRA v4.1	General ventilation: 30%, Closed system, Efficiency: 90%	long term, inhalative, local	0,00092 mg/m ³	0,0184
2.1 PROC 2	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 PROC 3	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 PROC 4	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, Respirator: 90% protection	long term, inhalative, local	0,0006 mg/m ³	0,012
2.1 PROC 5	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative, local	0,00011 mg/m ³	0,0022
2.1 PROC 7	EasyTRA v4.1	General ventilation: 30%, LEV: 95% efficiency	long term, inhalative, local	0,01022 mg/m ³	0,2044
2.1 PROC 8a	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,0036 mg/m ³	0,072
2.1 PROC 8b	EasyTRA v4.1	General ventilation: 30%, Closed system, 99% efficiency	long term, inhalative, local	0,00364 mg/m ³	0,0728
2.1 PROC 9	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative, local	0,004766 mg/m ³	0,095324

2.1 PROC 10	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,017 mg/m ³	0,340
2.1 PROC 13	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,017 mg/m ³	0,340
2.1 PROC 15	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, OR, Respirator: 90% protection	long term, inhalative, local	0,00558 mg/m ³	0,1116
2.1 PROC 21	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 All PROCs	Qualitative assessment	Gloves: 90% protection	Dermal exposure	*	< 1

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

* Qualitative approach used to conclude safe use.

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

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in section 2. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

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

1. Short title of Exposure Scenario: Use at industrial sites, Adhesives, sealants (ES6)

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 tableting, compression, extrusion, pelletisation PROC15: Use as laboratory reagent PROC21: Low energy manipulation of substances bound in materials and/ or articles
Environmental release category	: ERC6c: Industrial use of monomers for manufacture of thermoplastics

2.1 Contributing scenario controlling worker exposure for:

PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC21



Use at industrial sites, Adhesives, sealants

Product characteristics

Concentration of the Substance in Mixture/Article

PROC 1	: <= 100%
PROC 3	: <= 100%
PROC 15	: <= 100%
PROC 21	: <= 1%
All other PROCs	: <= 60%
Molar Mass	: 250 g/mol
Vapour pressure	: 0,001 Pa at 20 °C
Physical Form (at time of use)	: PROC 21, : Solid, low dustiness All other PROCs, : Low volatile liquid

Frequency and duration of use

General exposures	: 8 hours/day
PROC 5	: 1 hours/day
PROC 8a	: 1 hours/day
Remarks	: daily or less Short term
PROC 8b	: 1 hours/day
Remarks	: daily or less Short term
Frequency of use	: 5 days/week

Human factors not influenced by risk management

Exposed skin area	:
PROC 1, PROC 3, PROC 15	: 240 cm ² (palm of one hand)
PROC 2, PROC 4, PROC 5, PROC 9, PROC 13, PROC 14	: 480 cm ² (palms of both hands)
PROC 7	: 1500 cm ² (both hands and forearms)
PROC 8a, PROC 8b, PROC 10	: 960 cm ² (both hands)
PROC 21	: 1980 cm ² (both hands and forearms)

Other operational conditions affecting workers exposure

Outdoor / Indoor	: Indoor
Process Temperature	:
PROC 4	: 50 °C
PROC 14	: 50 °C
All other PROCs	: 23 °C

Technical conditions and measures

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

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 temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Handle substance within a predominantly closed system provided with extract ventilation. Handle in a fume cupboard or under extract ventilation.

Additional measures are specific for the following contributing scenarios:

PROC1: Use in closed process, no likelihood of exposure

Handle substance within a closed system.

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. 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)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC7: Industrial spraying

Local exhaust ventilation is required. Handle substance within a predominantly closed system provided with extract

ventilation. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Handle substance within a closed system.

PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC15: Use as laboratory reagent: With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. OR Provide extract ventilation to material transfer points and other openings. or Handle in a fume cupboard or under extract ventilation.

PROC15: Use as laboratory reagent: Without Local exhaust ventilation (LEV), With respiratory protection

Ensure the ventilation system is regularly maintained and tested.

Organisational measures to prevent /limit releases, dispersion and exposure

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Ensure control measures are regularly inspected and maintained.

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)

Ensure control measures are regularly inspected and maintained.

PROC7: Industrial spraying

Ensure control measures are regularly inspected and maintained.

PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Ensure control measures are regularly inspected and maintained.

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

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric

substances and BELOW 45°C for other MDI based substances or without spraying:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported. Wear a full face respirator conforming to EN136. 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.

Additional measures are specific for the following contributing scenarios:

PROC15: Use as laboratory reagent: Without Local exhaust ventilation (LEV), With respiratory protection

Wear suitable respiratory protection.

General advice

Irrespective of the stated risk management measures respiratory protection is generally recommended for spraying applications.

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	EasyTRA v4.1	General ventilation: 30%, Closed system, Efficiency: 90%	long term, inhalative, local	0,00092 mg/m ³	0,0184
2.1 PROC 2	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 PROC 3	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 PROC 4	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, Respirator: 90% protection	long term, inhalative, local	0,0006 mg/m ³	0,012
2.1 PROC 5	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative, local	0,00011 mg/m ³	0,0022
2.1 PROC 7	EasyTRA v4.1	General ventilation: 30%, LEV: 95% efficiency	long term, inhalative, local	0,01022 mg/m ³	0,2044
2.1 PROC 8a	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,0036 mg/m ³	0,072
2.1 PROC 8b	EasyTRA v4.1	General ventilation: 30%, Closed system, 99% efficiency	long term, inhalative, local	0,00364 mg/m ³	0,0728

2.1 PROC 9	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative, local	0,004766 mg/m ³	0,095324
2.1 PROC 10	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,017 mg/m ³	0,340
2.1 PROC 13	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,017 mg/m ³	0,340
2.1 PROC 14	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00576 mg/m ³	0,1152
2.1 PROC 15	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, OR, Respirator: 90% protection	long term, inhalative, local	0,00558 mg/m ³	0,1116
2.1 PROC 21	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 All PROCs	Qualitative assessment	Gloves: 90% protection	Dermal exposure	*	< 1

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

* Qualitative approach used to conclude safe use.

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

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in section 2. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

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

1. Short title of Exposure Scenario: Use at industrial sites, Elastomers, Thermoplastic polyurethane, Polyamide, polyimide & synthetic fibres, Manufacturing of other Polymers (ES7)

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 PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC15: Use as laboratory reagent PROC21: Low energy manipulation of substances bound in materials and/ or articles
Environmental release category	: ERC6c: Industrial use of monomers for manufacture of thermoplastics

2.1 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC14, PROC15, PROC21



Use at industrial sites, Elastomers, Thermoplastic polyurethane, Polyamide, polyimide & synthetic fibres, Manufacturing of other Polymers

Product characteristics

Concentration of the Substance in Mixture/Article

PROC 21	: <= 1%
All other PROCs	: <= 100%
Molar Mass	: 250 g/mol
Vapour pressure	: 0,001 Pa at 20 °C
Physical Form (at time of use)	: PROC 21, : Solid, low dustiness All other PROCs, : Low volatile liquid

Frequency and duration of use

General exposures	: 8 hours/day
PROC 5	: 1 hours/day

PROC 8a	:	1 hours/day
Remarks	:	daily or less , Short term
PROC 8b	:	1 hours/day
Remarks	:	daily or less , Short term
Frequency of use	:	5 days/week

Human factors not influenced by risk management

Exposed skin area	:	
PROC 1, PROC 3, PROC 15	:	240 cm ² (palm of one hand)
PROC 2, PROC 4, PROC 5, PROC 9, PROC 14	:	480 cm ² (palms of both hands)
PROC 7	:	1500 cm ² (both hands and forearms)
PROC 8a, PROC 8b, PROC 10	:	960 cm ² (both hands)
PROC 21	:	1980 cm ² (both hands and forearms)

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor
Process Temperature	:	
PROC 1	:	23 °C
PROC 5	:	23 °C
PROC 8a	:	23 °C
PROC 8b	:	23 °C
PROC 10	:	23 °C
PROC 15	:	23 °C
PROC 21	:	35 °C
All other PROCs	:	100 °C

Technical conditions and measures

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

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 temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Handle substance within a predominantly closed system provided with extract ventilation. Handle in a fume cupboard or under extract ventilation.

Additional measures are specific for the following contributing scenarios:

PROC1: Use in closed process, no likelihood of exposure

Handle substance within a closed system.

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. 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)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC7: Industrial spraying

Local exhaust ventilation is required. Handle substance within a predominantly closed system provided with extract ventilation. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Handle substance within a closed system.

PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC15: Use as laboratory reagent: With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. OR Provide extract ventilation to material transfer points and other openings. or Handle in a fume cupboard or under extract ventilation.

PROC15: Use as laboratory reagent: Without Local exhaust ventilation (LEV), With respiratory protection

Ensure the ventilation system is regularly maintained and tested.

Organisational measures to prevent /limit releases, dispersion and exposure

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Ensure control measures are regularly inspected and maintained.

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)

Ensure control measures are regularly inspected and maintained.

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

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents

BELOW 40°C:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. Wear a full face respirator conforming to EN136. 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. The use of latex gloves is not supported.

Additional measures are specific for the following contributing scenarios:

PROC15: Use as laboratory reagent: Without Local exhaust ventilation (LEV), With respiratory protection

Wear suitable respiratory protection.

General advice

Irrespective of the stated risk management measures respiratory protection is generally recommended for spraying applications.

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	EasyTRA v4.1	General ventilation: 30%, Closed system, Efficiency: 90%	long term, inhalative, local	0,00092 mg/m ³	0,0184
2.1 PROC 2	EasyTRA v4.1	General ventilation: 30%, Respirator: 90% protection	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 PROC 3	EasyTRA v4.1	General ventilation: 30%, Respirator: 90% protection	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 PROC 4	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, Respirator: 90% protection	long term, inhalative, local	0,0006 mg/m ³	0,012
2.1 PROC 5	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative, local	0,00011 mg/m ³	0,0022
2.1 PROC 7	EasyTRA v4.1	General ventilation: 30%, LEV: 95% efficiency, Respirator: 90% protection	long term, inhalative, local	0,01022 mg/m ³	0,2044
2.1 PROC 8a	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,0036 mg/m ³	0,072
2.1 PROC 8b	EasyTRA v4.1	General ventilation: 30%, Closed system, 99% efficiency	long term, inhalative, local	0,00364 mg/m ³	0,0728
2.1 PROC 9	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, Respirator: 90% protection	long term, inhalative, local	0,004766 mg/m ³	0,095324
2.1 PROC 10	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,017 mg/m ³	0,340
2.1 PROC 14	EasyTRA v4.1	General ventilation: 30%, Respirator: 90% protection	long term, inhalative, local	0,00576 mg/m ³	0,1152
2.1 PROC 15	EasyTRA v4.1	General ventilation: 30%, LEV:	long term,	0,00558 mg/m ³	0,1116

		90% efficiency, OR, Respirator: 90% protection	inhalative, local		
2.1 PROC 21	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 All PROCs	Qualitative assessment	Gloves: 90% protection	Dermal exposure	*	< 1

Based on the applied RMMs the risk towards humans is sufficiently controlled ($RCR \leq 1$).

* Qualitative approach used to conclude safe use.

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

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in section 2. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

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

1. Short title of Exposure Scenario: **Use at industrial sites, Composite Material Based on Wood/Man-made/Mineral/Natural Fibres (ES8)**

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) 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 PROC10: Roller application or brushing PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC15: Use as laboratory reagent PROC24a: High (mechanical) energy work-up of substances bound in materials and/or articles - pt < mp - Low Fugacity PROC24c: High (mechanical) energy work-up of substances bound in materials and/or articles - pt > mp - High Fugacity
Environmental release category	: ERC5: Industrial use resulting in inclusion into or onto a matrix

2.1 Contributing scenario controlling worker exposure for:

PROC1, PROC2, PROC3, PROC5, PROC7, PROC8a, PROC8b, PROC10, PROC14, PROC15, PROC24a, PROC24c



Use at industrial sites, Composite Material Based on Wood/Man-made/Mineral/Natural Fibres

Product characteristics

Concentration of the Substance in Mixture/Article

PROC 1, PROC 15, PROC 24c : <= 100%

PROC 2, PROC 3 : <= 10%

PROC 7 : <= 10%

Remarks : Cleaning with air pressurised systems

PROC 8b, PROC 10, PROC 14 : <= 10%

PROC 5 : <= 60%

PROC 7 : <= 60%

Remarks : Substrate spraying

PROC 8a : <= 60%

PROC 24a : <= 1%

Molar Mass : 250 g/mol

Vapour pressure : 0,001 Pa at 20 °C

Physical Form (at time of use)	:	PROC 1, PROC 5 PROC 7, Substrate spraying PROC 8a, PROC 8b, PROC 14, : Low volatile liquid PROC 2, Close to the mat line PROC 2, Sampling, maintenance or occasional interventions/inspections PROC 3, PROC 10, PROC 15, PROC 24a, : Solid, low dustiness PROC 2, Close to the former line PROC 7, Cleaning with air pressurised systems, : Solid, medium dustiness PROC 24c, : Solid, high dustiness
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Frequency and duration of use

General exposures	:	8 hours/day
PROC 2	:	7,5 seconds/day
Remarks	:	Close to the mat line
PROC 2	:	2 hours/day
Remarks	:	Close to the former line
PROC 2	:	8 hours/day
Remarks	:	Sampling, maintenance or occasional interventions/inspections
PROC 5	:	1 hours/day
PROC 7	:	1 hours/day
Remarks	:	Cleaning with air pressurised systems
PROC 7	:	8 hours/day
Remarks	:	Substrate spraying
PROC 8a	:	1 hours/day
Remarks	:	daily or less , Short term
PROC 8b	:	1 hours/day
Remarks	:	daily or less , Short term
PROC 24c	:	24 minutes/day
Frequency of use	:	5 days/week

Human factors not influenced by risk management

Exposed skin area	:	
PROC 1, PROC 3, PROC 15	:	240 cm ² (palm of one hand)
PROC 2, PROC 5, PROC 14	:	480 cm ² (palms of both hands)
PROC 7	:	1500 cm ² (both hands and forearms)
PROC 8a, PROC 8b, PROC 10	:	960 cm ² (both hands)
PROC 24a, PROC 24c	:	1980 cm ² (both hands and forearms)

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor
Process Temperature	:	
PROC 14	:	200 °C
PROC 24c	:	> 40 °C
All other PROCs	:	23 °C

Technical conditions and measures

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

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 temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Handle substance within a predominantly closed system provided with extract ventilation. Handle in a fume cupboard or under extract ventilation.

Additional measures are specific for the following contributing scenarios:

PROC1: Use in closed process, no likelihood of exposure

Handle substance within a closed system.

PROC2: Use in closed, continuous process with occasional controlled exposure: Close to the former line

Local exhaust ventilation is required. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. OR Minimise exposure by extracted full enclosure for the operation or equipment. OR Ensure mechanical ventilation is in place.

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

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC7: Industrial spraying: Substrate spraying

Local exhaust ventilation is required. Handle substance within a predominantly closed system provided with extract ventilation. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Handle substance within a closed system.

PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation: With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. OR Provide extract ventilation to material transfer points and other openings. OR Handle in a fume cupboard or under extract ventilation.

PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation: Without Local exhaust ventilation (LEV), With respiratory protection

Ensure the ventilation system is regularly maintained and tested.

PROC15: Use as laboratory reagent: With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. OR Provide extract ventilation to material transfer points and other openings. or Handle in a fume cupboard or under extract ventilation.

PROC15: Use as laboratory reagent: Without Local exhaust ventilation (LEV)

Ensure the ventilation system is regularly maintained and tested.

PROC24a: High (mechanical) energy work-up of substances bound in materials and/or articles - pt < mp - Low Fugacity

Local exhaust ventilation is required.

Organisational measures to prevent /limit releases, dispersion and exposure

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Ensure control measures are regularly inspected and maintained.

Additional measures are specific for the following contributing scenarios:

PROC2: Use in closed, continuous process with occasional controlled exposure: Close to the former line

Ensure control measures are regularly inspected and maintained.

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

Ensure control measures are regularly inspected and maintained.

PROC7: Industrial spraying: Cleaning with air pressurised systems

Ensure control measures are regularly inspected and maintained.

PROC7: Industrial spraying: Substrate spraying

Ensure control measures are regularly inspected and maintained.

PROC10: Roller application or brushing

Ensure control measures are regularly inspected and maintained.

PROC24c: High (mechanical) energy work-up of substances bound in materials and/or articles - pt > mp - High Fugacity

Ensure control measures are regularly inspected and maintained.

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

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents

BELOW 40°C:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported. Wear a full face respirator conforming to EN136. 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.

Additional measures are specific for the following contributing scenarios:

PROC2: Use in closed, continuous process with occasional controlled exposure: Close to the former line

Wear a respirator conforming to EN140.

PROC7: Industrial spraying: Cleaning with air pressurised systems

Wear a respirator conforming to EN140.

PROC10: Roller application or brushing

Wear a respirator conforming to EN140.

PROC15: Use as laboratory reagent: Without Local exhaust ventilation (LEV)

Wear suitable respiratory protection.

General advice

Irrespective of the stated risk management measures respiratory protection is generally recommended for spraying applications.

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	EasyTRA v4.1	General ventilation: 30%, Closed system, Efficiency: 90%	long term, inhalative, local	0,00057 mg/m ³	0,0114
2.1 PROC 2 Close to the mat line	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00153 mg/m ³	0,0306
2.1 PROC 2 Close to the former line	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, Mechanical ventilation, Efficiency: 25%, „Respirator: 90% protection	long term, inhalative, local	0,0028 mg/m ³	0,056
2.1 PROC 2 Continuous use/release Occasional exposure	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00572 mg/m ³	0,1144
2.1 PROC 3	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00572 mg/m ³	0,1144
2.1 PROC 5	EasyTRA v4.1	General ventilation: 30%, LEV:	long term,	0,00011 mg/m ³	0,0022

		90% efficiency	inhalative, local		
2.1 PROC 7 Cleaning with air pressurised systems	EasyTRA v4.1	General ventilation: 30%, Respirator: 90% protection	long term, inhalative, local	0,00074 mg/m ³	0,0148
2.1 PROC 7 Substrate spraying	EasyTRA v4.1	General ventilation: 30%, LEV: 95% efficiency	long term, inhalative, local	0,10 mg/m ³	0,2
2.1 PROC 8a	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00153 mg/m ³	0,0306
2.1 PROC 8b	EasyTRA v4.1	General ventilation: 30%, Closed system, 99% efficiency	long term, inhalative, local	0,00153 mg/m ³	0,0306
2.1 PROC 10	EasyTRA v4.1	General ventilation: 30%, Respirator: 90% protection	long term, inhalative, local	0,000687 mg/m ³	0,013749
2.1 PROC 14	EasyTRA v4.1	General ventilation: 30%, Respirator: 90% protection, LEV: 90% efficiency, OR, Without Local Exhaust Ventilation	long term, inhalative, local	0,000466 mg/m ³	0,00932
2.1 PROC 15	EasyTRA v4.1	General ventilation: 30%, AND, LEV: 90% efficiency, OR, Respirator: 90% protection	long term, inhalative, local	0,00558 mg/m ³	0,1116
2.1 PROC 24a	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative, local	0,00572 mg/m ³	0,1144
2.1 PROC 24c	EasyTRA v4.1	General ventilation: 30%, Respirator: 97.5% protection	long term, inhalative, local	0,002 mg/m ³	0,040
2.1 All PROCs	Qualitative assessment	Gloves: 90% protection	Dermal exposure	*	< 1

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

* Qualitative approach used to conclude safe use.

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

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in section 2. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

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

1. Short title of Exposure Scenario: **Use at industrial sites, Foundry (ES9)**

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) 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 PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC15: Use as laboratory reagent PROC21: Low energy manipulation of substances bound in materials and/ or articles
Environmental release category	: ERC5: Industrial use resulting in inclusion into or onto a matrix

2.1 Contributing scenario controlling worker exposure for: **PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC14, PROC15, PROC21** **Use at industrial sites, Foundry**

Product characteristics

Concentration of the Substance in Mixture/Article

PROC 15	: <= 100%
PROC 21	: <= 1%
All other PROCs	: <= 60%
Molar Mass	: 250 g/mol
Vapour pressure	: 0,001 Pa at 20 °C
Physical Form (at time of use)	: PROC 21, : Solid, low dustiness All other PROCs, : Low volatile liquid

Frequency and duration of use

General exposures	: 8 hours/day
PROC 4	: 1 hours/day
Remarks	: Cleaning of sand mixer
PROC 4	: 8 hours/day
Remarks	: Occasional exposure : Sampling , maintenance work
PROC 5	: 1 hours/day

PROC 8a	:	1 hours/day
Remarks	:	daily or less , Short term
PROC 8b	:	1 hours/day
Remarks	:	daily or less , Short term
Frequency of use	:	5 days/week

Human factors not influenced by risk management

Exposed skin area	:	
PROC 1, PROC 3, PROC 15	:	240 cm ² (palm of one hand)
PROC 2, PROC 4, PROC 5, PROC 14	:	480 cm ² (palms of both hands)
PROC 8a, PROC 8b	:	960 cm ² (both hands)
PROC 21	:	1980 cm ² (both hands and forearms)

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor
Process Temperature	:	
PROC 4	:	50 °C
PROC 14	:	50 °C
PROC 21	:	35 °C
All other PROCs	:	23 °C

Technical conditions and measures

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

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 temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Handle substance within a predominantly closed system provided with extract ventilation. Handle in a fume cupboard or under extract ventilation.

Additional measures are specific for the following contributing scenarios:

PROC1: Use in closed process, no likelihood of exposure

Handle substance within a closed system.

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. 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)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Handle substance within a closed system.

PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation: With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. OR Provide extract ventilation to material transfer points and other openings. OR Handle in a fume cupboard or under extract ventilation.

PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation: Without Local exhaust ventilation (LEV)

Ensure the ventilation system is regularly maintained and tested.

PROC15: Use as laboratory reagent: With Local exhaust ventilation (LEV), Without respiratory protection

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. OR Provide extract ventilation to material transfer points and other openings. or Handle in a fume cupboard or under extract ventilation.

PROC15: Use as laboratory reagent: With respiratory protection, Without Local exhaust ventilation (LEV)

Ensure the ventilation system is regularly maintained and tested.

Organisational measures to prevent /limit releases, dispersion and exposure

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Ensure control measures are regularly inspected and maintained.

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)

Ensure control measures are regularly inspected and maintained.

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

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported. Wear a full face respirator conforming to EN136. 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.

Additional measures are specific for the following contributing scenarios:

PROC15: Use as laboratory reagent: With respiratory protection, Without Local exhaust ventilation (LEV)

Wear suitable respiratory protection.

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	EasyTRA v4.1	General ventilation: 30%, Closed system, Efficiency: 90%	long term, inhalative, local	0,0018 mg/m ³	0,036
2.1 PROC 2	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,018 mg/m ³	0,360
2.1 PROC 3	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,018 mg/m ³	0,360
2.1 PROC 4 Cleaning of sand mixer OR Occasional exposure : Sampling maintenance work	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative, local	0,0039 mg/m ³	0,078
2.1 PROC 5	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative, local	0,00049 mg/m ³	0,0098
2.1 PROC 8a	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,0036 mg/m ³	0,072
2.1 PROC 8b	EasyTRA v4.1	General ventilation: 30%, Closed system, 99% efficiency	long term, inhalative, local	0,00364 mg/m ³	0,0728
2.1 PROC 14	EasyTRA v4.1	General ventilation: 30%, Respirator: 90% protection, LEV: 90% efficiency, OR, Without Local Exhaust Ventilation	long term, inhalative, local	0,0039 mg/m ³	0,078
2.1 PROC 15	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, OR, Respirator: 90% protection	long term, inhalative, local	0,00558 mg/m ³	0,1116
2.1 PROC 21	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 All PROCs	Qualitative assessment	Gloves: 90% protection	Dermal exposure	*	< 1

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

* Qualitative approach used to conclude safe use.

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

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in section 2. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

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

1. Short title of Exposure Scenario: Use at industrial sites, Other composite material (ES10)

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 PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC15: Use as laboratory reagent PROC21: Low energy manipulation of substances bound in materials and/ or articles
Environmental release category	: ERC5: Industrial use resulting in inclusion into or onto a matrix

2.1 Contributing scenario controlling worker exposure for:

PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC14, PROC15, PROC21



Use at industrial sites, Other composite material

Product characteristics

Concentration of the Substance in Mixture/Article

PROC 21 : <= 1%

All other PROCs : <= 100%

Molar Mass : 250 g/mol

Vapour pressure : 0,001 Pa at 20 °C

Physical Form (at time of use) :

PROC 21, :
Solid, low dustiness

All other PROCs, :
Low volatile liquid

Frequency and duration of use

General exposures : 8 hours/day

PROC 5 : 1 hours/day

PROC 8a : 1 hours/day

Remarks : daily or less Short term

PROC 8b	:	1 hours/day
Remarks	:	daily or less Short term
Frequency of use	:	5 days/week

Human factors not influenced by risk management

Exposed skin area	:	
PROC 1, PROC 3, PROC 15	:	240 cm ² (palm of one hand)
PROC 2, PROC 4, PROC 5, PROC 13, PROC 14	:	480 cm ² (palms of both hands)
PROC 7	:	1500 cm ² (both hands and forearms)
PROC 8a, PROC 8b, PROC 10	:	960 cm ² (both hands)
PROC 21	:	1980 cm ² (both hands and forearms)

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor
Process Temperature	:	
PROC 4	:	90 °C
PROC 14	:	90 °C
PROC 21	:	35 °C
All other PROCs	:	23 °C

Technical conditions and measures

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

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 temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Handle substance within a predominantly closed system provided with extract ventilation. Handle in a fume cupboard or under extract ventilation.

Additional measures are specific for the following contributing scenarios:

PROC1: Use in closed process, no likelihood of exposure

Handle substance within a closed system.

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. 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)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC7: Industrial spraying

Local exhaust ventilation is required. Handle substance within a predominantly closed system provided with extract ventilation. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Handle substance within a closed system.

PROC15: Use as laboratory reagent: With Local exhaust ventilation (LEV), Without respiratory protection

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. OR Provide extract ventilation to material transfer points and other openings. or Handle in a fume cupboard or under extract ventilation.

PROC15: Use as laboratory reagent: With respiratory protection, Without Local exhaust ventilation (LEV)

Ensure the ventilation system is regularly maintained and tested.

Organisational measures to prevent /limit releases, dispersion and exposure

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Ensure control measures are regularly inspected and maintained.

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)

Ensure control measures are regularly inspected and maintained.

PROC7: Industrial spraying

Ensure control measures are regularly inspected and maintained.

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

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported. Wear a full face respirator conforming to EN136. 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.

Additional measures are specific for the following contributing scenarios:

PROC15: Use as laboratory reagent: With respiratory protection, Without Local exhaust ventilation (LEV)

Wear suitable respiratory protection.

General advice

Irrespective of the stated risk management measures respiratory protection is generally recommended for spraying applications.

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	EasyTRA v4.1	General ventilation: 30%, Closed system, Efficiency: 90%	long term, inhalative, local	0,00092 mg/m ³	0,0184
2.1 PROC 2	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 PROC 3	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 PROC 4	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, Respirator: 90% protection	long term, inhalative, local	0,0006 mg/m ³	0,012
2.1 PROC 5	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative, local	0,00011 mg/m ³	0,0022
2.1 PROC 7	EasyTRA v4.1	General ventilation: 30%, LEV: 95% efficiency	long term, inhalative, local	0,01022 mg/m ³	0,2044
2.1 PROC 8a	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,0036 mg/m ³	0,072
2.1 PROC 8b	EasyTRA v4.1	General ventilation: 30%, Closed system, 99% efficiency	long term, inhalative, local	0,00364 mg/m ³	0,0728
2.1 PROC 10	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,017 mg/m ³	0,340
2.1 PROC 13	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,017 mg/m ³	0,340
2.1 PROC 14	EasyTRA v4.1	General ventilation: 30%, Respirator: 90% protection	long term, inhalative, local	0,00576 mg/m ³	0,1152
2.1 PROC 15	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, OR, Respirator: 90% protection	long term, inhalative, local	0,00558 mg/m ³	0,1116
2.1 PROC 21	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 All PROCs	Qualitative assessment	Gloves: 90% protection	Dermal exposure	*	< 1

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

* Qualitative approach used to conclude safe use.

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

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in section 2. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

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

1. Short title of Exposure Scenario: Use at industrial sites, Cleaning, with Aprotic Polar Solvents below 40°C (ES11)

Main User Groups	: SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Process category	: 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 PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring PROC15: Use as laboratory reagent
Environmental release category	: ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

2.1 Contributing scenario controlling worker exposure for: PROC3, PROC4, PROC5, PROC8a, PROC10, PROC13, PROC15**Use at industrial sites, Cleaning, with Aprotic Polar Solvents below 40°C**

Product characteristics

Concentration of the Substance in Mixture/Article

All PROCs	: <= 100%
Molar Mass	: 250 g/mol
Vapour pressure	: 0,001 Pa at 20 °C
Physical Form (at time of use)	: Low volatile liquid

Frequency and duration of use

General exposures	: 1 hours/day
Frequency of use	: 5 days/week

Human factors not influenced by risk management

Exposed skin area	:
PROC 3, PROC 15	: 240 cm ² (palm of one hand)
PROC 4, PROC 5, PROC 13	: 480 cm ² (palms of both hands)
PROC 8a, PROC 10	: 960 cm ² (both hands)

Other operational conditions affecting workers exposure

Outdoor / Indoor	: Indoor
Process Temperature	:
All PROCs	: 40 °C

Technical conditions and measures

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Handle substance within a predominantly closed system provided with extract ventilation. Handle in a fume cupboard or under extract ventilation.

These general measures are mandatory for all contributing scenarios. Additional measures are specific for the following contributing scenarios:

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. 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)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities: With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. OR Provide extract ventilation to material transfer points and other openings.

PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities: Without Local exhaust ventilation (LEV)

Ensure the ventilation system is regularly maintained and tested.

PROC10: Roller application or brushing: With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. OR Provide extract ventilation to material transfer points and other openings.

PROC10: Roller application or brushing: Without Local exhaust ventilation (LEV)

Ensure the ventilation system is regularly maintained and tested.

PROC13: Treatment of articles by dipping and pouring: With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. OR Provide extract ventilation to material transfer points and other openings.

PROC13: Treatment of articles by dipping and pouring: Without Local exhaust ventilation (LEV)

Ensure the ventilation system is regularly maintained and tested.

PROC15: Use as laboratory reagent: With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. OR Provide extract ventilation to material transfer points and other openings.

PROC15: Use as laboratory reagent: Without Local exhaust ventilation (LEV)

Ensure the ventilation system is regularly maintained and tested.

Organisational measures to prevent /limit releases, dispersion and exposure

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Ensure control measures are regularly inspected and maintained.

These general measures are mandatory for all contributing scenarios.

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

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported. Wear a full face respirator conforming to EN136. 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.

These general measures are mandatory for all contributing scenarios.

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 3	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00023 mg/m ³	0,0046
2.1 PROC 4	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative, local	0,00023 mg/m ³	0,0046
2.1 PROC 5	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative, local	0,00023 mg/m ³	0,0046
2.1 PROC 8a	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, OR, Respirator: 90% protection	long term, inhalative, local	0,00023 mg/m ³	0,0046
2.1 PROC 10	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, OR, Respirator: 90% protection	long term, inhalative, local	0,00023 mg/m ³	0,0046
2.1 PROC 13	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, OR, Respirator: 90% protection	long term, inhalative, local	0,00023 mg/m ³	0,0046
2.1 PROC 15	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, OR, Respirator: 90% protection	long term, inhalative, local	0,00023 mg/m ³	0,0046
2.1 All PROCs	Qualitative assessment	Gloves: 90% protection	Dermal exposure	*	< 1

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

* Qualitative approach used to conclude safe use.

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

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in section 2. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

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

1. Short title of Exposure Scenario: Use at industrial sites, Cleaning, with Aprotic Polar Solvents above 40°C (ES12)

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
Environmental release category	: ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

2.1 Contributing scenario controlling worker exposure for: PROC1**Use at industrial sites, Cleaning, with Aprotic Polar Solvents above 40°C**

Product characteristics

Concentration of the Substance in Mixture/Article

PROC 1	: <= 100%
Molar Mass	: 250 g/mol
Vapour pressure	: 0,001 Pa at 20 °C
Physical Form (at time of use)	: Low volatile liquid

Frequency and duration of use

PROC 1	: 1 hours/day
Frequency of use	: 5 days/week

Human factors not influenced by risk management

Exposed skin area	:
PROC 1	: 240 cm ² (palm of one hand)

Other operational conditions affecting workers exposure

Outdoor / Indoor	: Indoor
Process Temperature	:
PROC 1	: 41 °C

Technical conditions and measures

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Handle substance within a closed system. Handle substance within a predominantly closed system provided with extract ventilation. Handle in a fume cupboard or under extract ventilation.

Organisational measures to prevent /limit releases, dispersion and exposure

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Ensure control measures are regularly inspected and maintained.

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

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested

to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported. Wear a full face respirator conforming to EN136. 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 1	EasyTRA v4.1	General ventilation: 30%, Respirator: 90% protection, Closed system, Efficiency: 90%	long term, inhalative, local	0,00023 mg/m ³	0,0046
2.1 PROC 1	Qualitative assessment	Gloves: 90% protection	Dermal exposure	*	< 1

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

* Qualitative approach used to conclude safe use.

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

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in section 2. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

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

1. Short title of Exposure Scenario: **Use at industrial sites, Cleaning, without Aprotic Polar Solvents** (ES13)

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 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 PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring PROC15: Use as laboratory reagent
Environmental release category	: ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

2.1 Contributing scenario controlling worker exposure for: PROC1, PROC3, PROC4, PROC5, PROC8a, PROC10, PROC13, PROC15



Use at industrial sites, Cleaning, without Aprotic Polar Solvents

Product characteristics

Concentration of the Substance in Mixture/Article

All PROCs	: <= 100%
Molar Mass	: 250 g/mol
Vapour pressure	: 0,001 Pa at 20 °C
Physical Form (at time of use)	: Low volatile liquid

Frequency and duration of use

General exposures	: 1 hours/day
Frequency of use	: 5 days/week

Human factors not influenced by risk management

Exposed skin area	:
PROC 1, PROC 3, PROC 15	: 240 cm ² (palm of one hand)
PROC 4, PROC 5, PROC 13	: 480 cm ² (palms of both hands)
PROC 8a, PROC 10	: 960 cm ² (both hands)

Other operational conditions affecting workers exposure

Outdoor / Indoor	: Indoor
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Technical conditions and measures

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Handle substance within a closed system. Handle substance within a predominantly closed system provided with extract ventilation. Handle in a fume cupboard or under extract ventilation.

These general measures are mandatory for all contributing scenarios. Additional measures are specific for the following contributing scenarios:

PROC1: Use in closed process, no likelihood of exposure

Local exhaust ventilation is required.

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. 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)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

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

Local exhaust ventilation is required.

PROC10: Roller application or brushing

Local exhaust ventilation is required.

PROC13: Treatment of articles by dipping and pouring

Local exhaust ventilation is required.

PROC15: Use as laboratory reagent: With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. OR Provide extract ventilation to material transfer points and other openings. OR Handle in a fume cupboard or under extract ventilation.

PROC15: Use as laboratory reagent: Without Local exhaust ventilation (LEV)

Ensure the ventilation system is regularly maintained and tested.

Organisational measures to prevent /limit releases, dispersion and exposure

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Ensure control measures are regularly inspected and maintained.

These general measures are mandatory for all contributing scenarios.

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

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported. Wear a full face respirator conforming to EN136. 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.

These general measures are mandatory for all contributing scenarios. Additional measures are specific for the

following contributing scenarios:

PROC15: Use as laboratory reagent: Without Local exhaust ventilation (LEV)

Wear suitable respiratory protection.

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	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative, local	0,00023 mg/m ³	0,0046
2.1 PROC 3	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,0023 mg/m ³	0,046
2.1 PROC 4	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative, local	0,00023 mg/m ³	0,0046
2.1 PROC 5	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative, local	0,00023 mg/m ³	0,0046
2.1 PROC 8a	EasyTRA v4.1	General ventilation: 30%, LEV: 99% efficiency	long term, inhalative, local	0,0023 mg/m ³	0,046
2.1 PROC 10	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative, local	0,0023 mg/m ³	0,046
2.1 PROC 13	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative, local	0,0023 mg/m ³	0,046
2.1 PROC 15	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, OR, Respirator: 90% protection	long term, inhalative, local	0,00023 mg/m ³	0,0046
2.1 All PROCs	Qualitative assessment	Gloves: 90% protection	Dermal exposure	*	< 1

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

* Qualitative approach used to conclude safe use.

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

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in section 2. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

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

1. Short title of Exposure Scenario: Widespread use by professional workers, Rigid foam (ES14)

Main User Groups	: SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process category	: 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 PROC21: Low energy manipulation of substances bound in materials and/ or articles
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

2.1 Contributing scenario controlling worker exposure for: PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC10, PROC11, PROC21**Widespread use by professional workers, Rigid foam****Product characteristics**

Concentration of the Substance in Mixture/Article

PROC 3	: <= 100%
PROC 4	: <= 100%
PROC 21	: <= 1%
All other PROCs	: <= 60%
Molar Mass	: 250 g/mol
Vapour pressure	: 0,001 Pa at 20 °C
Physical Form (at time of use)	: PROC 21 Solid, low dustiness All other PROCs Low volatile liquid

Frequency and duration of use

General exposures	: 8 hours/day
PROC 5	: 1 hours/day
PROC 8a	: 1 hours/day
Remarks	: daily or less , Short term
PROC 8b	: 1 hours/day

Remarks	: daily or less , Short term
PROC 11	: 6 hours/day
Remarks	: 1 - 5
Frequency of use	: 5 days/week

Human factors not influenced by risk management

Exposed skin area	:
PROC 3	: 240 cm ² (palm of one hand)
PROC 4, PROC 5	: 480 cm ² (palms of both hands)
PROC 8a, PROC 8b, PROC 10	: 960 cm ² (both hands)
PROC 11	: 1500 cm ² (both hands and forearms)
PROC 21	: 1980 cm ² (both hands and forearms)

Other operational conditions affecting workers exposure

Outdoor / Indoor	:
Indoor/Outdoor use	: , PROC 5 , PROC 11
Indoor use	: , All other PROCs
Process Temperature	:
PROC 4	: 50 °C
PROC 11	: 35 °C, 1 - 5
PROC 21	: 35 °C
All other PROCs	: 23 °C

Technical conditions and measures

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying: Exception(s) : Outdoor use

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 temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Handle substance within a predominantly closed system provided with extract ventilation. 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: With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. 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): Indoor use, With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Handle substance within a closed system.

PROC11: Non industrial spraying: Indoor use, 1

Local exhaust ventilation is required. Handle substance within a predominantly closed system provided with extract ventilation. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer

points and other openings.

PROC11: Non industrial spraying: Indoor use, 2

Local exhaust ventilation is required. Ensure that a spraying booth is used.

PROC11: Non industrial spraying: Indoor use, 3

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

PROC11: Non industrial spraying: Indoor use, 4

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur.

PROC11: Non industrial spraying: Outdoor use, 5

Ensure operation is undertaken outdoors. Stay upwind/keep distance from source.

Organisational measures to prevent /limit releases, dispersion and exposure

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Ensure control measures are regularly inspected and maintained.

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): Indoor use, With Local exhaust ventilation (LEV)

Ensure control measures are regularly inspected and maintained.

PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact): Indoor use, Without Local exhaust ventilation (LEV), OR, Outdoor use

Ensure control measures are regularly inspected and maintained.

PROC11: Non industrial spraying: Indoor use, 1

Ensure control measures are regularly inspected and maintained.

PROC11: Non industrial spraying: Indoor use, 2

Access to work area only for authorized persons. Ensure control measures are regularly inspected and maintained.

PROC11: Non industrial spraying: Indoor use, 3

Access to work area only for authorized persons. Ensure control measures are regularly inspected and maintained.

PROC11: Non industrial spraying: Indoor use, 4

Access to work area only for authorized persons. Ensure control measures are regularly inspected and maintained.

PROC11: Non industrial spraying: Outdoor use, 5

Access to work area only for authorized persons. Ensure control measures are regularly inspected and maintained.

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

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported. Wear a full face respirator conforming to EN136. 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.

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): Indoor use, Without Local exhaust ventilation (LEV), OR, Outdoor use

Wear a respirator conforming to EN140.

PROC11: Non industrial spraying: Indoor use, 2

Wear a full face respirator conforming to EN136.

PROC11: Non industrial spraying: Indoor use, 3

Wear a full face respirator conforming to EN136.

PROC11: Non industrial spraying: Indoor use, 4

Wear a full face respirator conforming to EN136.

PROC11: Non industrial spraying: Outdoor use, 5

Wear a full face respirator conforming to EN136.

General advice

Irrespective of the stated risk management measures respiratory protection is generally recommended for spraying applications.

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 3	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 PROC 4	EasyTRA v4.1	General ventilation: 30%, Respirator: 90% protection, LEV: 90% efficiency	long term, inhalative, local	0,0006 mg/m ³	0,012
2.1 PROC 4	EasyTRA v4.1	General ventilation: 30%, Respirator: 90% protection	long term, inhalative, local	0,0006 mg/m ³	0,012
2.1 PROC 5 Indoor use	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, OR, Respirator: 90% protection	long term, inhalative, local	0,00011 mg/m ³	0,0022
2.1 PROC 5 Outdoor use	EasyTRA v4.1	Outdoor use: 30%, Respirator: 90% protection	long term, inhalative, local	0,00011 mg/m ³	0,0022
2.1 PROC 8a	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,0036 mg/m ³	0,072
2.1 PROC 8b	EasyTRA v4.1	General ventilation: 30%, Closed system, 99% efficiency	long term, inhalative, local	0,00364 mg/m ³	0,0728
2.1 PROC 10	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,01724 mg/m ³	0,3448
2.1 PROC 11 Indoor use 1	EasyTRA v4.1	General ventilation: 30%, LEV: 99% efficiency	long term, inhalative, local	0,012 mg/m ³	0,24
2.1 PROC 11 Indoor use 2	EasyTRA v4.1	General ventilation: 30%, Spray booth: 90% reduction, Respirator: 97.5% protection	long term, inhalative, local	0,003 mg/m ³	0,060
2.1 PROC 11 Indoor use 3	EasyTRA v4.1	General ventilation: 30%, Respirator: 97.5% protection	long term, inhalative, local	0,022 mg/m ³	0,440
2.1 PROC 11 Indoor use 4	EasyTRA v4.1	General ventilation: 30%, Respirator: 97.5% protection, LEV: 90% efficiency	long term, inhalative, local	0,003 mg/m ³	0,060
2.1 PROC 11 Outdoor use 5	EasyTRA v4.1	Outdoors: 30% reduction, Respirator: 97.5% protection	long term, inhalative, local	0,022 mg/m ³	0,440
2.1 PROC 21	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 All PROCs	Qualitative assessment	Gloves: 90% protection	Dermal exposure	*	< 1

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

* Qualitative approach used to conclude safe use.

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

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in section 2. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

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

1. Short title of Exposure Scenario: **Widespread use by professional workers, Use in coatings** (ES15)

Main User Groups	: SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process category	: 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 PROC21: Low energy manipulation of substances bound in materials and/ or articles
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

2.1 Contributing scenario controlling worker exposure for: PROC4, PROC5, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC21 □ Widespread use by professional workers, Use in coatings

Product characteristics

Concentration of the Substance in Mixture/Article

PROC 21 : <= 1%

All other PROCs : <= 60%

Molar Mass : 250 g/mol

Vapour pressure : 0,001 Pa at 20 °C

Physical Form (at time of use) :

PROC 21
Solid, low dustiness
All other PROCs
Low volatile liquid

Frequency and duration of use

General exposures : 8 hours/day

PROC 5 : 1 hours/day

PROC 8a : 1 hours/day

Remarks : daily or less , Short term

PROC 8b : 1 hours/day

Remarks : daily or less , Short term

PROC 11 : 6 hours/day

Remarks : 1 - 5

Frequency of use : 5 days/week

Human factors not influenced by risk management

Exposed skin area :
PROC 4, PROC 5, PROC 13 : 480 cm² (palms of both hands)
PROC 8a, PROC 8b, PROC 10 : 960 cm² (both hands)
PROC 11 : 1500 cm² (both hands and forearms)
PROC 21 : 1980 cm² (both hands and forearms)

Other operational conditions affecting workers exposure

Outdoor / Indoor :
Indoor/Outdoor use : , PROC 5 , PROC 11
Indoor use : , All other PROCs
Process Temperature :
PROC 4 : 50 °C
PROC 11 : 35 °C, 1 - 5
All other PROCs : 23 °C

Technical conditions and measures

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying: Exception(s) : Outdoor use

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 temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Handle substance within a predominantly closed system provided with extract ventilation. 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: With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. 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): Indoor use, With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Handle substance within a closed system.

PROC11: Non industrial spraying: Indoor use, 1

Local exhaust ventilation is required. Handle substance within a predominantly closed system provided with extract ventilation. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC11: Non industrial spraying: Indoor use, 2

Local exhaust ventilation is required. Ensure that a spraying booth is used.

PROC11: Non industrial spraying: Indoor use, 3

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

PROC11: Non industrial spraying: Indoor use, 4

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur.

PROC11: Non industrial spraying: Outdoor use, 5

Ensure operation is undertaken outdoors. Stay upwind/keep distance from source.

Organisational measures to prevent /limit releases, dispersion and exposure

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Ensure control measures are regularly inspected and maintained.

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): Indoor use, With Local exhaust ventilation (LEV)

Ensure control measures are regularly inspected and maintained.

PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact): Indoor use, Without Local exhaust ventilation (LEV), OR, Outdoor use

Ensure control measures are regularly inspected and maintained.

PROC11: Non industrial spraying: Indoor use, 1

Ensure control measures are regularly inspected and maintained.

PROC11: Non industrial spraying: Indoor use, 2

Access to work area only for authorized persons. Ensure control measures are regularly inspected and maintained.

PROC11: Non industrial spraying: Indoor use, 3

Access to work area only for authorized persons. Ensure control measures are regularly inspected and maintained.

PROC11: Non industrial spraying: Indoor use, 4

Access to work area only for authorized persons. Ensure control measures are regularly inspected and maintained.

PROC11: Non industrial spraying: Outdoor use, 5

Access to work area only for authorized persons. Ensure control measures are regularly inspected and maintained.

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

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported. Wear a full face respirator conforming to EN136. 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.

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): Indoor use, Without Local exhaust ventilation (LEV), OR, Outdoor use

Wear a respirator conforming to EN140.

PROC11: Non industrial spraying: Indoor use, 2

Wear a full face respirator conforming to EN136.

PROC11: Non industrial spraying: Indoor use, 3

Wear a full face respirator conforming to EN136.

PROC11: Non industrial spraying: Indoor use, 4

Wear a full face respirator conforming to EN136.

PROC11: Non industrial spraying: Outdoor use, 5

Wear a full face respirator conforming to EN136.

General advice

Irrespective of the stated risk management measures respiratory protection is generally recommended for spraying applications.

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 4	EasyTRA v4.1	General ventilation: 30%, Respirator: 90% protection, LEV: 90% efficiency	long term, inhalative, local	0,0006 mg/m ³	0,012
2.1 PROC 4	EasyTRA v4.1	General ventilation: 30%, Respirator: 90% protection, Without Local Exhaust Ventilation	long term, inhalative, local	0,0006 mg/m ³	0,012
2.1 PROC 5 Indoor use	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, OR, Respirator: 90% protection	long term, inhalative, local	0,00011 mg/m ³	0,0022
2.1 PROC 5 Outdoor use	EasyTRA v4.1	Outdoor use: 30%, Respirator: 90% protection	long term, inhalative, local	0,00011 mg/m ³	0,0022
2.1 PROC 8a	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,0036 mg/m ³	0,072
2.1 PROC 8b	EasyTRA v4.1	General ventilation: 30%, Closed system, 99% efficiency	long term, inhalative, local	0,00364 mg/m ³	0,0728
2.1 PROC 10	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,017 mg/m ³	0,340
2.1 PROC 11 Indoor use 1	EasyTRA v4.1	General ventilation: 30%, LEV: 99% efficiency	long term, inhalative, local	0,012 mg/m ³	0,240
2.1 PROC 11 Indoor use 2	EasyTRA v4.1	General ventilation: 30%, Spray booth: 90% reduction, Respirator: 97.5% protection	long term, inhalative, local	0,003 mg/m ³	0,060
2.1 PROC 11 Indoor use 3	EasyTRA v4.1	General ventilation: 30%, Respirator: 97.5% protection	long term, inhalative, local	0,022 mg/m ³	0,440
2.1 PROC 11 Indoor use 4	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, Respirator: 97.5% protection	long term, inhalative, local	0,003 mg/m ³	0,060
2.1 PROC 11 Outdoor use 5	EasyTRA v4.1	Outdoors: 30% reduction, Respirator: 97.5% protection	long term, inhalative, local	0,022 mg/m ³	0,440
2.1 PROC 13	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,017 mg/m ³	0,340
2.1 PROC 21	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 All PROCs	Qualitative assessment	Gloves: 90% protection	Dermal exposure	*	< 1

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

* Qualitative approach used to conclude safe use.

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

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in section 2. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

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

1. Short title of Exposure Scenario: **Widespread use by professional workers, Adhesives, sealants** (ES16)

Main User Groups	: SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process category	: 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 PROC21: Low energy manipulation of substances bound in materials and/ or articles
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

2.1 Contributing scenario controlling worker exposure for: PROC4, PROC5, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC21



Widespread use by professional workers, Adhesives, sealants

Product characteristics

Concentration of the Substance in Mixture/Article

PROC 21	: <= 1%
All other PROCs	: <= 60%
Molar Mass	: 250 g/mol
Vapour pressure	: 0,001 Pa at 20 °C
Physical Form (at time of use)	: PROC 21 Solid, low dustiness All other PROCs Low volatile liquid

Frequency and duration of use

General exposures	: 8 hours/day
PROC 5	: 1 hours/day
PROC 8a	: 1 hours/day
Remarks	: daily or less , Short term
PROC 8b	: 1 hours/day
Remarks	: daily or less , Short term
PROC 11	: 6 hours/day
Remarks	: 1 - 5

Frequency of use : 5 days/week

Human factors not influenced by risk management

Exposed skin area :
PROC 4, PROC 5, PROC 13 : 480 cm² (palms of both hands)
PROC 8a, PROC 8b, PROC 10 : 960 cm² (both hands)
PROC 11 : 1500 cm² (both hands and forearms)
PROC 21 : 1980 cm² (both hands and forearms)

Other operational conditions affecting workers exposure

Outdoor / Indoor :
Indoor/Outdoor use : , PROC 5 , PROC 11
Indoor use : , All other PROCs
:
Process Temperature :
PROC 4 : 50 °C
PROC 11 : 35 °C, 1 - 5
All other PROCs : 23 °C

Technical conditions and measures

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying: Exception(s) : Outdoor use

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 temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Handle substance within a predominantly closed system provided with extract ventilation. 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: With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. 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): Indoor use, With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Handle substance within a closed system.

PROC11: Non industrial spraying: Indoor use, 1

Local exhaust ventilation is required. Handle substance within a predominantly closed system provided with extract ventilation. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC11: Non industrial spraying: Indoor use, 2

Local exhaust ventilation is required. Ensure that a spraying booth is used.

PROC11: Non industrial spraying: Indoor use, 3

Open doors and windows.

PROC11: Non industrial spraying: Indoor use, 4

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur.

PROC11: Non industrial spraying: Outdoor use, 5

Ensure operation is undertaken outdoors. Stay upwind/keep distance from source.

Organisational measures to prevent /limit releases, dispersion and exposure

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Ensure control measures are regularly inspected and maintained.

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): Indoor use, With Local exhaust ventilation (LEV)

Ensure control measures are regularly inspected and maintained.

PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact): Indoor use, Without Local exhaust ventilation (LEV), OR, Outdoor use

Ensure control measures are regularly inspected and maintained.

PROC11: Non industrial spraying: Indoor use, 1

Ensure control measures are regularly inspected and maintained.

PROC11: Non industrial spraying: Indoor use, 2

Access to work area only for authorized persons. Ensure control measures are regularly inspected and maintained.

PROC11: Non industrial spraying: Indoor use, 3

Access to work area only for authorized persons. Ensure control measures are regularly inspected and maintained.

PROC11: Non industrial spraying: Indoor use, 4

Access to work area only for authorized persons. Ensure control measures are regularly inspected and maintained.

PROC11: Non industrial spraying: Outdoor use, 5

Access to work area only for authorized persons. Ensure control measures are regularly inspected and maintained.

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

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported. Wear a full face respirator conforming to EN136. 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.

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): Indoor use, Without Local exhaust ventilation (LEV), OR, Outdoor use

Wear a respirator conforming to EN140.

PROC11: Non industrial spraying: Indoor use, 2

Wear a full face respirator conforming to EN136.

PROC11: Non industrial spraying: Indoor use, 3

Wear a full face respirator conforming to EN136.

PROC11: Non industrial spraying: Indoor use, 4

Wear a full face respirator conforming to EN136.

PROC11: Non industrial spraying: Outdoor use, 5

Wear a full face respirator conforming to EN136.

General advice

Irrespective of the stated risk management measures respiratory protection is generally recommended for spraying applications.

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 4	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, OR, Respirator: 90% protection	long term, inhalative, local	0,0006 mg/m ³	0,012
2.1 PROC 5 Indoor use	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, OR, Respirator: 90% protection	long term, inhalative, local	0,00011 mg/m ³	0,0022
2.1 PROC 5 Outdoor use	EasyTRA v4.1	Outdoor use: 30%, Respirator: 90% protection	long term, inhalative, local	0,00011 mg/m ³	0,0022
2.1 PROC 8a	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,0036 mg/m ³	0,072
2.1 PROC 8b	EasyTRA v4.1	General ventilation: 30%, Closed system, 99% efficiency	long term, inhalative, local	0,00364 mg/m ³	0,0728
2.1 PROC 10	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,017 mg/m ³	0,340
2.1 PROC 11 Indoor use 1	EasyTRA v4.1	General ventilation: 30%, LEV: 99% efficiency	long term, inhalative, local	0,012 mg/m ³	0,240
2.1 PROC 11 Indoor use 2	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, Respirator: 97.5% protection	long term, inhalative, local	0,003 mg/m ³	0,060
2.1 PROC 11 Indoor use 3	EasyTRA v4.1	General ventilation: 30%, Respirator: 97.5% protection	long term, inhalative, local	0,022 mg/m ³	0,440
2.1 PROC 11 Indoor use 4	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, Respirator: 97.5% protection	long term, inhalative, local	0,003 mg/m ³	0,060
2.1 PROC 11 Outdoor use 5	EasyTRA v4.1	Outdoors: 30% reduction, Respirator: 97.5% protection	long term, inhalative, local	0,022 mg/m ³	0,440
2.1 PROC 13	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,017 mg/m ³	0,340
2.1 PROC 21	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 All PROCs	Qualitative assessment	Gloves: 90% protection	Dermal exposure	*	< 1

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

* Qualitative approach used to conclude safe use.

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

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in section 2. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

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

1. Short title of Exposure Scenario: **Widespread use by professional workers, Composite Material Based on Wood/Man-made/Mineral/Natural Fibres (ES17)**

Main User Groups	: 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) 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 PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC24a: High (mechanical) energy work-up of substances bound in materials and/or articles - pt < mp - Low Fugacity PROC24c: High (mechanical) energy work-up of substances bound in materials and/or articles - pt > mp - High Fugacity
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

2.1 Contributing scenario controlling worker exposure for:

PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC10, PROC11, PROC14, PROC24a, PROC24c



Widespread use by professional workers, Composite Material Based on Wood/Man-made/Mineral/Natural Fibres

Product characteristics

Concentration of the Substance in Mixture/Article

PROC 5 : <= 60%

PROC 8a : <= 60%

PROC 11 : <= 60%

PROC 24a : <= 1%

PROC 24c : <= 100%

All other PROCs : <= 10%

Molar Mass : 250 g/mol

Vapour pressure : 0,001 Pa at 20 °C

Physical Form (at time of use) :

PROC 5, PROC 8a, PROC 8b, PROC 14

PROC 11, 1, 2, 3, 5, :

Low volatile liquid

PROC 2, Close to the mat line
 PROC 2, Continuous use/release, Occasional exposure
 PROC 3, PROC 10, PROC 24a, :
 Solid, low dustiness

PROC 2, Close to the former line
 PROC 11, 4, Cleaning with air pressurised systems, :
 Solid, medium dustiness

PROC 24c, :
 Solid, high dustiness

Frequency and duration of use

General exposures	: 8 hours/day
PROC 2	: 7,5 seconds/day
Remarks	: Close to the mat line
PROC 2	: 2 hours/day
Remarks	: Close to the former line
PROC 2	: 8 hours/day
Remarks	: Continuous use/release , Occasional exposure
PROC 5	: 1 hours/day
PROC 8a	: 1 hours/day
Remarks	: daily or less , Short term
PROC 8b	: 1 hours/day
Remarks	: daily or less , Short term
PROC 11	: 6 hours/day
Remarks	: 1 - 3 , 5
PROC 11	: 1 hours/day
Remarks	: 4 Cleaning with air pressurised systems
PROC 24c	: 24 minutes/day
Frequency of use	: 5 days/week

Human factors not influenced by risk management

Exposed skin area	:
PROC 2, PROC 5, PROC 14	: 480 cm ² (palms of both hands)
PROC 3	: 240 cm ² (both hands and forearms)
PROC 8a, PROC 8b, PROC 10	: 960 cm ² (both hands)
PROC 11	: 1500 cm ² (both hands and forearms)
PROC 24a, PROC 24c	: 1980 cm ² (both hands and forearms)

Other operational conditions affecting workers exposure

Outdoor / Indoor	:
Indoor/Outdoor use	: , PROC 5 , PROC 11
Indoor use	: , All other PROCs
Process Temperature	:
PROC 11	: 35 °C, 1 - 5
PROC 14	: 200 °C
PROC 24c	: > 40 °C
All other PROCs	: 23 °C

Technical conditions and measures

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying: Exception(s) : Outdoor use

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 temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents

BELOW 40°C:

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Handle substance within a predominantly closed system provided with extract ventilation. Handle in a fume cupboard or under extract ventilation.

Additional measures are specific for the following contributing scenarios:

PROC2: Use in closed, continuous process with occasional controlled exposure: Close to the former line

Local exhaust ventilation is required. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. OR Minimise exposure by extracted full enclosure for the operation or equipment. OR Ensure mechanical ventilation is in place.

PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact): Indoor use, With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Handle substance within a closed system.

PROC11: Non industrial spraying: Indoor use, 1

Local exhaust ventilation is required. Handle substance within a predominantly closed system provided with extract ventilation. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC11: Non industrial spraying: Indoor use, 2

Local exhaust ventilation is required. Ensure that a spraying booth is used.

PROC11: Non industrial spraying: Indoor use, 3

Open doors and windows.

PROC11: Non industrial spraying: Outdoor use, 5

Ensure operation is undertaken outdoors. Stay upwind/keep distance from source.

PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation: With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. OR Provide extract ventilation to material transfer points and other openings. OR Handle in a fume cupboard or under extract ventilation.

PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation: Without Local exhaust ventilation (LEV)

Ensure the ventilation system is regularly maintained and tested.

PROC24a: High (mechanical) energy work-up of substances bound in materials and/or articles - pt < mp - Low Fugacity

Local exhaust ventilation is required.

Organisational measures to prevent /limit releases, dispersion and exposure

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Ensure control measures are regularly inspected and maintained.

Additional measures are specific for the following contributing scenarios:

PROC2: Use in closed, continuous process with occasional controlled exposure: Close to the former line

Ensure control measures are regularly inspected and maintained.

PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact): Indoor use, With Local exhaust ventilation (LEV)

Ensure control measures are regularly inspected and maintained.

PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact): Indoor use, Without Local exhaust ventilation (LEV), OR, Outdoor use

Ensure control measures are regularly inspected and maintained.

PROC10: Roller application or brushing

Ensure control measures are regularly inspected and maintained.

PROC11: Non industrial spraying: Indoor use, 1

Ensure control measures are regularly inspected and maintained.

PROC11: Non industrial spraying: Indoor use, 2

Access to work area only for authorized persons. Ensure control measures are regularly inspected and maintained.

PROC11: Non industrial spraying: Indoor use, 3

Access to work area only for authorized persons. Ensure control measures are regularly inspected and maintained.

PROC11: Non industrial spraying: Indoor use, 4, Cleaning with air pressurised systems

Ensure control measures are regularly inspected and maintained.

PROC11: Non industrial spraying: Outdoor use, 5

Access to work area only for authorized persons. Ensure control measures are regularly inspected and maintained.

PROC24c: High (mechanical) energy work-up of substances bound in materials and/or articles - pt > mp - High Fugacity

Ensure control measures are regularly inspected and maintained.

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

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported. Wear a full face respirator conforming to EN136. 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.

Additional measures are specific for the following contributing scenarios:

PROC2: Use in closed, continuous process with occasional controlled exposure: Close to the former line

Wear a respirator conforming to EN140.

PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact): Indoor use, Without Local exhaust ventilation (LEV), OR, Outdoor use

Wear a respirator conforming to EN140.

PROC10: Roller application or brushing

Wear a respirator conforming to EN140.

PROC11: Non industrial spraying: Indoor use, 2

Wear a full face respirator conforming to EN136.

PROC11: Non industrial spraying: Indoor use, 3

Wear a full face respirator conforming to EN136.

PROC11: Non industrial spraying: Indoor use, 4, Cleaning with air pressurised systems

Wear a respirator conforming to EN140.

PROC11: Non industrial spraying: Outdoor use, 5

Wear a full face respirator conforming to EN136.

PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation: With Local exhaust ventilation (LEV)

Wear a respirator conforming to EN140.

PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation: Without Local exhaust ventilation (LEV)

Wear a respirator conforming to EN140.

General advice

Irrespective of the stated risk management measures respiratory protection is generally recommended for spraying applications.

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 Close to the mat line	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00153 mg/m ³	0,0306
2.1 PROC 2 Close to the former line	EasyTRA v4.1	General ventilation: 30%, Respirator: 90% protection, LEV: 80% efficiency, Mechanical ventilation, Efficiency: 25%	long term, inhalative, local	0,0028 mg/m ³	0,056
2.1 PROC 2 Continuous use/release Occasional exposure	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00572 mg/m ³	0,1144
2.1 PROC 3	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00572 mg/m ³	0,1144
2.1 PROC 5 Indoor use	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, OR, Respirator: 90% protection	long term, inhalative, local	0,00011 mg/m ³	0,0022
2.1 PROC 5 Outdoor use	EasyTRA v4.1	Outdoor use: 30%, Respirator: 90% protection	long term, inhalative, local	0,00011 mg/m ³	0,0022
2.1 PROC 8a	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00153 mg/m ³	0,0306
2.1 PROC 8b	EasyTRA v4.1	General ventilation: 30%, Closed system, 99% efficiency	long term, inhalative, local	0,00153 mg/m ³	0,0306
2.1 PROC 10	EasyTRA v4.1	General ventilation: 30%, Respirator: 90% protection	long term, inhalative, local	0,000687 mg/m ³	0,013749
2.1 PROC 11 Indoor use 1	EasyTRA v4.1	General ventilation: 30%, LEV: 80% efficiency	long term, inhalative, local	0,012 mg/m ³	0,240
2.1 PROC 11 Indoor use 2	EasyTRA v4.1	General ventilation: 30%, Spray booth: 90% reduction, Respirator: 97.5% protection	long term, inhalative, local	0,003 mg/m ³	0,060
2.1 PROC 11 Indoor use 3	EasyTRA v4.1	General ventilation: 30%, Respirator: 97.5% protection	long term, inhalative, local	0,022 mg/m ³	0,440
2.1 PROC 11 Indoor use 4	EasyTRA v4.1	General ventilation: 30%, Respirator: 90% protection	long term, inhalative, local	0,00007 mg/m ³	0,0014
2.1 PROC 11 Outdoor use 5	EasyTRA v4.1	Outdoors: 30% reduction, Respirator: 97.5% protection	long term, inhalative, local	0,022 mg/m ³	0,440
2.1 PROC 14	EasyTRA v4.1	General ventilation: 30%, Respirator: 90% protection, LEV: 90% efficiency	long term, inhalative, local	0,000466 mg/m ³	0,00932

2.1 PROC 14	EasyTRA v4.1	General ventilation: 30%, Respirator: 90% protection	long term, inhalative, local	0,000466 mg/m ³	0,00932
2.1 PROC 24a	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative, local	0,00572 mg/m ³	0,1144
2.1 PROC 24c	EasyTRA v4.1	General ventilation: 30%, Respirator: 97.5% protection	long term, inhalative, local	0,002 mg/m ³	0,04
2.1 All PROCs	Qualitative assessment	Gloves: 90% protection	Dermal exposure	*	< 1

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

* Qualitative approach used to conclude safe use.

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

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in section 2. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

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

1. Short title of Exposure Scenario: **Widespread use by professional workers, Other composite material (ES18)**

Main User Groups	: 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 PROC13: Treatment of articles by dipping and pouring PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC21: Low energy manipulation of substances bound in materials and/ or articles
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

2.1 Contributing scenario controlling worker exposure for: PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC10, PROC13, PROC14, PROC21



Widespread use by professional workers, Other composite material

Product characteristics

Concentration of the Substance in Mixture/Article

PROC 21	: <= 1%
All other PROCs	: <= 100%
Molar Mass	: 250 g/mol
Vapour pressure	: 0,001 Pa at 20 °C
Physical Form (at time of use)	: PROC 21, : Solid, low dustiness All other PROCs, : Low volatile liquid

Frequency and duration of use

General exposures	: 8 hours/day
PROC 5	: 1 hours/day
PROC 8a	: 1 hours/day
Remarks	: daily or less , Short term

PROC 8b	:	1 hours/day
Remarks	:	daily or less , Short term
Frequency of use	:	5 days/week

Human factors not influenced by risk management

Exposed skin area	:	
PROC 2, PROC 4, PROC 5, PROC 13, PROC 14	:	480 cm ² (palms of both hands)
PROC 3	:	240 cm ² (palm of one hand)
PROC 8a, PROC 8b, PROC 10	:	960 cm ² (both hands)
PROC 21	:	1980 cm ² (both hands and forearms)

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	
Indoor/Outdoor use	:	, PROC 5
Indoor use	:	, All other PROCs
	:	
Process Temperature	:	
PROC 4	:	90 °C
PROC 14	:	90 °C
PROC 21	:	35 °C
All other PROCs	:	23 °C

Technical conditions and measures

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying: Exception(s) : Outdoor use

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 temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Handle substance within a predominantly closed system provided with extract ventilation. 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: With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. 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): Indoor use, With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Handle substance within a closed system.

Organisational measures to prevent /limit releases, dispersion and exposure

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric

substances and BELOW 45°C for other MDI based substances or without spraying:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Ensure control measures are regularly inspected and maintained.

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): Indoor use, With Local exhaust ventilation (LEV)

Ensure control measures are regularly inspected and maintained.

PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact): Indoor use, OR, Outdoor use, Without Local exhaust ventilation (LEV)

Ensure control measures are regularly inspected and maintained.

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

These measures are for all contributing scenarios at product temperature BELOW 40°C for MDI monomeric substances and BELOW 45°C for other MDI based substances or without spraying:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported.

These measures are for all contributing scenarios at product temperature ABOVE 40°C for MDI monomeric substances and ABOVE 45°C for other MDI based substances or with spraying and use of aprotic polar solvents BELOW 40°C:

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported. Wear a full face respirator conforming to EN136. 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.

Additional measures are specific for the following contributing scenarios:

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises: Without Local exhaust ventilation (LEV)

Wear a respirator conforming to EN140.

PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact): Indoor use, OR, Outdoor use, Without Local exhaust ventilation (LEV)

Wear a respirator conforming to EN140.

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	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 PROC 3	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 PROC 4	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, OR, Respirator: 90% protection	long term, inhalative, local	0,0006 mg/m ³	0,012
2.1 PROC 5 Indoor use	EasyTRA v4.1	General ventilation: 30%, LEV: 90% efficiency, OR, Respirator: 90% protection	long term, inhalative, local	0,00011 mg/m ³	0,0022
2.1 PROC 5 Outdoor use	EasyTRA v4.1	Outdoor use: 30%, Respirator: 90% protection	long term, inhalative, local	0,00011 mg/m ³	0,0022
2.1 PROC 8a	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,0036 mg/m ³	0,072
2.1 PROC 8b	EasyTRA v4.1	General ventilation: 30%, Closed system, 99% efficiency	long term, inhalative, local	0,00364 mg/m ³	0,0728
2.1 PROC 10	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,017 mg/m ³	0,340
2.1 PROC 13	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,017 mg/m ³	0,340
2.1 PROC 14	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00576 mg/m ³	0,1152
2.1 PROC 21	EasyTRA v4.1	General ventilation: 30%	long term, inhalative, local	0,00921 mg/m ³	0,1842
2.1 All PROCs	Qualitative assessment	Gloves: 90% protection	Dermal exposure	*	< 1

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

* Qualitative approach used to conclude safe use.

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

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in section 2. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

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

1. Short title of Exposure Scenario: **Widespread use by professional workers, Cleaning, without Aprotic Polar Solvents (ES19)**

Main User Groups	: SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process category	: 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 PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring PROC15: Use as laboratory reagent
Environmental release category	: ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems

2.1 Contributing scenario controlling worker exposure for: PROC3, PROC4, PROC5, PROC8a, PROC10, PROC13, PROC15



Widespread use by professional workers, Cleaning, without Aprotic Polar Solvents

Product characteristics

Concentration of the Substance in Mixture/Article

All PROCs	: <= 100%
Molar Mass	: 250 g/mol
Vapour pressure	: 0,001 Pa at 20 °C
Physical Form (at time of use)	: Low volatile liquid

Frequency and duration of use

General exposures	: 1 hours/day
Frequency of use	: 5 days/week

Human factors not influenced by risk management

Exposed skin area	:
PROC 3, PROC 15	: 240 cm ² (palm of one hand)
PROC 4, PROC 5, PROC 13	: 480 cm ² (palms of both hands)
PROC 8a, PROC 10	: 960 cm ² (both hands)

Other operational conditions affecting workers exposure

Outdoor / Indoor	:
Indoor use	: , PROC 15
Outdoor use	: , PROC 5
Indoor/Outdoor use	: , All other PROCs
Process Temperature	:
PROC 4	: < 40 °C

Technical conditions and measures

Handle substance within a closed system. Handle substance within a predominantly closed system provided with extract ventilation. Handle in a fume cupboard or under extract ventilation.

These general measures are mandatory for all contributing scenarios. Exception(s) : PROC 4

Additional measures are specific for the following contributing scenarios:

PROC3: Use in closed batch process (synthesis or formulation): Indoor use

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

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises: Indoor use, With Local exhaust ventilation (LEV)

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings. Ensure control measures are regularly inspected and maintained.

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises: Indoor use, With respiratory protection, Without Local exhaust ventilation (LEV)

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

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises: Outdoor, With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings. Ensure control measures are regularly inspected and maintained.

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises: Outdoor, With respiratory protection, Without Local exhaust ventilation (LEV)

Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings. Ensure control measures are regularly inspected and maintained.

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

Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.

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

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

PROC10: Roller application or brushing: Indoor use

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

PROC13: Treatment of articles by dipping and pouring: Indoor use

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

PROC15: Use as laboratory reagent: With Local exhaust ventilation (LEV)

Local exhaust ventilation is required. Provide extract ventilation to points where emissions occur. OR Provide extract ventilation to material transfer points and other openings. OR Handle in a fume cupboard or under extract ventilation.

Organisational measures to prevent /limit releases, dispersion and exposure

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure. Ensure control measures are regularly inspected and maintained.

These general measures are mandatory for all contributing scenarios. Exception(s) : PROC 4

Additional measures are specific for the following contributing scenarios:

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises: Indoor use, With Local exhaust ventilation (LEV)

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure.

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises: Indoor use, With respiratory protection, Without Local exhaust ventilation (LEV)

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure.

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises: Outdoor, With Local exhaust ventilation (LEV)

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure.

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises: Outdoor, With respiratory protection, Without Local exhaust ventilation (LEV)

Clear spills immediately. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure.

PROC15: Use as laboratory reagent: Without Local exhaust ventilation (LEV)

Ensure the ventilation system is regularly maintained and tested.

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

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported. Wear a full face respirator conforming to EN136. 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.

These general measures are mandatory for all contributing scenarios. Exception(s) : PROC 4

Additional measures are specific for the following contributing scenarios:

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises: Indoor use, With Local exhaust ventilation (LEV)

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested

to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported.

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises: Indoor use, With respiratory protection, Without Local exhaust ventilation (LEV)

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported. Wear a respirator conforming to EN140. Ensure control measures are regularly inspected and maintained.

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises: Outdoor, With Local exhaust ventilation (LEV)

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported.

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises: Outdoor, With respiratory protection, Without Local exhaust ventilation (LEV)

Do not inhale vapours / aerosols. Ensure that direct skin contact is avoided. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wash off any skin contamination immediately. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. The use of latex gloves is not supported. Wear a respirator conforming to EN140. Ensure control measures are regularly inspected and maintained.

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 3 Indoor use	EasyTRA	General ventilation: 30%	long term, inhalative, local	0,0023 mg/m ³	0,046
2.1 PROC 3 Outdoor use	EasyTRA	Outdoor use: 30%	long term, inhalative, local	0,0016 mg/m ³	0,032
2.1 PROC 4 Indoor use	EasyTRA	General ventilation: 30%, LEV: 90% efficiency, OR, Respirator: 90% protection	long term, inhalative, local	0,00023 mg/m ³	0,0046
2.1 PROC 4 Outdoor use	EasyTRA	Outdoor use: 30%, LEV: 90% efficiency, OR, Respirator: 90% protection	long term, inhalative, local	0,00069 mg/m ³	0,0138
2.1 PROC 5	EasyTRA	Outdoor use: 30%, Respirator: 90% protection	long term, inhalative, local	0,00069 mg/m ³	0,0138
2.1 PROC 8a Indoor use	EasyTRA	General ventilation: 30%, LEV: 99% efficiency	long term, inhalative, local	0,0023 mg/m ³	0,046
2.1 PROC 8a Outdoor use	EasyTRA	Outdoor use: 30%	long term, inhalative, local	0,0016 mg/m ³	0,032
2.1 PROC 10 Indoor use	EasyTRA	General ventilation: 30%, LEV: 90% efficiency	long term, inhalative, local	0,0023 mg/m ³	0,046
2.1 PROC 10 Outdoor use	EasyTRA	Outdoor use: 30%	long term, inhalative, local	0,0016 mg/m ³	0,032
2.1 PROC 13	EasyTRA	General ventilation: 30%, LEV:	long term,	0,0023 mg/m ³	0,046

Indoor use		90% efficiency	inhalative, local		
2.1 PROC 13 Outdoor use	EasyTRA	Outdoor use: 30%	long term, inhalative, local	0,0016 mg/m ³	0,032
2.1 PROC 15	EasyTRA	General ventilation: 30%, LEV: 90% efficiency, Respirator: 90% protection	long term, inhalative, local	0,00023 mg/m ³	0,0046
2.1 PROC 15	EasyTRA	General ventilation: 30%, Respirator: 90% protection	long term, inhalative, local	0,00023 mg/m ³	0,0046
2.1 All PROCs	Qualitative assessment	Gloves: 90% protection	Dermal exposure	*	< 1

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

* Qualitative approach used to conclude safe use.

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

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in section 2. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

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

1. Short title of Exposure Scenario: Consumer use, Rigid foam (ES20)

Main User Groups	: SU 21: Consumer uses: Private households (= general public = consumers)
Product category	: PC1: Adhesives, sealants
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

2.1 Contributing scenario controlling consumer exposure for: PC1**□ Consumer use, Rigid foam**

Product characteristics

Concentration of the Substance in Mixture/Article

PC1	: 10%
Molar Mass	: 250 g/mol
Vapour pressure	: 0,001 Pa at 20 °C

Amount used

Amount used per event	:
Remarks	: Inhalation exposure : 825 g

Frequency and duration of use

Exposure duration	: 30 min
Application duration	: 30 min

Other given operational conditions affecting consumers exposure

Room size	: 57,5 m ³
Temperature	: 23 °C
Ventilation rate per hour	: 1,5
Release area	: 250 cm ²
Mass transfer rate	: 0,192 m/min
Mol weight matrix	: 319 g/mol

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

Application Route	: PC1
Remarks	: No spraying

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 PC1: Adhesives, Sealants: One Component Foam [OCF]	Consexpo		short term, inhalative, systemic	0,00000295 mg/m ³	0,000059
2.1 PC1: Adhesives, Sealants: One Component Foam [OCF]	Consexpo		combined routes	0,0000000289 mg/kg bw/day	0,000059

Based on the applied RMMs the risk towards humans is sufficiently controlled ($RCR \leq 1$).

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

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in section 2. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

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

1. Short title of Exposure Scenario: Consumer use, Use in coatings (ES21)

Main User Groups	: SU 21: Consumer uses: Private households (= general public = consumers)
Product category	: PC9a: Coatings and paints, thinners, paint removers
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

2.1 Contributing scenario controlling consumer exposure for: PC9a**□ Consumer use, Use in coatings****Product characteristics**

Concentration of the Substance in Mixture/Article

PC9a	: 35%
Molar Mass	: 250 g/mol
Vapour pressure	: 0,001 Pa at 20 °C

Amount used

Remarks	: Inhalation exposure
PC9a: Coatings and paints, thinners, paint removers: 2 component roof and gutter coating - mixing	: 1000 g
	:
PC9a: Coatings and paints, thinners, paint removers: 2 component roof and gutter coating - applying	: 1000 g

Frequency and duration of use

PC9a: Coatings and paints, thinners, paint removers: 2 component roof and gutter coating - mixing	:
Exposure duration	: 5 min
Application duration	: 5 min
	:
PC9a: Coatings and paints, thinners, paint removers: 2 component roof and gutter coating - applying	:
Exposure duration	: 240 min
Application duration	: 240 min

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	: PC9a: Coatings and paints, thinners, paint removers: 2 component roof and gutter coating - mixing
Room size	: 1 m ³
Temperature	: 20 °C
Ventilation rate per hour	: 0,6
Outdoor / Indoor	:

Outdoor / Indoor : PC9a: Coatings and paints, thinners, paint removers: 2 component roof and gutter coating - applying

Room size : 20 m³

Temperature : 20 °C

Ventilation rate per hour : 0,6

PC9a: Coatings and paints, thinners, paint removers: 2 component roof and gutter coating - mixing

Release area : 320 cm²

PC9a: Coatings and paints, thinners, paint removers: 2 component roof and gutter coating - applying

Release area : 1000 cm²

PC9a

Mass transfer rate : 0,192 m/min

Mol weight matrix : 3000 g/mol

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

Application Route : PC9a

Remarks : No spraying

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: Coatings and paints, thinners, paint removers: 2 component roof and gutter coating - mixing	Consexpo		short term, inhalative, systemic	0,000883 mg/m ³	0,017657
2.1 PC9a: Coatings and paints, thinners, paint removers: 2 component roof and gutter coating - applying	Consexpo		short term, inhalative, systemic	0,001345 mg/m ³	0,026893
2.1 PC9a: Coatings and paints, thinners, paint removers: 2 component roof and gutter coating - mixing	Consexpo		combined routes	0,00000144 mg/kg bw/day	0,017657
2.1 PC9a: Coatings and paints, thinners, paint removers: 2 component roof and gutter coating - applying	Consexpo		combined routes	0,000105 mg/kg bw/day	0,026893

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

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

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in section 2. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

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

1. Short title of Exposure Scenario: Consumer use, Adhesives, sealants (ES22)

Main User Groups	: SU 21: Consumer uses: Private households (= general public = consumers)
Product category	: PC1: Adhesives, sealants
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

2.1 Contributing scenario controlling consumer exposure for: PC1**□ Consumer use, Adhesives, sealants****Product characteristics**

Concentration of the Substance in Mixture/Article

PC1 :

1 Component Bottled Construction Glue - Applying : 20%

1 Component Bottled Universal Wood Glue - Applying : 20%

2 Component Adhesives - Applying : 30%

2 Component Adhesives - Mixing : 30%

2 Component Joint Sealant - Mixing : 45%

2 Component Joint Sealant - Applying : 45%

2 Component Parquet Glue - Mixing : 50%

2 Component Parquet Glue - Applying : 50%

1 Component Assembly Sealant - Applying : 20%

Molar Mass : 250 g/mol
Vapour pressure : 0,001 Pa at 20 °C**Amount used**

PC1	:	
Remarks	:	Inhalation exposure
1 Component Bottled Construction Glue - Applying	:	250 g
1 Component Bottled Universal Wood Glue - Applying	:	10 g
2 Component Adhesives - Mixing	:	20 g
2 Component Adhesives - Applying	:	20 g
2 Component Joint Sealant - Mixing	:	160 g
2 Component Joint Sealant - Applying	:	160 g
2 Component Parquet Glue - Mixing	:	7000 g
2 Component Parquet Glue - Applying	:	22000 g
1 Component Assembly Sealant - Applying	:	390 g

Frequency and duration of use

PC1	:	
1 Component Bottled Construction Glue - Applying	:	
Exposure duration	:	240 min
Application duration	:	30 min
	:	
1 Component Bottled Universal Wood Glue - Applying	:	
Exposure duration	:	240 min
Application duration	:	20 min
	:	
2 Component Adhesives - Mixing	:	
Exposure duration	:	5 min
Application duration	:	5 min
	:	
2 Component Adhesives - Applying	:	
Exposure duration	:	240 min
Application duration	:	30 min
	:	
2 Component Joint Sealant - Mixing	:	
Exposure duration	:	5 min
Application duration	:	5 min
	:	
2 Component Joint Sealant - Applying	:	
Exposure duration	:	15 min
Application duration	:	15 min
	:	
2 Component Parquet Glue - Mixing	:	
Exposure duration	:	10 min
Application duration	:	10 min
	:	
2 Component Parquet Glue - Applying	:	
Exposure duration	:	480 min
Application duration	:	480 min
	:	
1 Component Assembly Sealant - Applying	:	
Exposure duration	:	240 min
Application duration	:	30 min

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	PC1
Outdoor / Indoor	:	1 Component Bottled Construction Glue - Applying
Room size	:	20 m ³
Temperature	:	20 °C
Ventilation rate per hour	:	0,6
Outdoor / Indoor	:	
Outdoor / Indoor	:	1 Component Bottled Universal Wood Glue - Applying
Room size	:	20 m ³
Temperature	:	20 °C
Ventilation rate per hour	:	0,6

Outdoor / Indoor	:	
Outdoor / Indoor	:	2 Component Adhesives - Mixing
Room size	:	20 m ³
Temperature	:	20 °C
Ventilation rate per hour	:	0,6
Outdoor / Indoor	:	
Outdoor / Indoor	:	2 Component Adhesives - Applying
Room size	:	20 m ³
Temperature	:	20 °C
Ventilation rate per hour	:	0,6
Outdoor / Indoor	:	
Outdoor / Indoor	:	2 Component Joint Sealant - Mixing
Room size	:	1 m ³
Temperature	:	20 °C
Ventilation rate per hour	:	0,6
Outdoor / Indoor	:	
Outdoor / Indoor	:	2 Component Joint Sealant - Applying
Room size	:	20 m ³
Temperature	:	20 °C
Ventilation rate per hour	:	0,6
Outdoor / Indoor	:	
Outdoor / Indoor	:	2 Component Parquet Glue - Mixing
Room size	:	1 m ³
Temperature	:	20 °C
Ventilation rate per hour	:	0,6
Outdoor / Indoor	:	
Outdoor / Indoor	:	2 Component Parquet Glue - Applying
Room size	:	58 m ³
Temperature	:	20 °C
Ventilation rate per hour	:	0,5
Outdoor / Indoor	:	
Outdoor / Indoor	:	1 Component Assembly Sealant - Applying
Room size	:	20 m ³
Temperature	:	20 °C
Ventilation rate per hour	:	0,6
Release area	:	
PC1	:	
1 Component Bottled Construction Glue - Applying	:	10000 cm ²
1 Component Bottled Universal Wood Glue - Applying	:	400 cm ²
2 Component Adhesives - Mixing	:	20 cm ²
2 Component Adhesives - Applying	:	20 cm ²
2 Component Joint Sealant - Mixing	:	20 cm ²
2 Component Joint Sealant - Applying	:	10 cm ²
2 Component Parquet Glue - Mixing	:	320 cm ²
2 Component Parquet Glue - Applying	:	10000 cm ²
1 Component Assembly Sealant - Applying	:	15000 cm ²
PC1	:	
Mass transfer rate	:	0,192 m/min
Mol weight matrix	:	3000 g/mol

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

Application Route	:	PC1
Remarks	:	No spraying

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 PC1 Adhesives, sealants 1 Component Bottled Construction Glue - Applying	Consexpo		short term, inhalative, systemic	0,017921 mg/m ³	0,358417
2.1 PC1 Adhesives, sealants 1 Component Bottled Construction Glue - Applying	Consexpo		combined routes	0,001404 mg/kg bw/day	0,358417
2.1 PC1 Adhesives, sealants 1 Component Bottled Universal Wood Glue - Applying	Consexpo		short term, inhalative, systemic	0,001133 mg/m ³	0,022661
2.1 PC1 Adhesives, sealants 1 Component Bottled Universal Wood Glue - Applying	Consexpo		combined routes	0,000089 mg/kg bw/day	0,022661
2.1 PC1 Adhesives, sealants 2 Component Adhesives - Mixing	Consexpo		short term, inhalative, systemic	0,0000027 mg/m ³	0,000054
2.1 PC1 Adhesives, sealants 2 Component Adhesives - Mixing	Consexpo		combined routes	0,0000000044 mg/kg bw/day	0,000054
2.1 PC1 Adhesives, sealants 2 Component Adhesives - Applying	Consexpo		short term, inhalative, systemic	0,000063 mg/m ³	0,00125
2.1 PC1 Adhesives, sealants 2 Component Adhesives - Applying	Consexpo		combined routes	0,0000049 mg/kg bw/day	0,00125
2.1 PC1 Adhesives, sealants 2 Component Joint Sealant - Mixing	Consexpo		short term, inhalative, systemic	0,000058 mg/m ³	0,001168
2.1 PC1 Adhesives, sealants 2 Component Joint Sealant - Mixing	Consexpo		combined routes	0,0000000953 mg/kg bw/day	0,001168
2.1 PC1 Adhesives, sealants 2 Component Joint Sealant - Applying	Consexpo		short term, inhalative, systemic	0,00000144 mg/m ³	0,000029
2.1 PC1 Adhesives, sealants 2 Component Joint Sealant - Applying	Consexpo		combined routes	0,0000000071 mg/kg bw/day	0,000029
2.1 PC1 Adhesives, sealants 2 Component Parquet Glue - Mixing	Consexpo		short term, inhalative, systemic	0,001841 mg/m ³	0,036816
2.1 PC1 Adhesives, sealants 2 Component Parquet Glue - Mixing	Consexpo		combined routes	0,00000601 mg/kg bw/day	0,036816
2.1 PC1 Adhesives, sealants	Consexpo		short term, inhalative,	0,014584 mg/m ³	0,291686

2 Component Parquet Glue - Applying			systemic		
2.1 PC1 Adhesives, sealants 2 Component Parquet Glue - Applying	Consexpo		combined routes	0,002285 mg/kg bw/day	0,291686
2.1 PC1 Adhesives, sealants 1 Component Assembly Sealant - Applying	Consexpo		short term, inhalative, systemic	0,022601 mg/m ³	0,452016
2.1 PC1 Adhesives, sealants 1 Component Assembly Sealant - Applying	Consexpo		combined routes	0,00177 mg/kg bw/day	0,452016

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

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

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