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

1.1 Product identifier

Product Name	Melamine
Chemical Name	1,3,5-triazine-2,4,6-triamine
Chemical Formula	$C_3H_6N_6$
CAS No.	108-78-1
EC No.	203-615-4
REACH Registration No.	01-2119485947-16-0017

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

Identified Use(s)	Melamine ($C_3H_6N_6$) is a product in form of white powder used for the production of a wide range of synthetic resins. • Formulation or re-packing • Use as intermediate for resins (reacted melamine) • Use as additive in foams • Use as additive in intumescent coatings • PU foams - Workers (industrial) • Intumescent coatings - Workers (industrial) • Intumescent coatings - Professional Workers
Uses Advised Against	Addition to food or feed products.

1.3 Details of the supplier of the safety data sheet

Company Identification	Qatar Melamine Co
Address	P.O. Box 50001, Mesaieed, Qatar.
Telephone	(+974) 44228888
E-mail	mktg@qafco.com.qa
Only representative of a non-Community	manufacturer
Company Identification	MUNTAJAT B.V.
Address	Prinses Margrietplantsoen 78-A 2595 BR, La Haye Pays Bas
Telephone	+31(0)70 219 7000
E-mail	REACH@muntajatbv.com
Website	www.muntajatbv.com

1.4 Emergency telephone number

National Poisons Information Service (Birmingham Centre)	+44 (0) 111
For Spill, Leak, Fire, Exposure or Accident, Call CHEMTREC Day or Night	Within USA and Canada: 1-800-424-9300 Outside USA and Canada: +1 703-741-5970 and +1-703-527-3887 (collect calls accepted)

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Regulation (EC) No. 1272/2008 (CLP) Repr. 2 :Suspected of damaging fertility.

2.2 Label elements

According to Regulation (EC) No. 1272/2008 (CLP)

Product Name Melamine.

Hazard Pictogram(s)

GHS08

Signal Word(s) Warning

Hazard Statement(s) H361f: Suspected of damaging fertility.

Precautionary Statement(s)

P201: Obtain special instructions before use.
P202: Do not handle until all safety precautions have been read and understood.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P308+P313: IF exposed or concerned: Get medical advice/attention.
P405: Store locked up.
P501: Dispose of contents in accordance with local, state or national legislation.

2.3 Other hazards

May be harmful if swallowed.
Dust may have irritant effect on skin, eyes and air passages.

2.4 Additional Information

None.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

HAZARDOUS INGREDIENT(S)	CAS No.	EC No.	%W/W	Hazard Statement(s)	Hazard Pictogram(s)
Melamine	108-78-1	203-615-4 01-2119485947-16-0017	≥ 99	Repr. 2 H361f	GHS08

3.2 Mixtures

Not applicable.

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

Inhalation: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. If symptoms persist, obtain medical attention.

Skin Contact: After contact with skin, wash immediately with plenty of soap and water.

Eye Contact: First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.

Ingestion: If swallowed, rinse mouth with water (only if the person is conscious).

4.2 Most important symptoms and effects, both acute and delayed

Dust may have irritant effect on skin, eyes and air passages.

4.3 Indication of any immediate medical attention and special treatment needed

IF exposed or concerned: Get medical advice/attention.

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media: Extinguish with carbon dioxide, dry chemical, foam or waterspray.

Unsuitable extinguishing media: Water with full jet.

5.2 Special hazards arising from the substance or mixture

Decomposes in a fire giving off toxic fumes: Carbon monoxide, Carbon dioxide, Oxides of nitrogen. Ammonia is released when melamine is heated above 500°C.

5.3 Advice for firefighters

Fire fighters should wear complete protective clothing including self-contained breathing apparatus.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation. Ensure suitable personal protection (including respiratory protection) during removal of spillages. Avoid generation of dust. Avoid breathing dust.

6.2 Environmental precautions

Do not allow to enter drains, sewers or watercourses.

6.3 Methods and material for containment and cleaning up

Sweep spilled substances into containers if appropriate moisten first to prevent dusting. Carefully collect remainder. Do not wash spillage with water as area will be slippery and will block sewage.

6.4 Reference to other sections

See Also Section 8, 13.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Provide adequate ventilation. Avoid generation of dust. Avoid breathing dust. Wear protective gloves/protective clothing/eye protection/face protection. Wash hands and exposed skin thoroughly after handling.

7.2 Conditions for safe storage, including any incompatibilities

Keep from direct sunlight. Store locked up. Store in dry place. Keep container tightly closed.

Storage temperature	Ambient.
Storage life	Stable under normal conditions.
Incompatible materials	Strongly acidic. Strong oxidising agents.

7.3 Specific end use(s)

- Formulation or re-packing
- Use as intermediate for resins (reacted melamine)
- Use as additive in foams
- Use as additive in intumescent coatings
- PU foams - Workers (industrial)
- Intumescent coatings - Workers (industrial)
- Intumescent coatings - Professional Workers

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

8.1.1 Occupational Exposure Limits

SUBSTANCE	CAS No.	LTEL (8 hr TWA ppm)	LTEL (8 hr TWA mg/m³)	STEL (ppm)	STEL (mg/m³)	Note
Melamine	108-78-1					None assigned

Source: UK Workplace Exposure Limits EH40/2005 (Fourth edition, published 2020), United Kingdom

8.1.2 Biological limit value Not established.

8.1.3 PNECs and DNELs

DNEL / DMEL	Oral	Inhalation	Dermal
Industry - Long Term - Local effects			
Industry - Long Term - Systemic effects		8.3 mg/m³	11.8 mg/kg bw/day
Industry - Short term - Local effects			
Industry - Short term - Systemic effects		82.3 mg/m³	117 mg/kg bw/day
Consumer - Long Term - Local effects			
Consumer - Long Term - Systemic effects	0.42 mg/kg bw/day	1.5 mg/m³	4.2 mg/kg bw/day
Consumer - Short term - Local effects			
Consumer - Short term - Systemic effects			

Environment	PNEC
Aquatic Compartment (including sediment)	Fresh water: 0.51 mg/l Intermittent release: 2 mg/l Sea water: 0.051 mg/l Fresh water (Sediment): 2.524 mg/kg dw Sea water (Sediment): 0.252 mg/kg dw
Terrestrial Compartment	Sewage Treatment Plant: 200 mg/l

Atmospheric Compartment	Soil: 0.206 mg/kg dw

8.2 Exposure controls

8.2.1. Appropriate engineering controls: Ensure adequate ventilation.

8.2.2. Personal protection equipment

Eye Protection: Wear protective eyewear (goggles, face shield, or safety glasses).

Skin protection: Wear protective gloves.
Breakthrough time of the glove material: refer to the information provided by the gloves' producer.

Respiratory protection: An approved dust mask should be worn if dust is generated during handling.

Thermal hazards: Not applicable.

8.2.3. Environmental Exposure Controls: Do not allow to enter drains, sewers or watercourses.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Powder. Colour : White.
Odour	Odourless.
Odour threshold	Not established.
pH	7.5-8.5 (aqueous solution), 20 g/l @ 20°C
Melting point/freezing point	354°C (Doesn't freeze, solidifies)
Initial boiling point and boiling range	>354°C (Sublimation)
Flash Point	Not applicable.
Evaporation rate	Not applicable.
Flammability (solid, gas)	Non-flammable.
Upper/lower flammability or explosive limits	Not available.
Vapour pressure	4.7 x 1.0E-8 Pa @ 20°C
Vapour density	Not applicable.
Density (g/ml)	1570 kg/m³
Relative density	1.57
Solubility(ies)	Solubility (Water) : Slightly soluble: 3.48 g/l @ 20°C Solubility (Other): Very slightly soluble: Acetone (0.3 g/l), Ethanol (0.6 g/l), Dimethylformamide (0.1 g/l), Soluble: Ethyl cellosolve (11.2 g/l) @ 30°C
Partition coefficient: n-octanol/water	-1.22 @ 20°C
Auto-ignition temperature	>500°C
Decomposition Temperature (°C)	>354°C
Viscosity	Not applicable.
Explosive properties	Not explosive.
Oxidising properties	Not oxidising.

9.2 Other information

Dissociation constant	6.7 pKa @ 20°C
Molecular weight	126.12 g/mol

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Stable under normal conditions.

10.2 Chemical Stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

No hazardous reactions known if used for its intended purpose.

10.4 Conditions to avoid

Keep away from moisture.

10.5 Incompatible materials

Strongly acidic. Strong oxidising agents.

10.6 Hazardous decomposition products

No hazardous decomposition products known.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity - Ingestion	May be harmful if swallowed. LD50 (rat): 3161 mg/kg
Acute toxicity - Skin Contact	Low acute toxicity.
Acute toxicity - Inhalation	Low acute toxicity. LC50 (rat): >5190 mg/m³
Skin corrosion/irritation	Not classified.
Serious eye damage/irritation	Not classified.
Skin sensitization data	It is not a skin sensitiser.
Respiratory sensitization data	Not classified.
Germ cell mutagenicity	There is no evidence of mutagenic potential.
Carcinogenicity	Not classifiable as to its carcinogenicity to humans. LOAEL (oral): 126 mg/kg bw/day (chronic, rat, bladder). Statistically significant increases in the incidence of transitional-cell carcinoma and combined incidences of transitional-cell carcinoma and papilloma in the urinary bladder were observed in male rats exposed to 4500 ppm melamine (ca. 263 mg/kg bw/day), but not when exposed to 2250 ppm melamine. With one exception, urinary bladder stones were observed in male rats that had transitional-cell carcinomas. Female rats did not develop tumours even when exposed up to 9000 ppm. No neoplastic findings related to treatment were observed in male or female mice. Not proven for humans.
Reproductive toxicity	Suspected of damaging fertility in male rats. NOAEL (oral): 89 mg/kg bw/day (subchronic, 168 hours/week rat). Adverse effects on the male reproductive system were detected in an EOGRTS performed according to OECD TG 443 in rats, following the ECHA decision number TPE-D-2114373433-50-01. Tubular degeneration/atrophy in the testis was observed with related minimal cellular debris in the epididymis in F0 and F1 males. In addition, an increase in sperm abnormalities (detached heads) was observed in the F0 and F1 males.
Lactation	None anticipated.
STOT - single exposure	Not classified.
STOT - repeated exposure	Not classified.
Aspiration hazard	None anticipated.

11.2 Other information

Dust may have irritant effect on skin, eyes and air passages.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

	Low toxicity to aquatic organisms.
Acute	LC50 (Daphnia magna): 200 mg/l
Chronic	NOEC (Fathead minnow (Pimephales promelas)): 5.1 mg/l NOEC (Daphnia magna): 11 mg/l
Algae	EC50 Fresh water: 325 mg/l NOEC Fresh water: 98 mg/l

12.2 Persistence and degradability

This substance is not readily biodegradable. Not expected to be inherently

biodegradable.

12.3 Bioaccumulative potential

The substance has no potential for bioaccumulation.
Bioconcentration factor (BCF): 3.8 L/kg ww

12.4 Mobility in soil

The substance is predicted to have moderate mobility in soil.

12.5 Results of PBT and vPvB assessment

Not classified as PBT or vPvB.

12.6 Other adverse effects

Not known.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Dispose of empty containers and wastes safely. Recover or recycle if possible.

13.2 Additional Information

Disposal should be in accordance with local, state or national legislation.

SECTION 14: TRANSPORT INFORMATION

Not classified as hazardous for transport.

14.1 UN number

Not applicable

14.2 UN proper shipping name

Not applicable

14.3 Transport hazard class(es)

Not applicable

14.4 Packing group

Not applicable

14.5 Environmental hazards

Not classified as a Marine Pollutant.

14.6 Special precautions for user

Not known

14.7 Transport in bulk according to Annex II of Marpol and the IBC Code

Not known

SECTION 15: REGULATORY INFORMATION

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

European Regulations - Authorisations and/or Restrictions On Use

Candidate List of Substances of Very High Concern for Authorisation	Not listed
REACH: ANNEX XIV list of substances subject to authorisation	Not listed
REACH: Annex XVII Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles	Not listed
Community Rolling Action Plan (CoRAP)	Not listed
Regulation (EC) N° 850/2004 of the European Parliament and of the Council	Not listed

on persistent organic pollutants	
Regulation (EC) N° 1005/2009 on substances that deplete the ozone layer	Not listed
Regulation (EU) N° 649/2012 of the European Parliament and of the Council concerning the export and import of hazardous chemicals	Not listed

National regulations

Inventory Status	Listed in: Australia, Canada (DSL), China, Japan, Korea, Taiwan, New Zealand (HSNO) – HSNO Approval: HSR002503, New Zealand (NZIoC), Philippines.

15.2 Chemical Safety Assessment

A REACH chemical safety assessment has been carried out.

SECTION 16: OTHER INFORMATION

The following sections contain revisions or new statements: 1-16

LEGEND

Hazard Pictogram(s)

GHS08

Hazard classification	Repr. 2 : Reproductive toxicity, Category 2
Hazard Statement(s)	H361f: Suspected of damaging fertility.
Precautionary Statement(s)	P201: Obtain special instructions before use. P202: Do not handle until all safety precautions have been read and understood. P280: Wear protective gloves/protective clothing/eye protection/face protection. P308+P313: IF exposed or concerned: Get medical advice/attention. P405: Store locked up. P501: Dispose of contents in accordance with local, state or national legislation.
Acronyms	CAS : Chemical Abstracts Service CLP : Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures DNEL : Derived No Effect Level EC : European Community LTEL : Long term exposure limit PBT : Persistent, Bioaccumulative and Toxic PNEC : Predicted No Effect Concentration REACH : Registration, Evaluation, Authorisation and Restriction of Chemicals STEL : Short term exposure limit STOT : Specific Target Organ Toxicity vPvB : very Persistent and very Bioaccumulative
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TABLE OF CONTENTS

1. Exposure Scenario 1: Formulation or re-packing - Formulation or re-packaging

SECTION 1:	Title of exposure scenario	
	Formulation or re-packaging	
Contributing scenario controlling environmental exposure		
CS1	Formulation or re-packaging	ERC2
Contributing scenario controlling worker exposure		
CS2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions	PROC2
CS3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions	PROC3
CS4	Chemical production where opportunity for exposure arises	PROC4
CS5	Mixing or blending in batch processes	PROC5
CS6	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities	PROC8a
CS7	Transfer of substance or mixture (charging and discharging) at dedicated facilities	PROC8b
CS8	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	PROC9
CS9	Tabletting, compression, extrusion, pelletisation, granulation	PROC14
CS10	Use as laboratory reagent	PROC15
CS11	Hand-mixing with intimate contact and only PPE available	PROC19
CS12	Manual maintenance (cleaning and repair) of machinery	PROC28

SECTION 2:	Conditions of use
2.1	**Contributing scenario controlling environmental exposure:** 1.1 Formulation or re-packaging (ERC 2)
Amount used, frequency and duration of use (or from service life)	
Daily use amount at site: not relevant for the assessment as scenario specific releases are estimated Annual use amount at site: not relevant for the assessment as scenario specific releases are estimated	
Conditions and measures related to biological sewage treatment plant	
Biological STP: Standard [Effectiveness, Water: 0.169%] Discharge rate of STP: >= 2E3 m3/day Application of the STP sludge on agricultural soil: Yes	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow: >= 1.8E4 m3/day	
2.2	**Contributing scenario controlling worker exposure:** 1.2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC 2)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	

Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.3	**Contributing scenario controlling worker exposure:** 1.3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions (PROC 3)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.4	**Contributing scenario controlling worker exposure:** 1.4 Chemical production where opportunity for exposure arises (PROC 4)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.5	**Contributing scenario controlling worker exposure:** 1.5 Mixing or blending in batch processes (PROC 5)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced	

Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.6	**Contributing scenario controlling worker exposure:** 1.6 Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC 8a)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.7	**Contributing scenario controlling worker exposure:** 1.7 Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC 8b)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.8	**Contributing scenario controlling worker exposure:** 1.8 Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC 9)
Product characteristics	

Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.9	**Contributing scenario controlling worker exposure:** 1.9 Tabletting, compression, extrusion, pelletisation, granulation (PROC 14)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
Place of use: Indoor Operating temperature: <= 40 °C	
2.10	**Contributing scenario controlling worker exposure:** 1.10 Use as laboratory reagent (PROC 15)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
2.11	**Contributing scenario controlling worker exposure:** 1.11 Hand-mixing with intimate contact and only PPE available (PROC 19)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 %	

Physical form of the used product: Solid (medium dusty form)
Frequency and duration of use
Duration of activity: <= 8 h/day
Technical conditions and measures to control dispersion from source towards the worker
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]
Conditions and measures related to personal protection, hygiene and health evaluation
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with specific activity training) and (other) appropriate dermal protection [Effectiveness, Dermal: 95%]
Other given operational conditions affecting workers exposure
Place of use: Indoor Operating temperature: <= 40 °C

2.12	**Contributing scenario controlling worker exposure:** 1.12 Manual maintenance (cleaning and repair) of machinery (PROC 28)

Product characteristics
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)
Frequency and duration of use
Duration of activity: <= 8 h/day
Technical conditions and measures to control dispersion from source towards the worker
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]
Conditions and measures related to personal protection, hygiene and health evaluation
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]
Other given operational conditions affecting workers exposure
Place of use: Indoor Operating temperature: <= 40 °C

SECTION 3:	**1.13 Exposure estimation**

3.1. Environment

Release	**Release estimation method**	**Explanations**
Water	Estimated release rate	Local release rate: 5 kg/day
Air	Estimated release rate	Local release rate: 1 kg/day
Non-Agricultural Soil	Estimated release factor	Release factor after on-site RMM: 0%

Protection target	**Exposure concentration**	**Risk quantification (RCR)**
Fresh water	Local PEC: 0.255 mg/l	0.5
Sedimentation (Fresh water)	Local PEC: 1.26 mg/kg dw	0.5
Marine water	Local PEC: 0.0255 mg/l	0.5
Sedimentation (Marine water)	Local PEC: 0.126 mg/kg dw	0.5
Sewage Treatment Plant	Local PEC: 2.496 mg/l	0.01
Agricultural soil	Local PEC: 0.029 mg/kg dw	0.14
Man via Environment - Inhalation (Systemic effects)	Concentration in air: 7.8E-5 mg/m³	< 0.01

Man via Environment - Oral	Exposure via food consumption: 0.017 mg/kg bw/day	0.04
Man via Environment - Combined routes		0.04

3.2. Worker

Contributing scenario controlling worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC 2)

Exposure route	Exposure estimate - Worker	Risk quantification (RCR)
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.06
Inhalation, Systemic effects, Acute	2 mg/m³	0.024
Dermal, Systemic effects, Long Term	1.37 mg/kg bw/day	0.116
Combined routes, Systemic effects, Long Term		0.176

Contributing scenario controlling worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions (PROC 3)

Exposure route	Exposure estimate - Worker	Risk quantification (RCR)
Inhalation, Systemic effects, Long Term	1 mg/m³	0.12
Inhalation, Systemic effects, Acute	4 mg/m³	0.049
Dermal, Systemic effects, Long Term	0.69 mg/kg bw/day	0.058
Combined routes, Systemic effects, Long Term		0.179

Contributing scenario controlling worker exposure: Chemical production where opportunity for exposure arises (PROC 4)

Exposure route	Exposure estimate - Worker	Risk quantification (RCR)
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	1.372 mg/kg bw/day	0.116
Combined routes, Systemic effects, Long Term		0.719

Contributing scenario controlling worker exposure: Mixing or blending in batch processes (PROC 5)

Exposure route	Exposure estimate - Worker	Risk quantification (RCR)
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	2.742 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.835

Contributing scenario controlling worker exposure: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC 8a)

Exposure route	Exposure estimate - Worker	Risk quantification (RCR)
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	2.742 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.835

Contributing scenario controlling worker exposure: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC 8b)

Exposure route	Exposure estimate - Worker	Risk quantification (RCR)
Inhalation, Systemic effects, Long Term	1 mg/m³	0.12
Inhalation, Systemic effects, Acute	4 mg/m³	0.049
Dermal, Systemic effects, Long Term	2.742 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.353

Contributing scenario controlling worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC 9)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	1.372 mg/kg bw/day	0.116
Combined routes, Systemic effects, Long Term		0.719
Contributing scenario controlling worker exposure: Tabletting, compression, extrusion, pelletisation, granulation (PROC 14)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	1 mg/m³	0.12
Inhalation, Systemic effects, Acute	4 mg/m³	0.049
Dermal, Systemic effects, Long Term	3.43 mg/kg bw/day	0.291
Combined routes, Systemic effects, Long Term		0.411
Contributing scenario controlling worker exposure: Use as laboratory reagent (PROC 15)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.06
Inhalation, Systemic effects, Acute	2 mg/m³	0.024
Dermal, Systemic effects, Long Term	0.34 mg/kg bw/day	0.029
Combined routes, Systemic effects, Long Term		0.089
Contributing scenario controlling worker exposure: Hand-mixing with intimate contact and only PPE available (PROC 19)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	3 mg/m³	0.361
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	7.072 mg/kg bw/day	0.599
Combined routes, Systemic effects, Long Term		0.961
Contributing scenario controlling worker exposure: Manual maintenance (cleaning and repair) of machinery (PROC 28)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	2.742 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.835
SECTION 4:	**1.14 Guidance to DU to evaluate whether he works inside the boundaries set by the ES**	
Remarks on exposure data from external estimation tools: ECETOC TRA Workers 3.1: Explanation: The exposure estimates for PROC 8a are used, as TRA Workers cannot predict exposure for PROC 28 and these estimates can be considered suitable for estimating exposures during manual maintenance.		

2. Exposure Scenario 2: Use at industrial sites - Use as intermediate for resins (reacted melamine)

SECTION 1:	**Title of exposure scenario**	
	Use at industrial sites - Use as intermediate for resins (reacted melamine)	
Contributing scenario controlling environmental exposure		
CS1	Use as intermediate for resins (reacted melamine)	ERC6a, ERC6c
Contributing scenario controlling worker exposure		
CS2	Chemical production or refinery in closed process without likelihood of exposure or	PROC1

	processes with equivalent containment conditions	
CS3	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions	PROC2
CS4	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions	PROC3
CS5	Chemical production where opportunity for exposure arises	PROC4
CS6	Mixing or blending in batch processes	PROC5
CS7	Calendering operations	PROC6
CS8	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities	PROC8a
CS9	Transfer of substance or mixture (charging and discharging) at dedicated facilities	PROC8b
CS10	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	PROC9
CS11	Tabletting, compression, extrusion, pelletisation, granulation	PROC14
CS12	Use as laboratory reagent	PROC15
CS13	Manual maintenance (cleaning and repair) of machinery	PROC28

SECTION 2:	**Conditions of use**
2.1	**Contributing scenario controlling environmental exposure:** 2.1 Use as intermediate for resins (reacted melamine) (ERC 6a; ERC 6c)
Amount used, frequency and duration of use (or from service life)	
Daily use amount at site: not relevant for the assessment as scenario specific releases are estimated Annual use amount at site: not relevant for the assessment as scenario specific releases are estimated	
Conditions and measures related to biological sewage treatment plant	
Biological STP: Standard [Effectiveness, Water: 0.169%] Discharge rate of STP: >= 2E3 m3/day Application of the STP sludge on agricultural soil: Yes	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow: >= 1.8E4 m3/day	
2.2	**Contributing scenario controlling worker exposure:** 2.2 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC 1)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.3	**Contributing scenario controlling worker exposure:** 2.3 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC 2)

Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.4	**Contributing scenario controlling worker exposure:** 2.4 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions (PROC 3)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.5	**Contributing scenario controlling worker exposure:** 2.5 Chemical production where opportunity for exposure arises (PROC 4)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	

Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.6	**Contributing scenario controlling worker exposure:** 2.6 Mixing or blending in batch processes (PROC 5)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.7	**Contributing scenario controlling worker exposure:** 2.7 Calendering operations (PROC 6)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness, Dermal: 90%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.8	**Contributing scenario controlling worker exposure:** 2.8 Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC 8a)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%]	

Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.9	**Contributing scenario controlling worker exposure:** 2.9 Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC 8b)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.10	**Contributing scenario controlling worker exposure:** 2.10 Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC 9)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.11	**Contributing scenario controlling worker exposure:** 2.11 Tabletting, compression, extrusion, pelletisation, granulation (PROC 14)
Product characteristics	

Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.12	**Contributing scenario controlling worker exposure:** 2.12 Use as laboratory reagent (PROC 15)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.13	**Contributing scenario controlling worker exposure:** 2.13 Manual maintenance (cleaning and repair) of machinery (PROC 28)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	

SECTION 3:	**2.14 Exposure estimation**

3.1. Environment

Release	**Release estimation method**	**Explanations**
Water	Estimated release rate	Local release rate: 3 kg/day
Air	Estimated release rate	Local release rate: 0.5 kg/day
Non-Agricultural Soil	Estimated release factor	Release factor after on-site RMM: 0%

Protection target	**Exposure concentration**	**Risk quantification (RCR)**
Fresh water	Local PEC: 0.155 mg/l	0.3
Sedimentation (Fresh water)	Local PEC: 1.26 mg/kg dw	0.3
Marine water	Local PEC: 0.0255 mg/l	0.3
Sedimentation (Marine water)	Local PEC: 0.126 mg/kg dw	0.3
Sewage Treatment Plant	Local PEC: 2.496 mg/l	< 0.01
Agricultural soil	Local PEC: 0.029 mg/kg dw	0.08
Man via Environment - Inhalation (Systemic effects)	Concentration in air: 7.8E-5 mg/m³	< 0.01
Man via Environment - Oral	Exposure via food consumption: 0.017 mg/kg bw/day	0.04
Man via Environment - Combined routes		0.02

3.2. Worker

Contributing scenario controlling worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC 1)

Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	0.01 mg/m³	< 0.01
Inhalation, Systemic effects, Acute	0.04 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.034 mg/kg bw/day	< 0.01
Combined routes, Systemic effects, Long Term		< 0.01

Contributing scenario controlling worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC 2)

Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.06
Inhalation, Systemic effects, Acute	2 mg/m³	0.024
Dermal, Systemic effects, Long Term	1.37 mg/kg bw/day	0.116
Combined routes, Systemic effects, Long Term		0.176

Contributing scenario controlling worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions (PROC 3)

Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	1 mg/m³	0.12
Inhalation, Systemic effects, Acute	4 mg/m³	0.049
Dermal, Systemic effects, Long Term	0.69 mg/kg bw/day	0.058
Combined routes, Systemic effects, Long Term		0.179

Contributing scenario controlling worker exposure: Chemical production where opportunity for exposure arises (PROC 4)

Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243

Dermal, Systemic effects, Long Term	1.372 mg/kg bw/day	0.116
Combined routes, Systemic effects, Long Term		0.719
Contributing scenario controlling worker exposure: Mixing or blending in batch processes (PROC 5)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	2.742 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.835
Contributing scenario controlling worker exposure: Calendering operations (PROC 6)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	2.743 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.835
Contributing scenario controlling worker exposure: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC 8a)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	2.742 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.835
Contributing scenario controlling worker exposure: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC 8b)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	1 mg/m³	0.12
Inhalation, Systemic effects, Acute	4 mg/m³	0.049
Dermal, Systemic effects, Long Term	2.742 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.353
Contributing scenario controlling worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC 9)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	1.372 mg/kg bw/day	0.116
Combined routes, Systemic effects, Long Term		0.719
Contributing scenario controlling worker exposure: Tabletting, compression, extrusion, pelletisation, granulation (PROC 14)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	1 mg/m³	0.12
Inhalation, Systemic effects, Acute	4 mg/m³	0.049
Dermal, Systemic effects, Long Term	3.43 mg/kg bw/day	0.291
Combined routes, Systemic effects, Long Term		0.411
Contributing scenario controlling worker exposure: Use as laboratory reagent (PROC 15)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**

Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.06
Inhalation, Systemic effects, Acute	2 mg/m³	0.024
Dermal, Systemic effects, Long Term	0.34 mg/kg bw/day	0.029
Combined routes, Systemic effects, Long Term		0.089
Contributing scenario controlling worker exposure: Manual maintenance (cleaning and repair) of machinery (PROC 28)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	2.742 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.835
SECTION 4:	**2.15 Guidance to DU to evaluate whether he works inside the boundaries set by the ES**	
Remarks on exposure data from external estimation tools: ECETOC TRA Workers 3.1: Explanation: The exposure estimates for PROC 8a are used, as TRA Workers cannot predict exposure for PROC 28 and these estimates can be considered suitable for estimating exposures during manual maintenance.		

3. Exposure Scenario 3: Use at industrial sites - Use of resins with unreacted residual melamine

SECTION 1:	**Title of exposure scenario**	
	Use at industrial sites - Use of resins with unreacted residual melamine	
Contributing scenario controlling environmental exposure		
CS1	Use of resins with unreacted residual melamine	ERC5
Contributing scenario controlling worker exposure		
CS2	Industrial spraying	PROC7
CS3	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities	PROC8a
CS4	Transfer of substance or mixture (charging and discharging) at dedicated facilities	PROC8b
CS5	Roller application or brushing	PROC10
CS6	Hand-mixing with intimate contact and only PPE available	PROC19
CS7	Manual maintenance (cleaning and repair) of machinery	PROC28
SECTION 2:	**Conditions of use**	
2.1	**Contributing scenario controlling environmental exposure:** 3.1 Use of resins with unreacted residual melamine (ERC 5)	
Amount used, frequency and duration of use (or from service life)		
Daily use amount at site: not relevant for the assessment as scenario specific releases are estimated Annual use amount at site: not relevant for the assessment as scenario specific releases are estimated		
Conditions and measures related to biological sewage treatment plant		
Biological STP: Standard [Effectiveness, Water: 0.169%] Discharge rate of STP: >= 2E3 m3/day Application of the STP sludge on agricultural soil: Yes		
Other given operational conditions affecting environmental exposure		
Receiving surface water flow: >= 1.8E4 m3/day		
2.2	**Contributing scenario controlling worker exposure:** 3.2 Industrial spraying (PROC 7)	
Product characteristics		
Percentage (w/w) of substance in mixture/article: <= 5 % Physical form of the used product: Liquid		

Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
Ventilation working room: General ventilation (mechanical) Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.3	**Contributing scenario controlling worker exposure:** 3.3 Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC 8a)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 5 % Physical form of the used product: Liquid	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.4	**Contributing scenario controlling worker exposure:** 3.4 Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC 8b)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 5 % Physical form of the used product: Liquid	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	

2.5	**Contributing scenario controlling worker exposure:** 3.5 Roller application or brushing (PROC 10)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 5 % Physical form of the used product: Liquid	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
Ventilation working room: General ventilation (mechanical) Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.6	**Contributing scenario controlling worker exposure:** 3.6 Hand-mixing with intimate contact and only PPE available (PROC 19)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 5 % Physical form of the used product: Liquid	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
Ventilation working room: General ventilation (mechanical) Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.7	**Contributing scenario controlling worker exposure:** 3.7 Manual maintenance (cleaning and repair) of machinery (PROC 28)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 5 % Physical form of the used product: Liquid	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	

Other given operational conditions affecting workers exposure		
Place of use: Indoor Operating temperature: <= 40 °C		
SECTION 3:	**3.8 Exposure estimation**	
3.1. Environment		
Release	**Release estimation method**	**Explanations**
Water	Estimated release rate	Local release rate: 0.5 kg/day
Air	Estimated release rate	Local release rate: 0 kg/day
Non-Agricultural Soil	Estimated release factor	Release factor after on-site RMM: 0%

Protection target	Exposure concentration	Risk quantification (RCR)
Fresh water	Local PEC: 0.03 mg/l	0.06
Sedimentation (Fresh water)	Local PEC: 0.148 mg/kg dw	0.06
Marine water	Local PEC: 3E-3 mg/l	0.06
Sedimentation (Marine water)	Local PEC: 0.015 mg/kg dw	0.06
Sewage Treatment Plant	Local PEC: 0.25 mg/l	< 0.01
Agricultural soil	Local PEC: 2.2E-3 mg/kg dw	0.01
Man via Environment - Inhalation (Systemic effects)	Concentration in air: 9.8E-16 mg/m³	< 0.01
Man via Environment - Oral	Exposure via food consumption: 1.09E-3 mg/kg bw/day	< 0.01
Man via Environment - Combined routes		< 0.01

3.2. Worker

Contributing scenario controlling worker exposure: Industrial spraying (PROC 7)

Exposure route	Exposure estimate - Worker	Risk quantification (RCR)
Inhalation, Systemic effects, Long Term	2.43 mg/m³	0.293
Inhalation, Systemic effects, Acute	2.43 mg/m³	0.03
Dermal, Systemic effects, Long Term	1.714 mg/kg bw/day	0.145
Combined routes, Systemic effects, Long Term		0.438

Contributing scenario controlling worker exposure: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC 8a)

Exposure route	Exposure estimate - Worker	Risk quantification (RCR)
Inhalation, Systemic effects, Long Term	0.105 mg/m³	0.013
Inhalation, Systemic effects, Acute	0.105 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	2.74 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.245

Contributing scenario controlling worker exposure: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC 8b)

Exposure route	Exposure estimate - Worker	Risk quantification (RCR)
Inhalation, Systemic effects, Long Term	0.105 mg/m³	0.013
Inhalation, Systemic effects, Acute	0.105 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	2.74 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.245

Contributing scenario controlling worker exposure: Roller application or brushing (PROC 10)

Exposure route	Exposure estimate - Worker	Risk quantification (RCR)
Inhalation, Systemic effects, Long Term	1.1 mg/m³	0.133

Inhalation, Systemic effects, Acute	1.1 mg/m³	0.013
Dermal, Systemic effects, Long Term	5.486 mg/kg bw/day	0.465
Combined routes, Systemic effects, Long Term		0.597
Contributing scenario controlling worker exposure: Hand-mixing with intimate contact and only PPE available (PROC 19)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	0.53 mg/m³	0.064
Inhalation, Systemic effects, Acute	0.53 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	5.657 mg/kg bw/day	0.479
Combined routes, Systemic effects, Long Term		0.543
Contributing scenario controlling worker exposure: Manual maintenance (cleaning and repair) of machinery (PROC 28)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	0.105 mg/m³	0.013
Inhalation, Systemic effects, Acute	0.105 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	2.74 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.245

SECTION 4:	**3.9 Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

Remarks on exposure data from external estimation tools:
Stoffenmanager 8:
Explanation: Inhalation exposure concentration estimated using Stoffenmanager® (version 8)
- Activity/type of task: Handling of liquids at high pressure resulting in substantial generation of mist or spray/haze
- Distance to task: In the breathing zone of the worker (distance head-product < 1 m) (worst-case assumption)
- Local controls: No control measures at the source
- Ventilation working room: General ventilation (mechanical)
- Volume of the working room: 100-1000 m3
- Regular cleaning of work area (daily): Yes
- Regular inspection and maintenance (at least monthly): Yes
- Presence of secondary emission sources (worst-case assumptions);

Other workers using the same substance simultaneously: Yes
A period of evaporation, drying or curing after the activity (with prolonged emission of vapours): Yes
The concentration that can be inhaled by the worker during the task due to the activity undertaken is obtained. As the task is performed for 8 hours, the daily average concentration equals the task concentration. In accordance with the ECHA Guidance (Chapter R.14), this estimated concentration is therefore considered to be the short-term as well as the long-term inhalation exposure estimate (90th percentiles).

ECETOC TRA Workers 3.1:
Explanation: As solid is used as value for CSA, while liquid is used, it is considered appropriate to refine the exposure estimates, using the standalone version of TRA Workers (v3.1). The vapour pressure at operating temperature (40°C) used for the calculation is 3.71E-8 Pa (as calculated by Chesar).

Stoffenmanager 8:
Explanation: Inhalation exposure concentration estimated using Stoffenmanager® (version 8)
- Activity/type of task: Handling of liquids on large surfaces or large work pieces
- Distance to task: In the breathing zone of the worker (distance head-product < 1 m) (worst-case assumption)
- Local controls: No control measures at the source
- Ventilation working room: General ventilation (mechanical)
- Volume of the working room: 100-1000 m3
- Regular cleaning of work area (daily): Yes
- Regular inspection and maintenance (at least monthly): Yes
- Presence of secondary emission sources (worst-case assumptions);

Other workers using the same substance simultaneously: Yes
A period of evaporation, drying or curing after the activity (with prolonged emission of vapours): Yes
The concentration that can be inhaled by the worker during the task due to the activity undertaken is obtained. As the task is performed for 8 hours, the daily average concentration equals the task concentration. In accordance with the ECHA Guidance (Chapter R.14), this estimated concentration is therefore considered to be the short-term as well as the long-term

inhalation exposure estimate (90th percentiles).

Stoffenmanager 8:
Explanation: Inhalation exposure concentration estimated using Stoffenmanager® (version 8)
- Activity/type of task: Handling of liquids using low pressure, low speed or on medium-sized surfaces
- Distance to task: In the breathing zone of the worker (distance head-product < 1 m) (worst-case assumption)
- Local controls: No control measures at the source
- Ventilation working room: General ventilation (mechanical)
- Volume of the working room: 100-1000 m3
- Regular cleaning of work area (daily): Yes
- Regular inspection and maintenance (at least monthly): Yes
- Presence of secondary emission sources (worst-case assumptions);

Other workers using the same substance simultaneously: Yes
A period of evaporation, drying or curing after the activity (with prolonged emission of vapours): Yes
The concentration that can be inhaled by the worker during the task due to the activity undertaken is obtained. As the task is performed for 8 hours, the daily average concentration equals the task concentration. In accordance with the ECHA Guidance (Chapter R.14), this estimated concentration is therefore considered to be the short-term as well as the long-term inhalation exposure estimate (90th percentiles).

ECETOC TRA Workers 3.1:
Explanation: The exposure estimates for PROC 8a are used, as TRA Workers cannot predict exposure for PROC 28 and these estimates can be considered suitable for estimating exposures during manual maintenance. The exposure estimates are calculated for using a liquid, with the standalone version of TRA Workers (v3.1). The vapour pressure at operating temperature (40°C) used for the calculation is 3.71E-8 Pa (as calculated by Chesar).

4. Exposure Scenario 4: Use at industrial sites - Use as intermediate for the production of other substances e.g. melamine salt (reacted melamine)

SECTION 1:	**Title of exposure scenario**	
	Use at industrial sites - Use as intermediate for the production of other substances e.g. melamine salt (reacted melamine)	
Contributing scenario controlling environmental exposure		
CS1	Use as intermediate for the production of other substances e.g. melamine salt (reacted melamine)	ERC6a
Contributing scenario controlling worker exposure		
CS2	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions	PROC1
CS3	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions	PROC2
CS4	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions	PROC3
CS5	Chemical production where opportunity for exposure arises	PROC4
CS6	Mixing or blending in batch processes	PROC5
CS7	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities	PROC8a
CS8	Transfer of substance or mixture (charging and discharging) at dedicated facilities	PROC8b
CS9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	PROC9
CS10	Use as laboratory reagent	PROC15
CS11	Manual maintenance (cleaning and repair) of machinery	PROC28
SECTION 2:	**Conditions of use**	
2.1	**Contributing scenario controlling environmental exposure:** 4.1 Use as intermediate for the production of other substances e.g. melamine salt (reacted melamine) (ERC 6a)	
Amount used, frequency and duration of use (or from service life)		
Daily use amount at site: not relevant for the assessment as scenario specific releases are estimated		

Annual use amount at site: not relevant for the assessment as scenario specific releases are estimated	
Conditions and measures related to biological sewage treatment plant	
Biological STP: Standard [Effectiveness, Water: 0.169%] Discharge rate of STP: >= 2E3 m3/day Application of the STP sludge on agricultural soil: Yes	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow: >= 1.8E4 m3/day	
2.2	**Contributing scenario controlling worker exposure:** 4.2 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC 1)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.3	**Contributing scenario controlling worker exposure:** 4.3 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC 2)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.4	**Contributing scenario controlling worker exposure:** 4.4 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions (PROC 3)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	

Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.5	**Contributing scenario controlling worker exposure:** 4.5 Chemical production where opportunity for exposure arises (PROC 4)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.6	**Contributing scenario controlling worker exposure:** 4.6 Mixing or blending in batch processes (PROC 5)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.7	**Contributing scenario controlling worker exposure:**

	4.7 Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC 8a)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.8	**Contributing scenario controlling worker exposure:** 4.8 Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC 8b)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.9	**Contributing scenario controlling worker exposure:** 4.9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC 9)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	

Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.10	**Contributing scenario controlling worker exposure:** 4.10 Use as laboratory reagent (PROC 15)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.11	**Contributing scenario controlling worker exposure:** 4.11 Manual maintenance (cleaning and repair) of machinery (PROC 28)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
SECTION 3:	**4.12 Exposure estimation**

3.1. Environment

Release	**Release estimation method**	**Explanations**
Water	Estimated release rate	Local release rate: 3 kg/day
Air	Estimated release rate	Local release rate: 0.5 kg/day
Non-Agricultural Soil	Estimated release factor	Release factor after on-site RMM: 0%

Protection target	**Exposure concentration**	**Risk quantification (RCR)**

Fresh water	Local PEC: 0.155 mg/l	0.3
Sedimentation (Fresh water)	Local PEC: 0.766 mg/kg dw	0.3
Marine water	Local PEC: 0.0155 mg/l	0.3
Sedimentation (Marine water)	Local PEC: 0.077 mg/kg dw	0.3
Sewage Treatment Plant	Local PEC: 1.497 mg/l	< 0.01
Agricultural soil	Local PEC: 0.02917 mg/kg dw	0.08
Man via Environment - Inhalation (Systemic effects)	Concentration in air: 3.97E-5 mg/m³	< 0.01
Man via Environment - Oral	Exposure via food consumption: 9.7E-3 mg/kg bw/day	0.02
Man via Environment – Combined routes		0.02

3.2. Worker

Contributing scenario controlling worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC 1)

Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	0.01 mg/m³	< 0.01
Inhalation, Systemic effects, Acute	0.04 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.034 mg/kg bw/day	< 0.01
Combined routes, Systemic effects, Long Term		< 0.01

Contributing scenario controlling worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC 2)

Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.06
Inhalation, Systemic effects, Acute	2 mg/m³	0.024
Dermal, Systemic effects, Long Term	1.37 mg/kg bw/day	0.116
Combined routes, Systemic effects, Long Term		0.176

Contributing scenario controlling worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions (PROC 3)

Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	1 mg/m³	0.12
Inhalation, Systemic effects, Acute	4 mg/m³	0.049
Dermal, Systemic effects, Long Term	0.69 mg/kg bw/day	0.058
Combined routes, Systemic effects, Long Term		0.179

Contributing scenario controlling worker exposure: Chemical production where opportunity for exposure arises (PROC 4)

Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	1.372 mg/kg bw/day	0.116
Combined routes, Systemic effects, Long Term		0.719

Contributing scenario controlling worker exposure: Mixing or blending in batch processes (PROC 5)

Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	2.742 mg/kg bw/day	0.232

Combined routes, Systemic effects, Long Term		0.835
Contributing scenario controlling worker exposure: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC 8a)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	2.742 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.835
Contributing scenario controlling worker exposure: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC 8b)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	1 mg/m³	0.12
Inhalation, Systemic effects, Acute	4 mg/m³	0.049
Dermal, Systemic effects, Long Term	2.742 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.353
Contributing scenario controlling worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC 9)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	1.372 mg/kg bw/day	0.116
Combined routes, Systemic effects, Long Term		0.719
Contributing scenario controlling worker exposure: Use as laboratory reagent (PROC 15)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.06
Inhalation, Systemic effects, Acute	2 mg/m³	0.024
Dermal, Systemic effects, Long Term	0.34 mg/kg bw/day	0.029
Combined routes, Systemic effects, Long Term		0.089
Contributing scenario controlling worker exposure: Manual maintenance (cleaning and repair) of machinery (PROC 28)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	2.742 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.835
SECTION 4:	**4.13 Guidance to DU to evaluate whether he works inside the boundaries set by the ES**	
Remarks on exposure data from external estimation tools: ECETOC TRA Workers 3.1: Explanation: The exposure estimates for PROC 8a are used, as TRA Workers cannot predict exposure for PROC 28 and these estimates can be considered suitable for estimating exposures during manual maintenance.		

5. Exposure Scenario 5: Use at industrial sites - Use as additive in foams

SECTION 1:	**Title of exposure scenario**	
	Use at industrial sites - Use as additive in foams	
Contributing scenario controlling environmental exposure		
CS1	Use as additive in foams	ERC5

Contributing scenario controlling worker exposure		
CS2	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions	PROC1
CS3	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions	PROC2
CS4	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions	PROC3
CS5	Chemical production where opportunity for exposure arises	PROC4
CS6	Mixing or blending in batch processes	PROC5
CS7	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities	PROC8a
CS8	Transfer of substance or mixture (charging and discharging) at dedicated facilities	PROC8b
CS9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	PROC9
CS10	Use as laboratory reagent	PROC15
CS11	Hand-mixing with intimate contact and only PPE available	PROC19
CS12	Manual maintenance (cleaning and repair) of machinery	PROC28
Subsequent service life exposure scenario(s):		
ES8	Service life (worker at industrial site) - PU foams - Workers (industrial)	
ES11	Service life (consumers) - PU foams – Consumers	

SECTION 2:	**Conditions of use**
2.1	**Contributing scenario controlling environmental exposure:** 5.1 Use as additive in foams (ERC 5)
Amount used, frequency and duration of use (or from service life)	
Daily use amount at site: not relevant for the assessment as scenario specific releases are estimated Annual use amount at site: not relevant for the assessment as scenario specific releases are estimated	
Conditions and measures related to biological sewage treatment plant	
Biological STP: Standard [Effectiveness, Water: 0.169%] Discharge rate of STP: >= 2E3 m3/day Application of the STP sludge on agricultural soil: Yes	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow: >= 1.8E4 m3/day	
2.2	**Contributing scenario controlling worker exposure:** 5.2 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC 1)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
Other given operational conditions affecting workers exposure	

Place of use: Indoor Operating temperature: <= 40 °C	
2.3	**Contributing scenario controlling worker exposure:** 5.3 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC 2)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.4	**Contributing scenario controlling worker exposure:** 5.4 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions (PROC 3)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.5	**Contributing scenario controlling worker exposure:** 5.5 Chemical production where opportunity for exposure arises (PROC 4)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	

Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.6	**Contributing scenario controlling worker exposure:** 5.6 Mixing or blending in batch processes (PROC 5)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.7	**Contributing scenario controlling worker exposure:** 5.7 Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC 8a)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.8	**Contributing scenario controlling worker exposure:** 5.8 Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC 8b)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	

Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.9	**Contributing scenario controlling worker exposure:** 5.9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC 9)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.10	**Contributing scenario controlling worker exposure:** 5.10 Use as laboratory reagent (PROC 15)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	

2.11	**Contributing scenario controlling worker exposure:** 5.11 Hand-mixing with intimate contact and only PPE available (PROC 19)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 4 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with specific activity training) and (other) appropriate dermal protection [Effectiveness, Dermal: 95%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.12	**Contributing scenario controlling worker exposure:** 5.12 Manual maintenance (cleaning and repair) of machinery (PROC 28)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	

SECTION 3:	**5.13 Exposure estimation**

3.1. Environment

Release	**Release estimation method**	**Explanations**
Water	Estimated release rate	Local release rate: 3 kg/day
Air	Estimated release rate	Local release rate: 0.5 kg/day
Non-Agricultural Soil	Estimated release factor	Release factor after on-site RMM: 0%

Protection target	**Exposure concentration**	**Risk quantification (RCR)**
Fresh water	Local PEC: 0.155 mg/l	0.3
Sedimentation (Fresh water)	Local PEC: 0.766 mg/kg dw	0.3
Marine water	Local PEC: 0.0155 mg/l	0.3
Sedimentation (Marine water)	Local PEC: 0.077 mg/kg dw	0.3
Sewage Treatment Plant	Local PEC: 1.497 mg/l	< 0.01

Agricultural soil	Local PEC: 0.017 mg/kg dw	0.08
Man via Environment - Inhalation (Systemic effects)	Concentration in air: 3.971E-5 mg/m³	< 0.01
Man via Environment - Oral	Exposure via food consumption: 9.7E-3 mg/kg bw/day	0.02
Man via Environment – Combined routes		0.02

3.2. Worker

Contributing scenario controlling worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC 1)

Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	0.01 mg/m³	< 0.01
Inhalation, Systemic effects, Acute	0.04 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.034 mg/kg bw/day	< 0.01
Combined routes, Systemic effects, Long Term		< 0.01

Contributing scenario controlling worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC 2)

Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.06
Inhalation, Systemic effects, Acute	2 mg/m³	0.024
Dermal, Systemic effects, Long Term	1.37 mg/kg bw/day	0.116
Combined routes, Systemic effects, Long Term		0.176

Contributing scenario controlling worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions (PROC 3)

Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	1 mg/m³	0.12
Inhalation, Systemic effects, Acute	4 mg/m³	0.049
Dermal, Systemic effects, Long Term	0.69 mg/kg bw/day	0.058
Combined routes, Systemic effects, Long Term		0.179

Contributing scenario controlling worker exposure: Chemical production where opportunity for exposure arises (PROC 4)

Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	1.372 mg/kg bw/day	0.116
Combined routes, Systemic effects, Long Term		0.719

Contributing scenario controlling worker exposure: Mixing or blending in batch processes (PROC 5)

Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	2.742 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.835

Contributing scenario controlling worker exposure: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC 8a)

Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602

Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	2.742 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.835
Contributing scenario controlling worker exposure: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC 8b)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	1 mg/m³	0.12
Inhalation, Systemic effects, Acute	4 mg/m³	0.049
Dermal, Systemic effects, Long Term	2.742 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.353
Contributing scenario controlling worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC 9)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	1.372 mg/kg bw/day	0.116
Combined routes, Systemic effects, Long Term		0.719
Contributing scenario controlling worker exposure: Use as laboratory reagent (PROC 15)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.06
Inhalation, Systemic effects, Acute	2 mg/m³	0.024
Dermal, Systemic effects, Long Term	0.34 mg/kg bw/day	0.029
Combined routes, Systemic effects, Long Term		0.089
Contributing scenario controlling worker exposure: Hand-mixing with intimate contact and only PPE available (PROC 19)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	3 mg/m³	0.361
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	7.072 mg/kg bw/day	0.599
Combined routes, Systemic effects, Long Term		0.961
Contributing scenario controlling worker exposure: Manual maintenance (cleaning and repair) of machinery (PROC 28)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	2.742 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.835
SECTION 4:	**5.14 Guidance to DU to evaluate whether he works inside the boundaries set by the ES**	
Remarks on exposure data from external estimation tools: ECETOC TRA Workers 3.1: Explanation: The exposure estimates for PROC 8a are used, as TRA Workers cannot predict exposure for PROC 28 and these estimates can be considered suitable for estimating exposures during manual maintenance.		

6. Exposure Scenario 6: Use at industrial sites - Use as additive in intumescent coatings

SECTION 1:	**Title of exposure scenario**
	Use at industrial sites - Use as additive in intumescent coatings

Contributing scenario controlling environmental exposure		
CS1	Use as additive in intumescent coatings	ERC5
Contributing scenario controlling worker exposure		
CS2	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions	PROC3
CS3	Chemical production where opportunity for exposure arises	PROC4
CS4	Mixing or blending in batch processes	PROC5
CS5	Industrial spraying with Local Exhaust Ventilation (LEV)	PROC7
CS6	Industrial spraying without Local Exhaust Ventilation (LEV)	PROC7
CS7	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities	PROC8a
CS8	Transfer of substance or mixture (charging and discharging) at dedicated facilities	PROC8b
CS9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	PROC9
CS10	Roller application or brushing	PROC10
CS11	Treatment of articles by dipping and pouring	PROC13
CS12	Use as laboratory reagent	PROC15
CS13	Hand-mixing with intimate contact and only PPE available	PROC19
CS14	Manual maintenance (cleaning and repair) of machinery	PROC28
Subsequent service life exposure scenario(s):		
ES9	Service life (worker at industrial site) - Intumescent coatings - Workers (industrial)	
ES10	Service life (professional worker) - Intumescent coatings - Professional Workers	
ES12	Service life (consumers) - Intumescent coating – Consumers	

SECTION 2:	**Conditions of use**
2.1	**Contributing scenario controlling environmental exposure:** 6.1 Use as additive in intumescent coatings (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily use amount at site: not relevant for the assessment as scenario specific releases are estimated Annual use amount at site: not relevant for the assessment as scenario specific releases are estimated
Conditions and measures related to biological sewage treatment plant
Biological STP: Standard [Effectiveness, Water: 0.169%] Discharge rate of STP: >= 2E3 m3/day Application of the STP sludge on agricultural soil: Yes
Other given operational conditions affecting environmental exposure
Receiving surface water flow: >= 1.8E4 m3/day

2.2	**Contributing scenario controlling worker exposure:** 6.2 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions (PROC 3)

Product characteristics
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)
Frequency and duration of use
Duration of activity: <= 8 h/day
Technical conditions and measures to control dispersion from source towards the worker
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced

Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.3	**Contributing scenario controlling worker exposure:** 6.3 Chemical production where opportunity for exposure arises (PROC 4)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.4	**Contributing scenario controlling worker exposure:** 6.4 Mixing or blending in batch processes (PROC 5)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.5	**Contributing scenario controlling worker exposure:** 6.5 Industrial spraying with Local Exhaust Ventilation (LEV) (PROC 7)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 30 % Physical form of the used product: Liquid	
Frequency and duration of use	

Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
Ventilation working room: General ventilation (mechanical) Occupational Health and Safety Management System: Advanced Local exhaust ventilation: Yes (TRA Effectiveness) [Effectiveness, Inhalation: 95%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.6	**Contributing scenario controlling worker exposure:** 6.6 Industrial spraying without Local Exhaust Ventilation (LEV) (PROC 7)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 30 % Physical form of the used product: Liquid	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
Ventilation working room: General ventilation (mechanical) Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: Yes (Respirator with APF of 10) [Effectiveness, Inhalation: 90%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.7	**Contributing scenario controlling worker exposure:** 6.7 Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC 8a)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.8	**Contributing scenario controlling worker exposure:**

	6.8 Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC 8b)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.9	**Contributing scenario controlling worker exposure:** 6.9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC 9)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.10	**Contributing scenario controlling worker exposure:** 6.10 Roller application or brushing (PROC 10)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 30 % Physical form of the used product: Liquid	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
Ventilation working room: General ventilation (mechanical) Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	

Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.11	**Contributing scenario controlling worker exposure:** 6.11 Treatment of articles by dipping and pouring (PROC 13)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 30 % Physical form of the used product: Liquid	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.12	**Contributing scenario controlling worker exposure:** 6.12 Use as laboratory reagent (PROC 15)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.13	**Contributing scenario controlling worker exposure:** 6.13 Hand-mixing with intimate contact and only PPE available (PROC 19)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 30 % Physical form of the used product: Liquid	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	

Ventilation working room: General ventilation (mechanical) Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with specific activity training) and (other) appropriate dermal protection [Effectiveness, Dermal: 95%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.14	**Contributing scenario controlling worker exposure:** 6.14 Manual maintenance (cleaning and repair) of machinery (PROC 28)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
SECTION 3:	**6.15 Exposure estimation**

3.1. Environment

Release	**Release estimation method**	**Explanations**
Water	Estimated release rate	Local release rate: 3 kg/day
Air	Estimated release rate	Local release rate: 0.5 kg/day
Non-Agricultural Soil	Estimated release factor	Release factor after on-site RMM: 0%

Protection target	**Exposure concentration**	**Risk quantification (RCR)**
Fresh water	Local PEC: 0.155 mg/l	0.3
Sedimentation (Fresh water)	Local PEC: 0.766 mg/kg dw	0.3
Marine water	Local PEC: 0.0155 mg/l	0.3
Sedimentation (Marine water)	Local PEC: 0.077 mg/kg dw	0.3
Sewage Treatment Plant	Local PEC: 1.497 mg/l	< 0.01
Agricultural soil	Local PEC: 0.017 mg/kg dw	0.08
Man via Environment - Inhalation (Systemic effects)	Concentration in air: 3.97E-5 mg/m³	< 0.01
Man via Environment - Oral	Exposure via food consumption: 9.7E-3 mg/kg bw/day	0.02
Man via Environment – Combined routes		0.02

3.2. Worker

Contributing scenario controlling worker exposure: Manufacture or formulation in the chemical industry in closed

batch processes with occasional controlled exposure or processes with equivalent containment conditions (PROC 3)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	1 mg/m³	0.12
Inhalation, Systemic effects, Acute	4 mg/m³	0.049
Dermal, Systemic effects, Long Term	0.69 mg/kg bw/day	0.058
Combined routes, Systemic effects, Long Term		0.179
Contributing scenario controlling worker exposure: Chemical production where opportunity for exposure arises (PROC 4)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	1.372 mg/kg bw/day	0.116
Combined routes, Systemic effects, Long Term		0.719
Contributing scenario controlling worker exposure: Mixing or blending in batch processes (PROC 5)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	2.742 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.835
Contributing scenario controlling worker exposure: Industrial spraying with Local Exhaust Ventilation (LEV) (PROC 7)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	0.4 mg/m³	0.048
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	8.572 mg/kg bw/day	0.726
Combined routes, Systemic effects, Long Term		0.775
Contributing scenario controlling worker exposure: Industrial spraying without Local Exhaust Ventilation (LEV) (PROC 7)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	0.795 mg/m³	0.096
Inhalation, Systemic effects, Acute	0.795 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	8.572 mg/kg bw/day	0.726
Combined routes, Systemic effects, Long Term		0.822
Contributing scenario controlling worker exposure: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC 8a)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	2.742 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.835
Contributing scenario controlling worker exposure: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC 8b)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	1 mg/m³	0.12
Inhalation, Systemic effects, Acute	4 mg/m³	0.049

Dermal, Systemic effects, Long Term	2.742 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.353
Contributing scenario controlling worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC 9)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	1.372 mg/kg bw/day	0.116
Combined routes, Systemic effects, Long Term		0.719
Contributing scenario controlling worker exposure: Roller application or brushing (PROC 10)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	3.59 mg/m³	0.433
Inhalation, Systemic effects, Acute	3.59 mg/m³	0.044
Dermal, Systemic effects, Long Term	5.486 mg/kg bw/day	0.465
Combined routes, Systemic effects, Long Term		0.897
Contributing scenario controlling worker exposure: Treatment of articles by dipping and pouring (PROC 13)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	0.525 mg/m³	0.063
Inhalation, Systemic effects, Acute	0.525 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	2.743 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.296
Contributing scenario controlling worker exposure: Use as laboratory reagent (PROC 15)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.06
Inhalation, Systemic effects, Acute	2 mg/m³	0.024
Dermal, Systemic effects, Long Term	0.34 mg/kg bw/day	0.029
Combined routes, Systemic effects, Long Term		0.089
Contributing scenario controlling worker exposure: Hand-mixing with intimate contact and only PPE available (PROC 19)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	1.74 mg/m³	0.21
Inhalation, Systemic effects, Acute	1.74 mg/m³	0.021
Dermal, Systemic effects, Long Term	7.072 mg/kg bw/day	0.599
Combined routes, Systemic effects, Long Term		0.809
Contributing scenario controlling worker exposure: Manual maintenance (cleaning and repair) of machinery (PROC 28)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	2.742 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.835

SECTION 4:	**6.16 Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

Remarks on exposure data from external estimation tools:
Stoffenmanager 8:
Explanation: Inhalation exposure concentration estimated using Stoffenmanager® (version 8)

- Activity/type of task: Handling of liquids at high pressure resulting in substantial generation of mist or spray/haze
- Distance to task: In the breathing zone of the worker (distance head-product < 1 m) (worst-case assumption)
- Local controls: No control measures at the source (refinement due to LEV done outside Stoffenmanager®, see below)
- Ventilation working room: General ventilation (mechanical)
- Volume of the working room: 100-1000 m3
- Regular cleaning of work area (daily): Yes
- Regular inspection and maintenance (at least monthly): Yes
- Presence of secondary emission sources (worst-case assumptions);

Other workers using the same substance simultaneously: Yes
A period of evaporation, drying or curing after the activity (with prolonged emission of vapours): Yes
The concentration during the task due to the activity undertaken is estimated to be 7.95 mg/m3, resulting in an exposure concentration of 0.4 mg/m3 due to the use of LEV with an effectiveness of 95% (TRA effectiveness). As the task is performed for 8 hours, the daily average concentration equals the task concentration. In accordance with the ECHA Guidance (Chapter R.14), this estimated concentration is therefore considered to be the short-term as well as the long-term inhalation exposure estimate (90th percentiles).

Stoffenmanager 8:
Explanation: Inhalation exposure concentration estimated using Stoffenmanager® (version 8)
- Activity/type of task: Handling of liquids at high pressure resulting in substantial generation of mist or spray/haze
- Distance to task: In the breathing zone of the worker (distance head-product < 1 m) (worst-case assumption)
- Local controls: No control measures at the source
- Ventilation working room: General ventilation (mechanical)
- Volume of the working room: 100-1000 m3
- Regular cleaning of work area (daily): Yes
- Regular inspection and maintenance (at least monthly): Yes
- Presence of secondary emission sources (worst-case assumptions);

Other workers using the same substance simultaneously: Yes
A period of evaporation, drying or curing after the activity (with prolonged emission of vapours): Yes
The concentration during the task due to the activity undertaken is estimated to be 7.95 mg/m3, resulting in an exposure concentration of 0.795 mg/m3 due to the use of respiratory protection with an effectiveness of 90%. As the task is performed for 8 hours, the daily average concentration equals the task concentration. In accordance with the ECHA Guidance (Chapter R.14), this estimated concentration is therefore considered to be the short-term as well as the long-term inhalation exposure estimate (90th percentiles).

Stoffenmanager 8:
Explanation: Inhalation exposure concentration estimated using Stoffenmanager® (version 8)
- Activity/type of task: Handling of liquids on large surfaces or large work pieces
- Distance to task: In the breathing zone of the worker (distance head-product < 1 m) (worst-case assumption)
- Local controls: No control measures at the source
- Ventilation working room: General ventilation (mechanical)
- Volume of the working room: 100-1000 m3
- Regular cleaning of work area (daily): Yes
- Regular inspection and maintenance (at least monthly): Yes
- Presence of secondary emission sources (worst-case assumptions);

Other workers using the same substance simultaneously: Yes
A period of evaporation, drying or curing after the activity (with prolonged emission of vapours): Yes
The concentration that can be inhaled by the worker during the task due to the activity undertaken is obtained. As the task is performed for 8 hours, the daily average concentration equals the task concentration. In accordance with the ECHA Guidance (Chapter R.14), this estimated concentration is therefore considered to be the short-term as well as the long-term inhalation exposure estimate (90th percentiles).

ECETOC TRA Workers 3.1:
Explanation: As solid is used as value for CSA, while liquid is used, it is considered appropriate to refine the exposure estimates, using the standalone version of TRA Workers (v3.1). The vapour pressure at operating temperature (40°C) used for the calculation is 3.71E-8 Pa (as calculated by Chesar).

Stoffenmanager 8:
Explanation: Inhalation exposure concentration estimated using Stoffenmanager® (version 8)
- Activity/type of task: Handling of liquids using low pressure, low speed or on medium-sized surfaces
- Distance to task: In the breathing zone of the worker (distance head-product < 1 m) (worst-case assumption)
- Local controls: No control measures at the source
- Ventilation working room: General ventilation (mechanical)
- Volume of the working room: 100-1000 m3
- Regular cleaning of work area (daily): Yes

- Regular inspection and maintenance (at least monthly): Yes
- Presence of secondary emission sources (worst-case assumptions);
Other workers using the same substance simultaneously: Yes
A period of evaporation, drying or curing after the activity (with prolonged emission of vapours): Yes
The concentration that can be inhaled by the worker during the task due to the activity undertaken is obtained. As the task is performed for 8 hours, the daily average concentration equals the task concentration. In accordance with the ECHA Guidance (Chapter R.14), this estimated concentration is therefore considered to be the short-term as well as the long-term inhalation exposure estimate (90th percentiles).

ECETOC TRA Workers 3.1:
Explanation: The exposure estimates for PROC 8a are used, as TRA Workers cannot predict exposure for PROC 28 and these estimates can be considered suitable for estimating exposures during manual maintenance.

7. Exposure Scenario 7: Widespread use by professional workers - Use as additive in intumescent coatings

SECTION 1:	**Title of exposure scenario**	
	Widespread use by professional workers - Use as additive in intumescent coatings	
Contributing scenario controlling environmental exposure		
CS1	Use as additive in intumescent coatings	ERC5
Contributing scenario controlling worker exposure		
CS2	Mixing or blending in batch processes	PROC5
CS3	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities	PROC8a
CS4	Transfer of substance or mixture (charging and discharging) at dedicated facilities	PROC8b
CS5	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	PROC9
CS6	Roller application or brushing	PROC10
	Non industrial spraying	PROC11
CS7	Treatment of articles by dipping and pouring	PROC13
CS8	Hand-mixing with intimate contact and only PPE available	PROC19
CS9	Manual maintenance (cleaning and repair) of machinery	PROC28
Subsequent service life exposure scenario(s):		
ES10	Service life (professional worker) - Intumescent coatings - Professional Workers	
ES12	Service life (consumers) - Intumescent coating – Consumers	

SECTION 2:	**Conditions of use**
2.1	**Contributing scenario controlling environmental exposure:** 7.1 Use as additive in intumescent coatings (ERC 8c, ERC 8f)
Amount used, frequency and duration of use (or from service life)	
Daily local widespread use amount: not relevant for the assessment as scenario specific releases are estimated	
Conditions and measures related to biological sewage treatment plant	
Biological STP: Standard [Effectiveness, Water: 0.169%] Discharge rate of STP: >= 2E3 m3/day Application of the STP sludge on agricultural soil: Yes	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow: >= 1.8E4 m3/day	
2.2	**Contributing scenario controlling worker exposure:** 7.2 Mixing or blending in batch processes (PROC 5)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	

Duration of activity: <= 8 h/day
Technical conditions and measures to control dispersion from source towards the worker
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Basic Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]
Conditions and measures related to personal protection, hygiene and health evaluation
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]
Other given operational conditions affecting workers exposure
Place of use: Indoor Operating temperature: <= 40 °C

2.3	**Contributing scenario controlling worker exposure:** 7.3 Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC 8a)

Product characteristics
Percentage (w/w) of substance in mixture/article: <= 30 % Physical form of the used product: Liquid
Frequency and duration of use
Duration of activity: <= 8 h/day
Technical conditions and measures to control dispersion from source towards the worker
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Basic Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]
Conditions and measures related to personal protection, hygiene and health evaluation
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]
Other given operational conditions affecting workers exposure
Place of use: Indoor Operating temperature: <= 40 °C

2.4	**Contributing scenario controlling worker exposure:** 7.4 Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC 8b)

Product characteristics
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)
Frequency and duration of use
Duration of activity: <= 8 h/day
Technical conditions and measures to control dispersion from source towards the worker
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Basic Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]
Conditions and measures related to personal protection, hygiene and health evaluation
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]
Other given operational conditions affecting workers exposure
Place of use: Indoor Operating temperature: <= 40 °C

2.5	**Contributing scenario controlling worker exposure:** 7.5 Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC 9)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Basic Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.6	**Contributing scenario controlling worker exposure:** 7.6 Roller application or brushing (PROC 10)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 30 % Physical form of the used product: Liquid	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
Ventilation working room: General ventilation (mechanical) Occupational Health and Safety Management System: Basic Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.7	**Contributing scenario controlling worker exposure:** 7.7 Non industrial spraying (PROC 11)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 30 % Physical form of the used product: Liquid	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
Ventilation working room: General ventilation (mechanical) Occupational Health and Safety Management System: Basic Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	

Respiratory protection: Yes (Respirator with APF of 20) [Effectiveness, Inhalation: 95%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness, Dermal: 90%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.8	**Contributing scenario controlling worker exposure:** 7.8 Treatment of articles by dipping and pouring (PROC 13)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 30 % Physical form of the used product: Liquid	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Basic Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.9	**Contributing scenario controlling worker exposure:** 7.9 Manual maintenance (cleaning and repair) of machinery (PROC 28)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 30 % Physical form of the used product: Liquid	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Basic Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: Yes (Chemically resistant gloves conforming to EN374) and (other) appropriate dermal protection [Effectiveness, Dermal: 80%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
SECTION 3:	**7.10 Exposure estimation**

3.1. Environment

Release	**Release estimation method**	**Explanations**
Water	Estimated release rate	Local release rate: 0 kg/day
Air	Estimated release rate	Local release rate: 0 kg/day
Non-Agricultural Soil	Estimated release factor	Release factor after on-site RMM: 0%

Protection target	**Exposure concentration**	**Risk quantification (RCR)**

Fresh water	Local PEC: 5.0E-3 mg/l	0.01
Sedimentation (Fresh water)	Local PEC: 0.025 mg/kg dw	0.01
Marine water	Local PEC: 5.0E-4 mg/l	0.01
Sedimentation (Marine water)	Local PEC: 2.4E-3 mg/kg dw	0.01
Sewage Treatment Plant	Local PEC: 0 mg/l	< 0.01
Agricultural soil	Local PEC: 2.52E-12 mg/kg dw	< 0.01
Man via Environment - Inhalation (Systemic effects)	Concentration in air: 1.62E-21 mg/m³	< 0.01
Man via Environment - Oral	Exposure via food consumption: 1.74E-4 mg/kg bw/day	< 0.01
Man via Environment – Combined routes		< 0.01

3.2. Worker

Contributing scenario controlling worker exposure: Mixing or blending in batch processes (PROC 5)

Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	2.742 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.835

Contributing scenario controlling worker exposure: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC 8a)

Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	0.525 mg/m³	0.063
Inhalation, Systemic effects, Acute	0.525 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	2.743 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.296

Contributing scenario controlling worker exposure: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC 8b)

Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	2.742 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.835

Contributing scenario controlling worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC 9)

Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	1.372 mg/kg bw/day	0.116
Combined routes, Systemic effects, Long Term		0.719

Contributing scenario controlling worker exposure: Roller application or brushing (PROC 10)

Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	3.61 mg/m³	0.435
Inhalation, Systemic effects, Acute	3.61 mg/m³	0.044
Dermal, Systemic effects, Long Term	5.486 mg/kg bw/day	0.465
Combined routes, Systemic effects, Long Term		0.9

Contributing scenario controlling worker exposure: Non industrial spraying (PROC 11)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	0.398 mg/m³	0.048
Inhalation, Systemic effects, Acute	0.398 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	10.71 mg/kg bw/day	0.908
Combined routes, Systemic effects, Long Term		0.956
Contributing scenario controlling worker exposure: Treatment of articles by dipping and pouring (PROC 13)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	0.525 mg/m³	0.063
Inhalation, Systemic effects, Acute	0.525 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	2.743 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.296
Contributing scenario controlling worker exposure: Manual maintenance (cleaning and repair) of machinery (PROC 28)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	0.525 mg/m³	0.063
Inhalation, Systemic effects, Acute	0.525 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	2.743 mg/kg bw/day	0.232
Combined routes, Systemic effects, Long Term		0.296

SECTION 4:	**7.11 Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

Remarks on exposure data from external estimation tools:

ECETOC TRA Workers 3.1:

Explanation: As solid is used as value for CSA, while liquid is used, it is considered appropriate to refine the exposure estimates, using the standalone version of TRA Workers (v3.1). The vapour pressure at operating temperature (40°C) used for the calculation is 3.71E-8 Pa (as calculated by Chesar).

Stoffenmanager 8:

Explanation: Inhalation exposure concentration estimated using Stoffenmanager® (version 8)
- Activity/type of task: Handling of liquids on large surfaces or large work pieces
- Distance to task: In the breathing zone of the worker (distance head-product < 1 m) (worst-case assumption)
- Local controls: No control measures at the source
- Ventilation working room: General ventilation (mechanical)
- Volume of the working room: 100-1000 m3
- Regular cleaning of work area (daily): No
- Regular inspection and maintenance (at least monthly): No
- Presence of secondary emission sources (worst-case assumptions);

Other workers using the same substance simultaneously: Yes

A period of evaporation, drying or curing after the activity (with prolonged emission of vapours): Yes

The concentration that can be inhaled by the worker during the task due to the activity undertaken is obtained. As the task is performed for 8 hours, the daily average concentration equals the task concentration. In accordance with the ECHA Guidance (Chapter R.14), this estimated concentration is therefore considered to be the short-term as well as the long-term inhalation exposure estimate (90th percentiles).

Stoffenmanager 8:

Explanation: Inhalation exposure concentration estimated using Stoffenmanager® (version 8)
- Activity/type of task: Handling of liquids at high pressure resulting in substantial generation of mist or spray/haze
- Distance to task: In the breathing zone of the worker (distance head-product < 1 m) (worst-case assumption)
- Local controls: No control measures at the source
- Ventilation working room: General ventilation (mechanical)
- Volume of the working room: 100-1000 m3
- Regular cleaning of work area (daily): No
- Regular inspection and maintenance (at least monthly): No
- Presence of secondary emission sources (worst-case assumptions);

Other workers using the same substance simultaneously: Yes
A period of evaporation, drying or curing after the activity (with prolonged emission of vapours): Yes
The concentration during the task due to the activity undertaken is estimated to be 7.96 mg/m3, resulting in an exposure concentration of 0.398 mg/m3 due to the use of respiratory protection. As the task is performed for 8 hours, the daily average concentration equals the task concentration. In accordance with the ECHA Guidance (Chapter R.14), this estimated concentration is therefore considered to be the short-term as well as the long-term inhalation exposure estimate (90th percentiles).

ECETOC TRA Workers 3.1:
Explanation: The exposure estimates for PROC 8a are used, as TRA Workers cannot predict exposure for PROC 28 and these estimates can be considered suitable for estimating exposures during manual maintenance. The exposure estimates are calculated for using a liquid, with the standalone version of TRA Workers (v3.1). The vapour pressure at operating temperature (40°C) used for the calculation is 3.71E-8 Pa (as calculated by Chesar).

8. Exposure Scenario 8: Service life (worker at industrial site) - PU foams - Workers (industrial)

SECTION 1:	**Title of exposure scenario**	
	Service life (worker at industrial site) - PU foams - Workers (industrial)	
Contributing scenario controlling environmental exposure		
CS1	PU foams - Workers (industrial)	ERC12a
Contributing scenario controlling worker exposure		
CS2	Low energy manipulation of substances bound in materials and/or articles	PROC21
CS3	High (mechanical) energy work-up of substances bound in materials and/or articles	PROC24
Exposure scenario(s) of the uses leading to the inclusion of the substance into the article(s):		
ES5	Use at industrial sites - Use as additive in foams	

SECTION 2:	**Conditions of use**
2.1	**Contributing scenario controlling environmental exposure:** 8.1 PU foams - Workers (industrial) (ERC 12a)
Amount used, frequency and duration of use (or from service life)	
Daily use amount at site: not relevant for the assessment as scenario specific releases are estimated Annual use amount at site: not relevant for the assessment as scenario specific releases are estimated	
Conditions and measures related to biological sewage treatment plant	
Biological STP: Standard [Effectiveness, Water: 0.169%] Discharge rate of STP: >= 2E3 m3/day Application of the STP sludge on agricultural soil: Yes	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow: >= 1.8E4 m3/day	
2.2	**Contributing scenario controlling worker exposure:** 8.2 Low energy manipulation of substances bound in materials and/or articles (PROC 21)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	

Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.3	**Contributing scenario controlling worker exposure:** 8.3 High (mechanical) energy work-up of substances bound in materials and/or articles (PROC 24)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
SECTION 3:	**8.4 Exposure estimation**

3.1. Environment

Release	**Release estimation method**	**Explanations**
Water	Estimated release rate	Local release rate: 0 kg/day
Air	Estimated release rate	Local release rate: 0 kg/day
Non-Agricultural Soil	Estimated release factor	Release factor after on-site RMM: 0%

Protection target	**Exposure concentration**	**Risk quantification (RCR)**
Fresh water	Local PEC: 5.0E-3 mg/l	0.01
Sedimentation (Fresh water)	Local PEC: 0.025 mg/kg dw	0.01
Marine water	Local PEC: 5.0E-4 mg/l	0.01
Sedimentation (Marine water)	Local PEC: 2.4E-3 mg/kg dw	0.01
Sewage Treatment Plant	Local PEC: 0 mg/l	< 0.01
Agricultural soil	Local PEC: 2.52E-12 mg/kg dw	< 0.01
Man via Environment - Inhalation (Systemic effects)	Concentration in air: 1.62E-21 mg/m³	< 0.01
Man via Environment - Oral	Exposure via food consumption: 1.74E-4 mg/kg bw/day	< 0.01
Man via Environment – Combined routes		< 0.01

3.2. Worker

Contributing scenario controlling worker exposure: Mixing or blending in batch processes (PROC 5)

Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	3 mg/m³	0.361
Inhalation, Systemic effects, Acute	12 mg/m³	0.146
Dermal, Systemic effects, Long Term	2.83 mg/kg bw/day	0.24
Combined routes, Systemic effects, Long Term		0.601

Contributing scenario controlling worker exposure: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC 8a)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	1 mg/m³	0.12
Inhalation, Systemic effects, Acute	4 mg/m³	0.049
Dermal, Systemic effects, Long Term	2.83 mg/kg bw/day	0.24
Combined routes, Systemic effects, Long Term		0.36

SECTION 4:	**8.5 Guidance to DU to evaluate whether he works inside the boundaries set by the ES**
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling could be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use, additional RMMs or a site-specific chemical safety assessment is required.	

9. Exposure Scenario 9: Service life (worker at industrial site) - Intumescent coatings - Workers (industrial)

SECTION 1:	**Title of exposure scenario**	
	Service life (worker at industrial site) - Intumescent coatings - Workers (industrial)	
Contributing scenario controlling environmental exposure		
CS1	Intumescent coatings - Workers (industrial)	ERC12a
Contributing scenario controlling worker exposure		
CS2	Low energy manipulation of substances bound in materials and/or articles	PROC21
CS3	High (mechanical) energy work-up of substances bound in materials and/or articles	PROC24
Exposure scenario(s) of the uses leading to the inclusion of the substance into the article(s):		
ES6	Use at industrial sites - Use as additive in intumescent coatings	

SECTION 2:	**Conditions of use**
2.1	**Contributing scenario controlling environmental exposure:** 9.1 Intumescent coatings - Workers (industrial) (ERC 12a)
Amount used, frequency and duration of use (or from service life)	
Daily use amount at site: not relevant for the assessment as scenario specific releases are estimated Annual use amount at site: not relevant for the assessment as scenario specific releases are estimated	
Conditions and measures related to biological sewage treatment plant	
Biological STP: Standard [Effectiveness, Water: 0.169%] Discharge rate of STP: >= 2E3 m3/day Application of the STP sludge on agricultural soil: Yes	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow: >= 1.8E4 m3/day	
2.2	**Contributing scenario controlling worker exposure:** 9.2 Low energy manipulation of substances bound in materials and/or articles (PROC 21)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	

Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
2.3	**Contributing scenario controlling worker exposure:** 9.3 High (mechanical) energy work-up of substances bound in materials and/or articles (PROC 24)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)	
Frequency and duration of use	
Duration of activity: <= 8 h/day	
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Advanced Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]	
Other given operational conditions affecting workers exposure	
Place of use: Indoor Operating temperature: <= 40 °C	
SECTION 3:	**9.4 Exposure estimation**

3.1. Environment

Release	Release estimation method	Explanations
Water	Estimated release rate	Local release rate: 0 kg/day
Air	Estimated release rate	Local release rate: 0 kg/day
Non-Agricultural Soil	Estimated release factor	Release factor after on-site RMM: 0%

Protection target	Exposure concentration	Risk quantification (RCR)
Fresh water	Local PEC: 5.0E-3 mg/l	0.01
Sedimentation (Fresh water)	Local PEC: 0.025 mg/kg dw	0.01
Marine water	Local PEC: 5.0E-4 mg/l	0.01
Sedimentation (Marine water)	Local PEC: 2.4E-3 mg/kg dw	0.01
Sewage Treatment Plant	Local PEC: 0 mg/l	< 0.01
Agricultural soil	Local PEC: 2.52E-12 mg/kg dw	< 0.01
Man via Environment - Inhalation (Systemic effects)	Concentration in air: 1.62E-21 mg/m³	< 0.01
Man via Environment - Oral	Exposure via food consumption: 1.74E-4 mg/kg bw/day	< 0.01
Man via Environment – Combined routes		< 0.01

3.2. Worker

Contributing scenario controlling worker exposure: Low energy manipulation of substances bound in materials and/or articles (PROC 21)

Exposure route	Exposure estimate - Worker	Risk quantification (RCR)
Inhalation, Systemic effects, Long Term	3 mg/m³	0.361

Inhalation, Systemic effects, Acute	12 mg/m³	0.146
Dermal, Systemic effects, Long Term	2.83 mg/kg bw/day	0.24
Combined routes, Systemic effects, Long Term		0.601
Contributing scenario controlling worker exposure: High (mechanical) energy work-up of substances bound in materials and/or articles (PROC 24)		
Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	1 mg/m³	0.12
Inhalation, Systemic effects, Acute	4 mg/m³	0.049
Dermal, Systemic effects, Long Term	2.83 mg/kg bw/day	0.24
Combined routes, Systemic effects, Long Term		0.36
SECTION 4:	**9.5 Guidance to DU to evaluate whether he works inside the boundaries set by the ES**	
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling could be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use, additional RMMs or a site-specific chemical safety assessment is required.		

10. Exposure Scenario 10: Service life (professional worker) - Intumescent coatings - Professional Workers

SECTION 1:	**Title of exposure scenario**	
	Service life (professional worker) - Intumescent coatings - Professional Workers	
Contributing scenario controlling environmental exposure		
CS1	Intumescent coatings - Professional Workers	ERC10a, ERC11a
Contributing scenario controlling worker exposure		
CS2	Low energy manipulation of substances bound in materials and/or articles	PROC21
Exposure scenario(s) of the uses leading to the inclusion of the substance into the article(s):		
ES6	Use at industrial sites - Use as additive in intumescent coatings	
ES7	Widespread use by professional workers - Use as additive in intumescent coatings	
SECTION 2:	**Conditions of use**	
2.1	**Contributing scenario controlling environmental exposure:** 10.1 Intumescent coatings - Professional Workers (ERC 10a, ERC 11a)	
Amount used, frequency and duration of use (or from service life)		
Daily local widespread use amount: not relevant for the assessment as scenario specific releases are estimated		
Conditions and measures related to biological sewage treatment plant		
Biological STP: Standard [Effectiveness, Water: 0.169%] Discharge rate of STP: >= 2E3 m3/day Application of the STP sludge on agricultural soil: Yes		
Other given operational conditions affecting environmental exposure		
Receiving surface water flow: >= 1.8E4 m3/day		
2.2	**Contributing scenario controlling worker exposure:** 10.2 Low energy manipulation of substances bound in materials and/or articles (PROC 21)	
Product characteristics		
Percentage (w/w) of substance in mixture/article: <= 100 % Physical form of the used product: Solid (medium dusty form)		
Frequency and duration of use		
Duration of activity: <= 8 h/day		
Technical conditions and measures to control dispersion from source towards the worker		

General ventilation: Basic general ventilation (1-3 air changes per hour) [Effectiveness, Inhalation: 0%] Occupational Health and Safety Management System: Basic Local exhaust ventilation: No [Effectiveness, Inhalation: 0%, Dermal: 0%]
Conditions and measures related to personal protection, hygiene and health evaluation
Respiratory protection: No [Effectiveness, Inhalation: 0%] Dermal protection: No [Effectiveness, Dermal: 0%]
Other given operational conditions affecting workers exposure
Place of use: Indoor Operating temperature: <= 40 °C

SECTION 3:	**10.3 Exposure estimation**

3.1. Environment

Release	**Release estimation method**	**Explanations**
Water	Estimated release rate	Local release rate: 0 kg/day
Air	Estimated release rate	Local release rate: 0 kg/day
Non-Agricultural Soil	Estimated release factor	Release factor after on-site RMM: 0%

Protection target	**Exposure concentration**	**Risk quantification (RCR)**
Fresh water	Local PEC: 5.0E-3 mg/l	0.01
Sedimentation (Fresh water)	Local PEC: 0.025 mg/kg dw	0.01
Marine water	Local PEC: 5.0E-4 mg/l	0.01
Sedimentation (Marine water)	Local PEC: 2.4E-3 mg/kg dw	0.01
Sewage Treatment Plant	Local PEC: 0 mg/l	< 0.01
Agricultural soil	Local PEC: 2.52E-12 mg/kg dw	< 0.01
Man via Environment - Inhalation (Systemic effects)	Concentration in air: 1.62E-21 mg/m³	< 0.01
Man via Environment - Oral	Exposure via food consumption: 1.74E-4 mg/kg bw/day	< 0.01
Man via Environment – Combined routes		< 0.01

3.2. Worker

Contributing scenario controlling worker exposure: Low energy manipulation of substances bound in materials and/or articles (PROC 21)

Exposure route	**Exposure estimate - Worker**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	5 mg/m³	0.602
Inhalation, Systemic effects, Acute	20 mg/m³	0.243
Dermal, Systemic effects, Long Term	2.83 mg/kg bw/day	0.24
Combined routes, Systemic effects, Long Term		0.842

SECTION 4:	**10.4 Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling could be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use, additional RMMs or a site-specific chemical safety assessment is required.

11. Exposure Scenario 11: Service life (consumers) - PU foams – Consumers

SECTION 1:	**Title of exposure scenario**	
	Service life (consumers) - PU foams – Consumers	
Contributing scenario controlling environmental exposure		
CS1	PU foams – Consumers	ERC10a, ERC11a

Contributing scenario controlling worker exposure		
CS2	Use of articles containing foam with encapsulated the substance	AC1, AC1a, AC 13, AC 13e
Exposure scenario(s) of the uses leading to the inclusion of the substance into the article(s):		
ES5	Use at industrial sites - Use as additive in foams	

SECTION 2:	**Conditions of use**
2.1	**Contributing scenario controlling environmental exposure:** 11.1 PU foams – Consumers (ERC 10a, ERC 11a)

Amount used, frequency and duration of use (or from service life)
Daily local widespread use amount: not relevant for the assessment as scenario specific releases are estimated
Conditions and measures related to biological sewage treatment plant
Biological STP: Standard [Effectiveness, Water: 0.169%] Discharge rate of STP: >= 2E3 m3/day Application of the STP sludge on agricultural soil: Yes
Other given operational conditions affecting environmental exposure
Receiving surface water flow: >= 1.8E4 m3/day

2.2	**Contributing scenario controlling consumer exposure:** 11.2 Use of articles containing foam with encapsulated the substance (AC1, AC1a, AC 13, AC13e)

Product characteristics
Percentage (w/w) of substance in mixture/article: <= 30 % Exposure via inhalation route: Inhalation exposure is considered to be not relevant Exposure via oral route: Oral exposure is considered to be not relevant

SECTION 3:	**11.3 Exposure estimation**

3.1. Environment

Release	**Release estimation method**	**Explanations**
Water	Estimated release rate	Local release rate: 0 kg/day
Air	Estimated release rate	Local release rate: 0 kg/day
Non-Agricultural Soil	Estimated release factor	Release factor after on-site RMM: 0%

Protection target	**Exposure concentration**	**Risk quantification (RCR)**
Fresh water	Local PEC: 5.0E-3 mg/l	0.01
Sedimentation (Fresh water)	Local PEC: 0.025 mg/kg dw	0.01
Marine water	Local PEC: 5.0E-4 mg/l	0.01
Sedimentation (Marine water)	Local PEC: 2.4E-3 mg/kg dw	0.01
Sewage Treatment Plant	Local PEC: 0 mg/l	< 0.01
Agricultural soil	Local PEC: 2.52E-12 mg/kg dw	< 0.01
Man via Environment - Inhalation (Systemic effects)	Concentration in air: 1.62E-21 mg/m³	< 0.01
Man via Environment - Oral	Exposure via food consumption: 1.74E-4 mg/kg bw/day	< 0.01
Man via Environment – Combined routes		< 0.01

3.2. Consumer

Contributing scenario controlling consumer exposure: Use of articles containing foam with encapsulated the substance (AC1, AC1a, AC 13, AC13e)

Exposure route	**Exposure estimate - Consumer**	**Risk quantification (RCR)**
Inhalation, Systemic effects, Long Term	Negligible (Migration study)	< 0.01
Dermal, Systemic effects, Long Term	0.1484 mg/kg bw/day: for a baby,	0.035

	when using additional sheets for mattress protection and comfort (Migration study) 0.06375 mg/kg bw/day: for an adult, when using additional sheets for mattress protection and comfort (Migration study) 0.6375 mg/kg bw/day: for an adult, when sleeping directly on the mattress cover (Migration study) 1.484 mg/kg bw/day: for a baby, when sleeping directly on the mattress cover (Migration study)	0.015
Oral, Systemic effects, Long Term	Negligible (Migration study)	< 0.01
Combined routes, Systemic effects, Long Term		0.035 for a baby 0.015 for an adult

SECTION 4:	**11.4 Guidance to DU to evaluate whether he works inside the boundaries set by the ES**

Remarks on exposure data:
Migration study:
Explanation: The substance is used in foam mattresses, as a non-halogenated flame retardant. The European association of flexible polyurethane foam blocks manufacturers (EUROPUR) commissioned a migration study, to evaluate the potential exposure of humans from melamine used in flexible PU foam used in mattresses. The study was submitted to ECHA by EUROPUR, as part of their response to the public consultation on the CLH report for melamine dated November 2019 and can be found on the ECHA website.
Based on the vapour pressure of the substance and since mattresses are flat and not mouthed, inhalation and oral exposure are considered negligible, while potential dermal exposure is deemed the most relevant route of exposure due to the prolonged contact duration, with a large part of the body and the possible effect of sweat as a vehicle.
The migration of melamine into synthetic sweat soaked filter papers from these foams was investigated. As a mattress typically consists of a PUR foam core surrounded with a fabric layer, migration was investigated with and without the use of a polyester-polypropylene mattress cover placed between the foam and filter paper. The set-up was compressed to 70% of its depth in order to simulate a person sleeping on the mattress and incubated at 40°C for 2 hours.
When the foam was covered, a standard practice for every mattress with flexible PU foam, the migration was below the limit of detection (LOD) and LOD/2 was used as estimate for people sleeping directly on the mattress cover (0.6375 mg/kg bw/day for an adult and 1.484 for a baby). Note that this is a worst-case assessment as usually people don't sleep directly on the mattress cover but put additional sheets for additional mattress protection and comfort. When refined due to the use of additional sheets for mattress protection and comfort, the dermal exposure estimates were concluded to be 0.06375 for an adult and 0.1484 for a baby. Note that no melamine was detected when the mattress cover was included in the test set-up and that the calculations are therefore done based on the LOD/2.

12. Exposure Scenario 12: Service life (consumers) - Intumescent coating – Consumers

SECTION 1:	**Title of exposure scenario**	
	Service life (consumers) - Intumescent coating – Consumers	
Contributing scenario controlling environmental exposure		
CS1	Intumescent coating – Consumers	ERC10a, ERC11a
Contributing scenario controlling worker exposure		
CS2	Use of articles with intumescent coating with encapsulated the substance	AC13
Exposure scenario(s) of the uses leading to the inclusion of the substance into the article(s):		
ES6	Use at industrial sites - Use as additive in intumescent coatings	
ES7	Widespread use by professional workers - Use as additive in intumescent coatings	
SECTION 2:	**Conditions of use**	
2.1	**Contributing scenario controlling environmental exposure:** 12.1 Intumescent coating – Consumers (ERC 10a, ERC 11a)	

Amount used, frequency and duration of use (or from service life)	
Daily local widespread use amount: not relevant for the assessment as scenario specific releases are estimated	
Conditions and measures related to biological sewage treatment plant	
Biological STP: Standard [Effectiveness, Water: 0.169%] Discharge rate of STP: >= 2E3 m3/day Application of the STP sludge on agricultural soil: Yes	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow: >= 1.8E4 m3/day	
2.2	**Contributing scenario controlling consumer exposure:** 12.2 Use of articles with intumescent coating with encapsulated the substance (AC 13)
Product characteristics	
Percentage (w/w) of substance in mixture/article: <= 30 % Exposure via inhalation route: Inhalation exposure is considered to be not relevant Exposure via dermal route: Dermal exposure assumed to be negligible Exposure via oral route: Oral exposure is considered to be not relevant	
SECTION 3:	**12.3 Exposure estimation**

3.1. Environment

Release	**Release estimation method**	**Explanations**
Water	Estimated release rate	Local release rate: 0 kg/day
Air	Estimated release rate	Local release rate: 0 kg/day
Non-Agricultural Soil	Estimated release factor	Release factor after on-site RMM: 0%

Protection target	**Exposure concentration**	**Risk quantification (RCR)**
Fresh water	Local PEC: 5.0E-3 mg/l	0.01
Sedimentation (Fresh water)	Local PEC: 0.025 mg/kg dw	0.01
Marine water	Local PEC: 5.0E-4 mg/l	0.01
Sedimentation (Marine water)	Local PEC: 2.4E-3 mg/kg dw	0.01
Sewage Treatment Plant	Local PEC: 0 mg/l	< 0.01
Agricultural soil	Local PEC: 2.52E-12 mg/kg dw	< 0.01
Man via Environment - Inhalation (Systemic effects)	Concentration in air: 1.62E-21 mg/m³	< 0.01
Man via Environment - Oral	Exposure via food consumption: 1.74E-4 mg/kg bw/day	< 0.01
Man via Environment – Combined routes		< 0.01

3.2 Consumer

Contributing scenario controlling consumer exposure: Use of articles with intumescent coating with encapsulated the substance (AC 13)
As any (dermal) contact by consumers with these coatings will be incidental and as the substance is embedded in a matrix, inhalation, dermal and oral exposure (and therefore risks) are considered to be negligible.

SECTION 4:	**12.4 Guidance to DU to evaluate whether he works inside the boundaries set by the ES**
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling could be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use, additional RMMs or a site-specific chemical safety assessment is required.	