Melamine

Safety Data Sheet

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2020/878

Product Reference code: OC00016

Revision date: 18/01/2023 Supersedes version of: 21/11/2022 Version: 5.2

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

1.1. Product identifier

Product form	:	Substance
Name	:	Melamine
Trade name	:	MelaminebyOCITM GPH MelaminebyOCITM GPH LD MelaminebyOCITM SLP Melafine®
IUPAC name	:	1,3,5-Triazine-2,4,6-triamine
EC-No.	:	203-615-4
CAS-No.	:	108-78-1
REACH registration No	:	01-2119485947-16-0000
Formula	:	$C_3H_6N_6$
Synonyms	:	Cyanuramide; Cyanurotriamide; 2,4,6-Triamino-s-triazine

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

1.2.1. Relevant identified uses

Use of the substance/mixture	:	Industrial use White crystalline powder, used in high performance products like wood-based panels, laminates, coatings, molding powders, concrete plasticizers and flame retardants

1.2.2. Uses advised against

Restrictions on use	:	Addition to food or feed products

1.3. Details of the supplier of the safety data sheet

Supplier
OCI Nitrogen B.V.
Poststraat 1
6135 KR Sittard - The Netherlands
T +31 (0) 46 7020205
info.melamine@ocinitrogen.com - www.ocinitrogen.com

Supplier
OCI Melamine Americas, Inc.
C/O Advanced Louisiana Logistics
501 Louisiana Avenue, Suite 201
LA 70802 Baton Rouge - USA
T +1 (225) 685 30 20 / 685 30 37 - F +1 (225) 685 30 03

Supplier
OCI Trading Shanghai
17N, Feizhou Guoji Building
No. 899 Lingling Road
200030 Shanghai - China
T +86 (0)21 64415441 - F +86 (0)21 64415440

1.4. Emergency telephone number

Emergency number	:	Alert & Care Centre Chemelot (Geleen, The Netherlands): +31 (0) 46 4765555 (24/7)

Country	Organisation/Company	Address	Emergency number	Comment
Ireland	National Poisons Information Centre Beaumont Hospital	PO Box 1297 Beaumont Road 9 Dublin	+353 1 809 2566 (Healthcare professionals-24/7) +353 1 809 2166 (public, 8am - 10pm, 7/7)	

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

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

Reproductive toxicity, Category 2 H361f

Full text of H- and EUH-statements: see section 16

Adverse physicochemical, human health and environmental effects

No additional information available

2.2. Label elements

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

Hazard pictograms (CLP) :

Signal word (CLP) : Warning
Hazard statements (CLP) : H361f - Suspected of damaging fertility.
Precautionary statements (CLP) : 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.
P501 - Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.

2.3. Other hazards

This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII
This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	Product identifier	Conc. (% w/w)	Classification according to Regulation (EC) No. 1272/2008 [CLP]
1,3,5-Triazine-2,4,6-triamine	(CAS-No.) 108-78-1 (EC-No.) 203-615-4 (REACH-no) 01-2119485947-16-0000	100	Repr. 2, H361f

Full text of H- and EUH-statements: see section 16

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : IF exposed or concerned: Get medical advice/attention.
First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. If breathing stops, give artificial respiration. Get medical attention immediately if symptoms occur.
First-aid measures after skin contact : Wash skin with plenty of water and soap. Remove all contaminated clothing and footwear.
First-aid measures after eye contact : Rinse immediately with plenty of water. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if symptoms occur.
First-aid measures after ingestion : Rinse mouth with water. Do not induce vomiting. Never give anything by mouth to an unconscious person. Get medical attention if symptoms occur.

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

Symptoms/effects after inhalation : Dust from this product may cause irritation to the respiratory tract.
Symptoms/effects after eye contact : Dust from this product may cause eye irritation.
Chronic symptoms : May damage fertility.

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

Treat symptomatically. Hazardous decomposition products in case of fire. Symptoms may be delayed. Consult an expert.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Water spray. Dry powder. Foam.

5.2. Special hazards arising from the substance or mixture

Fire hazard : The product is not flammable.

Hazardous decomposition products in case of fire : Under fire conditions, hazardous fumes will be present: Carbon dioxide, Carbon monoxide, Amines, Nitrogen oxides, Ammonia, Hydrogen cyanide > 600°C.

5.3. Advice for firefighters

Protection during firefighting : Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Emergency procedures : Ventilate spillage area. Evacuate unnecessary personnel. Do not breathe dust. Do not touch or walk on the spilled product. Avoid contact with skin, eyes and clothing.

6.1.2. For emergency responders

Protective equipment : Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".

6.2. Environmental precautions

Avoid release to the environment. Do not allow to enter drains or water courses. Avoid sub-soil penetration. Advise local authorities if considered necessary.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Mechanically recover the product. Avoid dust formation. Keep in suitable, closed containers for disposal. Notify authorities if product enters sewers or public waters.

Other information : Dispose of waste product or used containers according to local regulations. Dispose of materials or solid residues at an authorized site.

6.4. Reference to other sections

See sections 1, 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear personal protective equipment. Ensure good ventilation of the work station. Avoid dust formation. Do not breathe dust. In case of insufficient ventilation, wear suitable respiratory equipment.

Hygiene measures : Do not eat, drink or smoke when using this product. Always wash hands after handling the product. Remove contaminated clothes. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store in accordance with local, regional, national or international regulation. Store in dry, well-ventilated area. Keep away from: Direct sunlight, Oxidizing agents. Store locked up.

Incompatible materials : Strong oxidizing agents.

Storage area : (1) Do not stack big bags > 1000 kg. Do not stack more than two bulk bags <=1000 kg on top of each other in connection with the risk of ripping. (2) 'MelaminebyOCI SLP' may not be stacked.

7.3. Specific end use(s)

For the detailed identified uses of the product see appendix of the safety data sheet.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.1.1 National occupational exposure and biological limit values

No additional information available

8.1.2. Recommended monitoring procedures

No additional information available

8.1.3. Air contaminants formed

No additional information available

8.1.4. DNEL and PNEC

1,3,5-Triazine-2,4,6-triamine (108-78-1)	
DNEL/DMEL (Workers)	
Acute - systemic effects, dermal	117 mg/kg bodyweight/day
Acute - systemic effects, inhalation	82.3 mg/m³
Long-term - systemic effects, dermal	11.8 mg/kg bw/day
Long-term - systemic effects, inhalation	8.3 mg/m³
DNEL/DMEL (General population)	
Long-term - systemic effects,oral	0.42 mg/kg bodyweight/day
Long-term - systemic effects, inhalation	1.5 mg/m³
Long-term - systemic effects, dermal	4.2 mg/kg bodyweight/day
PNEC (Water)	
PNEC aqua (freshwater)	0.51 mg/l
PNEC aqua (marine water)	0.051 mg/l
PNEC aqua (intermittent, freshwater)	2 mg/l
PNEC (Sediment)	
PNEC sediment (freshwater)	2.524 mg/kg dwt
PNEC sediment (marine water)	0.252 mg/kg dwt
PNEC (Soil)	
PNEC soil	0.206 mg/kg dwt
PNEC (Oral)	
PNEC oral (secondary poisoning)	Bioaccumulation unlikely
PNEC (STP)	
PNEC sewage treatment plant	200 mg/l

8.1.5. Control banding

No additional information available

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Appropriate engineering controls:
Ensure good ventilation of the work station. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. See annex for more detailed information.

8.2.2. Personal protection equipment

Personal protective equipment:
When this substance/product is used in a mixture consult your industrial hygienist to adjust the personal protective equipment to the (hazard) properties of the mixture.
Personal protective equipment symbol(s):

8.2.2.1. Eye and face protection

Eye protection:			
Type	**Use**	**Characteristics**	**Standard**
Safety glasses with side shields	Dust		EN 166

8.2.2.2. Skin protection

Skin and body protection:	
Wear suitable protective clothing	
Type	**Standard**
Long sleeved protective clothing	

Hand protection:					
Chemically resistant protective gloves. Efficiency of at least: 80%. To increase glove efficiency additional good practice is required, e.g. provision of training or management supervision.					
Type	**Material**	**Permeation**	**Thickness (mm)**	**Penetration**	**Standard**
Protective gloves	Chloroprene rubber (CR), Butyl rubber, Polyvinylchloride (PVC)	6 (> 480 minutes)	0.5		EN 374
Protective gloves	Nitrile rubber (NBR)	6 (> 480 minutes)	0.35		EN 374
Protective gloves	Fluoroelastomer (FKM)	6 (> 480 minutes)	0.4		EN 374

8.2.2.3. Respiratory protection

Respiratory protection:			
In case of dust formation use respirator with filter:			
Device	**Filter type**	**Condition**	**Standard**
Dust mask	Type P2	Dust protection	EN 140

8.2.2.4. Thermal hazards
No additional information available

8.2.3. Other exposure controls

Environmental exposure controls:
Avoid release to the environment. See annex for more detailed information.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Solid
Colour	:	White
Appearance	:	Crystalline powder
Molecular mass	:	126.12 g/mol
Odour	:	Odourless, Ammoniacal slight
Odour threshold	:	Not available
Melting point	:	354 °C (with vaporization)
Freezing point	:	Not applicable
Boiling point	:	> 280 °C Decomposes
Flammability	:	Not flammable
Explosive properties	:	Not explosive
Explosive limits	:	Not applicable
Flash point	:	> 280 °C (closed cup)
Auto-ignition temperature	:	> 500 °C
Decomposition temperature	:	> 280 °C
pH	:	7.8 – 9.5 (10% aqueous suspension)
Viscosity, kinematic	:	Not applicable
Solubility	:	Slightly soluble Water: 0.348 g/100ml (20°C)
Partition coefficient n-octanol/water (Log Pow)	:	-1.14 (25°C)
Vapour pressure	:	< 0.02 kPa (20°C)
Density	:	1.57 g/cm³
Relative density	:	1.57 (20°C)
Relative vapour density at 20°C	:	4.34 (air = 1)
Particle size	:	Not available
Particle size distribution	:	Available on request

9.2. Other information

9.2.1. Information with regard to physical hazard classes

Oxidising properties	:	Non oxidizing

9.2.2. Other safety characteristics

Other properties	:	Ignition temperature: ≥ 658 °C / 1216.4 °F

SECTION 10: Stability and reactivity

10.1. Reactivity

The product is non-reactive under normal conditions of use, storage and transport.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use.

10.4. Conditions to avoid

Keep away from heat. Keep away from any flames or sparking source.

10.5. Incompatible materials

Oxidizing agents.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced. Thermal decomposition can lead to the release of irritating gases and vapours. Thermal decomposition generates: Carbon monoxide, Carbon dioxide, Nitrogen oxides, Amines, Ammonia, Hydrogen cyanide > 600°C.

SECTION 11: Toxicological information

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

Acute toxicity (oral) : Not classified
Acute toxicity (dermal) : Not classified
Acute toxicity (inhalation) : Not classified

1,3,5-Triazine-2,4,6-triamine (108-78-1)	
LD50 oral rat	3161 mg/kg bodyweight
LC50 Inhalation - Rat	> 5.19 mg/l/4h (OECD 403 method)

Skin corrosion/irritation : Not classified
pH: 7.8 – 9.5 (10% aqueous suspension)
Serious eye damage/irritation : Not classified
pH: 7.8 – 9.5 (10% aqueous suspension)
Respiratory or skin sensitisation : Not classified
Germ cell mutagenicity : Not classified
Carcinogenicity : Not classified.
Additional information : In feeding studies in rats and mice, transitional-cell carcinomas in the urinary bladder were observed only for male rats and only at high doses of melamine in the diet. No carcinomas were found for female rats or for mice of either sex. There is no evidence that melamine can cause cancer to humans.
Although exposure to high levels of melamine can cause bladder stones in humans there is no evidence for cancer developing as a result of exposure to melamine.

Melamine (108-78-1)	
IARC group	2B - Possibly carcinogenic to humans

1,3,5-Triazine-2,4,6-triamine (108-78-1)	
IARC group	2B - Possibly carcinogenic to humans

1,3,5-Triazine-2,4,6-triamine (108-78-1)	
LOAEL, Chronic, oral, rat	126 mg/kg bw/day

Reproductive toxicity : Suspected of damaging fertility.

1,3,5-Triazine-2,4,6-triamine (108-78-1)	
NOAEL (animal/male, F1)	89 mg/kg bodyweight Fertility
Target organ(s)	testis, Sperm

STOT-single exposure : Not classified
STOT-repeated exposure : Not classified.

1,3,5-Triazine-2,4,6-triamine (108-78-1)	
NOAEL (oral, rat, 90 days)	72 mg/kg bodyweight/day
Target organ(s)	urinary bladder, kidneys

Aspiration hazard : Not classified

Melamine (108-78-1)	
Viscosity, kinematic	Not applicable

11.2. Information on other hazards

11.2.1. Endocrine disrupting properties

No additional information available

11.2.2 Other information

No additional information available

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : The product is not considered harmful to aquatic organisms nor to cause long-term adverse effects in the environment.

Hazardous to the aquatic environment, short–term (acute) : Not classified

Hazardous to the aquatic environment, long–term (chronic) : Not classified

1,3,5-Triazine-2,4,6-triamine (108-78-1)	
LC50 fish 1	> 3000 mg/l Oncorhynchus mykiss
EC50 Daphnia 1	200 mg/l Daphnia magna
EC50 96h - Algae [1]	325 mg/l Pseudokirchneriella subcapitata
NOEC chronic fish	≥ 5.1 mg/l Pimephales promelas (36d)
NOEC chronic crustacea	≥ 11 mg/l (21d) Daphnia magna
NOEC chronic algae	98 mg/l Species: Pseudokirchneriella subcapitata
NOEC, microorganisms	2000 mg/l

12.2. Persistence and degradability

1,3,5-Triazine-2,4,6-triamine (108-78-1)	
Persistence and degradability	Not readily biodegradable. Not inherently biodegradable.

12.3. Bioaccumulative potential

Melamine (108-78-1)	
Partition coefficient n-octanol/water (Log Pow)	-1.14 (25°C)

1,3,5-Triazine-2,4,6-triamine (108-78-1)	
BCF fish 1	< 3.8 l/kg
Bioaccumulative potential	Bioaccumulation unlikely.

12.4. Mobility in soil

1,3,5-Triazine-2,4,6-triamine (108-78-1)	
Organic Carbon Normalized Adsorption Coefficient (Log Koc)	1.13 Quantitative structure-activity relationship (QSAR)

12.5. Results of PBT and vPvB assessment

Melamine (108-78-1)
This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII
This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII

12.6. Endocrine disrupting properties

No additional information available

12.7. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Regional legislation (waste) : Dispose in a safe manner in accordance with local/national regulations.
Waste treatment methods : Dispose of contents/container in accordance with licensed collector's sorting instructions.
Product/Packaging disposal recommendations : Recycling is preferred to disposal or incineration. Do not re-use empty containers without proper cleaning or reconditioning. Avoid release to the environment.

SECTION 14: Transport information

In accordance with ADR / IMDG / IATA / ADN / RID

ADR	IMDG	IATA	ADN	RID
14.1. UN number or ID number				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
14.2. UN proper shipping name				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
14.3. Transport hazard class(es)				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
14.4. Packing group				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
14.5. Environmental hazards				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
No supplementary information available				

14.6. Special precautions for user

Overland transport
Not regulated

Transport by sea
Not regulated

Air transport
Not regulated

Inland waterway transport
Not regulated

Rail transport
Not regulated

14.7. Maritime transport in bulk according to IMO instruments

Not applicable

SECTION 15: Regulatory information

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

15.1.1. EU-Regulations

Not listed on REACH Annex XVII
Listed on the REACH Candidate List: Melamine
Not listed on REACH Annex XIV (Authorisation List)
Not listed on the PIC list (Regulation EU 649/2012)
Not listed on the POP list (Regulation EU 2019/1021)

Other information, restriction and prohibition regulations : For pregnant/breastfeeding women (92/85/EC): National employment prohibitions and restrictions have to be observed.
For young people, <18 years (94/33/EC): National employment prohibitions and restrictions have to be observed.

15.1.2. National regulations

No additional information available

15.2. Chemical safety assessment

A chemical safety assessment has been carried out

SECTION 16: Other information

Indication of changes:
Regulatory information.

Training advice : Training staff on good practice. Ensure staff are informed of and trained on the nature of exposure and basic actions to minimise exposure.

Abbreviations and acronyms:	
PBT	Persistent Bioaccumulative Toxic
vPvB	Very Persistent and Very Bioaccumulative
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ICAO	International Civil Aviation Organization
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006
DNEL	Derived-No Effect Level
PNEC	Predicted No-Effect Concentration
EC50	Median effective concentration
NOEC	No-Observed Effect Concentration
BCF	Bioconcentration factor
IMDG	International Maritime Dangerous Goods
IATA	International Air Transport Association
DMEL	Derived Minimal Effect level
CLP	Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
IARC	International Agency for Research on Cancer
EC-No.	European Community number
EN	European Standard

LC50	Median lethal concentration
LD50	Median lethal dose
LOAEL	Lowest Observed Adverse Effect Level
OECD	Organisation for Economic Co-operation and Development
STP	Sewage treatment plant
CAS-No.	Chemical Abstract Service number
NOAEL	No-Observed Adverse Effect Level
ATE	Acute Toxicity Estimate
BLV	Biological limit value
BOD	Biochemical oxygen demand (BOD)
COD	Chemical oxygen demand (COD)
NOAEC	No-Observed Adverse Effect Concentration
OEL	Occupational Exposure Limit
SDS	Safety Data Sheet
ThOD	Theoretical oxygen demand (ThOD)
TLM	Median Tolerance Limit
VOC	Volatile Organic Compounds
N.O.S.	Not Otherwise Specified
ED	Endocrine disrupting properties

Full text of H- and EUH-statements:	
H361f	Suspected of damaging fertility.
Repr. 2	Reproductive toxicity, Category 2

Safety Data Sheet applicable for regions : IE - Ireland

SDS EU (REACH Annex II) - RHDHV

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

Annex to the safety data sheet

1. ES 1 - ES 1 Manufacture of substances

1.1. Title section

ES 1 Manufacture of substances	
ES Ref.: ES 1 ES Type: Worker	

Environment		Use descriptors
CS 1	Manufacture of substances	ERC1

Worker		Use descriptors
CS 2	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions	PROC1
CS 3	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions	PROC2
CS 4	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities	PROC8a
CS 5	Transfer of substance or mixture (charging and discharging) at dedicated facilities	PROC8b
CS 6	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	PROC9
CS 7	Use as laboratory reagent	PROC15
CS 8	Manual maintenance (cleaning and repair) of machinery	PROC28

1.2. Conditions of use affecting exposure

1.2.1. Control of environmental exposure: Manufacture of substances (ERC1)

ERC1	Manufacture of the substance

1.2.2. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	

Other conditions affecting workers exposure	
Assumes process temperature up to	40 °C

1.2.3. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

1.2.4. Control of worker exposure: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC8a)

PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.

Conditions and measures related to personal protection, hygiene and health evaluation	
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

1.2.5. Control of worker exposure: Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC8b)

PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

1.2.6. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

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

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

1.2.7. Control of worker exposure: Use as laboratory reagent (PROC15)

PROC15	Use as laboratory reagent

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use,Assumes process temperature up to	40 °C

1.2.8. Control of worker exposure: Manual maintenance (cleaning and repair) of machinery (PROC28)

PROC28	Manual maintenance (cleaning and repair) of machinery

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use,Assumes process temperature up to	40 °C

1.3. Exposure estimation and reference to its source

1.3.1. Environmental release and exposure Manufacture of substances (ERC1)

Information for contributing exposure scenario
Confidential

1.3.2. Worker exposure Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	0.034 mg/kg bw/day	< 0.01	Measured data
Inhalation - Long-term - systemic effects	0.01 mg/m³	< 0.01	Measured data
Sum RCR - Long-term - systemic effects		< 0.02	
Inhalation - Acute - systemic effects	0.04 mg/m³	< 0.01	Measured data
Sum RCR - Acute - systemic effects		< 0.01	

1.3.3. Worker exposure Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	1.37 mg/kg bw/day	0.116	Measured data
Inhalation - Long-term - systemic effects	0.5 mg/m³	0.06	Measured data
Sum RCR - Long-term - systemic effects		0.176	
Inhalation - Acute - systemic effects	2 mg/m³	0.024	Measured data
Sum RCR - Acute - systemic effects		0.024	

1.3.4. Worker exposure Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC8a)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.834	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

1.3.5. Worker exposure Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC8b)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	Measured data
Inhalation - Long-term - systemic effects	1 mg/m³	0.12	Measured data
Sum RCR - Long-term - systemic effects		0.352	
Inhalation - Acute - systemic effects	4 mg/m³	0.049	Measured data
Sum RCR - Acute - systemic effects		0.049	

1.3.6. Worker exposure Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	1.372 mg/kg bw/day	0.116	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.718	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

1.3.7. Worker exposure Use as laboratory reagent (PROC15)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	0.34 mg/kg bw/day	0.029	Measured data
Inhalation - Long-term - systemic effects	0.5 mg/m³	0.06	Measured data
Sum RCR - Long-term - systemic effects		0.089	
Inhalation - Acute - systemic effects	2 mg/m³	0.024	Measured data
Sum RCR - Acute - systemic effects		0.024	

1.3.8. Worker exposure Manual maintenance (cleaning and repair) of machinery (PROC28)

Information for contributing exposure scenario			
Exposure estimate: PROC 8a, TRA Workers v3.1			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	TRA Workers v3.1
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	TRA Workers v3.1
Sum RCR - Long-term - systemic effects		0.834	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	TRA Workers v3.1

Information for contributing exposure scenario			
Sum RCR - Acute - systemic effects		0.243	

1.4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

1.4.1. Environment

Guidance - Environment	Not applicable.

1.4.2. Health

Guidance - Health	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Contact supplier if guidance is required

2. ES 2 - ES 2 Formulation or re-packing

2.1. Title section

ES 2 Formulation or re-packing	
ES Ref.: ES 2 ES Type: Worker	

Environment		Use descriptors
CS 1	Formulation into mixture	ERC2

Worker		Use descriptors
CS 2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions	PROC2
CS 3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	PROC3
CS 4	Chemical production where opportunity for exposure arises	PROC4
CS 5	Mixing or blending in batch processes	PROC5
CS 6	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities	PROC8a
CS 7	Transfer of substance or mixture (charging and discharging) at dedicated facilities	PROC8b
CS 8	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	PROC9
CS 9	Tabletting, compression, extrusion, pelettisation, granulation	PROC14
CS 10	Use as laboratory reagent	PROC15
CS 11	Manual activities involving hand contact	PROC19
CS 12	Manual maintenance (cleaning and repair) of machinery	PROC28

2.2. Conditions of use affecting exposure

2.2.1. Control of environmental exposure: Formulation into mixture (ERC2)

ERC2	Formulation into mixture

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %

Conditions and measures related to sewage treatment plant	
Municipal Sewage Treatment Plant	0.169 % effectiveness water
Assumed domestic sewage treatment plant flow	≥ 2000 m³/d
Controlled application of sewage sludge to agricultural soil	

Other conditions affecting environmental exposure	
Receiving surface water flow (m³/day):	≥ 18000 m³/d

2.2.2. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

2.2.3. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

2.2.4. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

PROC4	Chemical production where opportunity for exposure arises

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

2.2.5. Control of worker exposure: Mixing or blending in batch processes (PROC5)

PROC5	Mixing or blending in batch processes

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

2.2.6. Control of worker exposure: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC8a)

PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

2.2.7. Control of worker exposure: Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC8b)

PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

2.2.8. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

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

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

2.2.9. Control of worker exposure: Tabletting, compression, extrusion, pelettisation, granulation (PROC14)

PROC14	Tabletting, compression, extrusion, pelettisation, granulation

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

2.2.10. Control of worker exposure: Use as laboratory reagent (PROC15)

PROC15	Use as laboratory reagent

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	

Technical and organisational conditions and measures	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

2.2.11. Control of worker exposure: Manual activities involving hand contact (PROC19)

PROC19	Manual activities involving hand contact

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Avoid carrying out operation for more than 4 hours,Covers exposure up to:	≤ 4 h/day

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Efficiency of at least:	95 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

2.2.12. Control of worker exposure: Manual maintenance (cleaning and repair) of machinery (PROC28)

PROC28	Manual maintenance (cleaning and repair) of machinery

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

2.3. Exposure estimation and reference to its source

2.3.1. Environmental release and exposure Formulation into mixture (ERC2)

Protection target	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	0.255 mg/l	0.51 mg/l	0.5	EUSES 2.2.0
Marine water	0.0255 mg/l	0.051 mg/l	0.5	EUSES 2.2.0
Secondary poisoning			0.04	EUSES 2.2.0
Freshwater sediment	1.26 mg/kg dwt	2.524 mg/kg dwt	0.5	EUSES 2.2.0
Marine water sediment	0.126 mg/kg dwt	0.252 mg/kg dwt	0.5	EUSES 2.2.0
Sewage treatment plant	2.496 mg/l	200 mg/l	0.01	EUSES 2.2.0
Soil	0.029 mg/kg dwt	0.206 mg/kg dwt	0.14	EUSES 2.2.0

Release estimation	Release route	Release rate	Release estimation method
Release estimation	Water	5 kg/day	
Release estimation	Air	1 kg/day	
Release estimation	soil	0 kg/day	

2.3.2. Worker exposure Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	1.37 mg/kg bw/day	0.116	Measured data
Inhalation - Long-term - systemic effects	0.5 mg/m³	0.06	Measured data
Sum RCR - Long-term - systemic effects		0.176	
Inhalation - Acute - systemic effects	2 mg/m³	0.024	Measured data
Sum RCR - Acute - systemic effects		0.024	

2.3.3. Worker exposure Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	0.69 mg/kg bw/day	0.058	Measured data
Inhalation - Long-term - systemic effects	1 mg/m³	0.12	Measured data
Sum RCR - Long-term - systemic effects		0.178	
Inhalation - Acute - systemic effects	4 mg/m³	0.049	Measured data
Sum RCR - Acute - systemic effects		0.049	

2.3.4. Worker exposure Chemical production where opportunity for exposure arises (PROC4)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	1.372 mg/kg bw/day	0.116	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.718	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

2.3.5. Worker exposure Mixing or blending in batch processes (PROC5)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.834	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

2.3.6. Worker exposure Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC8a)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.834	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

2.3.7. Worker exposure Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC8b)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	Measured data
Inhalation - Long-term - systemic effects	1 mg/m³	0.12	Measured data
Sum RCR - Long-term - systemic effects		0.352	
Inhalation - Acute - systemic effects	4 mg/m³	0.049	Measured data

Information for contributing exposure scenario			
Sum RCR - Acute - systemic effects		0.049	

2.3.8. Worker exposure Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	1.372 mg/kg bw/day	0.116	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.718	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

2.3.9. Worker exposure Tabletting, compression, extrusion, pelettisation, granulation (PROC14)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	3.43 mg/kg bw/day	0.291	Measured data
Inhalation - Long-term - systemic effects	1 mg/m³	0.12	Measured data
Sum RCR - Long-term - systemic effects		0.411	
Inhalation - Acute - systemic effects	4 mg/m³	0.049	Measured data
Sum RCR - Acute - systemic effects		0.049	

2.3.10. Worker exposure Use as laboratory reagent (PROC15)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	0.34 mg/kg bw/day	0.029	Measured data
Inhalation - Long-term - systemic effects	0.5 mg/m³	0.06	Measured data
Sum RCR - Long-term - systemic effects		0.089	
Inhalation - Acute - systemic effects	2 mg/m³	0.024	Measured data
Sum RCR - Acute - systemic effects		0.024	

2.3.11. Worker exposure Manual activities involving hand contact (PROC19)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	7.072 mg/kg bw/day	0.599	Measured data
Inhalation - Long-term - systemic effects	3 mg/m³	0.361	Measured data
Sum RCR - Long-term - systemic effects		0.96	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

2.3.12. Worker exposure Manual maintenance (cleaning and repair) of machinery (PROC28)

Information for contributing exposure scenario			
Exposure estimate: PROC 8a, TRA Workers v3.1			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	TRA Workers v3.1
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	TRA Workers v3.1

Information for contributing exposure scenario			
Sum RCR - Long-term - systemic effects		0.834	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	TRA Workers v3.1
Sum RCR - Acute - systemic effects		0.243	

2.4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

2.4.1. Environment

No data available

2.4.2. Health

Guidance - Health	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Contact supplier if guidance is required

3. ES 3 - ES 3 Use at industrial sites- Use as intermediate for resins (reacted melamine)

3.1. Title section

ES 3 Use at industrial sites- Use as intermediate for resins (reacted melamine)	
ES Ref.: ES 3 ES Type: Worker	

Environment		Use descriptors
CS 1	Use of intermediate, Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article)	ERC6a, ERC6c

Worker		Use descriptors
CS 2	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions	PROC1
CS 3	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions	PROC2
CS 4	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	PROC3
CS 5	Chemical production where opportunity for exposure arises	PROC4
CS 6	Mixing or blending in batch processes	PROC5
CS 7	Calendering operations	PROC6
CS 8	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities	PROC8a
CS 9	Transfer of substance or mixture (charging and discharging) at dedicated facilities	PROC8b
CS 10	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	PROC9
CS 11	Tabletting, compression, extrusion, pelettisation, granulation	PROC14
CS 13	Use as laboratory reagent	PROC15
CS 14	Manual maintenance (cleaning and repair) of machinery	PROC28

3.2. Conditions of use affecting exposure

3.2.1. Control of environmental exposure: Use of intermediate, Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article) (ERC6a, ERC6c)

ERC6a	Use of intermediate

ERC6c	Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article)

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %

Conditions and measures related to sewage treatment plant	
Municipal Sewage Treatment Plant	0.169 % effectiveness water
Assumed domestic sewage treatment plant flow	≥ 2000 m³/d
Controlled application of sewage sludge to agricultural soil	

Other conditions affecting environmental exposure	
Receiving surface water flow (m³/day):	≥ 18000 m³/d

3.2.2. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

3.2.3. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Product (article) characteristics	
Physical form of product	Solid

Product (article) characteristics	
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

3.2.4. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

3.2.5. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

PROC4	Chemical production where opportunity for exposure arises

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %

Product (article) characteristics	
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

3.2.6. Control of worker exposure: Mixing or blending in batch processes (PROC5)

PROC5	Mixing or blending in batch processes

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

3.2.7. Control of worker exposure: Calendering operations (PROC6)

PROC6	Calendering operations

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Efficiency of at least:	90 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

3.2.8. Control of worker exposure: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC8a)

PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	

Technical and organisational conditions and measures	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

3.2.9. Control of worker exposure: Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC8b)

PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

3.2.10. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

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

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

3.2.11. Control of worker exposure: Tabletting, compression, extrusion, pelettisation, granulation (PROC14)

PROC14	Tabletting, compression, extrusion, pelettisation, granulation

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

3.2.12. Control of worker exposure: Use as laboratory reagent (PROC15)

PROC15	Use as laboratory reagent

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

3.2.13. Control of worker exposure: Manual maintenance (cleaning and repair) of machinery (PROC28)

PROC28	Manual maintenance (cleaning and repair) of machinery

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

3.3. Exposure estimation and reference to its source

3.3.1. Environmental release and exposure Use of intermediate, Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article) (ERC6a, ERC6c)

Protection target	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	0.155 mg/l	0.51 mg/l	0.3	EUSES 2.2.0
Marine water	0.0155 mg/l	0.051 mg/l	0.3	EUSES 2.2.0
Secondary poisoning			0.02	EUSES 2.2.0
Freshwater sediment	0.766 mg/kg dwt	2.524 mg/kg dwt	0.3	EUSES 2.2.0
Marine water sediment	0.077 mg/kg dwt	0.252 mg/kg dwt	0.3	EUSES 2.2.0
Sewage treatment plant	1.497 mg/l	200 mg/l	< 0.01	EUSES 2.2.0
Soil	0.017 mg/kg dwt	0.206 mg/kg dwt	0.08	EUSES 2.2.0

Release estimation	Release route	Release rate	Release estimation method
Release estimation	Water	3 kg/day	
Release estimation	Air	0.5 kg/day	
Release estimation	soil	0 kg/day	

3.3.2. Worker exposure Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	0.034 mg/kg bw/day	< 0.01	Measured data
Inhalation - Long-term - systemic effects	0.01 mg/m³	< 0.01	Measured data
Sum RCR - Long-term - systemic effects		< 0.02	
Inhalation - Acute - systemic effects	0.04 mg/m³	< 0.01	Measured data
Sum RCR - Acute - systemic effects		< 0.01	

3.3.3. Worker exposure Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	1.37 mg/kg bw/day	0.116	Measured data
Inhalation - Long-term - systemic effects	0.5 mg/m³	0.06	Measured data
Sum RCR - Long-term - systemic effects		0.176	
Inhalation - Acute - systemic effects	2 mg/m³	0.024	Measured data
Sum RCR - Acute - systemic effects		0.024	

3.3.4. Worker exposure Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	0.69 mg/kg bw/day	0.058	Measured data
Inhalation - Long-term - systemic effects	1 mg/m³	0.12	Measured data
Sum RCR - Long-term - systemic effects		0.178	
Inhalation - Acute - systemic effects	4 mg/m³	0.049	Measured data
Sum RCR - Acute - systemic effects		0.049	

3.3.5. Worker exposure Chemical production where opportunity for exposure arises (PROC4)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	1.372 mg/kg bw/day	0.116	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.718	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

3.3.6. Worker exposure Mixing or blending in batch processes (PROC5)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.834	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

3.3.7. Worker exposure Calendering operations (PROC6)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.743 mg/kg bw/day	0.232	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.834	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

3.3.8. Worker exposure Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC8a)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.834	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data

Information for contributing exposure scenario			
Sum RCR - Acute - systemic effects		0.243	

3.3.9. Worker exposure Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC8b)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	Measured data
Inhalation - Long-term - systemic effects	1 mg/m³	0.12	Measured data
Sum RCR - Long-term - systemic effects		0.352	
Inhalation - Acute - systemic effects	4 mg/m³	0.049	Measured data
Sum RCR - Acute - systemic effects		0.049	

3.3.10. Worker exposure Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	1.372 mg/kg bw/day	0.116	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.718	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

3.3.11. Worker exposure Tabletting, compression, extrusion, pelettisation, granulation (PROC14)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	3.43 mg/kg bw/day	0.291	Measured data
Inhalation - Long-term - systemic effects	1 mg/m³	0.12	Measured data
Sum RCR - Long-term - systemic effects		0.411	
Inhalation - Acute - systemic effects	4 mg/m³	0.049	Measured data
Sum RCR - Acute - systemic effects		0.049	

3.3.12. Worker exposure Use as laboratory reagent (PROC15)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	0.34 mg/kg bw/day	0.029	Measured data
Inhalation - Long-term - systemic effects	0.5 mg/m³	0.06	Measured data
Sum RCR - Long-term - systemic effects		0.089	
Inhalation - Acute - systemic effects	2 mg/m³	0.024	Measured data
Sum RCR - Acute - systemic effects		0.024	

3.3.13. Worker exposure Manual maintenance (cleaning and repair) of machinery (PROC28)

Information for contributing exposure scenario			
Exposure estimate: PROC 8a, TRA Workers v3.1			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	TRA Workers v3.1
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	TRA Workers v3.1

Information for contributing exposure scenario			
Sum RCR - Long-term - systemic effects		0.834	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	TRA Workers v3.1
Sum RCR - Acute - systemic effects		0.243	

3.4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

3.4.1. Environment

No data available

3.4.2. Health

Guidance - Health	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Contact supplier if guidance is required

4. ES 4 - ES 4 Use at industrial sites- Use of resins with unreacted residual melamine

4.1. Title section

ES 4 Use at industrial sites- Use of resins with unreacted residual melamine	
ES Ref.: ES 4 ES Type: Worker	

Environment		Use descriptors
CS 1	Use at industrial site leading to inclusion into/onto article	ERC5

Worker		Use descriptors
CS 2	Handling of liquids at high pressure resulting in substantial generation of mist or spray/haze	PROC7
CS 3	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities	PROC8a
CS 4	Transfer of substance or mixture (charging and discharging) at dedicated facilities	PROC8b
CS 5	Handling of liquids on large surfaces or large work pieces	PROC10
CS 6	Handling of liquids using low pressure, low speed or on medium-sized surfaces	PROC19
CS 7	Manual maintenance (cleaning and repair) of machinery	PROC28

4.2. Conditions of use affecting exposure

4.2.1. Control of environmental exposure: Use at industrial site leading to inclusion into/onto article (ERC5)

ERC5	Use at industrial site leading to inclusion into/onto article

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %

Conditions and measures related to sewage treatment plant	
Municipal Sewage Treatment Plant	0.169 % effectiveness water
Assumed domestic sewage treatment plant flow	≥ 2000 m³/d
Controlled application of sewage sludge to agricultural soil	

Other conditions affecting environmental exposure	
Receiving surface water flow (m³/day):	≥ 18000 m³/d

4.2.2. Control of worker exposure: Handling of liquids at high pressure resulting in substantial generation of mist or spray/haze (PROC7)

PROC7	Industrial spraying

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 5 %

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Mechanical ventilation	
Task is followed by a period of evaporation, drying or curing	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	
Ensure regular inspection, cleaning and maintenance of equipment and machines.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C
Use in room with a volume of minimum 100 m3.	100 - 1000 m3
Distance to task: In the breathing zone of the worker (<1 meter)	< 1 m distance head-product

4.2.3. Control of worker exposure: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC8a)

PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 5 %

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

4.2.4. Control of worker exposure: Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC8b)

PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 5 %

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

4.2.5. Control of worker exposure: Handling of liquids on large surfaces or large work pieces (PROC10)

PROC10	Roller application or brushing

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 5 %

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Task is followed by a period of evaporation, drying or curing	
Mechanical ventilation	
Ensure regular inspection, cleaning and maintenance of equipment and machines.	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Use in room with a volume of minimum 100 m3.	100 - 1000 m3
Indoor use	

Other conditions affecting workers exposure	
Assumes process temperature up to	40 °C
Distance to task: In the breathing zone of the worker (<1 meter)	< 1 m distance head-product

4.2.6. Control of worker exposure: Handling of liquids using low pressure, low speed or on medium-sized surfaces (PROC19)

PROC19	Manual activities involving hand contact

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 5 %

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Task is followed by a period of evaporation, drying or curing	
Mechanical ventilation	
Ensure regular inspection, cleaning and maintenance of equipment and machines.	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Use in room with a volume of minimum 100 m3.	100 - 1000 m3
Indoor use	
Assumes process temperature up to	40 °C
Distance to task: In the breathing zone of the worker (<1 meter)	< 1 m distance head-product

4.2.7. Control of worker exposure: Manual maintenance (cleaning and repair) of machinery (PROC28)

PROC28	Manual maintenance (cleaning and repair) of machinery

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 5 %

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

4.3. Exposure estimation and reference to its source

4.3.1. Environmental release and exposure Use at industrial site leading to inclusion into/onto article (ERC5)

Protection target	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	0.03 mg/l	0.51 mg/l	0.06	EUSES 2.2.0
Marine water	0.003 mg/l	0.051 mg/l	0.06	EUSES 2.2.0
Secondary poisoning			< 0.01	EUSES 2.2.0
Freshwater sediment	0.148 mg/kg dwt	2.524 mg/kg dwt	0.06	EUSES 2.2.0
Marine water sediment	0.015 mg/kg dwt	0.252 mg/kg dwt	0.06	EUSES 2.2.0
Sewage treatment plant	0.25 mg/l	200 mg/l	< 0.01	EUSES 2.2.0
Soil	0.0022 mg/kg dwt	0.206 mg/kg dwt	0.01	EUSES 2.2.0

Release estimation	Release route	Release rate	Release estimation method
Release estimation	Water	0.5 kg/day	
Release estimation	Air	0 kg/day	
Release estimation	soil	0 kg/day	

4.3.2. Worker exposure Handling of liquids at high pressure resulting in substantial generation of mist or spray/haze (PROC7)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	1.714 mg/kg bw/day	0.145	Measured data
Inhalation - Long-term - systemic effects	2.43 mg/m³	0.293	Stoffenmanager v8
Sum RCR - Long-term - systemic effects		0.438	
Inhalation - Acute - systemic effects	2.43 mg/m³	0.03	Stoffenmanager v8
Sum RCR - Acute - systemic effects		0.03	

4.3.3. Worker exposure Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC8a)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.74 mg/kg bw/day	0.232	Measured data
Inhalation - Long-term - systemic effects	0.105 mg/m³	0.013	Measured data
Sum RCR - Long-term - systemic effects		0.245	
Inhalation - Acute - systemic effects	0.105 mg/m³	< 0.01	Measured data
Sum RCR - Acute - systemic effects		< 0.01	

4.3.4. Worker exposure Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC8b)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.74 mg/kg bw/day	0.232	Measured data
Inhalation - Long-term - systemic effects	0.105 mg/m³	0.013	Measured data
Sum RCR - Long-term - systemic effects		0.245	
Inhalation - Acute - systemic effects	0.105 mg/m³	< 0.01	Measured data
Sum RCR - Acute - systemic effects		< 0.01	

4.3.5. Worker exposure Handling of liquids on large surfaces or large work pieces (PROC10)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	5.486 mg/kg bw/day	0.465	Measured data
Inhalation - Long-term - systemic effects	1.1 mg/m³	0.133	Stoffenmanager v8
Sum RCR - Long-term - systemic effects		0.598	
Inhalation - Acute - systemic effects	1.1 mg/m³	0.013	Stoffenmanager v8
Sum RCR - Acute - systemic effects		0.013	

4.3.6. Worker exposure Handling of liquids using low pressure, low speed or on medium-sized surfaces (PROC19)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	5.657 mg/kg bw/day	0.479	Measured data
Inhalation - Long-term - systemic effects	0.53 mg/m³	0.064	Stoffenmanager v8
Sum RCR - Long-term - systemic effects		0.543	
Inhalation - Acute - systemic effects	0.53 mg/m³	< 0.01	Stoffenmanager v8
Sum RCR - Acute - systemic effects		< 0.01	

4.3.7. Worker exposure Manual maintenance (cleaning and repair) of machinery (PROC28)

Information for contributing exposure scenario			
Exposure estimate: PROC 8a, TRA Workers v3.1			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.74 mg/kg bw/day	0.232	TRA Workers v3.1
Inhalation - Long-term - systemic effects	0.105 mg/m³	0.013	TRA Workers v3.1
Sum RCR - Long-term - systemic effects		0.245	
Inhalation - Acute - systemic effects	0.105 mg/m³	< 0.01	TRA Workers v3.1
Sum RCR - Acute - systemic effects		< 0.01	

4.4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.4.1. Environment

No data available

4.4.2. Health

Guidance - Health	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Contact supplier if guidance is required

5. ES 5 - ES 5 Use at industrial sites- Use as intermediate for the production of other substances e.g. melamine salt (reacted melamine)

5.1. Title section

ES 5 Use at industrial sites- Use as intermediate for the production of other substances e.g. melamine salt (reacted melamine)	
ES Ref.: ES 5 ES Type: Worker	

Environment		Use descriptors
CS 1	Use of intermediate	ERC6a

Worker		Use descriptors
CS 2	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions	PROC1
CS 3	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions	PROC2
CS 4	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	PROC3
CS 5	Chemical production where opportunity for exposure arises	PROC4
CS 6	Mixing or blending in batch processes	PROC5
CS 7	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities	PROC8a
CS 8	Transfer of substance or mixture (charging and discharging) at dedicated facilities	PROC8b
CS 9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	PROC9
CS 10	Use as laboratory reagent	PROC15
CS 11	Manual maintenance (cleaning and repair) of machinery	PROC28

5.2. Conditions of use affecting exposure

5.2.1. Control of environmental exposure: Use of intermediate (ERC6a)

ERC6a	Use of intermediate

Conditions and measures related to sewage treatment plant	
Municipal Sewage Treatment Plant	0.169 % effectiveness water
Assumed domestic sewage treatment plant flow	≥ 2000 m³/d

Conditions and measures related to sewage treatment plant	
Controlled application of sewage sludge to agricultural soil	

Other conditions affecting environmental exposure	
Receiving surface water flow (m³/day):	≥ 18000 m³/d

5.2.2. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

5.2.3. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	

Technical and organisational conditions and measures	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

5.2.4. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

5.2.5. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

PROC4	Chemical production where opportunity for exposure arises

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

5.2.6. Control of worker exposure: Mixing or blending in batch processes (PROC5)

PROC5	Mixing or blending in batch processes

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

5.2.7. Control of worker exposure: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC8a)

PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

5.2.8. Control of worker exposure: Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC8b)

PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	

Other conditions affecting workers exposure	
Assumes process temperature up to	40 °C

5.2.9. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

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

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

5.2.10. Control of worker exposure: Use as laboratory reagent (PROC15)

PROC15	Use as laboratory reagent

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	

Technical and organisational conditions and measures	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

5.2.11. Control of worker exposure: Manual maintenance (cleaning and repair) of machinery (PROC28)

PROC28	Manual maintenance (cleaning and repair) of machinery

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

5.3. Exposure estimation and reference to its source

5.3.1. Environmental release and exposure Use of intermediate (ERC6a)

Protection target	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	0.155 mg/l	0.51 mg/l	0.3	EUSES 2.2.0
Marine water	0.0155 mg/l	0.051 mg/l	0.3	EUSES 2.2.0
Secondary poisoning			< 0.02	EUSES 2.2.0
Freshwater sediment	0.766 mg/kg dwt	2.524 mg/kg dwt	0.3	EUSES 2.2.0
Marine water sediment	0.077 mg/kg dwt	0.252 mg/kg dwt	0.3	EUSES 2.2.0
Sewage treatment plant	1.497 mg/l	200 mg/l	< 0.01	EUSES 2.2.0

Protection target	Exposure estimation	PNEC	RCR	Assessment method
Soil	0.017 mg/kg dwt	0.206 mg/kg dwt	0.08	EUSES 2.2.0

Release estimation	Release route	Release rate	Release estimation method
Release estimation	Water	3 kg/day	
Release estimation	Air	0.5 kg/day	
Release estimation	soil	0 kg/day	

5.3.2. Worker exposure Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	0.034 mg/kg bw/day	< 0.01	Measured data
Inhalation - Long-term - systemic effects	0.01 mg/m³	< 0.01	Measured data
Sum RCR - Long-term - systemic effects		< 0.02	
Inhalation - Acute - systemic effects	0.04 mg/m³	< 0.01	Measured data
Sum RCR - Acute - systemic effects		< 0.01	

5.3.3. Worker exposure Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	1.37 mg/kg bw/day	0.116	Measured data
Inhalation - Long-term - systemic effects	0.5 mg/m³	0.06	Measured data
Sum RCR - Long-term - systemic effects		0.176	
Inhalation - Acute - systemic effects	2 mg/m³	0.024	Measured data
Sum RCR - Acute - systemic effects		0.024	

5.3.4. Worker exposure Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	0.69 mg/kg bw/day	0.058	Measured data
Inhalation - Long-term - systemic effects	1 mg/m³	0.12	Measured data
Sum RCR - Long-term - systemic effects		0.178	
Inhalation - Acute - systemic effects	4 mg/m³	0.049	Measured data
Sum RCR - Acute - systemic effects		0.049	

5.3.5. Worker exposure Chemical production where opportunity for exposure arises (PROC4)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	1.372 mg/kg bw/day	0.116	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.718	

Information for contributing exposure scenario			
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

5.3.6. Worker exposure Mixing or blending in batch processes (PROC5)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.834	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

5.3.7. Worker exposure Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC8a)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.834	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

5.3.8. Worker exposure Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC8b)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	Measured data
Inhalation - Long-term - systemic effects	1 mg/m³	0.12	Measured data
Sum RCR - Long-term - systemic effects		0.352	
Inhalation - Acute - systemic effects	4 mg/m³	0.049	Measured data
Sum RCR - Acute - systemic effects		0.049	

5.3.9. Worker exposure Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	1.372 mg/kg bw/day	0.116	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.718	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

5.3.10. Worker exposure Use as laboratory reagent (PROC15)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	0.34 mg/kg bw/day	0.029	Measured data
Inhalation - Long-term - systemic effects	0.5 mg/m³	0.06	Measured data

Information for contributing exposure scenario			
Sum RCR - Long-term - systemic effects		0.089	
Inhalation - Acute - systemic effects	2 mg/m³	0.024	Measured data
Sum RCR - Acute - systemic effects		0.024	

5.3.11. Worker exposure Manual maintenance (cleaning and repair) of machinery (PROC28)

Information for contributing exposure scenario			
Exposure estimate: PROC 8a, TRA Workers v3.1			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	TRA Workers v3.1
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	TRA Workers v3.1
Sum RCR - Long-term - systemic effects		0.834	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	TRA Workers v3.1
Sum RCR - Acute - systemic effects		0.243	

5.4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

5.4.1. Environment

No data available

5.4.2. Health

Guidance - Health	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Contact supplier if guidance is required

6. ES 6 - ES 6 Use at industrial sites - Use as additive in foams

6.1. Title section

ES 6 Use at industrial sites - Use as additive in foams	
ES Ref.: ES 6 ES Type: Worker	

Environment		Use descriptors
CS 1	Use at industrial site leading to inclusion into/onto article	ERC5

Worker		Use descriptors
CS 2	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions	PROC1
CS 3	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions	PROC2
CS 4	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	PROC3
CS 5	Chemical production where opportunity for exposure arises	PROC4
CS 6	Mixing or blending in batch processes	PROC5
CS 7	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities	PROC8a
CS 8	Transfer of substance or mixture (charging and discharging) at dedicated facilities	PROC8b
CS 9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	PROC9
CS 10	Use as laboratory reagent	PROC15
CS 11	Manual activities involving hand contact	PROC19
CS 12	Manual maintenance (cleaning and repair) of machinery	PROC28

6.2. Conditions of use affecting exposure

6.2.1. Control of environmental exposure: Use at industrial site leading to inclusion into/onto article (ERC5)

ERC5	Use at industrial site leading to inclusion into/onto article

Conditions and measures related to sewage treatment plant	
Municipal Sewage Treatment Plant	0.169 % effectiveness water
Assumed domestic sewage treatment plant flow	≥ 2000 m³/d

Conditions and measures related to sewage treatment plant	
Controlled application of sewage sludge to agricultural soil	

Other conditions affecting environmental exposure	
Receiving surface water flow (m³/day):	≥ 18000 m³/d

6.2.2. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

6.2.3. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	

Technical and organisational conditions and measures	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

6.2.4. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

6.2.5. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

PROC4	Chemical production where opportunity for exposure arises

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

6.2.6. Control of worker exposure: Mixing or blending in batch processes (PROC5)

PROC5	Mixing or blending in batch processes

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

6.2.7. Control of worker exposure: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC8a)

PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

6.2.8. Control of worker exposure: Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC8b)

PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	

Other conditions affecting workers exposure	
Assumes process temperature up to	40 °C

6.2.9. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

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

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

6.2.10. Control of worker exposure: Use as laboratory reagent (PROC15)

PROC15	Use as laboratory reagent

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	

Technical and organisational conditions and measures	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

6.2.11. Control of worker exposure: Manual activities involving hand contact (PROC19)

PROC19	Manual activities involving hand contact

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Avoid carrying out operation for more than 4 hours,Covers exposure up to:	≤ 4 h/day

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Efficiency of at least:	95 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

6.2.12. Control of worker exposure: Manual maintenance (cleaning and repair) of machinery (PROC28)

PROC28	Manual maintenance (cleaning and repair) of machinery

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

6.3. Exposure estimation and reference to its source

6.3.1. Environmental release and exposure Use at industrial site leading to inclusion into/onto article (ERC5)

Protection target	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	0.155 mg/l	0.51 mg/l	0.3	EUSES 2.2.0
Marine water	0.0155 mg/l	0.051 mg/l	0.3	EUSES 2.2.0
Secondary poisoning			0.02	EUSES 2.2.0
Freshwater sediment	0.766 mg/kg dwt	2.524 mg/kg dwt	0.3	EUSES 2.2.0
Marine water sediment	0.077 mg/kg dwt	0.252 mg/kg dwt	0.3	EUSES 2.2.0
Sewage treatment plant	1.497 mg/l	200 mg/l	< 0.01	EUSES 2.2.0
Soil	0.017 mg/kg dwt	0.206 mg/kg dwt	0.08	EUSES 2.2.0

Release estimation	Release route	Release rate	Release estimation method
Release estimation	Water	3 kg/day	
Release estimation	Air	0.5 kg/day	
Release estimation	soil	0 kg/day	

6.3.2. Worker exposure Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	0.034 mg/kg bw/day	< 0.01	Measured data
Inhalation - Long-term - systemic effects	0.01 mg/m³	< 0.01	Measured data
Sum RCR - Long-term - systemic effects		< 0.02	
Inhalation - Acute - systemic effects	0.04 mg/m³	< 0.01	Measured data
Sum RCR - Acute - systemic effects		< 0.01	

6.3.3. Worker exposure Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	1.37 mg/kg bw/day	0.116	Measured data
Inhalation - Long-term - systemic effects	0.5 mg/m³	0.06	Measured data
Sum RCR - Long-term - systemic effects		0.176	
Inhalation - Acute - systemic effects	2 mg/m³	0.024	Measured data
Sum RCR - Acute - systemic effects		0.024	

6.3.4. Worker exposure Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	0.69 mg/kg bw/day	0.058	Measured data
Inhalation - Long-term - systemic effects	1 mg/m³	0.12	Measured data
Sum RCR - Long-term - systemic effects		0.178	
Inhalation - Acute - systemic effects	4 mg/m³	0.049	Measured data
Sum RCR - Acute - systemic effects		0.049	

6.3.5. Worker exposure Chemical production where opportunity for exposure arises (PROC4)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	1.372 mg/kg bw/day	0.116	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.718	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

6.3.6. Worker exposure Mixing or blending in batch processes (PROC5)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.834	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

6.3.7. Worker exposure Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC8a)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.834	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data

Information for contributing exposure scenario			
Sum RCR - Acute - systemic effects		0.243	

6.3.8. Worker exposure Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC8b)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	Measured data
Inhalation - Long-term - systemic effects	1 mg/m³	0.12	Measured data
Sum RCR - Long-term - systemic effects		0.352	
Inhalation - Acute - systemic effects	4 mg/m³	0.049	Measured data
Sum RCR - Acute - systemic effects		0.049	

6.3.9. Worker exposure Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	1.372 mg/kg bw/day	0.116	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.718	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

6.3.10. Worker exposure Use as laboratory reagent (PROC15)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	0.34 mg/kg bw/day	0.029	Measured data
Inhalation - Long-term - systemic effects	0.5 mg/m³	0.06	Measured data
Sum RCR - Long-term - systemic effects		0.089	
Inhalation - Acute - systemic effects	2 mg/m³	0.024	Measured data
Sum RCR - Acute - systemic effects		0.024	

6.3.11. Worker exposure Manual activities involving hand contact (PROC19)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	7.072 mg/kg bw/day	0.599	Measured data
Inhalation - Long-term - systemic effects	3 mg/m³	0.361	Measured data
Sum RCR - Long-term - systemic effects		0.96	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

6.3.12. Worker exposure Manual maintenance (cleaning and repair) of machinery (PROC28)

Information for contributing exposure scenario			
Exposure estimate: PROC 8a, TRA Workers v3.1			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	TRA Workers v3.1
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	TRA Workers v3.1

Information for contributing exposure scenario			
Sum RCR - Long-term - systemic effects		0.834	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	TRA Workers v3.1
Sum RCR - Acute - systemic effects		0.243	

6.4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

6.4.1. Environment

No data available

6.4.2. Health

Guidance - Health	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Contact supplier if guidance is required

7. ES 7 - ES 7 Use at industrial sites - Use as additive in intumescent coatings

7.1. Title section

ES 7 Use at industrial sites - Use as additive in intumescent coatings	
ES Ref.: ES 7 ES Type: Worker	

Environment		Use descriptors
CS 1	Use at industrial site leading to inclusion into/onto article	ERC5

Worker		Use descriptors
CS 2	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	PROC3
CS 3	Chemical production where opportunity for exposure arises	PROC4
CS 4	Mixing or blending in batch processes	PROC5
CS 5	Handling of liquids at high pressure resulting in substantial generation of mist or spray/haze - With LEV	PROC7
CS 6	Handling of liquids at high pressure resulting in substantial generation of mist or spray/haze - Without LEV	PROC7
CS 7	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities	PROC8a
CS 8	Transfer of substance or mixture (charging and discharging) at dedicated facilities	PROC8b
CS 9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	PROC9
CS 10	Handling of liquids on large surfaces or large work pieces	PROC10
CS 11	Treatment of articles by dipping and pouring	PROC13
CS 12	Use as laboratory reagent	PROC15
CS 13	Handling of liquids using low pressure, low speed or on medium-sized surfaces	PROC19
CS 14	Manual maintenance (cleaning and repair) of machinery	PROC28

7.2. Conditions of use affecting exposure

7.2.1. Control of environmental exposure: Use at industrial site leading to inclusion into/onto article (ERC5)

ERC5	Use at industrial site leading to inclusion into/onto article

Conditions and measures related to sewage treatment plant	
Municipal Sewage Treatment Plant	0.169 % effectiveness water
Assumed domestic sewage treatment plant flow	≥ 2000 m³/d
Controlled application of sewage sludge to agricultural soil	

Other conditions affecting environmental exposure	
Receiving surface water flow (m³/day):	≥ 18000 m³/d

7.2.2. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

7.2.3. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

PROC4	Chemical production where opportunity for exposure arises

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	

Technical and organisational conditions and measures	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

7.2.4. Control of worker exposure: Mixing or blending in batch processes (PROC5)

PROC5	Mixing or blending in batch processes

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

7.2.5. Control of worker exposure: Handling of liquids at high pressure resulting in substantial generation of mist or spray/haze - With LEV (PROC7)

PROC7	Industrial spraying

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 30 %

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Task is followed by a period of evaporation, drying or curing	
Mechanical ventilation	
Local exhaust ventilation - efficiency of at least [%]:	95 %
Ensure regular inspection, cleaning and maintenance of equipment and machines.	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Use in room with a volume of minimum 100 m3.	100 - 1000 m3
Indoor use	
Assumes process temperature up to	40 °C
Distance to task: In the breathing zone of the worker (<1 meter)	< 1 m distance head-product

7.2.6. Control of worker exposure: Handling of liquids at high pressure resulting in substantial generation of mist or spray/haze - Without LEV (PROC7)

PROC7	Industrial spraying

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 30 %

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Task is followed by a period of evaporation, drying or curing	
Mechanical ventilation	
Ensure regular inspection, cleaning and maintenance of equipment and machines.	

Technical and organisational conditions and measures	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of	90 % For further specification, refer to section 8 of the SDS.

Other conditions affecting workers exposure	
Use in room with a volume of minimum 100 m3.	100 - 1000 m3
Indoor use	
Assumes process temperature up to	40 °C
Distance to task: In the breathing zone of the worker (<1 meter)	< 1 m distance head-product

7.2.7. Control of worker exposure: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC8a)

PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

7.2.8. Control of worker exposure: Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC8b)

PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

7.2.9. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

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

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

7.2.10. Control of worker exposure: Handling of liquids on large surfaces or large work pieces (PROC10)

PROC10	Roller application or brushing

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 30 %

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Task is followed by a period of evaporation, drying or curing	
Mechanical ventilation	
Ensure regular inspection, cleaning and maintenance of equipment and machines.	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Use in room with a volume of minimum 100 m3.	100 - 1000 m3
Indoor use	
Assumes process temperature up to	40 °C
Distance to task: In the breathing zone of the worker (<1 meter)	< 1 m distance head-product

7.2.11. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

PROC13	Treatment of articles by dipping and pouring

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 30 %

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

7.2.12. Control of worker exposure: Use as laboratory reagent (PROC15)

PROC15	Use as laboratory reagent

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

7.2.13. Control of worker exposure: Handling of liquids using low pressure, low speed or on medium-sized surfaces (PROC19)

PROC19	Manual activities involving hand contact

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 30 %

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Task is followed by a period of evaporation, drying or curing	
Mechanical ventilation	
Ensure regular inspection, cleaning and maintenance of equipment and machines.	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Efficiency of at least:	95 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Use in room with a volume of minimum 100 m3.	100 - 1000 m3
Indoor use	
Assumes process temperature up to	40 °C
Distance to task: In the breathing zone of the worker (<1 meter)	< 1 m distance head-product

7.2.14. Control of worker exposure: Manual maintenance (cleaning and repair) of machinery (PROC28)

PROC28	Manual maintenance (cleaning and repair) of machinery

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

7.3. Exposure estimation and reference to its source

7.3.1. Environmental release and exposure Use at industrial site leading to inclusion into/onto article (ERC5)

Protection target	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	0.155 mg/l	0.51 mg/l	0.3	EUSES 2.2.0
Marine water	0.0155 mg/l	0.051 mg/l	0.3	EUSES 2.2.0
Secondary poisoning			0.02	EUSES 2.2.0
Freshwater sediment	0.766 mg/kg dwt	2.524 mg/kg dwt	0.3	EUSES 2.2.0
Marine water sediment	0.077 mg/kg dwt	0.252 mg/kg dwt	0.3	EUSES 2.2.0
Sewage treatment plant	1.497 mg/l	200 mg/l	< 0.01	EUSES 2.2.0
Soil	0.017 mg/kg dwt	0.206 mg/kg dwt	0.08	EUSES 2.2.0

Release estimation	Release route	Release rate	Release estimation method
Release estimation	Water	3 kg/day	
Release estimation	Air	0.5 kg/day	
Release estimation	soil	0 kg/day	

7.3.2. Worker exposure Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	0.69 mg/kg bw/day	0.058	Measured data
Inhalation - Long-term - systemic effects	1 mg/m³	0.12	Measured data
Sum RCR - Long-term - systemic effects		0.178	
Inhalation - Acute - systemic effects	4 mg/m³	0.049	Measured data
Sum RCR - Acute - systemic effects		0.049	

7.3.3. Worker exposure Chemical production where opportunity for exposure arises (PROC4)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	1.372 mg/kg bw/day	0.116	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.718	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data

Information for contributing exposure scenario			
Sum RCR - Acute - systemic effects		0.243	

7.3.4. Worker exposure Mixing or blending in batch processes (PROC5)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.834	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

7.3.5. Worker exposure Handling of liquids at high pressure resulting in substantial generation of mist or spray/haze - With LEV (PROC7)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	8.572 mg/kg bw/day	0.726	Measured data
Inhalation - Long-term - systemic effects	0.4 mg/m³	0.048	Stoffenmanager v8
Sum RCR - Long-term - systemic effects		0.774	
Inhalation - Acute - systemic effects	0.4 mg/m³	< 0.01	Stoffenmanager v8
Sum RCR - Acute - systemic effects		< 0.01	

7.3.6. Worker exposure Handling of liquids at high pressure resulting in substantial generation of mist or spray/haze - Without LEV (PROC7)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	8.572 mg/kg bw/day	0.726	Measured data
Inhalation - Long-term - systemic effects	0.795 mg/m³	0.096	Stoffenmanager v8
Sum RCR - Long-term - systemic effects		0.822	
Inhalation - Acute - systemic effects	0.795 mg/m³	< 0.01	Stoffenmanager v8
Sum RCR - Acute - systemic effects		< 0.01	

7.3.7. Worker exposure Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC8a)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.834	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

7.3.8. Worker exposure Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC8b)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	Measured data
Inhalation - Long-term - systemic effects	1 mg/m³	0.12	Measured data

Information for contributing exposure scenario			
Sum RCR - Long-term - systemic effects		0.352	
Inhalation - Acute - systemic effects	4 mg/m³	0.049	Measured data
Sum RCR - Acute - systemic effects		0.049	

7.3.9. Worker exposure Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	1.372 mg/kg bw/day	0.116	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.718	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

7.3.10. Worker exposure Handling of liquids on large surfaces or large work pieces (PROC10)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	5.486 mg/kg bw/day	0.465	Measured data
Inhalation - Long-term - systemic effects	3.59 mg/m³	0.433	Stoffenmanager v8
Sum RCR - Long-term - systemic effects		0.898	
Inhalation - Acute - systemic effects	3.59 mg/m³	0.044	Stoffenmanager v8
Sum RCR - Acute - systemic effects		0.044	

7.3.11. Worker exposure Treatment of articles by dipping and pouring (PROC13)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.743 mg/kg bw/day	0.232	TRA Workers v3.1
Inhalation - Long-term - systemic effects	0.525 mg/m³	0.063	TRA Workers v3.1
Sum RCR - Long-term - systemic effects		0.295	
Inhalation - Acute - systemic effects	0.525 mg/m³	< 0.01	TRA Workers v3.1
Sum RCR - Acute - systemic effects		< 0.01	

7.3.12. Worker exposure Use as laboratory reagent (PROC15)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	0.34 mg/kg bw/day	0.029	Measured data
Inhalation - Long-term - systemic effects	0.5 mg/m³	0.06	Measured data
Sum RCR - Long-term - systemic effects		0.089	
Inhalation - Acute - systemic effects	2 mg/m³	0.024	Measured data
Sum RCR - Acute - systemic effects		0.024	

7.3.13. Worker exposure Handling of liquids using low pressure, low speed or on medium-sized surfaces (PROC19)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	7.072 mg/kg bw/day	0.599	Measured data

Information for contributing exposure scenario			
Inhalation - Long-term - systemic effects	1.74 mg/m³	0.21	Stoffenmanager v8
Sum RCR - Long-term - systemic effects		0.809	
Inhalation - Acute - systemic effects	1.74 mg/m³	0.021	Stoffenmanager v8
Sum RCR - Acute - systemic effects		0.021	

7.3.14. Worker exposure Manual maintenance (cleaning and repair) of machinery (PROC28)

Information for contributing exposure scenario			
Exposure estimate: PROC 8a, TRA Workers v3.1			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	TRA Workers v3.1
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	TRA Workers v3.1
Sum RCR - Long-term - systemic effects		0.834	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	TRA Workers v3.1
Sum RCR - Acute - systemic effects		0.243	

7.4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

7.4.1. Environment

No data available

7.4.2. Health

Guidance - Health	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Contact supplier if guidance is required

8. ES 8 - ES 8 Widespread use by professional workers - Use as additive in intumescent coatings

8.1. Title section

ES 8 Widespread use by professional workers - Use as additive in intumescent coatings	
ES Ref.: ES 8 ES Type: Worker	

Environment		Use descriptors
CS 1	Widespread use leading to inclusion into/onto article (indoor), Widespread use leading to inclusion into/onto article (outdoor)	ERC8c, ERC8f

Worker		Use descriptors
CS 2	Mixing or blending in batch processes	PROC5
CS 3	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities	PROC8a
CS 4	Transfer of substance or mixture (charging and discharging) at dedicated facilities	PROC8b
CS 5	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	PROC9
CS 6	Handling of liquids on large surfaces or large work pieces	PROC10
CS 7	Handling of liquids at high pressure resulting in substantial generation of mist or spray/haze	PROC11
CS 8	Treatment of articles by dipping and pouring	PROC13
CS 9	Manual maintenance (cleaning and repair) of machinery	PROC28

8.2. Conditions of use affecting exposure

8.2.1. Control of environmental exposure: Widespread use leading to inclusion into/onto article (indoor), Widespread use leading to inclusion into/onto article (outdoor) (ERC8c, ERC8f)

ERC8c	Widespread use leading to inclusion into/onto article (indoor)
ERC8f	Widespread use leading to inclusion into/onto article (outdoor)

Conditions and measures related to sewage treatment plant	
Municipal Sewage Treatment Plant	0.169 % effectiveness water
Assumed domestic sewage treatment plant flow	≥ 2000 m³/d
Controlled application of sewage sludge to agricultural soil	

Other conditions affecting environmental exposure	
Receiving surface water flow (m³/day):	≥ 18000 m³/d

8.2.2. Control of worker exposure: Mixing or blending in batch processes (PROC5)

PROC5	Mixing or blending in batch processes

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

8.2.3. Control of worker exposure: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC8a)

PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 30 %

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

8.2.4. Control of worker exposure: Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC8b)

PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

8.2.5. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

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

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %

Product (article) characteristics	
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

8.2.6. Control of worker exposure: Handling of liquids on large surfaces or large work pieces (PROC10)

PROC10	Roller application or brushing

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 30 %

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Task is followed by a period of evaporation, drying or curing	
Mechanical ventilation	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Use in room with a volume of minimum 100 m3.	100 - 1000 m3

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C
Distance to task: In the breathing zone of the worker (<1 meter)	< 1 m distance head-product

8.2.7. Control of worker exposure: Handling of liquids at high pressure resulting in substantial generation of mist or spray/haze (PROC11)

PROC11	Non industrial spraying

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 30 %

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Mechanical ventilation	
Task is followed by a period of evaporation, drying or curing	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable respiratory protection. Inhalation - minimum efficiency of	95 % For further specification, refer to section 8 of the SDS.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Efficiency of at least:	90 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C
Use in room with a volume of minimum 100 m3.	100 - 1000 m3
Distance to task: In the breathing zone of the worker (<1 meter)	< 1 m distance head-product

8.2.8. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

PROC13	Treatment of articles by dipping and pouring

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 30 %

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

8.2.9. Control of worker exposure: Manual maintenance (cleaning and repair) of machinery (PROC28)

PROC28	Manual maintenance (cleaning and repair) of machinery

Product (article) characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 30 %

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	

Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Efficiency of at least:	80 % For further specification, refer to section 8 of the SDS.
If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

8.3. Exposure estimation and reference to its source

8.3.1. Environmental release and exposure Widespread use leading to inclusion into/onto article (indoor), Widespread use leading to inclusion into/onto article (outdoor) (ERC8c, ERC8f)

Protection target	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	0.005 mg/l	0.51 mg/l	0.01	EUSES 2.2.0
Marine water	0.0005 mg/l	0.051 mg/l	0.01	EUSES 2.2.0
Secondary poisoning			< 0.01	EUSES 2.2.0
Freshwater sediment	0.025 mg/kg dwt	2.524 mg/kg dwt	0.01	EUSES 2.2.0
Marine water sediment	0.0024 mg/kg dwt	0.252 mg/kg dwt	0.01	EUSES 2.2.0
Sewage treatment plant	< 0 mg/l	200 mg/l	< 0.01	EUSES 2.2.0
Soil	0 mg/kg dwt	0.206 mg/kg dwt	< 0.01	EUSES 2.2.0

Release estimation	Release route	Release rate	Release estimation method
Release estimation	Water	0 kg/day	
Release estimation	Air	0 kg/day	
Release estimation	soil	0 kg/day	

8.3.2. Worker exposure Mixing or blending in batch processes (PROC5)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.834	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

8.3.3. Worker exposure Transfer of substance or mixture (charging and discharging) at non-dedicated facilities (PROC8a)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.743 mg/kg bw/day	0.232	TRA Workers v3.1
Inhalation - Long-term - systemic effects	0.525 mg/m³	0.063	TRA Workers v3.1
Sum RCR - Long-term - systemic effects		0.295	
Inhalation - Acute - systemic effects	0.525 mg/m³	< 0.01	TRA Workers v3.1
Sum RCR - Acute - systemic effects		< 0.01	

8.3.4. Worker exposure Transfer of substance or mixture (charging and discharging) at dedicated facilities (PROC8b)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.742 mg/kg bw/day	0.232	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.834	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

8.3.5. Worker exposure Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	1.372 mg/kg bw/day	0.116	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.718	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

8.3.6. Worker exposure Handling of liquids on large surfaces or large work pieces (PROC10)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	5.486 mg/kg bw/day	0.465	Measured data
Inhalation - Long-term - systemic effects	3.61 mg/m³	0.435	Stoffenmanager v8
Sum RCR - Long-term - systemic effects		0.9	
Inhalation - Acute - systemic effects	3.61 mg/m³	0.044	Stoffenmanager v8
Sum RCR - Acute - systemic effects		0.044	

8.3.7. Worker exposure Handling of liquids at high pressure resulting in substantial generation of mist or spray/haze (PROC11)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	10.71 mg/kg bw/day	0.908	Measured data
Inhalation - Long-term - systemic effects	0.398 mg/m³	0.048	Stoffenmanager v8
Sum RCR - Long-term - systemic effects		0.956	
Inhalation - Acute - systemic effects	0.398 mg/m³	< 0.01	Stoffenmanager v8
Sum RCR - Acute - systemic effects		< 0.01	

8.3.8. Worker exposure Treatment of articles by dipping and pouring (PROC13)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.743 mg/kg bw/day	0.232	TRA Workers v3.1
Inhalation - Long-term - systemic effects	0.525 mg/m³	0.063	TRA Workers v3.1
Sum RCR - Long-term - systemic effects		0.295	
Inhalation - Acute - systemic effects	0.525 mg/m³	< 0.01	TRA Workers v3.1
Sum RCR - Acute - systemic effects		< 0.01	

8.3.9. Worker exposure Manual maintenance (cleaning and repair) of machinery (PROC28)

Information for contributing exposure scenario			
Exposure estimate: PROC 8a, TRA Workers v3.1			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.743 mg/kg bw/day	0.232	TRA Workers v3.1
Inhalation - Long-term - systemic effects	0.525 mg/m³	0.063	TRA Workers v3.1
Sum RCR - Long-term - systemic effects		0.295	
Inhalation - Acute - systemic effects	0.525 mg/m³	< 0.01	TRA Workers v3.1

Information for contributing exposure scenario			
Sum RCR - Acute - systemic effects		< 0.01	

8.4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

8.4.1. Environment

No data available

8.4.2. Health

Guidance - Health	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Contact supplier if guidance is required

9. ES 9 - ES 9 Service life - workers - PU foams - Workers (industrial)

9.1. Title section

ES 9 Service life - workers - PU foams - Workers (industrial)	
ES Ref.: ES 9 ES Type: Worker	

Environment		Use descriptors
CS 1	Processing of articles at industrial sites with low release	ERC12a

Worker		Use descriptors
CS 2	Low energy manipulation and handling of substances bound in/on materials or articles	PROC21
CS 2	High (mechanical) energy work-up of substances bound in/on materials and/or articles	PROC24

9.2. Conditions of use affecting exposure

9.2.1. Control of environmental exposure: Processing of articles at industrial sites with low release (ERC12a)

ERC12a	Processing of articles at industrial sites with low release

Conditions and measures related to sewage treatment plant	
Municipal Sewage Treatment Plant	0.169 % effectiveness water
Assumed domestic sewage treatment plant flow	≥ 2000 m³/d
Controlled application of sewage sludge to agricultural soil	

Other conditions affecting environmental exposure	
Receiving surface water flow (m³/day):	≥ 18000 m³/d

9.2.2. Control of worker exposure: Low energy manipulation and handling of substances bound in/on materials or articles (PROC21)

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

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

9.2.3. Control of worker exposure: High (mechanical) energy work-up of substances bound in/on materials and/or articles (PROC24)

PROC24	High (mechanical) energy work-up of substances bound in/on materials and/or articles

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

9.3. Exposure estimation and reference to its source

9.3.1. Environmental release and exposure Processing of articles at industrial sites with low release (ERC12a)

Protection target	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	0.005 mg/l	0.51 mg/l	0.01	EUSES 2.2.0
Marine water	0.0005 mg/l	0.051 mg/l	0.01	EUSES 2.2.0
Secondary poisoning			< 0.01	EUSES 2.2.0
Freshwater sediment	0.025 mg/kg dwt	2.524 mg/kg dwt	0.01	EUSES 2.2.0
Marine water sediment	0.0024 mg/kg dwt	0.252 mg/kg dwt	0.01	EUSES 2.2.0
Sewage treatment plant	0 mg/l	200 mg/l	< 0.01	EUSES 2.2.0
Soil	0 mg/kg dwt	0.206 mg/kg dwt	< 0.01	EUSES 2.2.0

Release estimation	Release route	Release rate	Release estimation method
Release estimation	Water	0 kg/day	
Release estimation	Air	0 kg/day	

Release estimation	Release route	Release rate	Release estimation method
Release estimation	soil	0 kg/day	

9.3.2. Worker exposure Low energy manipulation and handling of substances bound in/on materials or articles (PROC21)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.83 mg/kg bw/day	0.24	Measured data
Inhalation - Long-term - systemic effects	3 mg/m³	0.361	Measured data
Sum RCR - Long-term - systemic effects		0.601	
Inhalation - Acute - systemic effects	12 mg/m³	0.146	Measured data
Sum RCR - Acute - systemic effects		0.146	

9.3.3. Worker exposure High (mechanical) energy work-up of substances bound in/on materials and/or articles (PROC24)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.83 mg/kg bw/day	0.24	Measured data
Inhalation - Long-term - systemic effects	1 mg/m³	0.12	Measured data
Sum RCR - Long-term - systemic effects		0.36	
Inhalation - Acute - systemic effects	4 mg/m³	0.049	Measured data
Sum RCR - Acute - systemic effects		0.049	

9.4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

9.4.1. Environment

No data available

9.4.2. Health

Guidance - Health	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Contact supplier if guidance is required

10. ES 10 - ES 10 Service life - workers - Intumescent coatings - Workers (industrial)

10.1. Title section

ES 10 Service life - workers - Intumescent coatings - Workers (industrial)	
ES Ref.: ES 10 ES Type: Worker	

Environment		Use descriptors
CS 1	Processing of articles at industrial sites with low release	ERC12a

Worker		Use descriptors
CS 2	Low energy manipulation and handling of substances bound in/on materials or articles	PROC21
CS 2	High (mechanical) energy work-up of substances bound in/on materials and/or articles	PROC24

10.2. Conditions of use affecting exposure

10.2.1. Control of environmental exposure: Processing of articles at industrial sites with low release (ERC12a)

ERC12a	Processing of articles at industrial sites with low release

Conditions and measures related to sewage treatment plant	
Municipal Sewage Treatment Plant	0.169 % effectiveness water
Assumed domestic sewage treatment plant flow	≥ 2000 m³/d
Controlled application of sewage sludge to agricultural soil	

Other conditions affecting environmental exposure	
Receiving surface water flow (m³/day):	≥ 18000 m³/d

10.2.2. Control of worker exposure: Low energy manipulation and handling of substances bound in/on materials or articles (PROC21)

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

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

10.2.3. Control of worker exposure: High (mechanical) energy work-up of substances bound in/on materials and/or articles (PROC24)

PROC24	High (mechanical) energy work-up of substances bound in/on materials and/or articles

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

10.3. Exposure estimation and reference to its source

10.3.1. Environmental release and exposure Processing of articles at industrial sites with low release (ERC12a)

Protection target	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	0.005 mg/l	0.51 mg/l	0.01	EUSES 2.2.0
Marine water	0.0005 mg/l	0.051 mg/l	0.01	EUSES 2.2.0
Secondary poisoning			< 0.01	EUSES 2.2.0
Freshwater sediment	0.025 mg/kg dwt	2.524 mg/kg dwt	0.01	EUSES 2.2.0
Marine water sediment	0.0024 mg/kg dwt	0.252 mg/kg dwt	0.01	EUSES 2.2.0
Sewage treatment plant	0 mg/l	200 mg/l	< 0.01	EUSES 2.2.0
Soil	0 mg/kg dwt	0.206 mg/kg dwt	< 0.01	EUSES 2.2.0

Release estimation	Release route	Release rate	Release estimation method
Release estimation	Water	0 kg/day	
Release estimation	Air	0 kg/day	

Release estimation	Release route	Release rate	Release estimation method
Release estimation	soil	0 kg/day	

10.3.2. Worker exposure Low energy manipulation and handling of substances bound in/on materials or articles (PROC21)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.83 mg/kg bw/day	0.24	Measured data
Inhalation - Long-term - systemic effects	3 mg/m³	0.361	Measured data
Sum RCR - Long-term - systemic effects		0.601	
Inhalation - Acute - systemic effects	12 mg/m³	0.146	Measured data
Sum RCR - Acute - systemic effects		0.146	

10.3.3. Worker exposure High (mechanical) energy work-up of substances bound in/on materials and/or articles (PROC24)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.83 mg/kg bw/day	0.24	Measured data
Inhalation - Long-term - systemic effects	1 mg/m³	0.12	Measured data
Sum RCR - Long-term - systemic effects		0.36	
Inhalation - Acute - systemic effects	4 mg/m³	0.049	Measured data
Sum RCR - Acute - systemic effects		0.049	

10.4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

10.4.1. Environment

No data available

10.4.2. Health

Guidance - Health	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Contact supplier if guidance is required

11. ES 11 - ES 11 Service life - workers - Intumescent coatings - Professional Workers

11.1. Title section

ES 11 Service life - workers - Intumescent coatings - Professional Workers	
ES Ref.: ES 11 ES Type: Worker	

Environment		Use descriptors
CS 1	Widespread use of articles with low release (outdoor), Widespread use of articles with low release (indoor)	ERC10a, ERC11a

Worker		Use descriptors
CS 2	Low energy manipulation and handling of substances bound in/on materials or articles	PROC21

11.2. Conditions of use affecting exposure

11.2.1. Control of environmental exposure: Widespread use of articles with low release (outdoor), Widespread use of articles with low release (indoor) (ERC10a, ERC11a)

ERC10a	Widespread use of articles with low release (outdoor)
ERC11a	Widespread use of articles with low release (indoor)

Conditions and measures related to sewage treatment plant	
Municipal Sewage Treatment Plant	0.169 % effectiveness water
Assumed domestic sewage treatment plant flow	≥ 2000 m³/d
Controlled application of sewage sludge to agricultural soil	

Other conditions affecting environmental exposure	
Receiving surface water flow (m³/day):	≥ 18000 m³/d

11.2.2. Control of worker exposure: Low energy manipulation and handling of substances bound in/on materials or articles (PROC21)

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

Product (article) characteristics	
Physical form of product	Solid
Concentration of substance in product	≤ 100 %
Dustiness	Solid, medium dustiness

Amount used (or contained in articles), frequency and duration of use/exposure	
Covers daily exposures up to 8 hours (unless stated differently)	

Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	

Other conditions affecting workers exposure	
Indoor use	
Assumes process temperature up to	40 °C

11.3. Exposure estimation and reference to its source

11.3.1. Environmental release and exposure Widespread use of articles with low release (outdoor), Widespread use of articles with low release (indoor) (ERC10a, ERC11a)

Protection target	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	0.005 mg/l	0.51 mg/l	0.01	EUSES 2.2.0
Marine water	0.0005 mg/l	0.051 mg/l	0.01	EUSES 2.2.0
Secondary poisoning			< 0.01	EUSES 2.2.0
Freshwater sediment	0.025 mg/kg dwt	2.524 mg/kg dwt	0.01	EUSES 2.2.0
Marine water sediment	0.0024 mg/kg dwt	0.252 mg/kg dwt	0.01	EUSES 2.2.0
Sewage treatment plant	0 mg/l	200 mg/l	< 0.01	EUSES 2.2.0
Soil	0 mg/kg dwt	0.206 mg/kg dwt	< 0.01	EUSES 2.2.0

Release estimation	Release route	Release rate	Release estimation method
Release estimation	Water	0 kg/day	
Release estimation	Air	0 kg/day	
Release estimation	soil	0 kg/day	

11.3.2. Worker exposure Low energy manipulation and handling of substances bound in/on materials or articles (PROC21)

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	2.83 mg/kg bw/day	0.24	Measured data
Inhalation - Long-term - systemic effects	5 mg/m³	0.602	Measured data
Sum RCR - Long-term - systemic effects		0.842	
Inhalation - Acute - systemic effects	20 mg/m³	0.243	Measured data
Sum RCR - Acute - systemic effects		0.243	

11.4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

11.4.1. Environment

No data available

11.4.2. Health

Guidance - Health	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Contact supplier if guidance is required

12. ES 12 - ES 12 Service life - consumers - PU foams – Consumers

12.1. Title section

ES 12 Service life - consumers - PU foams – Consumers	
ES Ref.: ES 12 ES Type: Consumer	

Environment		Use descriptors
CS 1	Widespread use of articles with low release (outdoor), Widespread use of articles with low release (indoor)	ERC10a, ERC11a

Consumer		Use descriptors
CS 2.1	Vehicles, Vehicles covered by End of Life Vehicles (ELV) directive, Plastic articles, Plastic articles: Furniture & furnishings, including furniture coverings, baby	AC1, AC1a, AC13, AC13e
CS 2.2	Vehicles, Vehicles covered by End of Life Vehicles (ELV) directive, Plastic articles, Plastic articles: Furniture & furnishings, including furniture coverings, adult	AC1, AC1a, AC13, AC13e

12.2. Conditions of use affecting exposure

12.2.1. Control of environmental exposure: Widespread use of articles with low release (outdoor), Widespread use of articles with low release (indoor) (ERC10a, ERC11a)

ERC10a	Widespread use of articles with low release (outdoor)
ERC11a	Widespread use of articles with low release (indoor)

Other conditions affecting environmental exposure	
Receiving surface water flow (m³/day):	≥ 18000 m³/d

12.2.2. Control of consumer exposure: Vehicles, Vehicles covered by End of Life Vehicles (ELV) directive, Plastic articles, Plastic articles: Furniture & furnishings, including furniture coverings, baby (AC1, AC1a, AC13, AC13e)

AC1	Vehicles
AC1a	Vehicles covered by End of Life Vehicles (ELV) directive
AC13	Plastic articles
AC13e	Plastic articles: Furniture & furnishings, including furniture coverings

Product (article) characteristics	
Concentration of substance in product	≤ 30 %

Other conditions affecting consumer exposure	
Inhalation exposure is considered to be not relevant.	
Oral exposure is considered to be not relevant.	

12.2.3. Control of consumer exposure: Vehicles, Vehicles covered by End of Life Vehicles (ELV) directive, Plastic articles, Plastic articles: Furniture & furnishings, including furniture coverings, adult (AC1, AC1a, AC13, AC13e)

AC1	Vehicles
AC1a	Vehicles covered by End of Life Vehicles (ELV) directive
AC13	Plastic articles
AC13e	Plastic articles: Furniture & furnishings, including furniture coverings

Product (article) characteristics	
Concentration of substance in product	≤ 30 %

Other conditions affecting consumer exposure	
Inhalation exposure is considered to be not relevant.	
Oral exposure is considered to be not relevant.	

12.3. Exposure estimation and reference to its source

12.3.1. Environmental release and exposure Widespread use of articles with low release (outdoor), Widespread use of articles with low release (indoor) (ERC10a, ERC11a)

Protection target	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	0.005 mg/l	0.51 mg/l	0.01	EUSES 2.2.0
Marine water	0.0005 mg/l	0.051 mg/l	0.01	EUSES 2.2.0
Secondary poisoning			< 0.01	EUSES 2.2.0
Freshwater sediment	0.025 mg/kg dwt	2.524 mg/kg dwt	0.01	EUSES 2.2.0
Marine water sediment	0.0024 mg/kg dwt	0.252 mg/kg dwt	0.01	EUSES 2.2.0
Sewage treatment plant	0 mg/l	200 mg/l	< 0.01	EUSES 2.2.0
Soil	0 mg/kg dwt	0.206 mg/kg dwt	< 0.01	EUSES 2.2.0

Release estimation	Release route	Release rate	Release estimation method
Release estimation	Water	0 kg/day	
Release estimation	Air	0 kg/day	
Release estimation	soil	0 kg/day	

12.3.2. Consumer exposure Vehicles, Vehicles covered by End of Life Vehicles (ELV) directive, Plastic articles, Plastic articles: Furniture & furnishings, including furniture coverings, baby (AC1, AC1a, AC13, AC13e)

Information for contributing exposure scenario			
Inhalation exposure is considered to be not relevant,Oral exposure is considered to be not relevant.			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	0.1484 mg/kg bw/day	0.035	baby,Based on migration study
Sum RCR - Long-term - systemic effects		0.035	

12.3.3. Consumer exposure Vehicles, Vehicles covered by End of Life Vehicles (ELV) directive, Plastic articles, Plastic articles: Furniture & furnishings, including furniture coverings, adult (AC1, AC1a, AC13, AC13e)

Information for contributing exposure scenario
Inhalation exposure is considered to be not relevant,Oral exposure is considered to be not relevant.

Information for contributing exposure scenario			
Route of exposure and type of effects	**Exposure estimate:**	**RCR**	**Method**
Dermal - Long-term - systemic effects	0.06375 mg/kg bw/day	0.015	adult,Based on migration study
Sum RCR - Long-term - systemic effects		0.015	

12.4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

12.4.1. Environment

No data available

12.4.2. Health

Guidance - Health	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Contact supplier if guidance is required

13. ES 13 - ES 13 Service life - consumers - Intumescent coating – Consumers

13.1. Title section

ES 13 Service life - consumers - Intumescent coating – Consumers	
ES Ref.: ES 13 ES Type: Consumer	

Environment		Use descriptors
CS 1	Widespread use of articles with low release (outdoor), Widespread use of articles with low release (indoor)	ERC10a, ERC11a

Consumer		Use descriptors
CS 2	Plastic articles	AC13

13.2. Conditions of use affecting exposure

13.2.1. Control of environmental exposure: Widespread use of articles with low release (outdoor), Widespread use of articles with low release (indoor) (ERC10a, ERC11a)

ERC10a	Widespread use of articles with low release (outdoor)
ERC11a	Widespread use of articles with low release (indoor)

Other conditions affecting environmental exposure	
Receiving surface water flow (m³/day):	≥ 18000 m³/d

13.2.2. Control of consumer exposure: Plastic articles (AC13)

AC13	Plastic articles

Product (article) characteristics	
Concentration of substance in product	≤ 30 %

Other conditions affecting consumer exposure	
Inhalation exposure is considered to be not relevant.	
Oral exposure is considered to be not relevant.	
Dermal exposure:Negligible	

13.3. Exposure estimation and reference to its source

13.3.1. Environmental release and exposure Widespread use of articles with low release (outdoor), Widespread use of articles with low release (indoor) (ERC10a, ERC11a)

Protection target	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	0.005 mg/l	0.51 mg/l	0.01	EUSES 2.2.0
Marine water	0.0005 mg/l	0.051 mg/l	0.01	EUSES 2.2.0
Secondary poisoning			< 0.01	EUSES 2.2.0
Freshwater sediment	0.025 mg/kg dwt	2.524 mg/kg dwt	0.01	EUSES 2.2.0
Marine water sediment	0.0024 mg/kg dwt	0.252 mg/kg dwt	0.01	EUSES 2.2.0
Sewage treatment plant	0 mg/l	200 mg/l	< 0.01	EUSES 2.2.0

Protection target	Exposure estimation	PNEC	RCR	Assessment method
Soil	0 mg/kg dwt	0.206 mg/kg dwt	< 0.01	EUSES 2.2.0

Release estimation	Release route	Release rate	Release estimation method
Release estimation	Water	0 kg/day	
Release estimation	Air	0 kg/day	
Release estimation	soil	0 kg/day	

13.3.2. Consumer exposure Plastic articles (AC13)

Information for contributing exposure scenario
Inhalation exposure is considered to be not relevant,Oral exposure is considered to be not relevant,Dermal exposure: Negligible

13.4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

13.4.1. Environment

No data available

13.4.2. Health

Guidance - Health	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Contact supplier if guidance is required