Yoke Chemicals and New Materials (Shanghai) Co., Ltd.

and its subsidiaries Shekoy Chemicals Europe and USA

Material Safety Data Sheet Conforms to Regulation (EC) 1272/2008

PhireGuard LF-11

Issuing date: 03-01-2021, Version 3.3.

Section 1: Product and Company Identification

1.1 Product identifier

Product form	UVCB
Trade name	Phireguard LF-11
EC no	807-935-0
REACH registration nr	01-2119486772-26-0007
Proper shipping name	None
Formula	C9H18CL3O4P
Synonyms	TCPP, Phosphoric trichloride, reaction products with propylene oxide, Reaction products of phosphoryl trichloride and 2-methyloxirane
Product group	Raw material

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

1.2.1 Relevant identified uses

Main use category	Industrial use
Use of the substance/preparation	Fire-retarding agent Production of polyurethane foam
Function or use category	Flame retardants and fire preventing agents

See SECTION 16 for a complete list of uses for which an exposure scenario is provided as an annex

1.2.2 Uses advised against

No additional information available

1.3 Details of the supplier of the safety data sheet

Yoke Chemicals and New Materials (Shanghai) Co., Ltd.
Economic Development Zone
Yixing, Jiangsu Province
China
Tel: +86 510 87126528
Email: shenfu@yokechem.com

Only representative company name:

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Kromme Spieringweg 431
2141 AH Vijfhuizen.
The Netherlands
Tel: +31-(0)23-3035365
Email: purchase@shekoy.com

E-mail address of the competent person responsible for the sds: gc@yokechem.com

1.4 Emergency telephone number

Country	Emergency telephone	Hours of operation
Belgium	+32 70 245 245	24hrs
France	+33 1 45 42 59 59	24hrs
Germany	+49 214 3099300	24hrs
Italy	+39 800 883 300	24hrs
Norway	+47 22 59 13 00	24hrs
Poland	+48 42 63 14 724	24hrs
Portugal	+351 808 250 143	24hrs
Romania	+402 212 106 282	24hrs
Spain	+34 156 20420	24hrs
Sweden	+46 8 33 12 31 / 112	24hrs
Switzerland	+41 44 251 5151 (in Switzerland dial 145)	24hrs
The Netherlands	+31 30 274 8888	24hrs
Turkey	+90 312 433 7001 or +90 800 314 7900	24hrs
United Kingdom of Great Britain and Northern Ireland	+44 844 892 0111	24hrs

Section 2 Hazards Identification / Classification and Labeling

2.1. Classification of the substance or mixture

Classification in accordance with the CLP Regulation EC/1272/2008:

Classification: Acute oral toxicity category 4

2.2. Label elements

Labeling in accordance with the CLP Regulation EC/1272/2008:

GHS07

Signal word: Warning
Hazard Statement: H302: Harmful if swallowed

Precautionary:
P264: Wash thoroughly after handling.
P280: wear protective gloves/protective clothing/eye protection/face protection.
P301+312: If swallowed, call a Poison Centre or Doctor /Physician if you feel unwell.
P330: Rinse mouth.
P501: Dispose of contents/container in accordance with local/regional/national/international regulation.

2.3. Other hazards

Substance does meet the criteria for PBT according to Regulation (EC) No 1907/2006, Annex XIII: No.
Substance does meet the criteria for vPvB according to Regulation (EC) No 1907/2006, Annex XIII: No.
Other hazards which does not results in a classification: none

Section 3 Chemical Information / Composition

3.1. Substances

Substance	% Weight	EC No	CLP	Haz. St.
Reaction products of phosphoryl trichloride and methyloxirane	100	807-935-0	Warning	H302

3.2. Mixtures

Not applicable

Section 4: First-Aid Measures

4.1. Description of first aid measures

First-aid measures general:

Check the vital functions. Unconscious: maintain adequate airway and respiration. Respiratory arrest: artificial respiration or oxygen. Cardiac arrest: perform resuscitation. Victim conscious with laboured breathing: half-seated. Victim in shock: on his back with legs slightly raised. Vomiting: prevent asphyxia/aspiration pneumonia. Prevent cooling by covering the victim (no warming up). Keep watching the victim. Give psychological aid. Keep the victim calm, avoid physical strain. Depending on the victim's condition: doctor/hospital.

First-aid measures after inhalation:

Move exposed person to fresh air. Keep person warm and at rest.
If not breathing, if breathing is irregular or if respiratory arrest occurs provide artificial respiration or oxygen by trained personnel. Get medical attention. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as collar, tie, belt or waistband.

First-aid measures after ingestion:

Wash out mouth with water. Move exposed person to fresh air. Keep person warm and at rest. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit doesn't enter the lungs. Get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in the recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as collar, tie, belt or waistband.

First-aid measures after skin contact:

Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Obtain medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

First-aid measures after eye contact:

Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

4.2. Most important symptoms and effects both acute and delayed

Symptoms/Injuries after inhalation:	No data available
Symptoms/Injuries after skin contact:	Slight irritation
Symptoms/Injuries after eye contact:	Slight irritation

Symptoms/Injuries after ingestion:	No data available
Chronic symptoms:	No effects known

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

NOTES TO PHYSICIAN: All persons handling organic phosphorus ester materials regularly should undergo regular medical examination with special stress on the central nervous systems. Whilst atropine or pyridine-2-aldoxime methiodide (PAM) are beneficial antidotes for acute phosphate ester poisonings, they are of little value in reversing acute or chronic neurological damage due to phosphites and some types of aryl phosphate.

Section 5 Fire-fighting Measures

FIRE FIGHTING
Alert Fire Brigade and tell them location and nature of hazard.
Wear full body protective clothing with breathing apparatus.
Prevent, by any means available, spillage from entering drains or water course.
Use water delivered as a fine spray to control fire and cool adjacent area.
Avoid spraying water onto liquid pools.
DO NOT approach containers suspected to be hot.
Cool fire exposed containers with water spray from a protected location.
If safe to do so, remove containers from path of fire.

5.1. Extinguishing Media

Suitable extinguishing media:
In case of fire use water spray (fog), foam, dry chemical or CO2.

Unsuitable extinguishing media:
None

5.2. Special hazards arising from the substance or mixture

Combustion products include: carbon dioxide (CO2), phosphorus oxides (POx), other pyrolysis products typical of burning organic material. May emit poisonous fumes. May emit corrosive fumes.

In a fire or if heated, a pressure increase will occur and the container may burst. Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

FIRE/EXPLOSION HAZARD: Combustible. Slight fire hazard when exposed to heat or flame. Heating may cause expansion or decomposition leading to violent rupture of containers. On combustion, may emit toxic fumes of carbon monoxide (CO). May emit acrid smoke. Mists containing combustible materials may be explosive.
FIRE INCOMPATIBILITY: Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.
PERSONAL PROTECTION: Respirator Type A Filter of enough capacity

5.3. Advice for fire brigade

Special protective equipment for fire-fighters: Fire fighters should wear appropriate protective equipment and a self-contained breathing apparatus (SCBA) with a full face piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.
Remark:
Cool closed containers exposed to fire with water.

Section 6 Accidental Release Measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions: No action shall be taken involving any personal risk or without suitable training. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through split material. Avoid breathing vapour or mist. Provide adequate ventilation. Put on appropriate personal protective equipment (see section 8).

6.2. Environmental precautions

Avoid dispersal of split material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

6.3. Methods and material for containment and cleaning up

Large spill: Clear area of personnel and move upwind. Alert Fire Brigade and tell them location and nature of hazard. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or water course. No smoking, naked lights or ignition sources. Increase ventilation. Stop leak if safe to do so. Contain spill with sand, earth or vermiculite. Collect recoverable product into labeled containers for recycling. Absorb remaining product with sand, earth or vermiculite. Collect solid residues and seal in labeled drums for disposal. Wash area and prevent runoff into drains. If contamination of drains or waterways occurs, advise emergency services.

Small spill: Remove all ignition sources. Clean up all spills immediately. Avoid breathing vapors and contact with skin and eyes. Control personal contact by using protective equipment. Contain and absorb spill with sand, earth, inert material or vermiculite. Wipe up. Place in a suitable, labeled container for waste disposal.

6.4. Reference to other sections

See section 1 for emergency contact.
See section 8 for personal protection equipment.
See section 13 for additional waste treatment.

Section 7 Handling and Storage

7.1. Precautions for safe handling

Avoid all personal contact, including inhalation. Wear protective clothing when risk of exposure occurs. Use in a well-ventilated area. Prevent concentration in hollows and sumps. DO NOT enter confined spaces until atmosphere has been checked. Avoid smoking, naked lights or ignition sources. Avoid contact with incompatible materials. When handling, DO NOT eat, drink or smoke. Keep containers securely sealed when not in use. Avoid physical damage to containers. Always wash hands with soap and water after handling. Work clothes should be laundered separately. Use good occupational work practice. Observe manufacturer's storing and handling recommendations. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions. DO NOT allow clothing wet with material to stay in contact with skin.

7.2. Conditions for safe storage, including any incompatibilities

SUITABLE CONTAINER: Metal can or drums; Packaging as recommended by manufacturer. Check all containers are clearly labeled and free from leaks.
STORAGE INCOMPATIBILITY: Avoid reaction with oxidizing agents.
STORAGE REQUIREMENTS: Do not store above the following temperature: 50°C (122°F). Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10), food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in un-labeled containers. Use appropriate containment to avoid environmental contamination.

7.3. Specific end use(s)

No additional information available

Section 8 Exposure Control and Personal Protection

The information in this section contains generic advice and guidance for details; please refer to exposure scenario in eSDS.

8.1. Control parameters

DNEL/DMEL Exposure Route	Units	Exposure Frequency	Industrial Worker	Professional Worker	General Population
Oral	mg/kg bw/d	Short-term	NA**	NA**	NA**
Oral	mg/kg bw/d	Long-term, repeated	NA**	NA**	0,52
Dermal	mg/kg bw/d	Short-term	NA**	NA**	NA**
Dermal	mg/kg bw/d	Long-term, repeated	2,91	2,91	1,04
Inhalation	mg/m³	Short-term	22,6	22,6	5,6
Inhalation	mg/m³	Long-term, repeated	8,2	8,2	1,45

NA: Not applicable. NA**: not applicable for the identified uses

PNEC Exposure Route	Units	Environment
Fresh Water	mg/l	0,32
Marine Water	mg/l	0,032
Sediment	mg/kg dw	11,5
Marine Sediment	mg/kg dw	1,15
Soil	mg/kg dw	0,34
Sewage Treatment Plant	mg/l	19,1
Secondary Poisoning	mg/kg food	<11,6

NA: Not applicable

Exposure limits: no data available

8.2. Exposure controls

Occupational exposure controls:

If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to monitoring standards, such as the following: European Standard EN 689 (Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy) European Standard EN 14042 (Workplace atmospheres - Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents) European Standard EN 482 (Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents) Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

Personal protection measures:

Respiratory protection: Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Recommended: Full mask with type ABEK filter if product forms vapors.

Hand protection: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. After contamination with product change the gloves immediately and dispose of them according to relevant national and local regulations <1 hours (breakthrough time): nitrile rubber, PVC.

Eye protection: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. Recommended: Tightly fitting safety goggles.

Skin protection: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Recommended: Wear protective clothing.

Hygiene measures: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Environmental exposure controls:

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

Section 9 Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

Appearance	Liquid
Color	Clear
Odor	Mild
Boiling point/range	288°C at 101.3 kPa
Melting point/range	-20°C at 101.3 kPa
Flash point	>245°C
Flammability	Not applicable
Auto ignition temperature	>400°C
Decomposition Temperature	>220°C
Explosion limits	Not applicable
Explosive properties	Not applicable
Oxidizing properties	Not applicable
Vapor pressure	<1hPa
Vapor pressure at 50°C	<100hPa
Density	1.290 kg/m³
Bulk density	Not applicable
Solubility in water	Poor
Solubility in other solvents	alcohols, ketones and chlorinated hydrocarbons
pH value	Not determined
Acid value	< 0.1 mg KOH/g
Partition coefficient n-octanol/water	Log Kow= 2.68
Relative vapor density (air=1)	11.3
Viscosity	68.5 cP (20°C)

9.2. Other information

No other information available.

Section 10 Stability and Reactivity

10.1. Reactivity

On burning release toxic and corrosive gases/vapours (phosphorus oxides, carbon monoxide-carbon dioxide).

Reacts violently with (strong) oxidizers and with (some) acids/bases

10.2. Chemical Stability

Stable under normal conditions of use. Keep out of direct exposure to sunlight. Keep in a well-ventilated storage. If open, store under Nitrogen.

Provided the container is not open and kept in a ventilated area, away from direct sunlight exposition, the shelf-life of the product is at least one year.

10.3. Possibility of hazardous reactions

No additional information available

10.4. Conditions to avoid:

Elevated temperatures (> 200 °C)

10.5. Incompatible materials

No materiel to be especially mentioned

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11 Toxicological Information

11.1. Information on toxicological effects

Acute toxicity

Oral LD50	Rat: LD50: 632 mg/kg bw (female)
	Rat: LD50: >500 - <2000 mg/kg bw (male)
Dermal LD50	Rat: >2000 mg/kg
Inhalation LC50	Rat: LC50: >7 mg/L air (male/female)

Irritation

Skin rabbit:	Not irritating
Eye rabbit:	Not-irritating

Sensitisation

Mouse in vivo LLNA Not sensitizing

Genotoxicity

In vivo bone marrow cytogenicity:	Not mutagenic
Ames test:	Not mutagenic
In vitro cell gene mutation test (in mouse lymphoma cells):	Not mutagenic
In vitro cytogenetic test (in mouse lymphoma cells):	Not mutagenic

Other toxicological information

Not teratogenic (rat, NOEL 571 mg/kg bw).
Carcinogenicity: not classified
Not neurotoxic (chicken, at dose levels 10 g/kg)
Repeated dose toxicity: not classified (LOAEL 52 mg/kg bw/day)

Section 12 Ecological Information

12.1. Toxicity

Ecotoxicity

Fish 96h-LC50 (Pimeohales promela)	51 mg/l
Fish 96h-LC50 (Brachydanio rerio) :	56.2 mg/l
Daphnia magna 48h-EC50:	131 mg/l
Algae growth inhibition test (72h Pseudokirchnerella subcapitata)	82 mg/l

12.2. Persistence and degradability

Inherently biodegradable in water

12.3. Bioaccumulative potential

The measured and the calculated BCF values indicate that TCPP has no potential for bioaccumulation in both aquatic and terrestrial organisms.

12.4. Mobility in soil

Moderately mobile in soils

12.5. Results of PBT and vPvB assessment

The substance is not a PBT/vPvB candidate as it does not fulfil the B- and T-criterion.

12.6. Other adverse effects

No information available

Section 13 Disposal Considerations

13.1. Waste treatment methods

Methods of disposal:

The generation of waste should be avoided or minimised wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction.

Hazardous waste:

The classification of the product may meet the criteria for a hazardous waste.

Packaging. Methods of disposal:

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

Special precautions:

This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Section 14 Transport Information

Not regulated

Section 15 Regulatory Information

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

EC regulation 1272/2008 (CLP)

See section 2

Replaces 67/548/EC as from December 1st 2010

This safety data sheet is in compliance with the following EU legislation and its adaptations - as far as applicable - 67/548/EEC, 1999/45/EC, Regulation (EC) 1272/2008, Regulation (EC) No 2015/830, 98/24/EC, 92/85/EEC, 94/33/EC, 91/689/EEC and 1999/13/EC.

TSCA	DSL	NDSL	AICS	EINECS	ELINCS	ENCS	KECL	PICCS	China	NZIoC
×	×	-	×	×	-	×	×	×	×	×

(×) Complies (-) Does not comply

REACH registration nr: 01-2119486772-26-0007

15.2. Chemical safety assessment

A risk assessment has been performed under the Regulation (EC) No 1907/2006 (REACH) on the evaluation and control of the risks of existing substances. A chemical assessment has been carried out on the substance.

Number and title	Sector of Use (SU)	Preparation Category (PC)	Article (AC)	Environmental release category (ERC)	Process Category (PROC)
Exposure Scenario 1: Formulation or re-packing - Formulation into mixture				2	1, 2, 3 ,4, 5, 8a, 8b, 9, 15
Exposure Scenario 2: Use at industrial sites - Rigid foam production	12, 19	32		5	1, 2, 3, 5, 7, 8a, 8b, 9, 15, 21
Exposure Scenario 3: Use at industrial sites - Flexible foam production	12, 18	32		5	1, 2, 3, 5, 7, 8a, 8b, 9, 15, 21
Exposure Scenario 4: Use at industrial sites - Foam granules and rebound PUR foam	18, 19			5	1, 2, 3, 5, 7, 8a, 8b, 9, 15, 21
Exposure Scenario 5: Use at industrial sites - CASE, industrial application	12	1, 9a, 32		5	1, 2, 3, 4, 5, 6, 7, 8a, 8b, 9, 10, 13, 14, 15
Exposure Scenario 6: Widespread use by professional workers - Rigid (spray) foam, professional application	19	32		8c, 8d	5, 8a, 8b, 10, 11, 21
Exposure Scenario 7: Widespread use by professional workers - One-component PUR foams, professional application (foaming)	19	1, 32		8c, 8f	10, 11, 21
Exposure Scenario 8: Widespread use by professional workers - CASE, professional application	12	1, 9a, 32		8c, 8f	5, 8a, 8b, 10, 11, 13
Exposure Scenario 9: Widespread use by professional workers - Laboratory use, professional				8c	15
Exposure Scenario 10: Consumer use - One-component PUR foams, consumer application (foaming)		1, 32		8c, 8f	
Exposure Scenario 11: Service life (consumers) - Rigid foam, service life			13	10a, 11a	
Exposure Scenario 12: Service life (consumers) - Flexible foam, service life			1	10a	

Section 16 Other Information

16.1 Indication of changes

Extension

16.2. Key literature references and sources for data

- ESIS (European chemical Substances Information System), http://esis.jrc.ec.europa.eu/
- REACH registered chemicals, http://echa.europa.eu/chem_data_en.asp
- IFA GESTIS - International limit values for chemical agents - occupational exposure limits (OELs), http://www.dguv.de/ifa/en/gestis/limit_values/index.jsp

This product should be stored, handled and used in accordance with good industrial hygiene practices and in conformity with any legal regulation. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

This information only concerns the above mentioned product and does not need to be valid if used with other product(s) or in any process. The information and recommendations set forth herein are presented in good faith according to our best present knowledge, but without warranty. Information is supplied upon the condition that the persons receiving the same will make their own determination as to its safety and suitability for their purposes prior to use. It remains the user's own responsibility to make sure that the information is appropriate and complete for his special use of this product. In no event will Jiangsu Yoke Technology Co., Ltd or its affiliates be responsible for damages of any nature whatsoever resulting from the use of or reliance upon information.

1. ES 1: Formulation or re-packing

1.1. Title section

ES name: *Formulation or re-packing - Formulation into mixture*

Environment	
1: *Formulation or re-packing - Formulation into mixture*	ERC 2
Worker	
2: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions*	PROC 1
3: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions*	PROC 2
4: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC 3)*	PROC 3
5: *Chemical production where opportunity for exposure arises*	PROC 4
6: *Mixing or blending in batch processes*	PROC 5
7: *Transfer of substance or mixture (charging/discharging) at non dedicated-facilities*	PROC 8a
8: *Transfer of substance or mixture (charging/discharging) at dedicated facilities*	PROC 8b
9: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing)*	PROC 9
10: *Use as laboratory reagent*	PROC 15

1.2. Conditions of use affecting exposure

1.2.1. Control of environmental exposure: *Formulation or re-packing - Formulation into mixture* (ERC 2)

Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 13.7 tonnes/day
Annual amount per site <= 4.11E3 tonnes/year
Technical and organisational conditions and measures
In line with the TCPP EU RAR it is assumed that TCPP is only formulated at sites where fume elimination equipment is in place with efficiency of 90% or better regarding volatile emissions (EC, 2008)
Conditions and measures related to biological sewage treatment plant
Provide onsite wastewater treatment.
Assumed domestic sewage treatment plant flow >= 2E3 m3/day
No application of sewage sludge to soil
Other conditions affecting environmental exposure
Receiving surface water flow >= 1.8E4 m3/day

1.2.2. Control of worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions* (PROC 1)

Product (article) characteristics
Covers concentrations up to 100 %

Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.
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 chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
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* (PROC 2)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

1.2.4. 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 (PROC 3)* (PROC 3)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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 ‘basic’ employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

1.2.5. Control of worker exposure: *Chemical production where opportunity for exposure arises* (PROC 4)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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 ‘basic’ employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

1.2.6. Control of worker exposure: *Mixing or blending in batch processes* (PROC 5)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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 ‘basic’ employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

1.2.7. Control of worker exposure: *Transfer of substance or mixture*

(charging/discharging) at non dedicated-facilities (PROC 8a)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

1.2.8. Control of worker exposure: *Transfer of substance or mixture (charging/discharging) at dedicated facilities* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 95 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

1.2.9. Control of worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing)* (PROC 9)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

1.2.10. Control of worker exposure: *Use as laboratory reagent* (PROC 15)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
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: *Formulation or re-packing - Formulation into mixture* (ERC 2)

Release route	Release rate	Release estimation method
Water	3.425 kg/day	Estimated release factor
Air	0.343 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	0.165 mg/L (EUSES 2.1.2)	0.515
Sediment (freshwater)	5.934 mg/kg dw (EUSES 2.1.2)	0.516
Marine water	0.016 mg/L (EUSES 2.1.2)	0.515
Sediment (marine water)	0.593 mg/kg dw (EUSES 2.1.2)	0.516
Sewage Treatment Plant	1.647 mg/L (EUSES 2.1.2)	0.086
Agricultural soil	7.51E-4 mg/kg dw (EUSES 2.1.2)	< 0.01

Protection target	Exposure estimate	RCR
Predator's prey (freshwater)	0.949 mg/kg ww (EUSES 2.1.2)	0.082
Top predator's prey (marine water)	0.019 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (terrestrial)	4.47E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	7.83E-5 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	0.015 mg/kg bw/day (EUSES 2.1.2)	0.03
Man via environment - combined routes		0.03

1.3.2. Worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.136 mg/m³ (TRA Workers 3.0)	0.017
Inhalation, systemic, acute	0.136 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	3.4E-3 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.018
Combined, systemic, acute		< 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* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.487 mg/m³ (TRA Workers 3.0)	0.059
Inhalation, systemic, acute	0.487 mg/m³ (TRA Workers 3.0)	0.022
Dermal, systemic, long term	0.137 mg/kg bw/day (TRA Workers 3.0)	0.047
Combined, systemic, long term		0.106
Combined, systemic, acute		0.022

1.3.4. Worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition* (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.487 mg/m³ (TRA Workers 3.0)	0.059
Inhalation, systemic, acute	0.487 mg/m³ (TRA Workers 3.0)	0.022
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers 3.0)	0.024
Combined, systemic, long term		0.083
Combined, systemic, acute		0.022

1.3.5. Worker exposure: *Chemical production where opportunity for exposure arises* (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.487 mg/m³ (TRA Workers 3.0)	0.059
Inhalation, systemic, acute	0.487 mg/m³ (TRA Workers 3.0)	0.022
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.236
Combined, systemic, long term		0.295

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, acute		0.022

1.3.6. Worker exposure: *Mixing or blending in batch processes* (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.487 mg/m³ (TRA Workers 3.0)	0.059
Inhalation, systemic, acute	0.487 mg/m³ (TRA Workers 3.0)	0.022
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.471
Combined, systemic, long term		0.53
Combined, systemic, acute		0.022

1.3.7. Worker exposure: *Transfer of substance or mixture (charging/discharging) at non dedicated-facilities* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.136 mg/m³ (TRA Workers 3.0)	0.017
Inhalation, systemic, acute	0.136 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.471
Combined, systemic, long term		0.488
Combined, systemic, acute		< 0.01

1.3.8. Worker exposure: *Transfer of substance or mixture (charging/discharging) at dedicated facilities* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.068 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.068 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.471
Combined, systemic, long term		0.479
Combined, systemic, acute		< 0.01

1.3.9. Worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing)* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.487 mg/m³ (TRA Workers 3.0)	0.059
Inhalation, systemic, acute	0.487 mg/m³ (TRA Workers 3.0)	0.022
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.236
Combined, systemic, long term		0.295
Combined, systemic, acute		0.022

1.3.10. Worker exposure: *Use as laboratory reagent* (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.136 mg/m³ (TRA Workers 3.0)	0.017
Inhalation, systemic, acute	0.136 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	0.012
Combined, systemic, long term		0.028
Combined, systemic, acute		< 0.01

1.4. Guidance to DU to evaluate whether he works inside the

boundaries set by the ES

The vapour pressure at operating temperature (40°C) used for the calculation is 3.68E-3 Pa.
The Operational Conditions (OCs) and Risk Management Measures (RMMs) detailed in this contributing scenario ensure that the risk of TCPP exposure to workers is adequately controlled.

2. ES 2: Use at industrial sites; Polymer Preparations and Compounds (PC 32); Various sectors (SU 12, SU 19)

2.1. Title section

ES name: *Use at industrial sites - Rigid foam production*
Product category: Polymer Preparations and Compounds (PC 32)
Sector of use: Manufacture of plastics products, including compounding and conversion (SU 12), Building and construction work (SU 19)

Environment	
1: *Rigid foam production at large sites*	ERC 5
2: *Rigid foam production at small sites*	ERC 5
Worker	
3: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions; Covers percentage substance in the product up to 25 %.*	PROC 1
4: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions; Covers percentage substance in the product up to 25 %.*	PROC 2
5: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition; Covers percentage substance in the product up to 25 %.*	PROC 3
6: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition; Covers percentage substance in the product up to 25 %.*	PROC 4
7: *Mixing or blending in batch processes; Covers percentage substance in the product up to 25 %.*	PROC 5
8: *Industrial spraying*	PROC 7
9: *Transfer of substance or mixture (charging/discharging) at non dedicated-facilities; Covers percentage substance in the product up to 100 %.*	PROC 8a
10: *Transfer of substance or mixture (charging/discharging) at dedicated facilities; Covers percentage substance in the product up to 100 %.*	PROC 8b
11: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing); Covers percentage substance in the product up to 100 %.*	PROC 9
12: *Use as laboratory reagent; Covers percentage substance in the product up to 100 %.*	PROC 15
13: *Low energy manipulation and handling of substances bound in/on materials and/or articles; Covers percentage substance in the product up to 25 %.*	PROC 21

2.2. Conditions of use affecting exposure

2.2.1. Control of environmental exposure: *Rigid foam production at large sites* (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 14.3 tonnes/day
Annual amount per site <= 4.31E3 tonnes/year
Conditions and measures related to biological sewage treatment plant
Provide onsite wastewater treatment.
Assumed domestic sewage treatment plant flow >= 2E3 m3/day
No application of sewage sludge to soil

Other conditions affecting environmental exposure
Receiving surface water flow >= 1.8E4 m3/day

2.2.2. Control of environmental exposure: *Rigid foam production at small sites* (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 0.45 tonnes/day
Annual amount per site <= 135 tonnes/year
Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Assumed domestic sewage treatment plant flow >= 2E3 m3/day
Other conditions affecting environmental exposure
Receiving surface water flow >= 1.8E4 m3/day

2.2.3. Control of worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions; Covers percentage substance in the product up to 25 %.* (PROC 1)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

2.2.4. Control of worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions; Covers percentage substance in the product up to 25 %.* (PROC 2)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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 'basic' employee training.; 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.; For further specification,

refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

2.2.5. 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; Covers percentage substance in the product up to 25 %.* (PROC 3)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

2.2.6. 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; Covers percentage substance in the product up to 25 %.* (PROC 4)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use

Assumes process temperature up to 40 °C

2.2.7. Control of worker exposure: *Mixing or blending in batch processes; Covers percentage substance in the product up to 25 %.* (PROC 5)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

2.2.8. Control of worker exposure: *Industrial spraying* (PROC 7)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 95 %
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 specific activity training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

2.2.9. Control of worker exposure: *Transfer of substance or mixture (charging/discharging) at non dedicated-facilities; Covers percentage substance in the product up to 100 %.* (PROC 8a)

Product (article) characteristics

Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

2.2.10. Control of worker exposure: *Transfer of substance or mixture (charging/discharging) at dedicated facilities; Covers percentage substance in the product up to 100 %.* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 95 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

2.2.11. Control of worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing); Covers percentage substance in the product up to 100 %.* (PROC 9)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

2.2.12. Control of worker exposure: *Use as laboratory reagent; Covers percentage substance in the product up to 100 %.* (PROC 15)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

2.2.13. Control of worker exposure: *Low energy manipulation and handling of substances bound in/on materials and/or articles; Covers percentage substance in the product up to 25 %.* (PROC 21)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.

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: *Rigid foam production at large sites* (ERC 5)

Release route	Release rate	Release estimation method
Water	6.86E-4 kg/day	Estimated release factor
Air	6.86E-4 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	2.03E-4 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	7.31E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	1.98E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	7.11E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	3.3E-4 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.46E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Predator’s prey (freshwater)	2.57E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator’s prey (marine water)	2.49E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Top predator’s prey (marine water)	2.34E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator’s prey (terrestrial)	2.48E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	1.7E-7 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	3.81E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

2.3.2. Environmental release and exposure: *Rigid foam production at small sites* (ERC 5)

Release route	Release rate	Release estimation method
Water	0.045 kg/day	Estimated release factor
Air	2.16E-5 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	2.33E-3 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	0.084 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	2.33E-4 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	8.38E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	0.022 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	6.19E-3 mg/kg dw (EUSES 2.1.2)	0.018
Predator’s prey (freshwater)	0.015 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator’s prey (marine water)	1.47E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Top predator’s prey (marine water)	4.79E-4 mg/kg ww (EUSES 2.1.2)	< 0.01

Protection target	Exposure estimate	RCR
Predator's prey (terrestrial)	2.64E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	1.78E-8 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	2.46E-4 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

2.3.3. Worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions; Covers percentage substance in the product up to 25 %.* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.017
Combined, systemic, acute		< 0.01

2.3.4. Worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions; Covers percentage substance in the product up to 25 %.* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.487 mg/m³ (TRA Workers 3.0)	0.059
Inhalation, systemic, acute	0.487 mg/m³ (TRA Workers 3.0)	0.022
Dermal, systemic, long term	0.082 mg/kg bw/day (TRA Workers 3.0)	0.028
Combined, systemic, long term		0.088
Combined, systemic, acute		0.022

2.3.5. Worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition; Covers percentage substance in the product up to 25 %.* (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.487 mg/m³ (TRA Workers 3.0)	0.059
Inhalation, systemic, acute	0.487 mg/m³ (TRA Workers 3.0)	0.022
Dermal, systemic, long term	0.041 mg/kg bw/day (TRA Workers 3.0)	0.014
Combined, systemic, long term		0.074
Combined, systemic, acute		0.022

2.3.6. Worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition; Covers percentage substance in the product up to 25 %.* (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.082 mg/m³ (TRA Workers 3.0)	< 0.01

Route of exposure and type of effects	Exposure estimate	RCR
Dermal, systemic, long term	0.412 mg/kg bw/day (TRA Workers 3.0)	0.141
Combined, systemic, long term		0.151
Combined, systemic, acute		< 0.01

2.3.7. Worker exposure: *Mixing or blending in batch processes; Covers percentage substance in the product up to 25 %.* (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers 3.0)	0.283
Combined, systemic, long term		0.293
Combined, systemic, acute		< 0.01

2.3.8. Worker exposure: *Industrial spraying* (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.047 mg/m³ (TRA Workers 3.0)	0.25
Inhalation, systemic, acute	8.189 mg/m³ (TRA Workers 3.0)	0.362
Dermal, systemic, long term	1.286 mg/kg bw/day (TRA Workers 3.0)	0.442
Combined, systemic, long term		0.692
Combined, systemic, acute		0.362

2.3.9. Worker exposure: *Transfer of substance or mixture (charging/discharging) at non dedicated-facilities; Covers percentage substance in the product up to 100 %.* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.136 mg/m³ (TRA Workers 3.0)	0.017
Inhalation, systemic, acute	0.136 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.471
Combined, systemic, long term		0.488
Combined, systemic, acute		< 0.01

2.3.10. Worker exposure: *Transfer of substance or mixture (charging/discharging) at dedicated facilities; Covers percentage substance in the product up to 100 %.* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.068 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.068 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.471
Combined, systemic, long term		0.479
Combined, systemic, acute		< 0.01

2.3.11. Worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing); Covers percentage substance in the product up to 100 %.* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.136 mg/m³ (TRA Workers 3.0)	0.017
Inhalation, systemic, acute	0.136 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.236
Combined, systemic, long term		0.252
Combined, systemic, acute		< 0.01

2.3.12. Worker exposure: *Use as laboratory reagent; Covers percentage substance in the product up to 100 %.* (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.487 mg/m³ (TRA Workers 3.0)	0.059
Inhalation, systemic, acute	0.487 mg/m³ (TRA Workers 3.0)	0.022
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	0.012
Combined, systemic, long term		0.071
Combined, systemic, acute		0.022

2.3.13. Worker exposure: *Low energy manipulation and handling of substances bound in/on materials and/or articles; Covers percentage substance in the product up to 25 %.* (PROC 21)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	1.8 mg/m³ (ECETOC TRA Workers)	0.22
Inhalation, systemic, acute	7.2 mg/m³ (ECETOC TRA Workers)	0.319
Dermal, systemic, long term	0.17 mg/kg bw/day (ECETOC TRA Workers)	0.058
Combined, systemic, long term		0.278
Combined, systemic, acute		0.319

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

The vapour pressure at operating temperature (40°C) used for the calculation is 3.68E-3 Pa.
The Operational Conditions (OCs) and Risk Management Measures (RMMs) detailed in this contributing scenario ensure that the risk of TCPP exposure to workers is adequately controlled.

3. ES 3: Use at industrial sites; Polymer Preparations and Compounds (PC 32); Various sectors (SU 12, SU 18)

3.1. Title section

ES name: *Use at industrial sites - Flexible foam production*
Product category: Polymer Preparations and Compounds (PC 32)
Sector of use: Manufacture of plastics products, including compounding and conversion (SU 12), Manufacture of furniture (SU 18)

Environment	
1: *Flexible foam production at large sites*	ERC 5
2: *Flexible foam production at small sites*	ERC 5
3: *Use at industrial sites - Flexible foam cutting*	ERC 5
Worker	
4: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions; Covers percentage substance in the product up to 25 %.*	PROC 1

5: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions; Covers percentage substance in the product up to 25 %.*	PROC 2
6: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition; Covers percentage substance in the product up to 25 %.*	PROC 3
7: *Chemical production where opportunity for exposure arises; Covers percentage substance in the product up to 25 %.*	PROC 4
8: *Mixing or blending in batch processes; Covers percentage substance in the product up to 25 %.*	PROC 5
9: *Transfer of substance or mixture (charging/discharging) at non dedicated-facilities; Covers percentage substance in the product up to 100 %.*	PROC 8a
10: *Transfer of substance or mixture (charging/discharging) at dedicated facilities; Covers percentage substance in the product up to 100 %.*	PROC 8b
11: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing); Covers percentage substance in the product up to 100 %.*	PROC 9
12: *Tabletting, compression, extrusion, pelettisation, granulation; Covers percentage substance in the product up to 25 %.*	PROC 14
13: *Use as laboratory reagent; Covers percentage substance in the product up to 100 %.*	PROC 15
14: *Low energy manipulation and handling of substances bound in/on materials and/or articles; Covers percentage substance in the product up to 25 %.*	PROC 21

3.2. Conditions of use affecting exposure

3.2.1. Control of environmental exposure: *Flexible foam production at large sites* (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 6.6 tonnes/day
Annual amount per site <= 1.99E3 tonnes/year
Conditions and measures related to biological sewage treatment plant
Provide onsite wastewater treatment.
Assumed domestic sewage treatment plant flow >= 2E3 m3/day
No application of sewage sludge to soil
Other conditions affecting environmental exposure
Receiving surface water flow >= 1.8E4 m3/day

3.2.2. Control of environmental exposure: *Flexible foam production at small sites* (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 0.87 tonnes/day
Annual amount per site <= 262 tonnes/year
Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Assumed domestic sewage treatment plant flow >= 2E3 m3/day
Other conditions affecting environmental exposure
Receiving surface water flow >= 1.8E4 m3/day

3.2.3. Control of environmental exposure: *Use at industrial sites - Flexible*

foam cutting (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 24.52 tonnes/day
Annual amount per site <= 2.45E3 tonnes/year
Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Assumed domestic sewage treatment plant flow >= 2E3 m3/day
Other conditions affecting environmental exposure
Receiving surface water flow >= 1.8E4 m3/day

3.2.4. Control of worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions; Covers percentage substance in the product up to 25 %.* (PROC 1)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

3.2.5. Control of worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions; Covers percentage substance in the product up to 25 %.* (PROC 2)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use

Assumes process temperature up to 40 °C

3.2.6. 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; Covers percentage substance in the product up to 25 %.* (PROC 3)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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 suitable gloves tested to EN374.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

3.2.7. Control of worker exposure: *Chemical production where opportunity for exposure arises; Covers percentage substance in the product up to 25 %.* (PROC 4)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

3.2.8. Control of worker exposure: *Mixing or blending in batch processes; Covers percentage substance in the product up to 25 %.* (PROC 5)

Product (article) characteristics
Covers concentrations up to 25 %

Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
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/discharging) at non dedicated-facilities; Covers percentage substance in the product up to 100 %.* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
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 (charging/discharging) at dedicated facilities; Covers percentage substance in the product up to 100 %.* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 95 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

3.2.11. Control of worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing); Covers percentage substance in the product up to 100 %.* (PROC 9)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

3.2.12. Control of worker exposure: *Tabletting, compression, extrusion, pelettisation, granulation; Covers percentage substance in the product up to 25 %.* (PROC 14)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

3.2.13. Control of worker exposure: *Use as laboratory reagent; Covers percentage substance in the product up to 100 %.* (PROC 15)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

3.2.14. Control of worker exposure: *Low energy manipulation and handling of substances bound in/on materials and/or articles; Covers percentage substance in the product up to 25 %.* (PROC 21)

Product (article) characteristics
Covers concentrations up to 25 %
Solid, medium dustiness
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.
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 chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
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: *Flexible foam production at large sites* (ERC 5)

Release route	Release rate	Release estimation method
Water	7.92E-3 kg/day	Estimated release factor
Air	7.92E-3 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	5.51E-4 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	0.02 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	5.45E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	1.96E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	3.81E-3 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.55E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Predator’s prey (freshwater)	4.58E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator’s prey (marine water)	4.5E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Top predator’s prey (marine water)	2.74E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator’s prey (terrestrial)	2.52E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	1.83E-6 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	2.32E-4 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

3.3.2. Environmental release and exposure: *Flexible foam production at small sites* (ERC 5)

Release route	Release rate	Release estimation method
Water	0.087 kg/day	Estimated release factor
Air	1.04E-3 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	4.35E-3 mg/L (EUSES 2.1.2)	0.014
Sediment (freshwater)	0.157 mg/kg dw (EUSES 2.1.2)	0.014
Marine water	4.35E-4 mg/L (EUSES 2.1.2)	0.014
Sediment (marine water)	0.016 mg/kg dw (EUSES 2.1.2)	0.014
Sewage Treatment Plant	0.042 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	0.012 mg/kg dw (EUSES 2.1.2)	0.034
Predator’s prey (freshwater)	0.027 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator’s prey (marine water)	2.64E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Top predator’s prey (marine water)	7.13E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator’s prey (terrestrial)	4.87E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	2.52E-7 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	4.83E-4 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

3.3.3. Environmental release and exposure: *Use at industrial sites - Flexible*

foam cutting (ERC 5)

Release route	Release rate	Release estimation method
Water	0.049 kg/day	Estimated release factor
Air	0.049 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	2.53E-3 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	0.091 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	2.52E-4 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	9.08E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	0.024 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	6.74E-3 mg/kg dw (EUSES 2.1.2)	0.02
Predator's prey (freshwater)	6.9E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (marine water)	6.82E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Top predator's prey (marine water)	3.21E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (terrestrial)	2.86E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	3.75E-6 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	6.04E-4 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

3.3.4. Worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions; Covers percentage substance in the product up to 25 %.* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.017
Combined, systemic, acute		< 0.01

3.3.5. Worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions; Covers percentage substance in the product up to 25 %.* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.487 mg/m³ (TRA Workers 3.0)	0.059
Inhalation, systemic, acute	0.487 mg/m³ (TRA Workers 3.0)	0.022
Dermal, systemic, long term	0.082 mg/kg bw/day (TRA Workers 3.0)	0.028
Combined, systemic, long term		0.088
Combined, systemic, acute		0.022

3.3.6. Worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition; Covers percentage*

***substance in the product up to 25 %.* (PROC 3)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.487 mg/m³ (TRA Workers 3.0)	0.059
Inhalation, systemic, acute	0.487 mg/m³ (TRA Workers 3.0)	0.022
Dermal, systemic, long term	0.083 mg/kg bw/day (TRA Workers 3.0)	0.028
Combined, systemic, long term		0.088
Combined, systemic, acute		0.022

3.3.7. Worker exposure: *Chemical production where opportunity for exposure arises; Covers percentage substance in the product up to 25 %.* (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.412 mg/kg bw/day (TRA Workers 3.0)	0.141
Combined, systemic, long term		0.151
Combined, systemic, acute		< 0.01

3.3.8. Worker exposure: *Mixing or blending in batch processes; Covers percentage substance in the product up to 25 %.* (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers 3.0)	0.283
Combined, systemic, long term		0.293
Combined, systemic, acute		< 0.01

3.3.9. Worker exposure: *Transfer of substance or mixture (charging/discharging) at non dedicated-facilities; Covers percentage substance in the product up to 100 %.* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.136 mg/m³ (TRA Workers 3.0)	0.017
Inhalation, systemic, acute	0.136 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.471
Combined, systemic, long term		0.488
Combined, systemic, acute		< 0.01

3.3.10. Worker exposure: *Transfer of substance or mixture (charging/discharging) at dedicated facilities; Covers percentage substance in the product up to 100 %.* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.068 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.068 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.471
Combined, systemic, long term		0.479

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, acute		< 0.01

3.3.11. Worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing); Covers percentage substance in the product up to 100 %.* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.136 mg/m³ (TRA Workers 3.0)	0.017
Inhalation, systemic, acute	0.136 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.236
Combined, systemic, long term		0.252
Combined, systemic, acute		< 0.01

3.3.12. Worker exposure: *Tabletting, compression, extrusion, pelettisation, granulation; Covers percentage substance in the product up to 25 %.* (PROC 14)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.206 mg/kg bw/day (TRA Workers 3.0)	0.071
Combined, systemic, long term		0.081
Combined, systemic, acute		< 0.01

3.3.13. Worker exposure: *Use as laboratory reagent; Covers percentage substance in the product up to 100 %.* (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.487 mg/m³ (TRA Workers 3.0)	0.059
Inhalation, systemic, acute	0.487 mg/m³ (TRA Workers 3.0)	0.022
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	0.012
Combined, systemic, long term		0.071
Combined, systemic, acute		0.022

3.3.14. Worker exposure: *Low energy manipulation and handling of substances bound in/on materials and/or articles; Covers percentage substance in the product up to 25 %.* (PROC 21)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	1.8 mg/m³ (Measured data)	0.22
Inhalation, systemic, acute	7.2 mg/m³ (Measured data)	0.319
Dermal, systemic, long term	0.17 mg/kg bw/day (Measured data)	0.058
Combined, systemic, long term		0.278
Combined, systemic, acute		0.319

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

The vapour pressure at operating temperature (40°C) used for the calculation is 3.68E-3 Pa.
The Operational Conditions (OCs) and Risk Management Measures (RMMs) detailed in this contributing scenario ensure that the risk of TCPP exposure to workers is adequately controlled.

4. ES 4: Use at industrial sites; Polymer Preparations and Compounds (PC 32); Various sectors (SU 18, SU 19)

4.1. Title section

ES name: *Use at industrial sites - Foam granules and rebound PUR foam*
Product category: Polymer Preparations and Compounds (PC 32)
Sector of use: Manufacture of furniture (SU 18), Building and construction work (SU 19)

Environment	
1: *Rebonding of flexible PUR foam*	ERC 5
2: *Loose crumb (flexible) foam*	ERC 5
3: *Adhesive pressing*	ERC 5
Worker	
4: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions; Covers percentage substance in the product up to 25 %.*	PROC 1
5: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions; Covers percentage substance in the product up to 25 %.*	PROC 2
6: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition; Covers percentage substance in the product up to 25 %.*	PROC 3
7: *Chemical production where opportunity for exposure arises; Covers percentage substance in the product up to 25 %*	PROC 4
8: *Mixing or blending in batch processes; Covers percentage substance in the product up to 25 %.*	PROC 5
9: *Transfer of substance or mixture (charging/discharging) at non dedicated-facilities; Covers percentage substance in the product up to 100 %.*	PROC 8a
10: *Transfer of substance or mixture (charging/discharging) at dedicated facilities; Covers percentage substance in the product up to 100 %.*	PROC 8b
11: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing); Covers percentage substance in the product up to 100 %.*	PROC 9
12: *Tabletting, compression, extrusion, pelettisation, granulation; Covers percentage substance in the product up to 25 %.*	PROC 14
13: *Use as laboratory reagent; Covers percentage substance in the product up to 100 %.*	PROC 15
14: *Low energy manipulation and handling of substances bound in/on materials and/or articles; Covers percentage substance in the product up to 25 %.*	PROC 21

4.2. Conditions of use affecting exposure

4.2.1. Control of environmental exposure: *Rebonding of flexible PUR foam* (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 38 tonnes/day
Annual amount per site <= 760 tonnes/year
Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Assumed domestic sewage treatment plant flow >= 2E3 m3/day
Other conditions affecting environmental exposure

Receiving surface water flow >= 1.8E4 m3/day

4.2.2. Control of environmental exposure: *Loose crumb (flexible) foam* (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 0.39 tonnes/day
Annual amount per site <= 116.5 tonnes/year
Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Assumed domestic sewage treatment plant flow >= 2E3 m3/day
Other conditions affecting environmental exposure
Receiving surface water flow >= 1.8E4 m3/day

4.2.3. Control of environmental exposure: *Adhesive pressing* (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 0.27 tonnes/day
Annual amount per site <= 26.4 tonnes/year
Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Assumed domestic sewage treatment plant flow >= 2E3 m3/day
Other conditions affecting environmental exposure
Receiving surface water flow >= 1.8E4 m3/day

4.2.4. Control of worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions; Covers percentage substance in the product up to 25 %.* (PROC 1)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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 ‘basic’ employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

4.2.5. Control of worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions; Covers percentage substance in the*

***product up to 25 %.* (PROC 2)**

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

4.2.6. 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; Covers percentage substance in the product up to 25 %.* (PROC 3)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

4.2.7. Control of worker exposure: *Chemical production where opportunity for exposure arises; Covers percentage substance in the product up to 25 %* (PROC 4)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

4.2.8. Control of worker exposure: *Mixing or blending in batch processes; Covers percentage substance in the product up to 25 %.* (PROC 5)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

4.2.9. Control of worker exposure: *Transfer of substance or mixture (charging/discharging) at non dedicated-facilities; Covers percentage substance in the product up to 100 %.* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

4.2.10. Control of worker exposure: *Transfer of substance or mixture (charging/discharging) at dedicated facilities; Covers percentage substance in the product up to 100 %.* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 95 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

4.2.11. Control of worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing); Covers percentage substance in the product up to 100 %.* (PROC 9)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure

Indoor use
Assumes process temperature up to 40 °C

4.2.12. Control of worker exposure: *Tabletting, compression, extrusion, pelettisation, granulation; Covers percentage substance in the product up to 25 %.* (PROC 14)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

4.2.13. Control of worker exposure: *Use as laboratory reagent; Covers percentage substance in the product up to 100 %.* (PROC 15)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

4.2.14. Control of worker exposure: *Low energy manipulation and handling of substances bound in/on materials and/or articles; Covers percentage substance in the product up to 25 %.* (PROC 21)

Technical and organisational conditions and measures

Provide a basic standard of general ventilation (1 to 3 air changes per hour).

4.3. Exposure estimation and reference to its source

4.3.1. Environmental release and exposure: *Rebonding of flexible PUR foam* (ERC 5)

Release route	Release rate	Release estimation method
Water	0 kg/day	Estimated release factor
Air	0.152 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	1.7E-4 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	6.12E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	1.65E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	5.93E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	0 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.57E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Predator’s prey (freshwater)	2.38E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator’s prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Top predator’s prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator’s prey (terrestrial)	2.53E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	2.33E-6 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	2.7E-4 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

4.3.2. Environmental release and exposure: *Loose crumb (flexible) foam* (ERC 5)

Release route	Release rate	Release estimation method
Water	0 kg/day	Estimated release factor
Air	1.56E-3 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	1.7E-4 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	6.12E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	1.65E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	5.93E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	0 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.47E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Predator’s prey (freshwater)	2.38E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator’s prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Top predator’s prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator’s prey (terrestrial)	2.48E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	3.68E-7 mg/m³ (EUSES 2.1.2)	< 0.01

Protection target	Exposure estimate	RCR
Man via environment - Oral	5.8E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

4.3.3. Environmental release and exposure: *Adhesive pressing* (ERC 5)

Release route	Release rate	Release estimation method
Water	0.27 kg/day	Estimated release factor
Air	0.27 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	0.013 mg/L (EUSES 2.1.2)	0.041
Sediment (freshwater)	0.473 mg/kg dw (EUSES 2.1.2)	0.041
Marine water	1.31E-3 mg/L (EUSES 2.1.2)	0.041
Sediment (marine water)	0.047 mg/kg dw (EUSES 2.1.2)	0.041
Sewage Treatment Plant	0.13 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	0.036 mg/kg dw (EUSES 2.1.2)	0.105
Predator's prey (freshwater)	0.027 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (marine water)	2.66E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Top predator's prey (marine water)	7.17E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (terrestrial)	0.015 mg/kg ww (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	2.01E-5 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	3.2E-3 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

4.3.4. Worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions; Covers percentage substance in the product up to 25 %.* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	2.04E-3 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.011
Combined, systemic, acute		< 0.01

4.3.5. Worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions; Covers percentage substance in the product up to 25 %.* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.487 mg/m³ (TRA Workers 3.0)	0.059
Inhalation, systemic, acute	0.487 mg/m³ (TRA Workers 3.0)	0.022
Dermal, systemic, long term	0.082 mg/kg bw/day (TRA Workers 3.0)	0.028
Combined, systemic, long term		0.088
Combined, systemic, acute		0.022

4.3.6. Worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition; Covers percentage substance in the product up to 25 %.* (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.487 mg/m³ (TRA Workers 3.0)	0.059
Inhalation, systemic, acute	0.487 mg/m³ (TRA Workers 3.0)	0.022
Dermal, systemic, long term	0.041 mg/kg bw/day (TRA Workers 3.0)	0.014
Combined, systemic, long term		0.074
Combined, systemic, acute		0.022

4.3.7. Worker exposure: *Chemical production where opportunity for exposure arises; Covers percentage substance in the product up to 25 %* (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.412 mg/kg bw/day (TRA Workers 3.0)	0.141
Combined, systemic, long term		0.151
Combined, systemic, acute		< 0.01

4.3.8. Worker exposure: *Mixing or blending in batch processes; Covers percentage substance in the product up to 25 %.* (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers 3.0)	0.283
Combined, systemic, long term		0.293
Combined, systemic, acute		< 0.01

4.3.9. Worker exposure: *Transfer of substance or mixture (charging/discharging) at non dedicated-facilities; Covers percentage substance in the product up to 100 %.* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.136 mg/m³ (TRA Workers 3.0)	0.017
Inhalation, systemic, acute	0.136 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.471
Combined, systemic, long term		0.488
Combined, systemic, acute		< 0.01

4.3.10. Worker exposure: *Transfer of substance or mixture (charging/discharging) at dedicated facilities; Covers percentage substance in the product up to 100 %.* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.068 mg/m³ (TRA Workers 3.0)	< 0.01

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, acute	0.068 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.471
Combined, systemic, long term		0.479
Combined, systemic, acute		< 0.01

4.3.11. Worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing); Covers percentage substance in the product up to 100 %.* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.136 mg/m³ (TRA Workers 3.0)	0.017
Inhalation, systemic, acute	0.136 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.236
Combined, systemic, long term		0.252
Combined, systemic, acute		< 0.01

4.3.12. Worker exposure: *Tabletting, compression, extrusion, pelettisation, granulation; Covers percentage substance in the product up to 25 %.* (PROC 14)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.206 mg/kg bw/day (TRA Workers 3.0)	0.071
Combined, systemic, long term		0.081
Combined, systemic, acute		< 0.01

4.3.13. Worker exposure: *Use as laboratory reagent; Covers percentage substance in the product up to 100 %.* (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.487 mg/m³ (TRA Workers 3.0)	0.059
Inhalation, systemic, acute	0.487 mg/m³ (TRA Workers 3.0)	0.022
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	0.012
Combined, systemic, long term		0.071
Combined, systemic, acute		0.022

4.3.14. Worker exposure: *Low energy manipulation and handling of substances bound in/on materials and/or articles; Covers percentage substance in the product up to 25 %.* (PROC 21)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.6 mg/m³ (Measured data)	0.073
Inhalation, systemic, acute	2.4 mg/m³ (Measured data)	0.106
Dermal, systemic, long term	0.17 mg/kg bw/day (Measured data)	0.058
Combined, systemic, long term		0.132
Combined, systemic, acute		0.106

4.4. Guidance to DU to evaluate whether he works inside the

boundaries set by the ES

The vapour pressure at operating temperature (40°C) used for the calculation is 3.68E-3 Pa.
The Operational Conditions (OCs) and Risk Management Measures (RMMs) detailed in this contributing scenario ensure that the risk of TCPP exposure to workers is adequately controlled.

5. ES 5: Use at industrial sites; Various products (PC 1, PC 9a, PC 32); Manufacture of plastics products, including compounding and conversion (SU 12)

5.1. Title section

ES name: *Use at industrial sites - CASE, industrial application*
Product category: Adhesives, Sealants (PC 1), Coatings and Paints, Thinners, paint removers (PC 9a), Polymer Preparations and Compounds (PC 32)
Sector of use: Manufacture of plastics products, including compounding and conversion (SU 12)

Environment	
1: *Use at industrial sites - CASE, industrial application*	ERC 5
Worker	
2: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions; Covers percentage substance in the product up to 25 %.*	PROC 1
3: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions; Covers percentage substance in the product up to 25 %.*	PROC 2
4: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition; Covers percentage substance in the product up to 25 %.*	PROC 3
5: *Chemical production where opportunity for exposure arises; Covers percentage substance in the product up to 25 %.*	PROC 4
6: *Mixing or blending in batch processes; Covers percentage substance in the product up to 25 %.*	PROC 5
7: *Calendering operations; Covers percentage substance in the product up to 25 %.*	PROC 6
8: *Industrial spraying; Covers percentage substance in the product up to 25 %.*	PROC 7
9: *Transfer of substance or mixture (charging/discharging) at non dedicated-facilities; Covers percentage substance in the product up to 100 %.*	PROC 8a
10: *Transfer of substance or mixture (charging/discharging) at dedicated facilities; Covers percentage substance in the product up to 100 %.*	PROC 8b
11: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing); Covers percentage substance in the product up to 100 %.*	PROC 9
12: *Roller application or brushing; Covers percentage substance in the product up to 25 %.*	PROC 10
13: *Treatment of articles by dipping and pouring; Covers percentage substance in the product up to 25 %.*	PROC 13
14: *Tabletting, compression, extrusion, pelettisation, granulation; Covers percentage substance in the product up to 25 %.*	PROC 14
15: *Use as laboratory reagent; Covers percentage substance in the product up to 100 %.*	PROC 15

5.2. Conditions of use affecting exposure

5.2.1. Control of environmental exposure: *Use at industrial sites - CASE, industrial application* (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 8.9 tonnes/day
Annual amount per site <= 179 tonnes/year

Conditions and measures related to biological sewage treatment plant
Provide onsite wastewater treatment.
Assumed domestic sewage treatment plant flow >= 2E3 m3/day
Other conditions affecting environmental exposure
Receiving surface water flow >= 1.8E4 m3/day

5.2.2. Control of worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions; Covers percentage substance in the product up to 25 %.* (PROC 1)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
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; Covers percentage substance in the product up to 25 %.* (PROC 2)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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 ‘basic’ employee training.; 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.; For further specification, refer to section 8 of the SDS.
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; Covers*

***percentage substance in the product up to 25 %.* (PROC 3)**

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
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; Covers percentage substance in the product up to 25 %.* (PROC 4)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
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; Covers percentage substance in the product up to 25 %.* (PROC 5)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

5.2.7. Control of worker exposure: *Calendering operations; Covers percentage substance in the product up to 25 %.* (PROC 6)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

5.2.8. Control of worker exposure: *Industrial spraying; Covers percentage substance in the product up to 25 %.* (PROC 7)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 95 %
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 specific activity training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

5.2.9. Control of worker exposure: *Transfer of substance or mixture (charging/discharging) at non dedicated-facilities; Covers percentage substance in the product up to 100 %.* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

5.2.10. Control of worker exposure: *Transfer of substance or mixture (charging/discharging) at dedicated facilities; Covers percentage substance in the product up to 100 %.* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 95 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure

Indoor use
Assumes process temperature up to 40 °C

5.2.11. Control of worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing); Covers percentage substance in the product up to 100 %.* (PROC 9)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

5.2.12. Control of worker exposure: *Roller application or brushing; Covers percentage substance in the product up to 25 %.* (PROC 10)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

5.2.13. Control of worker exposure: *Treatment of articles by dipping and pouring; Covers percentage substance in the product up to 25 %.* (PROC 13)

Product (article) characteristics

Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

5.2.14. Control of worker exposure: *Tabletting, compression, extrusion, pelettisation, granulation; Covers percentage substance in the product up to 25 %.* (PROC 14)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

5.2.15. Control of worker exposure: *Use as laboratory reagent; Covers percentage substance in the product up to 100 %.* (PROC 15)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
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 at industrial sites - CASE, industrial application* (ERC 5)

Release route	Release rate	Release estimation method
Water	0.89 kg/day	Estimated release factor
Air	4.27E-4 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	0.043 mg/L (EUSES 2.1.2)	0.134
Sediment (freshwater)	1.547 mg/kg dw (EUSES 2.1.2)	0.134
Marine water	4.29E-3 mg/L (EUSES 2.1.2)	0.134
Sediment (marine water)	0.155 mg/kg dw (EUSES 2.1.2)	0.134
Sewage Treatment Plant	0.428 mg/L (EUSES 2.1.2)	0.022
Agricultural soil	0.116 mg/kg dw (EUSES 2.1.2)	0.341
Predator's prey (freshwater)	0.019 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (marine water)	1.88E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Top predator's prey (marine water)	5.6E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (terrestrial)	0.048 mg/kg ww (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	1.94E-8 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	3.14E-3 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

5.3.2. Worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions; Covers percentage substance in the product up to 25 %.* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.017
Combined, systemic, acute		< 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; Covers percentage substance in the product up to 25 %.* (PROC 2)**

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.487 mg/m³ (TRA Workers 3.0)	0.059
Inhalation, systemic, acute	0.487 mg/m³ (TRA Workers 3.0)	0.022
Dermal, systemic, long term	0.082 mg/kg bw/day (TRA Workers 3.0)	0.028
Combined, systemic, long term		0.088
Combined, systemic, acute		0.022

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; Covers percentage substance in the product up to 25 %.* (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.487 mg/m³ (TRA Workers 3.0)	0.059
Inhalation, systemic, acute	0.487 mg/m³ (TRA Workers 3.0)	0.022
Dermal, systemic, long term	0.041 mg/kg bw/day (TRA Workers 3.0)	0.014
Combined, systemic, long term		0.074
Combined, systemic, acute		0.022

5.3.5. Worker exposure: *Chemical production where opportunity for exposure arises; Covers percentage substance in the product up to 25 %.* (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.412 mg/kg bw/day (TRA Workers 3.0)	0.141
Combined, systemic, long term		0.151
Combined, systemic, acute		< 0.01

5.3.6. Worker exposure: *Mixing or blending in batch processes; Covers percentage substance in the product up to 25 %.* (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers 3.0)	0.283
Combined, systemic, long term		0.293
Combined, systemic, acute		< 0.01

5.3.7. Worker exposure: *Calendering operations; Covers percentage substance in the product up to 25 %.* (PROC 6)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	1.646 mg/kg bw/day (TRA Workers 3.0)	0.566

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.576
Combined, systemic, acute		< 0.01

5.3.8. Worker exposure: *Industrial spraying; Covers percentage substance in the product up to 25 %.* (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	2.047 mg/m³ (TRA Workers 3.0)	0.25
Inhalation, systemic, acute	8.189 mg/m³ (TRA Workers 3.0)	0.362
Dermal, systemic, long term	1.286 mg/kg bw/day (TRA Workers 3.0)	0.442
Combined, systemic, long term		0.692
Combined, systemic, acute		0.362

5.3.9. Worker exposure: *Transfer of substance or mixture (charging/discharging) at non dedicated-facilities; Covers percentage substance in the product up to 100 %.* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.136 mg/m³ (TRA Workers 3.0)	0.017
Inhalation, systemic, acute	0.136 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.471
Combined, systemic, long term		0.488
Combined, systemic, acute		< 0.01

5.3.10. Worker exposure: *Transfer of substance or mixture (charging/discharging) at dedicated facilities; Covers percentage substance in the product up to 100 %.* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.068 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.068 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.471
Combined, systemic, long term		0.479
Combined, systemic, acute		< 0.01

5.3.11. Worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing); Covers percentage substance in the product up to 100 %.* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.136 mg/m³ (TRA Workers 3.0)	0.017
Inhalation, systemic, acute	0.136 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.236
Combined, systemic, long term		0.252
Combined, systemic, acute		< 0.01

5.3.12. Worker exposure: *Roller application or brushing; Covers percentage substance in the product up to 25 %.* (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	1.646 mg/kg bw/day (TRA Workers 3.0)	0.566
Combined, systemic, long term		0.576
Combined, systemic, acute		< 0.01

5.3.13. Worker exposure: *Treatment of articles by dipping and pouring; Covers percentage substance in the product up to 25 %.* (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers 3.0)	0.283
Combined, systemic, long term		0.293
Combined, systemic, acute		< 0.01

5.3.14. Worker exposure: *Tabletting, compression, extrusion, pelettisation, granulation; Covers percentage substance in the product up to 25 %.* (PROC 14)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Inhalation, systemic, acute	0.082 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.206 mg/kg bw/day (TRA Workers 3.0)	0.071
Combined, systemic, long term		0.081
Combined, systemic, acute		< 0.01

5.3.15. Worker exposure: *Use as laboratory reagent; Covers percentage substance in the product up to 100 %.* (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.487 mg/m³ (TRA Workers 3.0)	0.059
Inhalation, systemic, acute	0.487 mg/m³ (TRA Workers 3.0)	0.022
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	0.012
Combined, systemic, long term		0.071
Combined, systemic, acute		0.022

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

The vapour pressure at operating temperature (40°C) used for the calculation is 3.68E-3 Pa.
The Operational Conditions (OCs) and Risk Management Measures (RMMs) detailed in this contributing scenario ensure that the risk of TCPP exposure to workers is adequately controlled.

6. ES 6: Widespread use by professional workers; Polymer Preparations and Compounds (PC 32); Building and construction work (SU 19)

6.1. Title section

ES name: *Widespread use by professional workers - Rigid (spray) foam, professional application*
Product category: Polymer Preparations and Compounds (PC 32)
Sector of use: Building and construction work (SU 19)

Environment	
1: *Rigid (spray) foam, professional application, indoor*	ERC 8c
2: *Rigid (spray) foam, professional application, outdoor*	ERC 8d
Worker	
3: *Mixing or blending in batch processes; Covers percentage substance in the product up to 15 %.*	PROC 5
4: *Transfer of substance or mixture (charging/discharging) at non dedicated-facilities; Covers percentage substance in the product up to 100 %.*	PROC 8a
5: *Transfer of substance or mixture (charging/discharging) at dedicated facilities; Covers percentage substance in the product up to 100 %.*	PROC 8b
6: *Roller application or brushing; Covers percentage substance in the product up to 15 %.*	PROC 10
7: *Non-industrial spraying; Covers percentage substance in the product up to 15 %.*	PROC 11
8: *Low energy manipulation and handling of substances bound in/on materials and/or articles; Covers percentage substance in the product up to 15 %.*	PROC 21

6.2. Conditions of use affecting exposure

6.2.1. Control of environmental exposure: *Rigid (spray) foam, professional application, indoor* (ERC 8c)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply
Indoor use

6.2.2. Control of environmental exposure: *Rigid (spray) foam, professional application, outdoor* (ERC 8d)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Other conditions affecting environmental exposure
Outdoor use

6.2.3. Control of worker exposure: *Mixing or blending in batch processes; Covers percentage substance in the product up to 15 %.* (PROC 5)

Product (article) characteristics
Covers concentrations up to 15 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Conditions and measures related to personal protection, hygiene and health evaluation

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; 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.; For further specification, refer to section 8 of the SDS.
Wear suitable respiratory protection.; Inhalation - minimum efficiency of 95 %; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C

6.2.4. Control of worker exposure: *Transfer of substance or mixture (charging/discharging) at non dedicated-facilities; Covers percentage substance in the product up to 100 %.* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; 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.; For further specification, refer to section 8 of the SDS.
Wear suitable respiratory protection.; Inhalation - minimum efficiency of 95 %; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C

6.2.5. Control of worker exposure: *Transfer of substance or mixture (charging/discharging) at dedicated facilities; Covers percentage substance in the product up to 100 %.* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
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 chemically resistant gloves (tested to EN374) in combination with specific activity training.; 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.; For further specification, refer to section 8 of the SDS.
Wear suitable respiratory protection.; Inhalation - minimum efficiency of 95 %; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

6.2.6. Control of worker exposure: *Roller application or brushing; Covers percentage substance in the product up to 15 %.* (PROC 10)

Product (article) characteristics
Covers concentrations up to 15 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.; 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.; For further specification, refer to section 8 of the SDS.
Wear suitable respiratory protection.; Inhalation - minimum efficiency of 95 %; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C

6.2.7. Control of worker exposure: *Non-industrial spraying; Covers percentage substance in the product up to 15 %.* (PROC 11)

	Method
Product (Article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 15.0 % .	ART 1.5
• Physical form of the used product: Liquid	ART 1.5
• [ART] Viscosity of the substance/preparation: Liquids with medium viscosity (like oil)	ART 1.5
• [ART] Vapour pressure at process temperature: < 0.012 Pa	ART 1.5
• [ART] Activity coefficient: = 1.0	ART 1.5
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8.0 h/day	ART 1.5
Technical and organisational conditions and measures	
• [ART] Primary emission source proximity: Primary emission source located in the breathing zone of the worker (Near field source)	ART 1.5
• [ART] Housekeeping practices: Demonstrable and effective housekeeping practices in place	ART 1.5
• [ART] Dispersion - General ventilation: No restriction on general ventilation characteristics	ART 1.5
• [ART] Activity class: Spray application of liquids / Surface spraying of liquids	ART 1.5
• [ART] Situation: High application rate (> 3 l/minute)	ART 1.5
• [ART] Spray technique: Spraying with high compressed air use	ART 1.5
• [ART] Spray direction: Spraying in any direction (including upwards)	ART 1.5
• [ART] Primary localized controls: No localized controls [Effectiveness Inhalation: 0%]	ART 1.5
• [ART] Secondary emission source: No secondary emission sources present in the workroom in addition to the source in the breathing zone of the worker	ART 1.5
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: Yes (Respirator with APF of 20) [Effectiveness Inhalation: 95%]	ART 1.5
• Dermal protection (refinement): Yes (Chemically resistant gloves conforming to EN374 with intensive management supervision controls) and (other) appropriate dermal protection [Effectiveness Dermal: 98%]	TRA Workers 3.0 (modified)

	Method
Other conditions affecting workers exposure	
• Place of use: Indoor and outdoor	ART 1.5
• [ART] Dispersion - Room size: Any size workroom	ART 1.5
• Operating temperature: <= 60.0 °C	TRA Workers 3.0 (modified)
• [ART] Details Assessment tool: Advanced REACH Tool v1.5 (ART) for inhalation exposure	ART 1.5
• [ART] Deviation from Advanced REACH Tool: yes, the use of respiratory protective equipment (RPE) is assumed	ART 1.5
• [ART] Details Exposure predictions: The predicted values for inhalation exposure refer to the 90th percentile full-shift exposure	ART 1.5

6.2.8. Control of worker exposure: *Low energy manipulation and handling of substances bound in/on materials and/or articles; Covers percentage substance in the product up to 15 %.* (PROC 21)

Product (article) characteristics
Covers concentrations up to 15 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable respiratory protection.; Inhalation - minimum efficiency of 90 %; For further specification, refer to section 8 of the SDS.
Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Assumes process temperature up to 40 °C

6.3. Exposure estimation and reference to its source

6.3.1. Environmental release and exposure: *Rigid (spray) foam, professional application, indoor* (ERC 8c)

Release route	Release rate	Release estimation method
Water	0 kg/day	Estimated release factor
Air	1.92E-3 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	1.7E-4 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	6.12E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	1.65E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	5.93E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	0 mg/L (EUSES 2.1.2)	< 0.01

Protection target	Exposure estimate	RCR
Agricultural soil	3.45E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Predator's prey (freshwater)	2.38E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Top predator's prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (terrestrial)	2.47E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	1.28E-8 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.97E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

6.3.2. Environmental release and exposure: *Rigid (spray) foam, professional application, outdoor* (ERC 8d)

Release route	Release rate	Release estimation method
Water	0 kg/day	Estimated release factor
Air	1.92E-3 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	1.7E-4 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	6.12E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	1.65E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	5.93E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	0 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.45E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Predator's prey (freshwater)	2.38E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Top predator's prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (terrestrial)	2.47E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	1.28E-8 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.97E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

6.3.3. Worker exposure: *Mixing or blending in batch processes; Covers percentage substance in the product up to 15 %.* (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.041 mg/m³ (ECETOC TRA Workers)	< 0.01
Inhalation, systemic, acute	0.041 mg/m³ (ECETOC TRA Workers)	< 0.01
Dermal, systemic, long term	0.165 mg/kg bw/day (ECETOC TRA Workers)	0.057
Combined, systemic, long term		0.062
Combined, systemic, acute		< 0.01

6.3.4. Worker exposure: *Transfer of substance or mixture (charging/discharging) at non dedicated-facilities; Covers percentage substance in the product up to 100 %.* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.068 mg/m³ (ECETOC TRA Workers)	< 0.01
Inhalation, systemic, acute	0.068 mg/m³ (ECETOC TRA Workers)	< 0.01
Dermal, systemic, long term	0.274 mg/kg bw/day (ECETOC TRA Workers)	0.094
Combined, systemic, long term		0.102
Combined, systemic, acute		< 0.01

6.3.5. Worker exposure: *Transfer of substance or mixture (charging/discharging) at dedicated facilities; Covers percentage substance in the product up to 100 %.* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.068 mg/m³ (ECETOC TRA Workers)	< 0.01
Inhalation, systemic, acute	0.068 mg/m³ (ECETOC TRA Workers)	< 0.01
Dermal, systemic, long term	0.274 mg/kg bw/day (ECETOC TRA Workers)	0.094
Combined, systemic, long term		0.102
Combined, systemic, acute		< 0.01

6.3.6. Worker exposure: *Roller application or brushing; Covers percentage substance in the product up to 15 %.* (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.486 mg/m³ (ECETOC TRA Workers)	0.059
Inhalation, systemic, acute	0.486 mg/m³ (ECETOC TRA Workers)	0.022
Dermal, systemic, long term	0.329 mg/kg bw/day (ECETOC TRA Workers)	0.113
Combined, systemic, long term		0.172
Combined, systemic, acute		0.022

6.3.7. Worker exposure: *Non-industrial spraying; Covers percentage substance in the product up to 15 %.* (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4 mg/m³ (ART)	0.488
Inhalation, systemic, acute	8 mg/m³ (ART)	0.354
Dermal, systemic, long term	1.286 mg/kg bw/day (ECETOC TRA Workers)	0.442
Combined, systemic, long term		0.93
Combined, systemic, acute		0.354

6.3.8. Worker exposure: *Low energy manipulation and handling of substances bound in/on materials and/or articles; Covers percentage substance in the product up to 15 %.* (PROC 21)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	1.2 mg/m³ (ECETOC TRA Workers)	0.146
Inhalation, systemic, acute	4.8 mg/m³ (ECETOC TRA Workers)	0.212
Dermal, systemic, long term	0.17 mg/kg bw/day (ECETOC TRA Workers)	0.058
Combined, systemic, long term		0.205
Combined, systemic, acute		0.212

6.4. Guidance to DU to evaluate whether he works inside the

boundaries set by the ES

The vapour pressure at operating temperature (40°C) used for the calculation is 3.68E-3 Pa.
The Operational Conditions (OCs) and Risk Management Measures (RMMs) detailed in this contributing scenario ensure that the risk of TCPP exposure to workers is adequately controlled.

7. ES 7: Widespread use by professional workers; Various products (PC 1, PC 32); Building and construction work (SU 19)

7.1. Title section

ES name: *Widespread use by professional workers - One-component PUR foams, professional application (foaming)*
Product category: Adhesives, Sealants (PC 1), Polymer Preparations and Compounds (PC 32)
Sector of use: Building and construction work (SU 19)

Environment	
1: *Widespread use by professional workers - One-component PUR foams, professional application (foaming)*	ERC 8c
2: *Widespread use by professional workers - One-component PUR foams, professional application (foaming)*	ERC 8f
Worker	
3: *Non-industrial spraying; Roller application or brushing; Covers percentage substance in the product up to 25 %.*	PROC 11, PROC 10
4: *Low energy manipulation and handling of substances bound in/on materials and/or articles; Covers percentage substance in the product up to 25 %.*	PROC 21

7.2. Conditions of use affecting exposure

7.2.1. Control of environmental exposure: *Widespread use by professional workers - One-component PUR foams, professional application (foaming)* (ERC 8c)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Indoor use

7.2.2. Control of environmental exposure: *Widespread use by professional workers - One-component PUR foams, professional application (foaming)* (ERC 8f)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Outdoor use

7.2.3. Control of worker exposure: *Non-industrial spraying; Roller application or brushing; Covers percentage substance in the product up to 25 %.* (PROC 11, PROC 10)

	Method
Product (Article) characteristics	

	Method
• [ConsExpo Worker] Weight fraction of the compound of interest: 25.0 %	ConsExpo 4.1 (adapted for worker)
• [ConsExpo Worker] Vapour pressure (at application temperature): < 0.0037 Pa	ConsExpo 4.1 (adapted for worker)
• [ConsExpo Worker] Inhalation exposure model / Average molecular weight of the matrix (product minus the compound of interest): 3000 g/mol	ConsExpo 4.1 (adapted for worker)
Amount used (or contained in articles), frequency and duration of use/exposure	
• [ConsExpo Worker] Use frequency: 1.0 times/day	ConsExpo 4.1 (adapted for worker)
• [ConsExpo Worker] Exposure duration (time): 480.0 min	ConsExpo 4.1 (adapted for worker)
• [ConsExpo Worker] Inhalation exposure model / Application duration: 120.0 min	ConsExpo 4.1 (adapted for worker)
• [ConsExpo Worker] Inhalation exposure model / Applied amount: 3300 g	ConsExpo 4.1 (adapted for worker)
• [ConsExpo Worker] Inhalation exposure model / Mass transfer rate: 0.19 m/min	ConsExpo 4.1 (adapted for worker)
• [ConsExpo Worker] Inhalation exposure model / Mass transfer rate - Approximating model: Thibodeux's method	ConsExpo 4.1 (adapted for worker)
• [ConsExpo Worker] Dermal exposure model / Applied amount: 1.0 g	ConsExpo 4.1 (adapted for worker)
Technical and organisational conditions and measures	
• [ConsExpo Worker] Inhalation exposure model / Room volume: 57.5 m3	ConsExpo 4.1 (adapted for worker)
• [ConsExpo Worker] Inhalation exposure model / Ventilation rate: 0.5 air changes/hour	ConsExpo 4.1 (adapted for worker)
• [ConsExpo Worker] Inhalation exposure model / Release area: 8.0 m2	ConsExpo 4.1 (adapted for worker)
Conditions and measures related to personal protection, hygiene and health evaluation	
• [ConsExpo Worker] Dermal Protection (REFINEMENT): yes (minimum efficiency dermal: 90%)	ConsExpo 4.1 (adapted for worker)
Other conditions affecting workers exposure	
• Place of use: Indoor and outdoor	
• [ConsExpo Worker] Application temperature: 40.0 °C	ConsExpo 4.1 (adapted for worker)
• [ConsExpo Worker] Body weight: 65.0 kg	ConsExpo 4.1 (adapted for worker)
• [ConsExpo Worker] Dermal exposure model / Exposed area: 1900 cm2	ConsExpo 4.1 (adapted for worker)
• [ConsExpo Worker] Details Assessment tool: ConsExpo v4.1 for inhalation and dermal exposure	ConsExpo 4.1 (adapted for worker)
• [ConsExpo Worker] Deviation from default scenario?: yes	ConsExpo 4.1 (adapted for worker)
• [ConsExpo Worker] Inhalation exposure model: Exposure to vapour - Evaporation	ConsExpo 4.1 (adapted for worker)
• [ConsExpo Worker] Dermal exposure model: Direct dermal contact with product - Instant application	ConsExpo 4.1 (adapted for worker)

	Method
• [ConsExpo Worker] Default scenario: DO IT YOURSELF PRODUCTS >> Miscellaneous do it yourself products >> Isolation foam >> Application	ConsExpo 4.1 (adapted for worker)

7.2.4. Control of worker exposure: *Low energy manipulation and handling of substances bound in/on materials and/or articles; Covers percentage substance in the product up to 25 %.* (PROC 21)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 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 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
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: *Widespread use by professional workers - One-component PUR foams, professional application (foaming)* (ERC 8c)

Release route	Release rate	Release estimation method
Water	0 kg/day	Estimated release factor
Air	3.07E-3 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	1.7E-4 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	6.12E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	1.65E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	5.93E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	0 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.45E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Predator's prey (freshwater)	2.38E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Top predator's prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01

Protection target	Exposure estimate	RCR
Predator's prey (terrestrial)	2.47E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	1.28E-8 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.97E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

7.3.2. Environmental release and exposure: *Widespread use by professional workers - One-component PUR foams, professional application (foaming)* (ERC 8f)

Release route	Release rate	Release estimation method
Water	0 kg/day	Estimated release factor
Air	3.07E-3 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	1.7E-4 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	6.12E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	1.65E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	5.93E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	0 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.45E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Predator's prey (freshwater)	2.38E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Top predator's prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (terrestrial)	2.47E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	1.28E-8 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.97E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

7.3.3. Worker exposure: *Non-industrial spraying; Roller application or brushing; Covers percentage substance in the product up to 25 %.* (PROC 11, PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.222 mg/m³ (ConsExpo 4.1 (adapted for worker))	0.027
Inhalation, systemic, acute	0.888 mg/m³ (ConsExpo 4.1 (adapted for worker))	0.039
Dermal, systemic, long term	0.385 mg/kg bw/day (ConsExpo 4.1 (adapted for worker))	0.132
Combined, systemic, long term		0.159
Combined, systemic, acute		0.039

7.3.4. Worker exposure: *Low energy manipulation and handling of substances bound in/on materials and/or articles; Covers percentage substance in the product up to 25 %.* (PROC 21)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	3 mg/m³ (ECETOC TRA Workers)	0.366

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, acute	12 mg/m³ (ECETOC TRA Workers)	0.531
Dermal, systemic, long term	0.17 mg/kg bw/day (ECETOC TRA Workers)	0.058
Combined, systemic, long term		0.424
Combined, systemic, acute		0.531

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

The vapour pressure at operating temperature (40°C) used for the calculation is 3.68E-3 Pa.
The Operational Conditions (OCs) and Risk Management Measures (RMMs) detailed in this contributing scenario ensure that the risk of TCPP exposure to workers is adequately controlled.

8. ES 8: Widespread use by professional workers; Various products (PC 1, PC 9a, PC 32); Manufacture of plastics products, including compounding and conversion (SU 12)

8.1. Title section

ES name: *Widespread use by professional workers - CASE, professional application*
Product category: Adhesives, Sealants (PC 1), Coatings and Paints, Thinners, paint removers (PC 9a), Polymer Preparations and Compounds (PC 32)
Sector of use: Manufacture of plastics products, including compounding and conversion (SU 12)

Environment	
1: *Widespread use by professional workers - CASE, professional application*	ERC 8c
2: *Widespread use by professional workers - CASE, professional application*	ERC 8f
Worker	
3: *Mixing or blending in batch processes; Covers percentage substance in the product up to 25 %.*	PROC 5
4: *Transfer of substance or mixture (charging/discharging) at non dedicated-facilities; Covers percentage substance in the product up to 100 %.*	PROC 8a
5: *Transfer of substance or mixture (charging/discharging) at dedicated facilities; Covers percentage substance in the product up to 100 %.*	PROC 8b
6: *Roller application or brushing; Covers percentage substance in the product up to 25 %.*	PROC 10
7: *Non-industrial spraying; Covers percentage substance in the product up to 25 %.*	PROC 11
8: *Treatment of articles by dipping and pouring; Covers percentage substance in the product up to 25 %.*	PROC 13

8.2. Conditions of use affecting exposure

8.2.1. Control of environmental exposure: *Widespread use by professional workers - CASE, professional application* (ERC 8c)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Other conditions affecting environmental exposure
Indoor use

8.2.2. Control of environmental exposure: *Widespread use by professional workers - CASE, professional application* (ERC 8f)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Other conditions affecting environmental exposure
Outdoor use

8.2.3. Control of worker exposure: *Mixing or blending in batch processes; Covers percentage substance in the product up to 25 %.* (PROC 5)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
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 chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.; 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.; For further specification, refer to section 8 of the SDS.
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/discharging) at non dedicated-facilities; Covers percentage substance in the product up to 100 %.* (PROC 8a)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
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 chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.; 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.; For further specification, refer to section 8 of the SDS.
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 (charging/discharging) at dedicated facilities; Covers percentage substance in the product up to 100 %.* (PROC 8b)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
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 chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

8.2.6. Control of worker exposure: *Roller application or brushing; Covers percentage substance in the product up to 25 %.* (PROC 10)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
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 chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

8.2.7. Control of worker exposure: *Non-industrial spraying; Covers percentage substance in the product up to 25 %.* (PROC 11)

	Method
Product (Article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25.0 %	ART 1.5
• Physical form of the used product: Liquid	ART 1.5
• [ART] Viscosity of the substance/preparation: Liquids with medium viscosity (like oil)	ART 1.5
• [ART] Vapour pressure at process temperature: < 0.0037 Pa	ART 1.5
• [ART] Activity coefficient: = 1.0	ART 1.5
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8.0 h/day	ART 1.5 TRA Workers 3.0 (modified)
Technical and organisational conditions and measures	
• [ART] Primary emission source proximity: Primary emission source located in the breathing zone of the worker (Near field source)	ART 1.5
• [ART] Housekeeping practices: General good housekeeping practices in place	ART 1.5
• [ART] Dispersion - General ventilation: No restriction on general ventilation characteristics	ART 1.5
• [ART] Activity class: Spray application of liquids / Surface spraying of liquids	ART 1.5
• [ART] Situation: Moderate application rate (0.3 - 3 l/minute)	ART 1.5
• [ART] Spray technique: Spraying with no or low compressed air use	ART 1.5
• [ART] Spray direction: Only horizontal or downward spraying	ART 1.5
• [ART] Primary localized controls: No localized controls [Effectiveness Inhalation: 0%]	ART 1.5
• [ART] Secondary emission source: No secondary emission sources present in the workroom in addition to the source in the breathing zone of the worker	ART 1.5
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: Yes (Respirator with APF of 20) [Effectiveness Inhalation: 95%]	ART 1.5
• Dermal protection (refinement): Yes (Chemically resistant gloves conforming to	TRA Workers 3.0

	Method
EN374 with intensive management supervision controls) and (other) appropriate dermal protection [Effectiveness Dermal: 98%]	(modified)
Other conditions affecting workers exposure	
• Place of use: Indoor and outdoor	ART 1.5
• Operating temperature: <= 40.0 °C	ART 1.5
• [ART] Details Assessment tool: Advanced REACH Tool v1.5 (ART) for inhalation exposure	ART 1.5
• [ART] Deviation from Advanced REACH Tool: yes, the use of respiratory protective equipment (RPE) is assumed	ART 1.5
• [ART] Details Exposure predictions: The predicted values for inhalation exposure refer to the 90th percentile full-shift exposure	ART 1.5

8.2.8. Control of worker exposure: *Treatment of articles by dipping and pouring; Covers percentage substance in the product up to 25 %.* (PROC 13)

Product (article) characteristics
Covers concentrations up to 25 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; 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.; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Outdoor 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 by professional workers - CASE, professional application* (ERC 8c)

Release route	Release rate	Release estimation method
Water	0 kg/day	Estimated release factor
Air	4.13E-5 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	1.7E-4 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	6.12E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	1.65E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	5.93E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	0 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.45E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Predator's prey (freshwater)	2.38E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01

Protection target	Exposure estimate	RCR
Top predator's prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (terrestrial)	2.47E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	1.28E-8 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.97E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

8.3.2. Environmental release and exposure: *Widespread use by professional workers - CASE, professional application* (ERC 8f)

Release route	Release rate	Release estimation method
Water	0 kg/day	Estimated release factor
Air	4.13E-5 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	1.7E-4 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	6.12E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	1.65E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	5.93E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	0 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.45E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Predator's prey (freshwater)	2.38E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Top predator's prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (terrestrial)	2.47E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	1.28E-8 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.97E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

8.3.3. Worker exposure: *Mixing or blending in batch processes; Covers percentage substance in the product up to 25 %.* (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.487 mg/m³ (TRA Workers 3.0)	0.059
Inhalation, systemic, acute	0.487 mg/m³ (TRA Workers 3.0)	0.022
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers 3.0)	0.283
Combined, systemic, long term		0.342
Combined, systemic, acute		0.022

8.3.4. Worker exposure: *Transfer of substance or mixture (charging/discharging) at non dedicated-facilities; Covers percentage substance in the product up to 100 %.* (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.487 mg/m³ (TRA Workers 3.0)	0.059
Inhalation, systemic, acute	0.487 mg/m³ (TRA Workers 3.0)	0.022
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers 3.0)	0.471

Route of exposure and type of effects	Exposure estimate	RCR
Combined, systemic, long term		0.53
Combined, systemic, acute		0.022

8.3.5. Worker exposure: *Transfer of substance or mixture (charging/discharging) at dedicated facilities; Covers percentage substance in the product up to 100 %.* (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.487 mg/m³ (TRA Workers 3.0)	0.059
Inhalation, systemic, acute	0.487 mg/m³ (TRA Workers 3.0)	0.022
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers 3.0)	0.283
Combined, systemic, long term		0.342
Combined, systemic, acute		0.022

8.3.6. Worker exposure: *Roller application or brushing; Covers percentage substance in the product up to 25 %.* (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.487 mg/m³ (TRA Workers 3.0)	0.059
Inhalation, systemic, acute	0.487 mg/m³ (TRA Workers 3.0)	0.022
Dermal, systemic, long term	1.646 mg/kg bw/day (TRA Workers 3.0)	0.566
Combined, systemic, long term		0.625
Combined, systemic, acute		0.022

8.3.7. Worker exposure: *Non-industrial spraying; Covers percentage substance in the product up to 25 %.* (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.295 mg/m³ (ART)	0.036
Inhalation, systemic, acute	0.59 mg/m³ (ART)	0.026
Dermal, systemic, long term	1.286 mg/kg bw/day (ART)	0.442
Combined, systemic, long term		0.478
Combined, systemic, acute		0.026

8.3.8. Worker exposure: *Treatment of articles by dipping and pouring; Covers percentage substance in the product up to 25 %.* (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.487 mg/m³ (TRA Workers 3.0)	0.059
Inhalation, systemic, acute	0.487 mg/m³ (TRA Workers 3.0)	0.022
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers 3.0)	0.283
Combined, systemic, long term		0.342
Combined, systemic, acute		0.022

8.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The vapour pressure at operating temperature (40°C) used for the calculation is 3.68E-3 Pa.
The Operational Conditions (OCs) and Risk Management Measures (RMMs) detailed in this contributing scenario ensure that the risk of TCPP exposure to workers is adequately controlled.

9. ES 9: Widespread use by professional workers

9.1. Title section

ES name: *Widespread use by professional workers - Laboratory use, professional*

Environment	
1: *Widespread use by professional workers - Laboratory use, professional*	ERC 8c
Worker	
2: *Use as laboratory reagent; Covers percentage substance in the product up to 100 %. (*	PROC 15

9.2. Conditions of use affecting exposure

9.2.1. Control of environmental exposure: *Widespread use by professional workers - Laboratory use, professional* (ERC 8c)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.

9.2.2. Control of worker exposure: *Use as laboratory reagent; Covers percentage substance in the product up to 100 %. (* (PROC 15)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Local exhaust ventilation; Inhalation - minimum efficiency of 80 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.; 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.; For further specification, refer to section 8 of the SDS.
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: *Widespread use by professional workers - Laboratory use, professional* (ERC 8c)

Release route	Release rate	Release estimation method
Water	1.65E-4 kg/day	ERC
Air	8.25E-5 kg/day	ERC
Soil	0 kg/day	ERC

Protection target	Exposure estimate	RCR
Fresh water	1.78E-4 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	6.41E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	1.72E-5 mg/L (EUSES 2.1.2)	< 0.01

Protection target	Exposure estimate	RCR
Sediment (marine water)	6.21E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	7.93E-5 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.67E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Predator's prey (freshwater)	2.44E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (marine water)	2.36E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Top predator's prey (marine water)	2.31E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (terrestrial)	2.56E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	1.28E-8 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	2.06E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

9.3.2. Worker exposure: *Use as laboratory reagent; Covers percentage substance in the product up to 100 %. (* (PROC 15)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.273 mg/m³ (TRA Workers 3.0)	0.033
Inhalation, systemic, acute	0.273 mg/m³ (TRA Workers 3.0)	0.012
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	0.012
Combined, systemic, long term		0.045
Combined, systemic, acute		0.012

9.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The vapour pressure at operating temperature (40°C) used for the calculation is 3.68E-3 Pa.
The Operational Conditions (OCs) and Risk Management Measures (RMMs) detailed in this contributing scenario ensure that the risk of TCPP exposure to workers is adequately controlled.

10. ES 10: Consumer use; Various products (PC 1, PC 32)

10.1. Title section

ES name: *Consumer use - One-component PUR foams, consumer application (foaming)*
Product category: Adhesives, Sealants (PC 1), Polymer Preparations and Compounds (PC 32)

Environment	
1: *Consumer use - One-component PUR foams, consumer application (foaming)*	ERC 8c
2: *Consumer use - One-component PUR foams, consumer application (foaming)*	ERC 8f
Consumer	
3: *Adhesives, sealants; Covers percentage substance in the product up to 25 %.*	PC 1
4: *Polymer preparations and compounds; Covers percentage substance in the product up to 25 %.*	PC 32

10.2. Conditions of use affecting exposure

10.2.1. Control of environmental exposure: *Consumer use - One-component PUR foams, consumer application (foaming)* (ERC 8c)

Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Municipal sewage treatment plant is assumed.

10.2.2. Control of environmental exposure: *Consumer use - One-component PUR foams, consumer application (foaming)* (ERC 8f)

Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Municipal sewage treatment plant is assumed.

10.2.3. Control of consumer exposure: *Adhesives, sealants; Covers percentage substance in the product up to 25 %.* (PC 1)

	Method
Product (article) characteristics	
• [ConsExpo] Weight fraction of the compound of interest: 25.0 % .	ConsExpo 4.1
• [ConsExpo] Vapour pressure (at application temperature): < 0.0037 Pa	ConsExpo 4.1
• [ConsExpo] Inhalation exposure model / Average molecular weight of the matrix (product minus the compound of interest): 3000 g/mol	ConsExpo 4.1
• Exposure via oral route: Oral exposure is considered to be not relevant	ConsExpo 4.1
Amount used (or contained in articles), frequency and duration of use/exposure	
• [ConsExpo] Use frequency: 0.00055 times/day	ConsExpo 4.1
• [ConsExpo] Exposure duration (time): 480.0 min	ConsExpo 4.1
• [ConsExpo] Inhalation exposure model / Application duration: 30.0 min	ConsExpo 4.1
• [ConsExpo] Inhalation exposure model / Applied amount: 825.0 g	ConsExpo 4.1
• [ConsExpo] Inhalation exposure model / Mass transfer rate: 0.19 m/min	ConsExpo 4.1
• [ConsExpo] Inhalation exposure model / Mass transfer rate - Approximating model: Thibodeux's method	ConsExpo 4.1
• [ConsExpo] Dermal exposure model / Applied amount: 0.25 g	ConsExpo 4.1

	Method
Information and behavioral advice for consumers	
• [ConsExpo] Inhalation exposure model / Ventilation rate: 0.5 air changes/hour	ConsExpo 4.1
Other conditions affecting consumers exposure	
• [ConsExpo] Application temperature: 40.0 °C	ConsExpo 4.1
• [ConsExpo] Body weight: 65.0 kg	ConsExpo 4.1
• [ConsExpo] Dermal exposure model / Exposed area: 1900 cm2	ConsExpo 4.1
• [ConsExpo] Inhalation exposure model / Release area: 2.0 m2	ConsExpo 4.1
• [ConsExpo] Inhalation exposure model / Room volume: 57.5 m3	ConsExpo 4.1
• [ConsExpo] Default scenario: DO IT YOURSELF PRODUCTS >> Miscellaneous do it yourself products >> Isolation foam >> Application	ConsExpo 4.1
• [ConsExpo] Deviation from default scenario?: yes	ConsExpo 4.1
• [ConsExpo] Details Assessment tool: ConsExpo v4.1 for inhalation and dermal exposure	ConsExpo 4.1
• [ConsExpo] Inhalation exposure model: Exposure to vapour - Evaporation	ConsExpo 4.1
• [ConsExpo] Dermal exposure model: Direct dermal contact with product - Instant application	ConsExpo 4.1

10.2.4. Control of consumer exposure: *Polymer preparations and compounds; Covers percentage substance in the product up to 25 %.* (PC 32)

	Method
Product (article) characteristics	
• [ConsExpo] Weight fraction of the compound of interest: 25.0 % .	ConsExpo 4.1
• [ConsExpo] Vapour pressure (at application temperature): < 0.0037 Pa	ConsExpo 4.1
• [ConsExpo] Inhalation exposure model / Average molecular weight of the matrix (product minus the compound of interest): 3000 g/mol	ConsExpo 4.1
• Exposure via oral route: Oral exposure is considered to be not relevant	ConsExpo 4.1
Amount used (or contained in articles), frequency and duration of use/exposure	
• [ConsExpo] Use frequency: 0.00055 times/day	ConsExpo 4.1
• [ConsExpo] Exposure duration (time): 480.0 min	ConsExpo 4.1
• [ConsExpo] Inhalation exposure model / Application duration: 30.0 min	ConsExpo 4.1
• [ConsExpo] Inhalation exposure model / Applied amount: 825.0 g	ConsExpo 4.1
• [ConsExpo] Inhalation exposure model / Mass transfer rate: 0.19 m/min	ConsExpo 4.1
• [ConsExpo] Inhalation exposure model / Mass transfer rate - Approximating model: Thibodeux's method	ConsExpo 4.1
• [ConsExpo] Dermal exposure model / Applied amount: 0.25 g	ConsExpo 4.1
Information and behavioral advice for consumers	
• [ConsExpo] Inhalation exposure model / Ventilation rate: 0.5 air changes/hour	ConsExpo 4.1
Other conditions affecting consumers exposure	
• [ConsExpo] Application temperature: 40.0 °C	ConsExpo 4.1
• [ConsExpo] Body weight: 65.0 kg	ConsExpo 4.1
• [ConsExpo] Dermal exposure model / Exposed area: 1900 cm2	ConsExpo 4.1
• [ConsExpo] Inhalation exposure model / Release area: 2.0 m2	ConsExpo 4.1
• [ConsExpo] Inhalation exposure model / Room volume: 57.5 m3	ConsExpo 4.1

	Method
• [ConsExpo] Default scenario: DO IT YOURSELF PRODUCTS >> Miscellaneous do it yourself products >> Isolation foam >> Application	ConsExpo 4.1
• [ConsExpo] Deviation from default scenario?: yes	ConsExpo 4.1
• [ConsExpo] Details Assessment tool: ConsExpo v4.1 for inhalation and dermal exposure	ConsExpo 4.1
• [ConsExpo] Inhalation exposure model: Exposure to vapour - Evaporation	ConsExpo 4.1
• [ConsExpo] Dermal exposure model: Direct dermal contact with product - Instant application	ConsExpo 4.1

10.3. Exposure estimation and reference to its source

10.3.1. Environmental release and exposure: *Consumer use - One-component PUR foams, consumer application (foaming)* (ERC 8c)

Release route	Release rate	Release estimation method
Water	0 kg/day	Estimated release factor
Air	1.63E-3 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	1.7E-4 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	6.12E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	1.65E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	5.93E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	0 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.45E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Predator’s prey (freshwater)	2.38E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator’s prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Top predator’s prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator’s prey (terrestrial)	2.47E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	1.28E-8 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.97E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

10.3.2. Environmental release and exposure: *Consumer use - One-component PUR foams, consumer application (foaming)* (ERC 8f)

Release route	Release rate	Release estimation method
Water	0 kg/day	Estimated release factor
Air	1.63E-3 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	1.7E-4 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	6.12E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	1.65E-5 mg/L (EUSES 2.1.2)	< 0.01

Protection target	Exposure estimate	RCR
Sediment (marine water)	5.93E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	0 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.45E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Predator's prey (freshwater)	2.38E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Top predator's prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (terrestrial)	2.47E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	1.28E-8 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.97E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

10.3.3. Consumer exposure: *Adhesives, sealants; Covers percentage substance in the product up to 25 %.* (PC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	3.42E-7 mg/m³ (ConsExpo)	< 0.01
Inhalation, systemic, acute	0.032 mg/m³ (ConsExpo)	< 0.01
Dermal, systemic, long term	5.27E-4 mg/kg bw/day (ConsExpo)	< 0.01
Combined, systemic, acute		< 0.01

10.3.4. Consumer exposure: *Polymer preparations and compounds; Covers percentage substance in the product up to 25 %.* (PC 32)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	3.42E-7 mg/m³ (ConsExpo)	< 0.01
Inhalation, systemic, acute	0.03 mg/m³ (ConsExpo)	< 0.01
Dermal, systemic, long term	5.27E-4 mg/kg bw/day (ConsExpo)	< 0.01
Combined, systemic, acute		< 0.01

10.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The vapour pressure at operating temperature (40°C) used for the calculation is 3.68E-3 Pa.
The Operational Conditions (OCs) and Risk Management Measures (RMMs) detailed in this contributing scenario ensure that the risk of TCPP exposure to workers is adequately controlled.

11. ES 11: Service life (consumers); Plastic articles (AC 13)

11.1. Title section

ES name: *Service life (consumers) - Rigid foam, service life*
Article category: Plastic articles (AC 13)

Environment	
1: *Rigid foam, service life*	ERC 10a
2: *Adhesive pressed (rigid) foam, service life*	ERC 11a
Consumer	
3: *Plastic articles*	AC 13

11.2. Conditions of use affecting exposure

11.2.1. Control of environmental exposure: *Rigid foam, service life* (ERC 10a)

Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Municipal sewage treatment plant is assumed.

11.2.2. Control of environmental exposure: *Adhesive pressed (rigid) foam, service life* (ERC 11a)

Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Municipal sewage treatment plant is assumed.

11.2.3. Control of consumer exposure: *Plastic articles* (AC 13)

Product (article) characteristics
Assumes no dermal contact
Oral exposure is considered to be not relevant.

11.3. Exposure estimation and reference to its source

11.3.1. Environmental release and exposure: *Rigid foam, service life* (ERC 10a)

Release route	**Release rate**	**Release estimation method**
Water	0 kg/day	Estimated release factor
Air	0 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	**Exposure estimate**	**RCR**
Fresh water	1.7E-4 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	6.12E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	1.65E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	5.93E-4 mg/kg dw (EUSES 2.1.2)	< 0.01

Protection target	Exposure estimate	RCR
Sewage Treatment Plant	0 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.45E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Predator's prey (freshwater)	2.38E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Top predator's prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (terrestrial)	2.47E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	1.28E-8 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.97E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

11.3.2. Environmental release and exposure: *Adhesive pressed (rigid) foam, service life* (ERC 11a)

Release route	Release rate	Release estimation method
Water	7.99E-6 kg/day	Estimated release factor
Air	7.99E-6 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	1.7E-4 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	6.14E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	1.65E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	5.94E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	3.84E-6 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.46E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Predator's prey (freshwater)	2.38E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (marine water)	2.31E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Top predator's prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (terrestrial)	2.48E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	1.28E-8 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.97E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

11.3.3. Consumer exposure: *Plastic articles* (AC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	1 µg/m³ (Measured data)	< 0.01
Inhalation, systemic, acute	1 µg/m³ (Measured data)	< 0.01
Combined, systemic, acute		< 0.01

11.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The vapour pressure at operating temperature (40°C) used for the calculation is 3.68E-3 Pa.
The Operational Conditions (OCs) and Risk Management Measures (RMMs) detailed in this contributing scenario ensure that the risk of TCPP exposure to workers is adequately controlled.

12. ES 12: Service life (consumers); Vehicles (AC 1)

12.1. Title section

ES name: *Service life (consumers) - Flexible foam, service life*
Article category: Vehicles (AC 1)

Environment	
1: *Flexible foam, service life*	ERC 10a
2: *Rebonded (flexible) foam, service life*	ERC 10a
3: *Loose crumb (flexible) foam, service life*	ERC 10a
Consumer	
4: *Vehicles*	AC 1

12.2. Conditions of use affecting exposure

12.2.1. Control of environmental exposure: *Flexible foam, service life* (ERC 10a)

Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Municipal sewage treatment plant is assumed.

12.2.2. Control of environmental exposure: *Rebonded (flexible) foam, service life* (ERC 10a)

Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Municipal sewage treatment plant is assumed.

12.2.3. Control of environmental exposure: *Loose crumb (flexible) foam, service life* (ERC 10a)

Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Municipal sewage treatment plant is assumed.

12.2.4. Control of consumer exposure: *Vehicles* (AC 1)

	Method
Product (article) characteristics	
• [ConsExpo] Weight fraction of the compound of interest: 25.0 %	ConsExpo 4.1
• [ConsExpo] Vapour pressure (at application temperature): < 0.0037 Pa	ConsExpo 4.1
• Exposure via dermal route: No dermal contact	ConsExpo 4.1
• Exposure via oral route: Oral exposure is considered to be not relevant	ConsExpo 4.1
Amount used (or contained in articles), frequency and duration of use/exposure	
• [ConsExpo] Use frequency: 1.0 times/day	ConsExpo 4.1
• [ConsExpo] Exposure duration (time): 480.0 min	ConsExpo 4.1
• [ConsExpo] Inhalation exposure model / Release duration: 480.0 min	ConsExpo 4.1

	Method
• [ConsExpo] Inhalation exposure model / Applied amount: 2000 g	ConsExpo 4.1
Information and behavioral advice for consumers	
• [ConsExpo] Inhalation exposure model / Ventilation rate: 0.5 air changes/hour	ConsExpo 4.1
Other conditions affecting consumers exposure	
• [ConsExpo] Application temperature: 40.0 °C	ConsExpo 4.1
• [ConsExpo] Body weight: 65.0 kg	ConsExpo 4.1
• [ConsExpo] Inhalation exposure model / Room volume: 2.0 m3 *A room size of 2 m3 is taken for assessment.*	ConsExpo 4.1
• [ConsExpo] Details Assessment tool: ConsExpo v4.1 for inhalation exposure	ConsExpo 4.1
• [ConsExpo] Inhalation exposure model: Exposure to vapour - Constant rate	ConsExpo 4.1
• [ConsExpo] Inhalation exposure model / Air concentration limited to the vapour pressure of the pure substance?: yes	ConsExpo 4.1

12.3. Exposure estimation and reference to its source

12.3.1. Environmental release and exposure: *Flexible foam, service life* (ERC 10a)

Release route	Release rate	Release estimation method
Water	0 kg/day	Estimated release factor
Air	1.73E-4 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	1.7E-4 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	6.12E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	1.65E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	5.93E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	0 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.45E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Predator’s prey (freshwater)	2.38E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator’s prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Top predator’s prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator’s prey (terrestrial)	2.47E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	1.28E-8 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.97E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

12.3.2. Environmental release and exposure: *Rebonded (flexible) foam, service life* (ERC 10a)

Release route	Release rate	Release estimation method
Water	0 kg/day	Estimated release factor
Air	1.73E-3 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	1.7E-4 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	6.12E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	1.65E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	5.93E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	0 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.45E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Predator's prey (freshwater)	2.38E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Top predator's prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (terrestrial)	2.47E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	1.28E-8 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.97E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

12.3.3. Environmental release and exposure: *Loose crumb (flexible) foam, service life* (ERC 10a)

Release route	Release rate	Release estimation method
Water	0 kg/day	Estimated release factor
Air	1.73E-4 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	1.7E-4 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	6.12E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	1.65E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	5.93E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	0 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	3.45E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Predator's prey (freshwater)	2.38E-3 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Top predator's prey (marine water)	2.3E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Predator's prey (terrestrial)	2.47E-4 mg/kg ww (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation	1.28E-8 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.97E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

12.3.4. Consumer exposure: *Vehicles* (AC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.155 mg/m³ (ConsExpo 4.1)	0.107
Inhalation, systemic, acute	0.464 mg/m³ (ConsExpo 4.1)	0.083
Dermal, systemic, long term	0 mg/kg bw/day (ConsExpo 4.1)	<0.01
Oral, systemic, long term	0 mg/kg bw/day (ConsExpo 4.1)	< 0.01
Combined routes, systemic, long-term		0.107

Route of exposure and type of effects	Exposure estimate	RCR
Combined routes, systemic, acute		0.083

12.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The vapour pressure at operating temperature (40°C) used for the calculation is 3.68E-3 Pa.
The Operational Conditions (OCs) and Risk Management Measures (RMMs) detailed in this contributing scenario ensure that the risk of TCPP exposure to workers is adequately controlled.