SIBUR-KHIMPROM JSC

SAFETY DATA SHEET

According to Regulations (EC) 1907/2006 (REACH), (EC) 1272/2008 (CLP) & (EU) 2015/830

STYRENE

Version: 3.2
Date created: 24/01/2019

SECTION 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

1.1. Product identifier

Product form:	Substance
Substance name:	Styrene
Chemical name:	Styrene
EC index No.:	601-026-00-0
EC No.:	202-851-5
CAS-No.:	100-42-5
REACH registration No:	01-2119457861-32-0016
Formula:	C8H8
Synonyms:	Phenyl ethylene, Phenyl ethene, Vinyl benzene, Ethenyl benzene, Styrene monomer
Trade names:	Styrene

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

1.2.1. Relevant identified uses

Use of the substance/mixture:	Manufacturing of UP/VE resins and formulated resins (Gelcoat, Colour Paste, Putty, Bonding paste / Adhesive, etc.) Batch suspension polymerisation of Polystyrene (HIPS and GPPS) Continuous mass polymerisation of Polystyrene (HIPS and GPPS) Production of Expandable Polystyrene Production of other Styrene based polymeric dispersions FRP manufacturing in an industrial setting, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.) Production of Styrene Butadiene Latex (SBL) Production of Copolymers of Styrene Production of filled Polyols Production of Styrene Butadiene Rubber (SBR) Production of Styrene Isoprene Copolymers FRP manufacturing in a professional setting, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.) *For the detailed identified uses of the product see Annex.*
Most common technical function of substance:	Monomer

1.2.2. Uses advised against

Restrictions on use:	Uses other than those given in section 1.2.1 are not recommended unless an assessment is completed, prior to commencement of that use, which demonstrates that the use will be controlled.

Consumer uses advised against:
Consumer use of liquid UP resin for repair purposes
Consumer use of resin paste used as fillers/putties
For the detailed information on Consumer uses advised against of the product see Section 16.

1.3. Details of the supplier of the safety data sheet

Only representative

Company name:	Gazprom Marketing and Trading France
Address:	68 avenue des Champs-Elysées, 75008, Paris, France
Contact Telephone:	+33 1 42 99 73 50
Fax:	+33 1 42 99 73 99
Email Address:	didier.lebout@gazprom-mt.com

Manufacturer

Company name:	Sibur-Khimprom JSC
Address:	98, Promishlennaya str., Perm, Perm region, 614055, Russian Federation
Contact phone:	+7 3422 90-89-01 (Moscow, 7.00 to 15.00) - Chief Engineer
Fax:	+7 3422 90-86-60
Email Address:	mail-shp@sibur.ru; techservice@sibur.ru
Emergency Telephone:	+7 3422 90-87-05 (round the clock)
Importer:	List of importers is available with the Only Representative

1.4. Emergency telephone number

Emergency phone in the country of delivery	**112** (*Please note that emergency numbers may vary depending upon the country of delivery though 112 remains valid as universal number*

SECTION 2. HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

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

Flam. Liquid 3	H226
Asp. Tox. 1	H304
Skin Irrit. 2	H315
Eye Irrit. 2	H319
Acute Tox. 4	H332
STOT Single Exp. 3	H335
Repr. 2	H361
STOT Rep. Exp. 1	H372
Aquatic Chronic 3	H412

Full text of hazard classes and H-statements : see section 16

2.2. Label elements

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

Hazard pictograms (CLP):

GHS02 GHS07 GHS08

Signal word (CLP): **Danger**

Hazard statements (CLP): H226: Flammable liquid and vapour.
H304: May be fatal if swallowed and enters airways.

	H315: Causes skin irritation. H319: Causes serious eye irritation H332: Harmful if inhaled H335: May cause respiratory irritation. (Affected organs: Nose. Route of exposure: Inhalation). H361: Suspected of damaging fertility or the unborn child. H372: Causes damage to organs through prolonged or repeated exposure (Affected organs: ear. Route of exposure: Inhalation). H412: Harmful to aquatic life with long lasting effects.
Precautionary statements (CLP):	P210: Keep away from heat/sparks/open flames/hot surfaces. No smoking. P260 Do not breathe dust/fume/gas/mist/vapours/spray P280: Wear protective gloves/protective clothing/eye protection/face protection. P331 Do NOT induce vomiting P303+P361+P353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. P305+P351+P338, IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P403+P233: Store in a well-ventilated place. Keep container tightly closed.
EUH-statements:	Not applicable

2.3. Other hazards

Other hazards not contributing to the classification:	No other hazards identified.
Assessment PBT / vPvB:	According to Annex XIII of Regulation (EC) No.1907/2006 (REACH): - not fulfilling PBT (persistent/bioaccumulative/toxic) criteria; - not fulfilling vPvB (very persistent/very bioaccummulative) criteria.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances

Name	**Product identifier**	**%**	**Classification [CLP])**
Styrene	(CAS-No.) 100-42-5 (EC No.) 202-851-5 (EC index No.) 601-026-00-0 (REACH-no) 01-2119457861-32-0016	< 99.6—100%	H226; H304; H315; H319; H332; H335; H361; H372; H412
Additives (stabilizer inhibits the polymerization of styrene)			
4-tert-butylpyrocatechol	(CAS-No.) 98-29-3 (EC No.) 202-653-9	5 - 10 ppm	H302; H312; H314; H317; H400; H411

Full text of hazard classes and H-statements : see section 16.
The product does not contain impurities or additives that could affect product's labelling and classification according to Regulation (EC) No 1272/2008 (CLP).

3.2. Mixtures

Not applicable

SECTION 4. FIRST-AID MEASURES

4.1. Description of first aid measures

First-aid measures general

Remove contaminated clothing. If danger of consciousness loss, place patient in recovery position and transport accordingly. Apply artificial respiration if necessary.

Emergency Personnel Protection: First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection).

First-aid measures after inhalation

Keep patient calm, move person to fresh air. If not breathing, give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask, etc). If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

First-aid measures after skin contact

In case of contact with substance, immediately flush skin with plenty of water for at least 20 minutes.

In case of burns, immediately cool affected skin for as long as possible with cold water.

Remove and isolate contaminated clothing and shoes. Do not remove clothing if adhering to skin. Wash clothing before reuse.

First-aid measures after eye contact

Immediately wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

First-aid measures after ingestion

Keep patient calm, remove to fresh air, do NOT induce vomiting. Call a physician and/or transport to emergency facility immediately.

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

Symptoms/effects after inhalation:	Dry mouth, cough, convulsions, loss of reflexes, cyanosis of the skin, drop in body temperature, muscle twitching, frequent pulse. Drowsiness, dizziness, headache. Local irritation symptoms. Nausea, vomiting. Muscle twitching, frequent pulse. Symptoms of intoxication.
Symptoms/effects after skin contact:	Dryness, redness, itch.
Symptoms/effects after eye contact:	Serious eye damage. Irritation of eyes and mucous membrane. Itchy, lachrymation, redness, pain.
Symptoms/effects after ingestion:	Stomach-ache.

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

Advice to physician

Maintain adequate ventilation and oxygenation of the patient. Because rapid absorption may occur through the lungs if aspirated and cause systemic effects, the decision of whether to induce vomiting or not should be made by a physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. If burn is present, treat as any thermal burn, after decontamination. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

SECTION 5. FIRE-FIGHTING MEASURES

5.1. Extinguishing media

Suitable extinguishing media:	LARGE FIRE: Use water spray, fog or regular foam. SMALL FIRE: Dry extinguishing media, foam, carbon dioxide (CO_2)
Unsuitable extinguishing media	Do not use water jet. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

5.2. Special hazards arising from the substance or mixture

Fire hazard:	Flammable mixtures of this product are readily ignited even by static discharge. Vapours are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Flammable mixtures may exist within the vapor space of containers at room temperature. Flammable concentrations of vapor can accumulate at temperatures above flash point. Dense smoke is produced when product burns.
Explosion hazard:	Container may rupture from polymerization. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Electrically ground and bond all equipment.
Hazardous decomposition products in case of fire:	During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Carbon monoxide. Carbon dioxide.

5.3. Advice for firefighters

Firefighting instructions:	Keep people away. Isolate fire and deny unnecessary entry. Stay upwind. Keep out of low areas where gases (fumes) can accumulate. Water may not be effective in extinguishing fire. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Do not use direct water stream. May spread fire. Eliminate ignition sources. Move container from fire area if this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Avoid accumulation of water. Product may be carried across water surface spreading fire or contacting an ignition source. Contain fire water run-off if possible. Fire water run-off, if not contained, may cause environmental damage.
Protection during firefighting:	Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location.
Further information:	Keep containers cool by spraying with water if exposed to fire.

SECTION 6. ACCIDENTAL RELEASE MEASURE

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Emergency procedures	Use breathing apparatus if exposed to vapours/dust/aerosol. Avoid contact with skin, eyes, and clothing. Sources of ignition should be kept well clear. Stay upwind. Keep out of low areas. Ventilate closed spaces before entering. Keep unauthorized personnel away. Fully encapsulating, vapour protective clothing should be worn for spills and leaks with no fire. Do not touch or walk through spilled material.

6.1.2. For emergency responders

Emergency procedures	As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Ventilate contaminated area thoroughly. Do not breathe vapour. Wear protective equipment. Take off immediately all contaminated clothing. Stop leak if you can do it without risk.

6.2. Environmental precautions

Provide exhaust ventilation. Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. Spillages or uncontrolled discharges into watercourses must be IMMEDIATELY alerted to the Environmental Agency or other appropriate regulatory body.

6.3. Methods and material for containment and cleaning up

Large spill: Dike spillage. Place into suitable container for disposal. Water spray may reduce vapour; but may not prevent ignition in closed spaces. Consider initial downwind evacuation for at least 300 meters (1000 feet).

Small spill: A vapour suppressing foam may be used to reduce vapours. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Use clean non-sparking tools to collect absorbed material.

6.4. Reference to other sections

SECTION 8: Exposure controls/personal protection. SECTION 13: Disposal considerations.

SECTION 7. HANDLING AND STORAGE

7.1. Precautions for safe handling

Precautions for safe handling	Use with adequate ventilation. Keep container closed. Never use air pressure for transferring product. No smoking, open flames or sources of ignition in handling and storage area. Vapours are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Electrically bond and ground all containers, personnel and equipment before transfer or use of material. Containers, even those that have been emptied, can contain vapours. Do not cut, drill, grind, weld, or perform similar operations on or near empty containers. Use of non-sparking or explosion-proof equipment may be necessary, depending upon the type of operation. Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.
Hygiene measures	Do not breathe gas/fumes/ vapor/spray. Wash thoroughly after handling. Wear suitable protective clothing and gloves. DO NOT eat, drink or smoke in product area. Avoid contact with skin, eyes and clothing.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions	Avoid all possible sources of ignition (spark or flame). Keep away from heat and direct sunlight. Store locked up. Keep the container tightly closed and in a dry, cool and well-ventilated place. Check frequently to ensure that stabilizer content is adequate. Additives: 4-tert-butylpyrocatechol (CAS Number: 98-29-3). Store away from foodstuffs and feed.
Incompatible materials	Oxidizing materials, acids, alkalis, explosives, combustible and flammable substances, liquefied gases. See also Section 10.
Storage area	Vapours may form explosive mixture with air. Take precautionary measures against static discharges. Containers should be earthed during decanting operations. Keep away from sources of ignition - No smoking.
Storage temperature:	20 °C
Packaging materials	Suitable materials: steel, stainless steel, glass, Aluminium. Unsuitable materials for containers: brass, Copper

7.3. Specific end use(s)

Not applicable.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

8.1.1. Occupational Exposure Limits

Styrene (CAS 100-42-5)

	LTEL TWA ppm	LTEL TWA mg/m^3	STEL ppm	STEL mg/m^3	Note
European Union					
Austria	20	85	80	340	
Belgium	50	216	100	432	
Denmark	25	105	25	105	
Finland	20	86	100 (1)	430 (1)	(1) 15 minutes average value
France	*23.3*	*100*	*46.6 (1)*	*200 (1)*	Italic type: Indicative statutory limit values (1) 15 minutes average value
Germany (AGS)	20	86	40 (1)	172 (1)	(1) 15 minutes average value
Germany (DFG)	20	86	40 (1)	172 (1)	(1) 15 minutes average value
Hungary		50		50	
Ireland	20	85	40 (1)	170 (1)	(1) 15 minutes reference period
Latvia		10		30 (1)	(1) 15 minutes average value
Poland		50		200	
Romania	12	50	35 (1)	150 (1)	(1) 15 minutes average value
Spain	20	86	40	172	
Sweden	10	43	20 (1)	86 (1)	(1) 15 minutes average value
Switzerland	20	85	40	170	
United Kingdom	100	430	250	1080	

8.1.2. DNEL/ PNEC values

Styrene (CAS 100-42-5)	
DNEL/DMEL (Workers)	
Acute - systemic effects, dermal	Low hazard (no threshold derived)
Acute – systemic effects, inhalation	289 mg/m^3 (Most sensitive endpoint: acute toxicity)
Acute - local effects, dermal	Low hazard (no threshold derived)
Acute - local effects, inhalation	306 mg/m^3 (Most sensitive endpoint: acute toxicity)
Long-term - systemic effects, dermal	406 mg/kg bw/day (Most sensitive endpoint: repeated dose toxicity)
Long-term - systemic effects, inhalation	85 mg/m³ (Most sensitive endpoint: repeated dose toxicity)
Long-term local effects, dermal	Low hazard (no threshold derived)
Long-term local effects, inhalation	Low hazard (no threshold derived)
Eyes, local effects	Low hazard (no threshold derived)
DNEL/DMEL (General population)	
Acute - systemic effects, dermal	Low hazard (no threshold derived)
Acute - systemic effects, inhalation	174.25 mg/m³ (Most sensitive endpoint: acute toxicity)
Acute - systemic effects, oral	Low hazard (no threshold derived)
Acute - local effects, dermal	Low hazard (no threshold derived)
Acute - local effects, inhalation	182.75 mg/m³ (Most sensitive endpoint: acute toxicity)
Long-term - systemic effects, dermal	343 mg/kg bw/day (Most sensitive endpoint: repeated dose toxicity)
Long-term - systemic effects, inhalation	10.2 mg/m³ (Most sensitive endpoint: repeated dose toxicity)
Long-term - systemic effects,oral	2.1 mg/kg bw/day (Most sensitive endpoint: repeated dose toxicity)
Long-term - local effects, dermal	Low hazard (no threshold derived)
Long-term - local effects, inhalation	Low hazard (no threshold derived)
Eyes, local effects	Low hazard (no threshold derived)
PNEC (water)	
PNEC aqua (freshwater)	0.028 mg/L
PNEC aqua (marine water)	0.014 mg/L
PNEC aqua (intermittent, freshwater)	0.04 mg/L
PNEC (Sediment)	
PNEC sediment (freshwater)	0.614 mg/kg sediment dw
PNEC sediment (marine water)	0.307 mg/kg sediment dw
PNEC (Soil)	
PNEC soil	0.2 mg/kg soil dw
PNEC (Oral)	
PNEC oral (secondary poisoning)	No potential for bioaccumulation
PNEC (STP)	
PNEC sewage treatment plant	5 mg/L

8.2. Exposure controls

Appropriate engineering controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapours below their respective threshold limit value.

Storage and processing should be located at least 17 meter (50 feet) away from open flames and all high temperature operations likely to cause ignition of the styrene monomer vapour. All sparks,

flames, heated surface, or other sources of ignition should be kept away from all vents.
In venting styrene monomer vapours, consideration should be given to possible halogenation of the vapours by low concentrations of free chlorine and bromine with the resultant formation of lacrimations.
Process should be designed so that the operator is not exposed to direct contact with styrene monomer or the vapour. The technical problems of designing equipment, providing adequate ventilation and operating procedures which promise maximum security and economy, can best be handled by competent engineers. Due to the tendency of styrene monomer to form polymers which may plug equipment, all piping, valves, gauges, vents, tank openings, pressure relief devices, and engineering controls should be so designed and located that may be readily and periodically inspected and cleaned.
It is essential for safety that equipment be used and maintained as recommended by the manufacturer.

Hand protection:

Wear appropriate gloves to prevent skin exposure. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.
Full contact:
Material: Fluorinated rubber
Minimum layer thickness: 0,7 mm
Break through time: > 480 min
Splash contact:
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 32 min
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario

Eye protection:

Face shield and safety glasses against toxic liquid. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).
Build a shower booth near the place.

Skin and body protection:

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection:

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Environmental exposure controls:

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Other information:
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.
For more information please see Annex of this SDS.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Physical state at 20 °C and 101.3 kPa	Liquid
Colour	Colourless to yellowish
Odour	Pungent, specific
Melting / freezing point	-31° C at 1013.25 hPa (Melting point is not relevant because the value is below -20° C).
Boiling point	145° C at 1013.25 hPa
Relative density	0.90 - 0.91 at 20° C
Vapour pressure	6.67 hPa at 20° C
Surface tension	Not applicable
Water solubility	320 mg/l at 25° C
Partition coefficient n-octanol/water (log value)	log Pow= 2.96 at 25° C
Flash point	31° C at 1013 hPa
Flammability	Flammable liquid GHS-Category 3. (FP: > 23° C and < 60°C). Flammability derived from flash point. Based on chemical structure pyrophoric properties and flammability in contact with water are not to be expected.
Explosive properties	Non explosive
Self-ignition temperature	490° C at 1013.25 hPa
Oxidising properties	No oxidising properties
Viscosity	0.696 mPa/s (dynamic) at 25°C 0.77 mm²/s (kinematic) at 25 °C
Granulometry	Not applicable
Stability in organic solvents and identity of relevant degradation products	Not applicable
Dissociation constant	Not applicable

9.2. Other information

Self-accelerating polymerisation temperature (SAPT)	> 50 °C at the inhibitor level 7 ppm

SECTION 10. STABILITY AND REACTIVITY

10.1. Reactivity

Violent reaction up to explosion with all under "Incompatible materials" mentioned products. Oxidizes on contact with air. Polymerizes exothermically on exposure to light, heat and most halides. In case of contact with water the inhibitor concentration might decrease and cause polymerization.

10.2. Chemical stability

The product is stable under recommended storage conditions. Pay attention to sufficient concentration of the stabilizer (inhibitor of polymerization).
Additives: 4-tert-butyl catechol (CAS Number: 98-29-3).
Under specific conditions, may generate peroxide species and explosive polymerization may occur.

10.3. Possibility of hazardous reactions

Hazardous reactions are not expected during normal storage. Contact with incompatible materials may cause explosion.

10.4. Conditions to avoid

Avoid heat, flames and sparks, electrostatic discharges.
Product is sensitive to light. Can form explosive vapour-air mixture. Avoid direct sunlight and exposure to air.

10.5. Incompatible materials

Strong oxidizing agents, halides, acids, peroxides, Sodium, Aluminium (II)-chloride, Chlorine, halocarbons, polymerization catalysts, air/oxygen, Copper and copper alloys. Refer to Section 7.

10.6. Hazardous decomposition products

Hazardous decomposition products are not expected to form during normal storage. Thermal decomposition or combustion may liberate carbon oxides and other toxic gases or vapours.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Acute toxicity — CLP classification (Regulation (EC) No 1272/2008):
Inhalation route (vapour): Acute Category 4. Harmful if inhaled.

Styrene (CAS 100-42-5)	
LD50, oral, hamster, male	> 6 000 mg/kg bw (Standard acute method, GLP compliance: no)
LC50(4h), inhalation, rats	11.8 mg/L air (2770 ppm) (Standard acute method, GLP compliance: no)
NOAEC (7 h), inhalation, human	100 ppm (no effects on the central nervous system (CNS) function at this concentration)
LD50, dermal, rats	> 2000 mg/kg bw (OECD Guideline 402)

Skin corrosion/irritation	Adverse effect observed (irritating). CLP classification (Regulation (EC) No 1272/2008): Skin corrosion/irritation: Category 2
Additional information	Rabbit: irritating.
Serious eye damage/ irritation	Adverse effect observed (irritating). CLP classification (Regulation (EC) No 1272/2008): Serious eye damage/eye irritation: Category 2A.
Additional information	Rabbit: irritating.

Skin/respiratory sensitisation	Not sensitizing.
Additional information	Taken together, in a weight of evidence approach, the present data for the test substance do not fulfil the criteria laid down in 1272/2008/EEC for skin and respiratory sensitization, respectively, and therefore, a non-classification is warranted.
Germ cell mutagenicity	Genetic toxicity: no adverse effect observed (negative). CLP classification (Regulation (EC) No 1272/2008): no classification required.
Additional information	*Human studies:* there is no convincing evidence that styrene has shown mutagenic activity in humans. *In-vitro assay results:* in some test systems (including tests in vitro chromosome aberration studies in mammalian cells), styrene does posses some genotoxic potential in-vitro. Metabolic activation (presumably to styrene oxide) is required for this activity. *In-vivo assay results:* the available data in-vivo in experimental animals suggest that styrene is weakly positive in indicator tests detecting SCEs, DNA stand breaks and DNA adducts. In contrast, an in vivo UDS test performed in accordance with international guidelines did not reveal a genotoxic effect of styrene in mouse liver. Overall, based on standard regulatory tests, there is no convincing evidence that styrene possesses significant mutagenic/clastogenic potential in vivo from the available data in experimental animals. Therefore, a classification for mutagenicity according to CLP-criteria (1272/2008/EC) is not warranted for styrene.
Carcinogenicity	CLP classification (Regulation (EC) No 1272/2008): no classification required.
Additional information	There is no convincing evidence that styrene possesses significant carcinogenic potential in humans.

Styrene (CAS 100-42-5)	
NOAEL (carcinogenicity), oral, rats, male/female	>= 2000 mg/kg bw/day (A bioassay for the possible carcinogenicity of styrene was conducted using Fischer 344 rats) Remarks on result: Effect type: carcinogenicity (migrated information).
LOAEL (carcinogenicity), oral, mouse, male	150 mg/kg bw/day Basis for effect level: histopathology (broncheoalveolar neoplasms) Remarks on result: Effect type: carcinogenicity (migrated information).
NOAEC, systemic, inhalation, rats, male/female	>= 4.34 mg/L air (1019 ppm)(nominal) (OECD Guideline 453) Basis for effect level: no effects observed. Remarks on result: Effect type: carcinogenicity (migrated information).
NOAEC, systemic, inhalation, mouse, male	0.09 mg/L air (OECD Guideline 453) Remarks on result: other: Effect type: carcinogenicity (migrated information).

Toxicity for reproduction	CLP classification (Regulation (EC) No 1272/2008): Reproductive Toxicity, Category 2: Suspected of damaging the unborn child.

Styrene (CAS 100-42-5)	
NOAEC, inhalation, rat, male/female (fertility)	500 ppm (OECD Guideline 416) Basis for effect level: other: no adverse effects observed
NOAEC, inhalation, rat, male/female (developmental toxicity)	150 ppm

STOT-single exposure	With regard to the respiratory tract, styrene fulfils the requirements to be classified as STOT single exposure Category 3, H335 for respiratory irritation according to GHS-CLP criteria (1272/2008/EC).
Additional information	Affected organs: Nose. Human (Respiratory tract) (1 h): NOAEC = 216 ppm
Repeated dose toxicity	CLP classification (Regulation (EC) No 1272/2008): Specific Target Organ Toxicity RE Category 1. Causes damage to the hearing organs through prolonged or repeated exposure

Styrene (CAS 100-42-5)	
NOAEC (Effects on colour vision), long-term, inhalation, human	50 ppm (8h TWA) Remarks on the study: Obtained from studies in workers using tests specifically designed to evaluate colour vision. This NOAEC is supported by Seeber et al. (2009) in workers with high exposures of 50 ppm.
NOAEC (Ototoxicity), long-term, inhalation, human	20 ppm, equivalent to 85 mg/m3
NOAEC (Ototoxicity), long-term, inhalation, rat	500 ppm
NOAEC (developmental toxicity), long-term, inhalation, rat	500 ppm
NOAEL (corrected), dermal	615 mg/kg/d (resulting from route-to-route extrapolation) (inhalation to dermal route)

Aspiration hazard	CLP classification (Regulation (EC) No 1272/2008): Aspiration Tox. Category 1. May be fatal if swallowed and enters airways.
Additional information	Based on the physical-chemical properties of styrene.

SECTION 12. ECOLOGICAL INFORMATION

12.1. Toxicity

The acute toxicity concentrations in fish, daphnia and algae are between 1 mg/L and 10 mg/L, however styrene is readily biodegradable and therefore no environmental classification for acute effects is required.
Regarding the long-term toxicity styrene has to be classified as Aquatic Chronic 3 which is triggered by the EC10 = 0.28 mg/L for algae.

Styrene (CAS 100-42-5)	
Fish (Short-term toxicity)	
LC50 (96h)	4.02 mg/L *Pimephales promelas* (freshwater)

Fish (Long-term toxicity)	
Not available.	
Aquatic invertebrates (Short-term toxicity)	
EC50/LC50 (48 h)	4.7 mg/L *Daphnia magna* (freshwater) (OECD Guideline 202)
Aquatic invertebrates (Long-term toxicity)	
EC10/LC10 or NOEC (21 d)	1.01 mg/L *Daphnia magna* (freshwater) (OECD Guideline 211)
Algae and aquatic plants	
EC50 (72 h)	4.9 mg/L *Pseudokirchneriella subcapitata* (freshwater) (EPA OTS 797.1050)
EC50 (96h)	6.3 mg/L *Pseudokirchneriella subcapitata* (freshwater) (EPA OTS 797.1050)
EC10 (96h)	0.28 mg/L *Pseudokirchneriella subcapitata* (freshwater) (EPA OTS 797.1050)
Toxicity to aquatic micro-organisms	
EC50 (30 min)	500 mg/L *Activated sludge of a predominantly domestic sewage* (freshwater) (OECD Guideline 209)

12.2. Persistence and degradability

Abiotic degradation:	Hydrolysis No data available. Styrene is not expected to undergo hydrolysis in the environment due to a lack of hydrolysable functional groups. Phototransformation in air After evaporation or exposure to the air, the product will be rapidly degraded by photochemical processes. Phototransformation in water Indirect photolysis is not a relevant degradation process in water in comparison to volatilisation and biotransformation.
Biodegradation	Readily biodegradable. % Degradation of test substance (ISO DIS 9408): 68 after 10 d (ThOD) (mean of 7 samples) 70.9 after 28 d (ThOD) (mean of 7 samples) 100 after 28 d (COD) (mean of 7 samples)
Persistence and degradability	Several tests are available which show that styrene is readily biodegradable and can therefore considered neither persistent (not P) nor very persistent (not vP) in the environment.

12.3. Bioaccumulative potential

Aquatic bioaccumulation:	Significant accumulation in organisms is not to be expected.
Secondary poisoning:	Based on the available information, there is no indication of a bioaccumulation potential and, hence, secondary poisoning is not considered relevant.

12.4. Mobility in soil

Biodegradation in soil:	Adsorption to solid soil phase is possible. Koc at 20°C: 352 (estimated) (QSAR) Mobility of styrene in soil is considered to be moderate.

12.5. Results of PBT and vPvB assessment

Regarding all available data on biotic and abiotic degradation, bioaccumulation and toxicity it can be stated that the substance does not fulfil the PBT criteria (not PBT) and not the vPvB criteria (not vPvB).

12.6. Other adverse effects

Not available.

SECTION 13. DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste disposal recommendations	General information: Waste to be treated as controlled waste. Must not be disposed of together with household garbage. Disposal to licensed waste disposal site in accordance with local Waste Disposal Authority. Do not allow product to reach sewage system. Disposal recommendations: Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations. Uncleaned packagings: Make sure contaminated packagings are empty thoroughly before discarding (explosion risk). They can be recycled after thorough and proper cleaning. Packagings that cannot be cleansed are to be disposed of in the same manner as the product.
European List of Waste (LoW) code	Not available.

SECTION 14. TRANSPORT INFORMATION

14.1. Land transport (ADR/ RID)

UN-No.	2055
Proper Shipping Name:	STYRENE MONOMER, STABILIZED
Hazard class:	3
Packing group:	III
Hazard label:	Class 3 (flammable)
	
Classification Code:	F1
Hazard identification number (HIN):	39
Tunnel restriction code (ADR)	3(D/E)
Environmental hazard:	No

14.2. Inland waterway transport (ADN)

UN-No.	2055
Proper Shipping Name:	STYRENE MONOMER, STABILIZED
Hazard class:	3

Packing group:	III
Hazard label:	Class 3 (flammable)

Classification Code:	F1
Hazard identification number (HIN):	39
Environmental hazard:	No

14.3. Sea transport (IMDG)

UN-No.	2055
Proper Shipping Name:	STYRENE MONOMER, STABILIZED
Hazard class:	3
Packing group:	III
Hazard label:	Class 3 (flammable)

EmS-No. (Fire)	F-E
EmS-No. (Spillage)	S-D
Marine pollutant:	No

14.4. Air transport (IATA/ICAO)

UN-No.	2055
Proper Shipping Name:	STYRENE MONOMER, STABILIZED
Hazard class:	3
Packing group:	III
Hazard label:	Class 3 (flammable)

Environmental hazard:	No

14.5. Special precautions for user

Always transport in closed containers. Ensure that persons transporting the product know what to do in the event of an accident or spillage. For information regarding Exposure Controls/Personal Protection see Section 8 of the SDS.

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

IMO Pollution category:	Y
IMO Ship type:	3

SECTION 15. REGULATORY INFORMATION

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

15.1.1. EU-Regulations

Authorisations and/or restrictions on use (Annex XVII): Not applicable.
Styrene (CAS 100-42-5) is not on the REACH Candidate List.
Styrene (CAS 100-42-5) is not on the REACH Annex XIV List.

Other information, restriction and prohibition regulations	Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex I and Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer. Annex II - Not listed. Directive 2012/18/EU on the control of major-accident hazards

involving dangerous substances- (SEVESO III):
Physical Hazard – P5b - Flammable liquids.
Directive 2013/39/EU priority substances in the field of water policy (amending Directive 2006/60/EC – Water Framework Directive and Directive 2008/105/EC on environmental quality standards in the field of water policy): Not listed.
Regulation (EC) No 850/2004 on persistent organic pollutants: Annex III – Not listed.
Regulation (EC) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of dangerous chemicals: Not listed.

15.1.2. National regulations

No information available.

15.2. Chemical safety assessment

Chemical Safety Report has been performed for Styrene (CAS#100-42-5).

SECTION 16. OTHER INFORMATION

16.1. Indication of changes

	Date of change	Section	Description of changes
Version: 1.0	16/03/2010	All	Initial SDS.
Version: 2.0	25/10/2010	All	Version was created after registration. Sections 1÷16 were fully updated
Version: 2.1	07/02/2011	All	Section 8 was updated
Version: 2.2	25/01/2014	All	The dossier was updated by the Lead Registrant. Sections 2-16 were fully reconfigured, new information was added.
Version: 3.0	26/09/2018	All	SDS have been corrected in according to new data of Registration dossier, Chemical Safety Report and new Transport information
Version: 3.1	07/12/2018	7.2	Storage temperature parameter was updated.
Version: 3.2	24/02/2019	9	Self-accelerating polymerisation temperature (SAPT) parameter was added.

16.2. Abbreviations and acronyms

ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
AGS	The German Committee on Hazardous Substances (Ausschuss für Gefahrstoffe – AGS)
DFG	Germany Research Foundation
DNEL	Derived No Effect Level
IMDG	International Maritime Dangerous Goods
ICAO-TI	Technical Instructions for the Safe Transport of Dangerous Goods by Air
K_{oc}	Adsorption coefficient
Kow	octanol-water partition coefficient
LC50	Lethal Concentration to 50 % of a test population
LD50	Lethal Dose to 50% of a test population (Median Lethal Dose)
LOAEC	Lowest Observable Adverse Effect Concentration

LTEL	Long Term Exposure Limit
NIOSH	National Institute for Occupational Safety and Health *(USA CDC)*
NOEC	No Observed Effect Concentration
NOAEL	No Observed Adverse Effect Level
OECD	Organization for Economic Co-operation and Development
PNEC	Predicted No Effect Concentration
PBT	Persistent, bioaccumulative, toxic chemical
vPvB	Very Persistent, Very Bioaccumulative
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
STEL	Short Term Exposure Limit
STP	sewage treatment plant
STOT	Specific Target Organ Toxicity
(STOT) RE	Repeated Exposure
(STOT) SE	Single Exposure
TWA	Time Weighted Average
UN	United Nations

16.3. Full text of H- and EUH-statements:

H226	Flam. Liq. 3	Flammable liquid and vapour.
H302	Acute Tox. 4	Harmful if swallowed.
H304	Asp. Tox. 1	May be fatal if swallowed and enters airways.
H312	Acute Tox. 4	Harmful in contact with skin
H314	Skin Corr. 1B	Causes severe skin burns and eye damage.
H315	Acute Tox. 4	Causes skin irritation.
H317	Skin Sens. 1B	May cause an allergic skin reaction.
H319	Eye Irrit. 2	Causes serious eye irritation.
H332	Acute Tox. 4	Harmful if inhaled.
H335	STOT SE 3 Affected organs: Nose Route of exposure: Inhalation	May cause respiratory irritation.
H361	Repr. 2 Specific effect: Suspected of damaging the unborn child	Suspected of damaging fertility or the unborn child <state specific effect if known> <state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard>.
H372	STOT RE 1 Affected organs: ear Route of exposure: Inhalation	Causes damage to organs <or state all organs affected, if known> through prolonged or repeated exposure <state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard>.
H400	Aquatic Acute 1	Very toxic to aquatic life.
H411	Aquatic Chronic 2	Toxic to aquatic life with long lasting effects.
H412	Aquatic Chronic 3	Harmful to aquatic life with long lasting effects.

16.4. List of ES (exposure scenario) given in Annerx to the extended SDS

ES1	Continuous mass polymerisation of Polystyrene (HIPS and GPPS)
ES2	Batch suspension polymerisation of Polystyrene (HIPS and GPPS)
ES3	Production of Expandable Polystyrene
ES4	Production of Styrenic Copolymers
ES5	Manufacturing of UP/VE resins and formulated resins (Gelcoat, Colour Paste, Putty, Bonding paste / Adhesive, etc.)

ES6	FRP manufacturing in an industrial setting, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.)
ES7	FRP manufacturing in a professional setting, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.)
ES8	Production of Styrene Butadiene Rubber (SBR)
ES9	Production of Styrene Butadiene Latex (SBL)
ES10	Production of Styrene Isoprene Copolymers
ES11	Production of other Styrene based polymeric dispersions
ES12	Production of filled Polyols

16.5. List of Consumer uses advised against

C-14	**Consumer use of liquid UP resin for repair purposes** Further description of the use: Contributing activity/technique for the environment: **- Consumer use of liquid UP resin for repair purposes (ERC8b)** Contributing activity/technique for consumers: **- Consumer use of liquid UP resin for repair purposes - Product category (PC): PC 9a** Technical function of the substance: **Remarks:** It cannot be ensured that the conditions necessary for safe handling are kept by the consumer. As a consequence, the risk for the consumer cannot be controlled and consumer applications cannot be regarded as safe. Therefore, consumer uses are explicitly advised against.
C-15	**Consumer use of resin paste used as fillers/putties** Further description of the use: Contributing activity/technique for the environment: **- Consumer use of resin paste used as fillers/putties (ERC8b)** Contributing activity/technique for consumers: **- Consumer use of resin paste used as fillers/putties - Product category (PC): PC 9b** Technical function of the substance: **Remarks:** It cannot be ensured that the conditions necessary for safe handling are kept by the consumer. As a consequence, the risk for the consumer cannot be controlled and consumer applications cannot be regarded as safe. Therefore, consumer uses are explicitly advised against.

16.6. Key literature references and sources

CHEMICAL SAFETY REPORT to STYRENE (CAS 100-42-5)

EU DIRECTIVES

REGULATION (EC) No 1907/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

Regulation (EC) No 1272/2008 REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006.

Regulations. Commission regulation (EU) no 2015/830 of 28 May 2015 amending Regulation

(EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH).

Training advice

Personnel handling the product has to be acquainted demonstrably with its hazardous properties, with health and environmental protection principles related to the product and first aid principles.

DISCLAIMER

This information is based on our current level of knowledge. This information may be subject to revision as new knowledge and experience becomes available, and SIBUR makes no warranties and assumes no liability in connection with any use of this information. Since SIBUR cannot be aware of all aspects of your business and the impact the REACH Regulation has for your company, SIBUR strongly encourages you to get familiar with the REACH Regulation in order to comply with its requirements and timelines.

ANNEX. EXPOSURE SCENARIOS

Exposure Scenario 1 (ES1): Continuous mass polymerisation of Polystyrene (HIPS and GPPS)

Free short title	**Continuous mass polymerisation of Polystyrene (HIPS and GPPS)**
Systematic title based on use descriptor	ERC 6C; PROC 2, 8A, 8B, 9, 14, 15
Name of contributing environmental scenario and corresponding ERC	ERC 6c Production of plastics
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 15 - Use of laboratory reagents in small scale laboratories
Contributing Scenario (1) controlling environmental exposure for ERC 6C	
Operational conditions	
Annual tonnage	2.42E6 to/year
Daily amount used at site	4.83E5 kg/day
Release times per year	300 days/year *(justification: 300)*
Local freshwater dilution factor	10
Local marine water dilution factor	100
Release fraction to air from process	0.102 %
Release fraction to wastewater from process	0.000012 %
Release fraction to soil from process	0 %
Fraction tonnage to region	10 %
Fraction used at main source	60 %
STP	yes
River flow rate	18000 m^3/day
Municipal sewage treatment plant discharge	2000000 L/day
Other modified EUSES values	
Fraction released to waste water (Femis.water)	0.000012 % *(justification: Release for production by continuous masss process (EU Risk Assessment report))*
Fraction released to air (Femis.air)	0.102 % *(justification: Worst case estimation from European polymerisation sites(EU Risk Assessment Report on Styrene,European Communities, 2002))*
Fraction used at main source	60 % *(justification: Value adopted to account for worst-case European manufacturing site)*

Fraction of emission directed to water by local STP (Fstp.water)	0.081 - *(justification: Efficiency STP 91.9%)*
Contributing Scenario (2) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Continuous process [CS54]. Styrene Storage in tanks
Qualitative Risk Assessment	
General	Ensure good work practices are implemented. Provide basic employe training to prevent/minimize exposures. In case of potential exposure: Use suitable eye protection.Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (3) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Continuous process [CS54]. Charging reactor via pipeline
Qualitative Risk Assessment	
General	Ensure good work practices are implemented. Provide basic employe training to prevent/minimize exposures. In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	Liquid
Concentration in substance	100 %
Fugacity / Dustiness	Medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2

Other given operational conditions affecting workers exposure	
Location	Indoors
Domain	Industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	No
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	No
Contributing Scenario (4) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Material transfers [CS3]. Heat exchange and agitator in reactor
Qualitative Risk Assessment	
General	Ensure good work practices are implemented. Provide basic employe training to prevent/minimize exposures. In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	Liquid
Concentration in substance	100 %
Fugacity / Dustiness	Medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	Indoors
Domain	Industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Continuous process [CS54]. Devolatilisation tower
Qualitative Risk Assessment	
General	Ensure good work practices are implemented. Provide basic employe training to prevent/minimize exposures. In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	Liquid

Concentration in substance	100 %
Fugacity / Dustiness	Medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	Indoors
Domain	Industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	No
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	No
Contributing Scenario (6) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Continuous process [CS54]. Recycling styrene from tower to rector via pipeline
Qualitative Risk Assessment	
General	Ensure good work practices are implemented. Provide basic employe training to prevent/minimize exposures. In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	Liquid
Concentration in substance	100 %
Fugacity / Dustiness	Medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	Indoors
Domain	Industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	No
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	No
Contributing Scenario (7) controlling industrial worker exposure for PROC 2	

Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Material transfers [CS3]. Waste management : recovery using condensation or adsorption/ desorption processes
Qualitative Risk Assessment	
General	Ensure good work practices are implemented. Provide basic employe training to prevent/minimize exposures. In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	Liquid
Concentration in substance	100 %
Fugacity / Dustiness	Medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	Indoors
Domain	Industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	No
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	No
Contributing Scenario (8) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Process sampling [CS2]. Sampling from reactors/devolatilisation tower
Qualitative Risk Assessment	
General	Ensure good work practices are implemented. Provide basic employe training to prevent/minimize exposures. Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	Liquid
Concentration in substance	100 %
Fugacity / Dustiness	Medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	Indoors

Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	No
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	No
Use a sampling system designed to control exposure	inhalation: 80 % *(justification: Use a sampling system designed to control exposure)*
Contributing Scenario (9) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Material transfers [CS3]. Loading tank storage from road, rail or boat transport
Qualitative Risk Assessment	
General	Clear transfer lines prior to de-coupling. Ensure good work practices are implemented. Provide basic employe training to prevent/minimize exposures. In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	Liquid
Concentration in substance	100 %
Fugacity / Dustiness	Medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	Indoors
Domain	Industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	No
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	No
Contributing Scenario (10) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes
Qualitative Risk Assessment	
General	Ensure good work practices are implemented. Provide basic employe training to prevent/minimize exposures. In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	Liquid

Concentration in substance	100 %
Fugacity / Dustiness	Medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	Indoors
Domain	Industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	No
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	No
Contributing Scenario (11) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Bulk transfers [CS14]. Finished product Loading of road tanker, railcar, container
Product characteristics	
Physical state	Liquid
Concentration in substance	1-5%
Fugacity / Dustiness	Medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	Indoors
Domain	Industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	No
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	No
Contributing Scenario (12) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Material transfers [CS3]. Waste management : transfer of process wastes to storage containers: off-line in workplace
Qualitative Risk Assessment	

General	Ensure good work practices are implemented. Provide basic employe training to prevent/minimize exposures. In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	Liquid
Concentration in substance	100 %
Fugacity / Dustiness	Medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	Indoors
Domain	Industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	No
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	No
Contributing Scenario (13) controlling industrial worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	Small package filling [CS7]. Small package filling - Packaging of product
Product characteristics	
Physical state	Liquid
Concentration in substance	1-5%
Fugacity / Dustiness	Medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	Indoors
Domain	Industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	No
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	No

Contributing Scenario (14) controlling industrial worker exposure for PROC 14	
Name of contributing scenario	14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation
Scenario subtitle	Extrusion and masterbatching [CS88]. Extruder – Pelletizing
Product characteristics	
Physical state	Liquid
Concentration in substance	1-5%
Fugacity / Dustiness	Medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	Indoors
Domain	Industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	No
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	No
Contributing Scenario (15) controlling industrial worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Laboratory activities [CS36]. Laboratory - Quality Control
Qualitative Risk Assessment	
General	Ensure good work practices are implemented. Provide basic employe training to prevent/minimize exposures. In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	Liquid
Concentration in substance	100 %
Fugacity / Dustiness	Medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	Indoors
Domain	Industrial
Technical conditions and measures to control dispersion and exposure	

Local exhaust ventilation	No
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	No

Exposure Scenario 2 (ES2): Batch suspension polymerisation of Polystyrene (HIPS and GPPS)

Free short title	**Batch suspension polymerisation of Polystyrene (HIPS and GPPS)**
Systematic title based on use descriptor	ERC 6C; PROC 8B, 2, 3, 8A, 9, 15, 14
Name of contributing environmental scenario and corresponding ERC	ERC 6c Production of plastics
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 15 - Use of laboratory reagents in small scale laboratories PROC 14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation
Contributing Scenario (1) controlling environmental exposure for ERC 6C	
Operational conditions	
Annual tonnage	2.42E6 to/year
Daily amount used at site	4.83E5 kg/day
Release times per year	300 days/year *(justification: Continuous production)*
Local freshwater dilution factor	10
Local marine water dilution factor	100
Release fraction to air from process	0.102 %
Release fraction to wastewater from process	0.000012 %
Release fraction to soil from process	0 %
Fraction tonnage to region	10 %
Fraction used at main source	60 %
STP	yes
River flow rate	18000 m^3/day
Municipal sewage treatment plant discharge	2000000 L/day
Other modified EUSES values	
Fraction released to waste water (Femis.water)	0.000012 % *(justification: EU Risk Assessment Report, 2002)*
Fraction released to air (Femis.air)	0.102 % *(justification: EU Risk Assessment Report, 2002)*
Fraction used at main source	60 % *(justification: Value adopted to account for worst-case European manufacturing site)*
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - *(justification: Efficiency STP 91.9%)*
Contributing Scenario (2) controlling industrial worker exposure for PROC 8B	

Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Material transfers [CS3]. Loading tank storage from road, rail or boat transport
Qualitative Risk Assessment	
General	Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (3) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Material transfers [CS3]. Styrene Storage in tanks
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week

Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Material transfers [CS3]. Waste management : recovery using condensation or adsorption/ desorption processes
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Material transfers [CS3]. Charging reactors via pipeline
Qualitative Risk Assessment	

General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Dispersing and heat in reactor
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors

Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (7) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Washed and dried tanks
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (8) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Process sampling [CS2]. Sampling from reactors/tanks
Qualitative Risk Assessment	

General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Use a sampling system designed to control exposure	inhalation: 80 % *(justification: Use a sampling system designed to control exposure)*
Contributing Scenario (9) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2

Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (10) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Bulk transfers [CS14]. Finished product Loading of road tanker, railcar, container
Product characteristics	
Physical state	liquid
Concentration in substance	1-5%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (11) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Material transfers [CS3]. Waste management : transfer of process wastes to storage containers: off-line in workplace
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid

Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (12) controlling industrial worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	Small package filling [CS7]. Small package filling - Packaging of product
Product characteristics	
Physical state	liquid
Concentration in substance	1-5%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (13) controlling industrial worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Laboratory activities [CS36]. Laboratory - Quality Control
Qualitative Risk Assessment	

General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (14) controlling industrial worker exposure for PROC 14	
Name of contributing scenario	14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation
Scenario subtitle	Operation of solids filtering equipment [CS117]. Pelletizing
Product characteristics	
Physical state	liquid
Concentration in substance	1-5%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No

Respiratory protection	no

Exposure Scenario 3 (ES3): Production of Expandable Polystyrene

Free short title	**Production of Expandable Polystyrene**
Systematic title based on use descriptor	ERC 6C; PROC 2, 3, 8A, 8B, 9, 14, 15
Name of contributing environmental scenario and corresponding ERC	ERC 6c Production of plastics
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 15 - Use of laboratory reagents in small scale laboratories
Contributing Scenario (1) controlling environmental exposure for ERC 6C	
Operational conditions	
Annual tonnage	2.42E6 to/year
Daily amount used at site	4.83E5 kg/day
Release times per year	300 days/year *(justification: Continuous production)*
Local freshwater dilution factor	10
Local marine water dilution factor	100
Release fraction to air from process	0.102 %
Release fraction to wastewater from process	0.000012 %
Release fraction to soil from process	0 %
Fraction tonnage to region	10 %
Fraction used at main source	60 %
STP	yes
River flow rate	18000 m^3/day
Municipal sewage treatment plant discharge	2000000 L/day
Other modified EUSES values	
Fraction released to waste water (Femis.water)	0.000012 % *(justification: EU Risk Assessment Report, 2002)*
Fraction released to air (Femis.air)	0.102 % *(justification: EU Risk Assessment Report, 2002)*

Fraction used at main source	60 % *(justification: Value adopted to account for worst-case European manufacturing site)*
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - *(justification: Efficiency STP 91.9%)*
Contributing Scenario (2) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Material transfers [CS3]. Waste management : recovery using condensation or adsorption/ desorption processes
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (3) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Material transfers [CS3]. Styrene Storage in tanks
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium

Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Material transfers [CS3]. Charging reactors via pipeline
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling industrial worker exposure for PROC 3	

Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Dispersing and heat in reactor
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Washed and dried tanks
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	

Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (7) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Process sampling [CS2]. Sampling from reactors/tanks
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Use a sampling system designed to control exposure	inhalation: 80 % *(justification: Use a sampling system designed to control exposure)*
Contributing Scenario (8) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities

Scenario subtitle	Material transfers [CS3]. Loading tank storage from road, rail or boat transport
Qualitative Risk Assessment	
General	Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (9) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week

Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (10) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Bulk transfers [CS14]. Finished product Loading of road tanker, railcar, container
Product characteristics	
Physical state	liquid
Concentration in substance	1-5%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (11) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Material transfers [CS3]. Waste management : transfer of process wastes to storage containers: off-line in workplace
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.

Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (12) controlling industrial worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	Small package filling [CS7]. Small package filling - Packaging of product
Product characteristics	
Physical state	liquid
Concentration in substance	1-5%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (13) controlling industrial worker exposure for PROC 14	
Name of contributing scenario	14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation

Scenario subtitle	Operation of solids filtering equipment [CS117]. Pelletizing
Product characteristics	
Physical state	liquid
Concentration in substance	1-5%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (14) controlling industrial worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Laboratory activities [CS36]. Laboratory - Quality Control
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no

Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no

Exposure Scenario 4 (ES4): Production of Styrenic Copolymers

Free short title	**Production of Styrenic Copolymers**
Systematic title based on use descriptor	ERC 6C; PROC 8B, 2, 3, 8A, 9, 15
Name of contributing environmental scenario and corresponding ERC	ERC 6c Production of plastics
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 15 - Use of laboratory reagents in small scale laboratories
Contributing Scenario (1) controlling environmental exposure for ERC 6C	
Operational conditions	
Annual tonnage	2.42E6 to/year
Daily amount used at site	4.83E5 kg/day
Release times per year	300 days/year *(justification: Continuous production)*
Local freshwater dilution factor	10
Local marine water dilution factor	100
Release fraction to air from process	0.102 %
Release fraction to wastewater from process	0.000012 %
Release fraction to soil from process	0 %
Fraction tonnage to region	10 %
Fraction used at main source	60 %
STP	yes
River flow rate	18000 m^3/day
Municipal sewage treatment plant discharge	2000000 L/day
Other modified EUSES values	
Fraction released to waste water (Femis.water)	0.000012 % *(justification: EU Risk Assessment Report, 2002)*
Fraction released to air (Femis.air)	0.102 % *(justification: EU Risk Assessment Report, 2002)*
Fraction used at main source	60 % *(justification: Value adopted to account for worst-case European manufacturing site)*
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - *(justification: Efficiency STP 91.9%)*

Contributing Scenario (2) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Material transfers [CS3]. Loading tank storage from road, rail or boat transport
Qualitative Risk Assessment	
General	Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (3) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Material transfers [CS3]. Styrene Storage in tanks
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)

Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Material transfers [CS3]. Waste management : recovery using condensation or adsorption/ desorption processes
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Material transfers [CS3]. Charging reactors via pipeline
Qualitative Risk Assessment	

General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Dissolving and polymerisation reactor
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors

Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (7) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Suspension reactor
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (8) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Washed and dried tanks
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.

Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (9) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Process sampling [CS2]. Sampling from reactors/tanks
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no

Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Use a sampling system designed to control exposure	inhalation: 80 % *(justification: Use a sampling system designed to control exposure)*
Contributing Scenario (10) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (11) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Bulk transfers [CS14]. Finished product Loading of road tanker, railcar, container
Product characteristics	
Physical state	liquid
Concentration in substance	1-5%
Fugacity / Dustiness	medium
Frequency and duration of use	

Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (12) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Material transfers [CS3]. Waste management : transfer of process wastes to storage containers: off-line in workplace
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (13) controlling industrial worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)

Scenario subtitle	Small package filling [CS7]. Small package filling - Packaging of product
Product characteristics	
Physical state	liquid
Concentration in substance	1-5%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (14) controlling industrial worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Laboratory activities [CS36]. Laboratory - Quality Control
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no

Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no

Exposure Scenario 5 (ES 5): Manufacturing of UP/VE resins and formulated resins (Gelcoat, Colour Paste, Putty, Bonding paste / Adhesive, etc.)

Free short title	**Manufacturing of UP/VE resins and formulated resins (Gelcoat, Colour Paste, Putty, Bonding paste / Adhesive, etc.)**
Systematic title based on use descriptor	ERC 2; PROC 1, 3, 4, 5, 8A, 8B, 9, 15
Name of contributing environmental scenario and corresponding ERC	ERC 2 Formulation of preparations
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process, no likelihood of exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 15 - Use of laboratory reagents in small scale laboratories
Contributing Scenario (1) controlling environmental exposure for ERC 2	
Operational conditions	
Annual tonnage	2.28E5 to/year
Daily amount used at site	4.57E4 kg/day
Release times per year	300 days/year *(justification: Continuous production)*
Local freshwater dilution factor	41
Local marine water dilution factor	100
Release fraction to air from process	0.200 %
Release fraction to wastewater from process	0.0049 %
Release fraction to soil from process	0 %
Fraction tonnage to region	10 %
Fraction used at main source	60 %
STP	yes
River flow rate	400000 m^3/day *(justification: Site specific information)*
Municipal sewage treatment plant discharge	10000000 L/day *(justification: Site specific information)*
Risk management measures	
Reduction of sludge to soil	100 % *(justification: Do not apply industrial sludge to natural soils)*
Other modified EUSES values	
Fraction released to waste water (Femis.water)	0.0049 % *(justification: Worst-case estimate from measured concentrations at manufacturing sites (EU Risk Assessment Report on Styrene,European Communities, 2002))*

Fraction released to air (Femis.air)	0.200 % *(justification: EU Risk Assessment Report on Styrene,European Communities, 2002)*
Fraction used at main source	60 % *(justification: Value adopted to account for largest European manufacturing site (EU Risk Assessment Report on Styrene,European Communities, 2002))*
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - *(justification: Efficiency STP 91.9%)*
Contributing Scenario (2) controlling industrial worker exposure for PROC 1	
Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	General exposures [CS1]. Use in contained batch processes [CS37].
Qualitative Risk Assessment	
General	Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no

Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Good standard of general ventilation; natural or controlled	inhalation: 30 % *(justification: Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.)*
Contributing Scenario (3) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Bulk transfers [CS14]. Receipt and storage of raw materials in bulk or as packed goods, indoor and outdoor; Raw material assembly and charging; dispensing of liquids and solids via pipeline;
Qualitative Risk Assessment	
General	Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	outdoors (30%)
Domain	industrial

Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Contributing Scenario (4) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	General exposures (closed systems) [CS15]. Dissolving linear UP/VE polymer into styrene in blending vessel (or dissolver)
Qualitative Risk Assessment	
General	Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	

Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Contributing Scenario (5) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Equipment cleaning and maintenance [CS39]. Cleaning and maintenance of blending vessel, roadtankers etc.
Qualitative Risk Assessment	
General	Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	

Protective gloves	Gloves APF 5 80 %
Respiratory protection	95 %
Apply vessel entry procedure including use of forced supplied air	inhalation: 30 % *(justification: Drain down and flush system prior to equipment break-in or maintenance)*
Contributing Scenario (6) controlling industrial worker exposure for PROC 4	
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Material transfers [CS3]. All internal transport Raw material assembly and charging / raw material dispensing of liquids and solids manually from bulk storage or packed goods into blending tank
Qualitative Risk Assessment	
General	Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	

Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Contributing Scenario (7) controlling industrial worker exposure for PROC 4	
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Process sampling [CS2]. Sampling from blender
Qualitative Risk Assessment	
General	Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no

Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Contributing Scenario (8) controlling industrial worker exposure for PROC 5	
Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	Drum/batch transfers [CS8]; Pouring from small containers [CS9]; Transfer from/pouring from containers [CS22]; Mixing operations (open systems) [CS30]. Mixing liquid and solid components / into final formulated resin in blending vessel; Examples are gelcoat blending and compounding
Qualitative Risk Assessment	
General	Use drum pumps. Carefully pour from container. Put lids on containers immediately after use. Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial

Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Contributing Scenario (9) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Equipment cleaning and maintenance [CS39]. Cleaning and maintenance of pipes, pumps, filters, etc.
Qualitative Risk Assessment	
General	Carefully pour from container. Use drum pumps. Put lids on containers immediately after use. Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial

Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	95 %
Forced air circulation	inhalation: 70 % *(justification: Drain or remove substance from equipment prior to break-in or maintenance)*
Contributing Scenario (10) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Disposal of wastes [CS28]. Waste management / handling and storage of waste for removal for off-site treatment or for on-site treatment like incineration and/or biological waste water treatment
Qualitative Risk Assessment	
General	Carefully pour from container. Use drum pumps. Put lids on containers immediately after use. Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	

Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Provide a good standard of general ventilation; natural or controlled	inhalation: 30 % *(justification: Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.)*
Contributing Scenario (11) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Bulk transfers [CS14]. All activities related to transport finished product to customer Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) into roadtanker . Tier2 assessment has been done to prove safe use of styrene
Qualitative Risk Assessment	
General	Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	

Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	outdoors (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Use of external/measured value inhalation	Exposure assessment using the Bayesian model of ART Version 1.5. The predicted 90th percentile full-shift exposure is 18 mg/m³. The confidence interval is 8,1 mg/m³ to 44 mg/m³. PROC 8b Emission sources: Far-field exposure Vapour pressure: 1300 Pa (Elevated temperature) Liquid mole fraction: 0,5 Activity coefficient: 1 Process temperature: Room temperature Substance product type: Liquids Activity class: Falling of liquids Transfer technique: Transfer liquid products flow > 1000 L/min Situation: Open process, splash loading Localised controls: None No segregation, no personal enclosure Effective housekeeping practices in place? Yes Work area: Outdoors, close to buildings, worker located >4 m from far field source Duration (mins): 480 min
Contributing Scenario (12) controlling industrial worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	Bulk transfers [CS14]. All activities related to transport finished product to customer Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) / into storage tank, IBC, drum or pail
Qualitative Risk Assessment	

General	Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
LEV	inhalation: 90 % *(justification: Fill containers/cans at dedicated fill points supplied with local extract ventilation)*
Contributing Scenario (13) controlling industrial worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Laboratory activities [CS36]. All laboratory activities Quality control work of samples from reactor and blending vessel; R&D work including handling of samples from 1 kg to 1 drum
Qualitative Risk Assessment	

General	Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Carry out in a vented booth or extracted enclosure	inhalation: 90 % *(justification: Carry out in a vented booth or extracted enclosure)*

Exposure Scenario 6 (ES 6): FRP manufacturing in an industrial setting, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.)

Free short title	**FRP manufacturing in an industrial setting, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.)**
Systematic title based on use descriptor	ERC 6D; PROC 3, 5, 7, 8A, 10, 13, 14, 15
Name of contributing environmental scenario and corresponding ERC	ERC 6d Production of resins/rubbers
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact) PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact) PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact) PROC 7 - Industrial spraying PROC 7 - Industrial spraying PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 10 - Roller application or brushing PROC 10 - Roller application or brushing PROC 13 - Treatment of articles by dipping and pouring PROC 14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 15 - Use of laboratory reagents in small scale laboratories
Contributing Scenario (1) controlling environmental exposure for ERC 6D	
Operational conditions	
Annual tonnage	8.06E5 to/year
Daily amount used at site	1.61E5 kg/day
Release times per year	300 days/year *(justification: Continuous release)*
Local freshwater dilution factor	10
Local marine water dilution factor	100
Release fraction to air from process	0.102 %
Release fraction to wastewater from process	0.00063 %
Release fraction to soil from process	0 %
Fraction tonnage to region	10 %
Fraction used at main source	60 %
STP	yes
River flow rate	18000 m^3/day
Municipal sewage treatment plant discharge	2000000 L/day
Other modified EUSES values	
Fraction released to waste water (Femis.water)	0.00063 % *(justification: EU Risk Assessment Report, 2002)*
Fraction released to air (Femis.air)	0.102 % *(justification: EU Risk Assessment Report, 2002)*
Fraction used at main source	60 % *(justification: Value adopted to account for Worst-case European manufacturing site)*

Fraction of emission directed to water by local STP (Fstp.water)	0.081 - *(justification: Efficiency STP 91.9%)*
Contributing Scenario (2) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Material transfers [CS3]; Automated process with (semi) closed systems [CS93]; Use in contained batch processes [CS37]. Resin injection and transfer processes, such as vacuüm infusion, RTM, impregnation of sewer relining sleeves
Qualitative Risk Assessment	
General	Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	

Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Contributing Scenario (3) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Material transfers [CS3]. Product delivery/storage - delivery of bulk and packaged products - outdoor / indoor
Qualitative Risk Assessment	
General	Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %

Respiratory protection	no
Contributing Scenario (4) controlling industrial worker exposure for PROC 5	
Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	Casting operations [CS32]; Mixing operations (open systems) [CS30]. Casting and mixing operations in (semi-) open containers. Examples are centrifugal casting, casting of polymer concrete and artificial marble and the manufacturing of SMC / BMC/ TMC, engineered stone, etc
Qualitative Risk Assessment	
General	Use drum pumps. Carefully pour from container. Put lids on containers immediately after use. Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	5-25%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	

Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Contributing Scenario (5) controlling industrial worker exposure for PROC 5	
Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	General exposures (closed systems) [CS15]. Mixing liquid and solid components / into final formulated resin in blending vessel; Examples are gelcoat blending and compounding, formulation of repair putties, bonding pastes, chemical anchoring, etc
Qualitative Risk Assessment	
General	Use drum pumps. Carefully pour from container. Put lids on containers immediately after use. Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial

Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Contributing Scenario (6) controlling industrial worker exposure for PROC 5	
Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	Drum/batch transfers [CS8]; Pouring from small containers [CS9]; Transfer from/pouring from containers [CS22]; Mixing operations (open systems) [CS30]. Loading of mixing equipment; Preparation of material for application; (liquid products) - batch, indoor
Qualitative Risk Assessment	
General	Carefully pour from container. Use drum pumps. Put lids on containers immediately after use. Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	

Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Contributing Scenario (7) controlling industrial worker exposure for PROC 7	
Name of contributing scenario	7 - Industrial spraying
Scenario subtitle	Spraying [CS10]; Spraying (automatic/robotic) [CS97] All open mould applications where resins is applied by automated spraying or by robot in a spray cabin without direct worker involvement. Examples are spray lamination, gelcoat spraying and “chop-hoop” filament winding
Qualitative Risk Assessment	
General	Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,500 cm^2
Other given operational conditions affecting workers exposure	

Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	95 %
Carry out in a vented booth or extracted enclosure	inhalation: 95 % *(justification: Ventilation effectiveness)*
Contributing Scenario (8) controlling industrial worker exposure for PROC 7	
Name of contributing scenario	7 - Industrial spraying
Scenario subtitle	Spraying [CS10]; Spraying (manually) [CS97] All open mould applications where resins is applied by manual spraying in an open work environment. Examples are spray lamination, gelcoat spraying and “chop-hoop” filament winding
Qualitative Risk Assessment	
General	Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,500 cm^2

Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 95 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 20 95 %
Respiratory protection	97.5 % *(justification: Use a powered respirator with masks (BS EN 12942), Filter Type A1 (Organic Vapours, BP>65°C), P3 filter (aerosols EN143), with an effectiveness of 97.5% (APF 40). For activities >1h, a constant flow airline breathing apparatus with hoods/helmets (BS EN 14594) is recommended (APF 200).)*
Contributing Scenario (9) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Equipment maintenance [CS5]; Maintenance of small items [CS18]. Equipment cleaning and maintenance, open indoor
Qualitative Risk Assessment	
General	Carefully pour from container. Use drum pumps. Put lids on containers immediately after use. Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*
Fugacity / Dustiness	medium
Frequency and duration of use	

Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	95 %
Local exhaust ventilation	inhalation: 70 % *(justification: Use local exhaust ventilation with adequate effectiveness)*
Contributing Scenario (10) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Disposal of wastes [CS28]. Handling of non cured waste; Waste management / handling and storage of waste for removal for off-site treatment or for on-site treatment like incineration and/or biological waste water treatment
Qualitative Risk Assessment	
General	Carefully pour from container. Use drum pumps. Put lids on containers immediately after use. Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid

Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	95 %
Contributing Scenario (11) controlling industrial worker exposure for PROC 10	
Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	Rolling, Brushing [CS51]; Roller, spreader, flow application [CS98] All open mould applications where resins is applied by brushing, rolling and other low energy spreading operations; Examples are handlamination, gelcoatbrushing, filament winding
Qualitative Risk Assessment	
General	Use long handled tools where possible Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid

Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	95 %
Contributing Scenario (12) controlling industrial worker exposure for PROC 10	
Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	Dipping, immersion and pouring [CS4]; Rolling, Brushing [CS51]; Roller, spreader, flow application [CS98] Application of repair putties; Application of bonding pastes / adhesives.
Qualitative Risk Assessment	
General	Use long handled tools where possible Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid

Concentration in substance	5-25%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 20 95 %
Respiratory protection	95 %
Contributing Scenario (13) controlling industrial worker exposure for PROC 13	
Name of contributing scenario	13 - Treatment of articles by dipping and pouring
Scenario subtitle	Dipping, immersion and pouring [CS4]; Continuous process [CS54]. Continuous processes with open impregnation steps, such as pultrusion with open impregnation baths and (semi-) continuous production of flat laminates, filament winding.
Qualitative Risk Assessment	
General	Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*

Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 20 95 %
Respiratory protection	95 %
Contributing Scenario (14) controlling industrial worker exposure for PROC 14	
Name of contributing scenario	14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation
Scenario subtitle	Material transfers [CS3]; Production or preparation or articles by tabletting, compression, extrusion or pelletisation [CS100]; Cold press moulding. Treatment by heating [CS129]; Batch processes at elevated temperatures [CS136]. Processes where curing of UP / VE resins takes place at high temperature. Examples are pultrusion with injection dies and processing of SMC / BMC / TMC, etc
Qualitative Risk Assessment	
General	Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid

Concentration in substance	5-25%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Contributing Scenario (15) controlling industrial worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Laboratory activities [CS36]. Quality control work of samples from blending vessel; R&D work including handling of samples from 1 kg to 1 drum
Qualitative Risk Assessment	
General	Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*

Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no

Exposure Scenario 7 (ES 7): FRP manufacturing in a professional setting, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.)

Free short title	**FRP manufacturing in a professional setting, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.)**
Systematic title based on use descriptor	ERC 8F; PROC 3, 4, 5, 8A, 10, 11
Name of contributing environmental scenario and corresponding ERC	ERC 8f Wide dispersive outdoor leading to inclusion into/onto matrix
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 3 - Use in closed batch process (synthesis or formulation) PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 10 - Roller application or brushing PROC 10 - Roller application or brushing PROC 10 - Roller application or brushing PROC 11 - Non industrial spraying
Contributing Scenario (1) controlling environmental exposure for ERC 8F	
Operational conditions	
Annual tonnage	2.42E6 to/year
Daily amount used at site	4.83E5 kg/day
Release times per year	300 days/year *(justification: Continuous production)*
Local freshwater dilution factor	10
Local marine water dilution factor	100
Release fraction to air from process	0.102 %
Release fraction to wastewater from process	0.000012 %
Release fraction to soil from process	0 %
Fraction tonnage to region	10 %
Fraction used at main source	60 %
STP	yes
River flow rate	18000 m^3/day
Municipal sewage treatment plant discharge	2000000 L/day
Other modified EUSES values	
Fraction released to waste water (Femis.water)	0.000012 % *(justification: EU Risk Assessment Report, 2002)*
Fraction released to air (Femis.air)	0.102 % *(justification: EU Risk Assessment Report, 2002)*
Fraction used at main source	60 % *(justification: Value adopted to account for worst-case European manufacturing site)*
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - *(justification: Efficiency STP 91.9%)*
Contributing Scenario (2) controlling professional worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Use in contained batch processes [CS37]. Application of chemical anchoring
Qualitative Risk Assessment	

General	Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	5-25%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	outdoors (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Contributing Scenario (3) controlling professional worker exposure for PROC 4	
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Use in contained batch processes [CS37]. Sewer relining operation
Qualitative Risk Assessment	

General	Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	outdoors (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	95 %
Contributing Scenario (4) controlling professional worker exposure for PROC 5	
Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	Material transfers [CS3]; Pouring from small containers [CS9]. Preparation of material for application (liquids) - transfer of material from one container to another; Formulating / blending resins, gelcoats, bonding pastes, putties etc. in blending vessels

Qualitative Risk Assessment	
General	Use drum pumps. Carefully pour from container. Put lids on containers immediately after use. Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	95 % *(justification: Use a full face mask respirator - gas/vapour filter (BS EN 136 mask and BS EN 14387 filter), Filter Type A1 (Organic Vapours, BP>65°C), with an effectiveness of 95% (APF 20).)*
Contributing Scenario (5) controlling professional worker exposure for PROC 8A	

Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Equipment maintenance [CS5]; Maintenance of small items [CS18]. Equipment cleaning and maintenance, open indoor
Qualitative Risk Assessment	
General	Use drum pumps. Carefully pour from container. Put lids on containers immediately after use. Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	95 %

Contributing Scenario (6) controlling professional worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Disposal of wastes [CS28]. Handling of non cured waste; Waste management / handling and storage of waste for removal for off-site treatment or for on-site treatment like incineration and/or biological waste water treatment
Qualitative Risk Assessment	
General	Use drum pumps. Carefully pour from container. Put lids on containers immediately after use. Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	

Protective gloves	Gloves APF 10 90 %
Respiratory protection	95 %
Contributing Scenario (7) controlling professional worker exposure for PROC 10	
Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	Rolling, Brushing [CS51]; Roller, spreader, flow application [CS98] All open mould applications where resins is applied by brushing, rolling and other low energy spreading operations; Examples are handlamination, gelcoatbrushing, semi-continuous production of flat panels and laminates
Qualitative Risk Assessment	
General	Use long handled tools where possible Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)

Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	97.5 % *(justification: Use a powered respirator with hood/helmets (BS EN 12941), Filter Type A1 (Organic Vapours, BP>65°C), with an effectiveness of 97.5% (APF 40).)*
Contributing Scenario (8) controlling professional worker exposure for PROC 10	
Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	Dipping, immersion and pouring [CS4]; Rolling, Brushing [CS51]; Roller, spreader, flow application [CS98] Application of floorings, mastics, coatings, castings
Qualitative Risk Assessment	
General	Use long handled tools where possible Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional

Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	97.5 % *(justification: Use a powered respirator with hood/helmets (BS EN 12941), Filter Type A1 (Organic Vapours, BP>65°C), with an effectiveness of 97.5% (APF 40).)*
Contributing Scenario (9) controlling professional worker exposure for PROC 10	
Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	Dipping, immersion and pouring [CS4]; Rolling, Brushing [CS51]; Roller, spreader, flow application [CS98] Application of repair putties; Application of bonding pastes / adhesives. Application of chemical anchoring (indoor).
Qualitative Risk Assessment	
General	Use long handled tools where possible Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors

Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	97.5 % *(justification: Use a powered respirator with hood/helmets (BS EN 12941), Filter Type A1 (Organic Vapours, BP>65°C), with an effectiveness of 97.5% (APF 40).)*
Contributing Scenario (10) controlling professional worker exposure for PROC 11	
Name of contributing scenario	11 - Non industrial spraying
Scenario subtitle	Spraying [CS10]; Spraying (manually) [CS97] All open mould applications where resins is applied by manual spraying in an open work environment. Examples are spray lamination, gelcoat spraying and “chop-hoop” filament winding
Qualitative Risk Assessment	
General	Where appropriate, replacement of task by automated and/or closed processes. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Clear transfer lines prior to de-coupling Drain down and flush system prior to equipment break-in or maintenance. In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. Use suitable eye protection. Use suitable chemically resistant gloves. Provide specific employee training to prevent/minimize exposures. Wear suitable coveralls to prevent exposure to the skin. Wear a suitable respiratory protection with adequate effectiveness . Clear spills immediately Disposal - This material and its container must be disposed of in a safe manner. Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Consider the need for risk based health surveillance. Avoid inhalation of the product. In case of vapours: Handle in a fume cupboard or under extract ventilation
Product characteristics	
Physical state	liquid
Concentration in substance	50 %, concentration has been considered linearly *(justification: Limit the substance content in the product to 50%.)*
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,500 cm^2

Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	97.5 % *(justification: Use a powered respirator with masks (BS EN 12942), Filter Type A1 (Organic Vapours, BP>65°C), P3 filter (aerosols EN143), with an effectiveness of 97.5% (APF 40). For activities >1h, a constant flow airline breathing apparatus with hoods/helmets (BS EN 14594) is recommended (APF 200).)*

Exposure Scenario 8 (ES 8): Production of Styrene Butadiene Rubber (SBR)

Free short title	**Production of Styrene Butadiene Rubber (SBR)**
Systematic title based on use descriptor	ERC 6C; PROC 2, 3, 8A, 8B, 9, 15
Name of contributing environmental scenario and corresponding ERC	ERC 6c Production of plastics
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 15 - Use of laboratory reagents in small scale laboratories
Contributing Scenario (1) controlling environmental exposure for ERC 6C	
Operational conditions	
Annual tonnage	2.42E6 to/year
Daily amount used at site	4.83E5 kg/day
Release times per year	300 days/year *(justification: Continuous production)*
Local freshwater dilution factor	10
Local marine water dilution factor	100
Release fraction to air from process	0.102 %
Release fraction to wastewater from process	0.000012 %
Release fraction to soil from process	0 %
Fraction tonnage to region	10 %
Fraction used at main source	60 %
STP	yes
River flow rate	18000 m^3/day
Municipal sewage treatment plant discharge	2000000 L/day
Other modified EUSES values	
Fraction released to waste water (Femis.water)	0.000012 % *(justification: EU Risk Assessment Report, 2002)*
Fraction released to air (Femis.air)	0.102 % *(justification: EU Risk Assessment Report, 2002)*

Fraction used at main source	60 % *(justification: Value adopted to account for worst-case European manufacturing site)*
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - *(justification: Efficiency STP 91.9%)*
Contributing Scenario (2) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Material transfers [CS3]. Styrene Storage in tanks
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (3) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Material transfers [CS3]. Waste management : recovery using condensation or adsorption/ desorption processes
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium

Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Material transfers [CS3]. Charging reactors via pipeline
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling industrial worker exposure for PROC 3	

Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Polymerisation reactor
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Vacuum steam distillation
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	

Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (7) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Coagulation reactor
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (8) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Drying tank
Qualitative Risk Assessment	

General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (9) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Material transfers [CS3]. Recycling styrene from distillator to reactor via pipeline
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	

Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (10) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Process sampling [CS2]. Sampling from reactors
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Use a sampling system designed to control exposure	inhalation: 80 % *(justification: Use a sampling system designed to control exposure)*
Contributing Scenario (11) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Material transfers [CS3]. Loading tank storage from road, rail or boat transport
Qualitative Risk Assessment	

General	Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (12) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	

Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (13) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Bulk transfers [CS14]. Finished product Loading of road tanker, railcar, container
Product characteristics	
Physical state	liquid
Concentration in substance	1-5%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (14) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Material transfers [CS3]. Waste management : transfer of process wastes to storage containers: off-line in workplace
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %

Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (15) controlling industrial worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	Small package filling [CS7]. Small package filling - Packaging of product
Product characteristics	
Physical state	liquid
Concentration in substance	1-5%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (16) controlling industrial worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Laboratory activities [CS36]. Laboratory - Quality Control
Qualitative Risk Assessment	

General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no

Exposure Scenario 9 (ES 9): Production of Styrene Butadiene Latex (SBL)

Free short title	**Production of Styrene Butadiene Latex (SBL)**
Systematic title based on use descriptor	ERC 6C; PROC 2, 3, 8A, 8B, 9, 15
Name of contributing environmental scenario and corresponding ERC	ERC 6c Production of plastics
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 15 - Use of laboratory reagents in small scale laboratories
Contributing Scenario (1) controlling environmental exposure for ERC 6C	
Operational conditions	
Annual tonnage	2.42E6 to/year
Daily amount used at site	4.83E5 kg/day
Release times per year	300 days/year *(justification: Continuous production)*
Local freshwater dilution factor	10
Local marine water dilution factor	100
Release fraction to air from process	0.102 %
Release fraction to wastewater from process	0.000012 %
Release fraction to soil from process	0 %
Fraction tonnage to region	10 %
Fraction used at main source	60 %
STP	yes
River flow rate	18000 m^3/day
Municipal sewage treatment plant discharge	2000000 L/day
Other modified EUSES values	
Fraction released to waste water (Femis.water)	0.000012 % *(justification: EU Risk Assessment Report, 2002)*
Fraction released to air (Femis.air)	0.102 % *(justification: EU Risk Assessment Report, 2002)*
Fraction used at main source	60 % *(justification: Value adopted to account for worst-case European manufacturing site)*
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - *(justification: Efficiency STP 91.9%)*

Contributing Scenario (2) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Material transfers [CS3]. Styrene Storage in tanks
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (3) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Material transfers [CS3]. Waste management : recovery using condensation or adsorption/ desorption processes
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week

Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Material transfers [CS3]. Charging reactors via pipeline
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Polymerisation reactor
Qualitative Risk Assessment	

General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Vacuum steam distillation
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors

Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (7) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Material transfers [CS3]. Recycling styrene from distillator to reactor via pipeline
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (8) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Process sampling [CS2]. Sampling from reactors
Qualitative Risk Assessment	

General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Use a sampling system designed to control exposure .	inhalation: 80 % *(justification: Use a sampling system designed to control exposure)*
Contributing Scenario (9) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Material transfers [CS3]. Loading tank storage from road, rail or boat transport
Qualitative Risk Assessment	
General	Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	

Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (10) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (11) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Bulk transfers [CS14]. Finished product Loading of road tanker, railcar, container
Product characteristics	

Physical state	liquid
Concentration in substance	1-5%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (12) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Material transfers [CS3]. Waste management : transfer of process wastes to storage containers: off-line in workplace
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	

Protective gloves	No
Respiratory protection	no
Contributing Scenario (13) controlling industrial worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	Small package filling [CS7]. Small package filling - Packaging of product
Product characteristics	
Physical state	liquid
Concentration in substance	1-5%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (14) controlling industrial worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Laboratory activities [CS36]. Laboratory - Quality Control
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	

Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no

Exposure Scenario 10 (ES 10): Production of Styrene Isoprene Copolymers

Free short title	**Production of Styrene Isoprene Copolymers**
Systematic title based on use descriptor	ERC 6C; PROC 2, 3, 8A, 8B, 9, 15
Name of contributing environmental scenario and corresponding ERC	ERC 6c Production of plastics
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 15 - Use of laboratory reagents in small scale laboratories
Contributing Scenario (1) controlling environmental exposure for ERC 6C	
Operational conditions	
Annual tonnage	2.42E6 to/year
Daily amount used at site	4.83E5 kg/day
Release times per year	300 days/year *(justification: Continuous production)*
Local freshwater dilution factor	10
Local marine water dilution factor	100
Release fraction to air from process	0.102 %
Release fraction to wastewater from process	0.000012 %
Release fraction to soil from process	0 %
Fraction tonnage to region	10 %
Fraction used at main source	60 %
STP	yes
River flow rate	18000 m^3/day
Municipal sewage treatment plant discharge	2000000 L/day
Other modified EUSES values	
Fraction released to waste water (Femis.water)	0.000012 % *(justification: EU Risk Assessment Report, 2002)*
Fraction released to air (Femis.air)	0.102 % *(justification: EU Risk Assessment Report, 2002)*
Fraction used at main source	60 % *(justification: Value adopted to account for worst-case European manufacturing site)*
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - *(justification: Efficiency STP 91.9%)*

Contributing Scenario (2) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Material transfers [CS3]. Styrene Storage in tanks
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (3) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Material transfers [CS3]. Waste management : recovery using condensation or adsorption/ desorption processes
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week

Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Material transfers [CS3]. Charging reactors via pipeline
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Dissolving and polymerisation reactor
Qualitative Risk Assessment	

General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Suspension reactor
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors

Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (7) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Washed and dried tanks
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (8) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Process sampling [CS2]. Sampling from reactors/tanks
Qualitative Risk Assessment	

General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Use a sampling system designed to control exposure	inhalation: 80 % *(justification: Use a sampling system designed to control exposure)*
Contributing Scenario (9) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2

Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (10) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Bulk transfers [CS14]. Finished product Loading of road tanker, railcar, container
Product characteristics	
Physical state	liquid
Concentration in substance	1-5%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (11) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Material transfers [CS3]. Loading tank storage from road, rail or boat transport
Qualitative Risk Assessment	
General	Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	

Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (12) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Material transfers [CS3]. Waste management : transfer of process wastes to storage containers: off-line in workplace
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	

Protective gloves	No
Respiratory protection	no
Contributing Scenario (13) controlling industrial worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	Small package filling [CS7]. Small package filling - Packaging of product
Product characteristics	
Physical state	liquid
Concentration in substance	1-5%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (14) controlling industrial worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Laboratory activities [CS36]. Laboratory - Quality Control
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	

Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no

Exposure Scenario 11 (ES 11): Production of other Styrene based polymeric dispersions

Free short title	**Production of other Styrene based polymeric dispersions**
Systematic title based on use descriptor	ERC 6C; PROC 2, 3, 8A, 8B, 9, 15
Name of contributing environmental scenario and corresponding ERC	ERC 6c Production of plastics
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 15 - Use of laboratory reagents in small scale laboratories
Contributing Scenario (1) controlling environmental exposure for ERC 6C	
Operational conditions	
Annual tonnage	2.42E6 to/year
Daily amount used at site	4.83E5 kg/day
Release times per year	300 days/year *(justification: Continuous production)*
Local freshwater dilution factor	10
Local marine water dilution factor	100
Release fraction to air from process	0.102 %
Release fraction to wastewater from process	0.000012 %
Release fraction to soil from process	0 %
Fraction tonnage to region	10 %
Fraction used at main source	60 %
STP	yes

River flow rate	18000 m^3/day
Municipal sewage treatment plant discharge	2000000 L/day
Other modified EUSES values	
Fraction released to waste water (Femis.water)	0.000012 % *(justification: EU Risk Assessment Repoert, 2002)*
Fraction released to air (Femis.air)	0.102 % *(justification: EU Risk Assessment Repoert, 2002)*
Fraction used at main source	60 % *(justification: Value adopted to account for worst-case European manufacturing site)*
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - *(justification: Efficiency STP 91.9%)*
Contributing Scenario (2) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Material transfers [CS3]. Styrene Storage in tanks
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (3) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Material transfers [CS3]. Waste management : recovery using condensation or adsorption/ desorption processes
Qualitative Risk Assessment	

General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Material transfers [CS3]. Charging reactors via pipeline
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)

Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Dissolving and polymerisation reactor
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Suspension reactor
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	

Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (7) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Washed and dried tanks
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no

Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (8) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Process sampling [CS2]. Sampling from reactors/tanks
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Use a sampling system designed to control exposure	inhalation: 80 % *(justification: Use a sampling system designed to control exposure)*
Contributing Scenario (9) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Material transfers [CS3]. Loading tank storage from road, rail or boat transport
Qualitative Risk Assessment	
General	Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.

Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (10) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no

Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (11) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Bulk transfers [CS14]. Finished product Loading of road tanker, railcar, container
Product characteristics	
Physical state	liquid
Concentration in substance	1-5%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (12) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Material transfers [CS3]. Waste management : transfer of process wastes to storage containers: off-line in workplace
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week

Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (13) controlling industrial worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	Small package filling [CS7]. Small package filling - Packaging of product
Product characteristics	
Physical state	liquid
Concentration in substance	1-5%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (14) controlling industrial worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Laboratory activities [CS36]. Laboratory - Quality Control
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid

Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no

Exposure Scenario 12 (ES 12): Production of filled Polyols

Free short title	**Production of filled Polyols**
Systematic title based on use descriptor	ERC 6C; PROC 2, 3, 8A, 8B, 9, 15
Name of contributing environmental scenario and corresponding ERC	ERC 6c Production of plastics
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 15 - Use of laboratory reagents in small scale laboratories
Contributing Scenario (1) controlling environmental exposure for ERC 6C	
Operational conditions	
Annual tonnage	2.42E6 to/year
Daily amount used at site	4.83E5 kg/day
Release times per year	300 days/year *(justification: Continuous production)*
Local freshwater dilution factor	10
Local marine water dilution factor	100
Release fraction to air from process	0.102 %
Release fraction to wastewater from process	0.000012 %
Release fraction to soil from process	0 %
Fraction tonnage to region	10 %
Fraction used at main source	60 %
STP	yes
River flow rate	18000 m^3/day
Municipal sewage treatment plant discharge	2000000 L/day
Other modified EUSES values	
Fraction released to waste water (Femis.water)	0.000012 % *(justification: EU Risk Assessment Report, 2002)*
Fraction released to air (Femis.air)	0.102 % *(justification: EU Risk Assessment Report, 2002)*
Fraction used at main source	60 % *(justification: Value adopted to account for worst-case European manufacturing site)*
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - *(justification: Efficiency STP 91.9%)*

Contributing Scenario (2) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Material transfers [CS3]. Waste management : recovery using condensation or adsorption/ desorption processes
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (3) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Material transfers [CS3]. Styrene Storage in tanks
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week

Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Material transfers [CS3]. Charging reactors via pipeline
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Dissolving and polymerisation reactor
Qualitative Risk Assessment	

General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Suspension reactor
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors

Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (7) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Batch process [CS55]. Washed and dried tanks
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (8) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Process sampling [CS2]. Sampling from reactors/tanks
Qualitative Risk Assessment	

General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Use a sampling system designed to control exposure	inhalation: 80 % *(justification: Use a sampling system designed to control exposure)*
Contributing Scenario (9) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Material transfers [CS3]. Loading tank storage from road, rail or boat transport
Qualitative Risk Assessment	
General	Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	

Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (10) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Equipment maintenance [CS5]. Manufacturing equipment maintenance: opening and cleaning manufacturing equipment for maintenance purposes
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (11) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Bulk transfers [CS14]. Finished product Loading of road tanker, railcar, container
Product characteristics	

Physical state	liquid
Concentration in substance	1-5%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (12) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Material transfers [CS3]. Waste management : transfer of process wastes to storage containers: off-line in workplace
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	

Protective gloves	No
Respiratory protection	no
Contributing Scenario (13) controlling industrial worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	Small package filling [CS7]. Small package filling - Packaging of product
Product characteristics	
Physical state	liquid
Concentration in substance	1-5%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (14) controlling industrial worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Laboratory activities [CS36]. Laboratory - Quality Control
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	

Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no

END OF SAFETY DATA SHEET