SAFETY DATA SHEET

According to Regulation EC No 1907/2006 - REACH and Regulation EC No 1272/2008 - CLP

STYRENE

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

1.1 Product identifier

Commercial name	STYRENE
Chemical name	Styrene.
Synonyms	Vinylbenzene, phenylethylene, phenyl ethene.
CAS	100-42-5
EC (EINECS)	202-851-5
Index No (annex VI Regulation EC No 1272/2008)	601-026-00-0
Registration Number	01-2119457861-32-0157
Authoritation Number	N/A

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

1.3 Details of the supplier of the safety data sheet

Company	REPSOL TRADING, S.A.
Address	Méndez Álvaro, 44 28045 - MADRID, Spain
Phone	+34 917538000/+34 917538100
Fax	+34 913485074
e-mail address	sdstrading@repsol.com

1.4 Emergency telephone number
Carechem 24: +44 (0) 1235 239 670
Carechem 24: +1 215 207 0061
Carechem 24: 001866 928 0789

SECTION 2. Hazards identification

<table>
<tr><td>2.1 Classification of the substance or mixture</td><td colspan="2">2.2 Label elements</td></tr>
<tr><td>CLASSIFICATION Reg.(CE)1272/2008(CLP)</td><td colspan="2">LABELLING</td></tr>
<tr><td rowspan="4">Flammable liquid: Flam. Liq. 3
Acute toxicity: Acute Tox. 4
Skin corrosion/irritation: Skin Irrit. 2
Serious eye damage/eye irritation: Eye Irrit. 2
Aspiration hazard: Asp. Tox. 1
Specific target organ toxicity: STOT SE 3
Specific target organ toxicity: STOT RE 1
Hazardous to the aquatic environment: Aquatic Chronic 3</td><td>Pictograms
GHS02
GHS07
GHS08</td><td>  </td></tr>
<tr><td>Signal word</td><td>Danger</td></tr>
<tr><td>Hazard statements</td><td>H226: Flammable liquid and vapour.
H332: Harmful if inhaled.
H319: Causes serious eye irritation.
H335: May cause respiratory irritation.
H315: Causes skin irritation.
H372: Causes damage to organs through prolonged or repeated exposure.
H304: May be fatal if swallowed and enters airways.
H412: Harmful to aquatic life with long lasting effects.</td></tr>
<tr><td>supplemental information</td><td>N/A</td></tr>
</table>

	Precautionary statements	P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P233: Keep container tightly closed. P260: Do not breathe dust/fume/gas/mist/vapours/spray. P270: Do no eat, drink or smoke when using this product. P273: Avoid release to the environment. P280: Wear protective gloves/protective clothing/eye protection/face protection. P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P501: Dispose of the contents/receptacle into the container supplied for that purpose in accordance with current guidelines.

2.3 Other hazards

Results of the assessment of PBT and vPvB in the product, in accordance with the criteria set out in Annex XIII of REACH, can be found in Section 12.5 of this MSDS.
Please refer to Sections 5, 6 and 7 of this MSDS for information on other dangers, different from classification dangers but which may contribute to the overall hazards of the product.

SECTION 3. Composition/information on ingredients

STYRENE

Dangerous components Reg. (CE) 1272/2008 (CLP)	Concentration (%)	Hazard statements
Styrene **CAS**: 100-42-5 **EC (EINECS)**: 202-851-5	99,6	H226, H304, H315, H319, H332, H335, H372, H412

SECTION 4. First aid measures

4.1. Description of first aid measures

Inhalation: Keep patient calm, remove to fresh air, seek medical attention

Ingestion/Aspiration: Keep patient calm, remove to fresh air, seek medical attention.

Contact skin: Wash thoroughly with soap and water.

Contact eyes: Immediately wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist.

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

Inhalation: These vapors are toxic and can cause upper respiratory tract irritation, fainting, vomiting, pulmonary edema and central nervous system damage. Inhalation of high vapour concentrations may cause transient irritation of the respiratory tract, headache, nausea.

Ingestion/Aspiration: Harmful if swallowed. Symptoms are same as those caused by inhalation, as well as causing severe irritation of mouth, throat and stomach.

Contact skin: Contact with liquid may cause irritation. Repeated and prolonged contact may cause infections and dermatitis.

Contact eyes: Contact with liquid may cause irritation.
Spills can cause irritation and damage to the epithelium of the cornea.

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

Seek medical care.

SECTION 5. Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media: Dry extinguishing media, foam, carbon dioxide

Unsuitable extinguishing media: Water

5.2. Special hazards arising from the substance or mixture

Combustion products: CO2, H2O; formaldehyde; CO (in the absence of oxygen). Fire will produce irritating and very acidic fumes.

Special measures: Move containers from the fire area if it can be done without risk. Cool flame-exposed containers with water. Avoid ignition sources. Withdraw immediately in case of alarm. Consult and follow existing emergency standard procedures if they exist.

Special hazards: Flammable/combustible material. May be ignited by heat, sparks, flames or static discharge. Containers may explode in heat fire. Vapor is heavier than air and may travel to a source of ignition and flash back or concentrate in low spaces. At high temperatures polymerization may occur.

5.3. Advice for firefighters:

Wear self-contained breathing apparatus and chemical-protective clothing.

SECTION 6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions: Use breathing apparatus if exposed to vapours/dust/aerosol.
Sources of ignition should be kept well clear.

Personal protection: 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.

6.2. Environmental precautions

Avoid contamination of land and water.Prevent spillage or entry into drains and waterways using soil, sand or other suitable barriers.Keep away from sources of ignition, flames, sparks, and no smoking in the risk zone.

6.3. Methods and material for containment and cleaning up

For small amounts:
Pick up with suitable absorbent material.
Dispose of absorbed material in accordance with regulations.
For large amounts:
Dike spillage.
Place into suitable container for disposal.
For residues:
Pick up with suitable absorbent material.
Dispose of absorbed material in accordance with regulations.

6.4. Reference to other sections

Section 8 contains more detailed advice on personal protective equipment and section 13 on waste disposal.

SECTION 7. Handling and storage

7.1. Precautions for safe handling

General precautions: Take precautionary measures against static discharges.
Keep away from sources of ignition - No smoking.
Wear suitable protective clothing and gloves.

Specific conditions: Good local exhaust ventilation system to maintain levels of styrene below the permitted limit.
In filling operations or handling containers should be used appropriate protective equipment and respiratory protection when vapors.
Special procedures are necessary during tank loading, cleaning or maintaining.
The tanks must be empty before performing any inspection, which will be performed by qualified personnel.

7.2. Conditions for safe storage, including any incompatibilities

Temperature and decomposition products: Flammable vapors/gases.

Dangerous reactions: Flammable liquid.
Take precautionary measures against static discharges to avoid polymerization hazard.

Storage conditions: Keep at temperature not exceeding 40 °C.
additives:
4-tert-butyl catechol (CAS Number: 98-29-3)
Storage temperature:
< 40 °C
Check frequently to ensure that stabilizer content is adequate.

Incompatible materials: Brass, Copper.

7.3. Specific end use(s)
See section 1 or exposure scenario

SECTION 8. Exposure controls/personal protection

8.1 Control parameters

Styrene (Nº CAS: 100-42-5):
INSHT (Spain):VLA-ED: 20 ppm (85 mg/m³) / VLA-EC: 40 ppm (170 mg/m³).
ACGIH (USA): TLV-TWA: 20 ppm / TLV-STEL : 40 ppm.
GKV_MAK (Austria): TWA: 20 ppm (85 mg/m³) / STEL: 80 ppm (340 mg/m³).
Lijst Grenswaarden / Valeurs Limites(Belgium): TWA: 50 ppm (216 mg/m³) / STEL: 100 ppm (432 mg/m³).
Arbejdstilsynet (Denmark): TWA: 25 ppm (105 mg/m³) / STEL: 25 ppm (105 mg/m³).
INRS (France): TWA: 50 ppm (215 mg/m³).
TRGS900 AGW (Germany): TWA: 20 ppm (86 mg/m³) / STEL: 40 ppm (172 mg/m³).
EüM-SzCsM (Hungary):TWA: 50 mg/m³ / STEL: 50 mg/m³.
NAOSH (Ireland): TWA: 20 ppm (85 mg/m³) / STEL: 40 ppm (170 mg/m³).
LV Nat. Standardisation and Meterological Centre (Latvia): TWA: 10 mg/m³ / STEL: 30 mg/m³.
Rozporządzenie Ministra Pracy i Polityki Społecznej (Poland): TWA: 50 mg/m³ / STEL: 200 mg/m³.
AFS 2005:17 (Sweden): NGV: 10 ppm (43 mg/m³) / KTV: 20 ppm (86 mg/m³).
NIOSH (USA): REL-TWA: 50 ppm (215 mg/m³) / REL-STEL: 100 ppm (425 mg/m³).
OSHA (USA): PEL-TWA: 100 ppm / PEL-STEL: 200 ppm.

EH40/2005 WELs (UK): OEL-TWA: 100 ppm (430 mg/m³) / OEL-STEL: 250 ppm (1080 mg/m³).

DNEL

DNELs for workers

Acute exposure - systemic effects, Dermal (mg/kg bw /day): Assessment of hazard sufficiently covered by derivation of the respective DNEL for long-term exposure
Acute exposure - systemic effects, Inhalation (mg/m³): 289
Acute exposure - local effects, Dermal (mg/kg bw /day): Assessment of hazard sufficiently covered by derivation of the respective DNEL for long-term exposure
Acute exposure - local effects, Inhalation (mg/m³): 306
Long-term exposure - systemic effects, Dermal (mg/kg bw /day): 406
Long-term exposure - systemic effects, Inhalation (mg/m³): 85
Long-term exposure - local effects, Dermal (mg/kg bw /day): Assessment of hazard sufficiently covered by derivation of the respective DNEL for long-term exposure
Long-term exposure - local effects, Inhalation (mg/m³): Assessment of hazard sufficiently covered by derivation of the respective DNEL for long-term exposure

DNELs for the general population

Acute exposure - systemic effects, Dermal (mg/kg bw /day): Assessment of hazard sufficiently covered by derivation of the respective DNEL for long-term exposure
Acute exposure - systemic effects, Inhalation (mg/m³): 174,25
Acute exposure - systemic effects, Oral (mg/kg bw /day) : Assessment of hazard sufficiently covered by derivation of the respective DNEL for long-term exposure
Acute exposure - local effects, Dermal (mg/kg bw /day): Assessment of hazard sufficiently covered by derivation of the respective DNEL for long-term exposure
Acute exposure - local effects, Inhalation (mg/m³): 182,75
Long-term exposure - systemic effects, Dermal (mg /kg bw /day) : 343
Long-term exposure - systemic effects, Inhalation (mg /m³): 10,2
Long-term exposure - systemic effects, Oral (mg/kg bw /day): 2,1
Long-term exposure - local effects, Dermal (mg/kg bw /day): Assessment of hazard sufficiently covered by derivation of the respective DNEL for long-term exposure
Long-term exposure - local effects, Inhalation (mg/m³): Assessment of hazard sufficiently covered by derivation of the respective DNEL for long-term exposure

PNEC

PNEC water

PNEC aqua - freshwater (mg/L): 0,028 (assessment factor: 10)
PNEC aqua - marine water (mg/L): 0,014 (assessment factor: 20)
PNEC aqua - intermittent releases (mg/L): 0,04 (assessment factor: 100)

PNEC sediment

PNEC sediment – freshwater (mg/kg d.w.): 0,614
PNEC sediment – marine water (mg/kgd.w.): 0,307

PNEC soil

PNEC soil (mg/kg d.w.): 0,2

PNEC for sewage treatment plant

PNEC STP (mg/l): 5 (assessment factor: 100)

PNEC oral (secondary poisoning)

PNEC oral (mg/kg food): The environmental fate end the low log Kow of styrene indicate, that secondary poisoning is an unlikely exposure pathway

8.2 Exposure controls

Avoid prolonged contact with product and vapor inhalation. Contaminated clothing must be quickly wet to eliminate risk of inflammation.

Individual protection measures, such as personal protective equipment

Respiratory protection: Efficient ventilation. Protective mask against organic vapors with built-in NPF 20 particulate filter in the presence of vapors.

Skin protection: Neoprene gloves, safety shoes and chemical resistant clothes.

Eye/face protection: Safety goggles or face shield to avoid splashes.

Other protective equipment: Showers and eye-washers in the work area.

Specific hygiene measures: Do not breathe vapors. Keep away from food, drink and animal feed. Wash/clean skin after stopping work.

Medical Conditions Aggravated by Exposure: Respiratory tract deficiencies and dermatological problems.

Environmental exposure controls:
Product should not reach the environment through wastewater or sewage. Measures to take in case of accidental release can be found in Section 6 of this MSDS.

SECTION 9. Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance: Liquid.
Odour: Sweet
Odour threshold: N/A
Colour: Colorless.
pH: N/A
Melting point/freezing point: -31°C
Initial boiling point and boiling range: 145°C
Flash point: 32°C (Abel)
Evaporation rate: N/A
Flammability (solid, gas): Flammable liquid and vapour.
Upper/lower flammability or explosive limits: Lower explosive lim.: 1.1% vol. Upper explosive lim.: 6.1% vol.
Vapour pressure: 670 Pa at 20°C
Vapour density: 3.6 (air: 1)
Density: 0.906 g/cm3 at 20°C
Solubility(ies: In organic solvents: Ether, benzene.
Partition coefficient: n-octanol/water: log Pow: 2.95
Auto-ignition temperature: 490°C
Decomposition temperature: N/A
Viscosity: (20°C) 0.76 mPa.s (25°C) (dynamic) 0.7 mPa.s
Explosive properties: N/A
Oxidising properties: N/A

9.2 Other information

Water solubility: 0.29 kg/m3 at 20°C

Surface tension: 34 mN/m
Odor threshold: 0.1 ppm critical temperature: 373°C Heat of combustion:-1018.83 Kcal/mol at 25°C evaporation speed: 12.4 (ASTM D 3539, nBuAc = 1) molecular weight: 104.15 Electrical conductivity: < 50 pS/m

SECTION 10. Stability and reactivity

10.1. Reactivity: May occur if heated above 65°C. May cause rupture of container.

10.2. Chemical stability: It must be stabilized with tertbutylcatechol. Content with stabilizers too low can cause polymerization linked to formation of heat. Styrene oxidizes on contact with air and reacts violently with strong oxidizing agents.

10.3. Possibility of hazardous reactions: Oxidizers, halides, catalysts for vinyl polymers; peroxides, strong acids, aluminum chloride, copper and copper alloys.

10.4. Conditions to avoid: Exposure to flames, heat, sparks and static electricity. Metal salts, peroxides and strong acids, heat and light. Styrene readily reacts with low concentrations of halogens in the presence of UV light to produce a potent lacrimator.

10.5. Incompatible materials: N/A

10.6. Hazardous decomposition products: Flammable vapors/gases.

SECTION 11. Toxicological information

11.1. Information on toxicological effects

The provided toxicological information results from the application of Annexes VII to XI of Regulation 1907/2006 (REACH).

Acute toxicity: The present data for the test substance identify styrene to cause acute toxicity via the inhalative route, as the LC50 in rats was 11.8 mg/l after a 4 hour inhalation period of the vapour.

Skin corrosion/irritation: Irritating.

Serious eye damage/irritation: Irritating.

Respiratory or skin sensitisation: Not skin sensitisers

Germ cell mutagenicity: 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 is not warranted for styrene.

Carcinogenicity: There is no convincing evidence that styrene possesses significant carcinogenic potential in humans. A classification for carcinogenicity is not warranted for styrene.

Product rating corresponds to the comparison of the results from the toxicological studies with the criteria set out in Regulation (EC) No 1272/2008 for CMR, categories 1A and 1B.

Reproductive toxicity: In November 2012 RAC (Risk Assessment Committee) assessed the evidence for developmental toxicity on developmental neurotoxicity in rats. Four effects were assessed in detail in the RAC opinion leading to the conclusion to classify styrene as a category 2 developmental toxicant. The RAC is of the opinion that there is sufficient evidence of developmental effects to warrant classification as Repr. 2, H361d (CLP).

STOT-single exposure: May cause respiratory irritation by inhalation (Organ: Nose)

STOT-repeated exposure: Inhalation: - human: effects on colour vision after long-term inhalation: NOAEC = 50 ppm (8-hr TWA ototoxicity after long-term inhalation: NOAEC = 20 ppm - rat: NOAEC = 500 ppm developmental toxicity after long-term inhalation: Dermal: corrected NOAEL = 615 mg/kg/d resulting from route-to-route extrapolation (inhalation to dermal route). There is clear evidence that styrene causes a specific adverse effect on hearing in laboratory animals after long-term exposure. Additionally, there is an indication for styrene-induced hearing losses in humans.

Aspiration hazard: May be fatal if swallowed and enters airways.

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.

12.2. Persistence and degradability: Significant amounts of styrene may be released to the environment from emissions generated by its production, use and from automobile exhaust.

Oxidizes rapidly by photo-chemical reactions in air. Readily biodegradable.

12.3. Bioaccumulative potential: No problem to bioaccumulate in living organisms or incidence in the trophic food web.

12.4. Mobility in soil: Soil spills can move and contaminate groundwater.

12.5. Results of PBT and vPvB assessment: The substance do not meet all the specific criteria detailed in Annex XIII or do not allow a direct comparison with all the criteria in Annex XIII but nevertheless indicate that the substance would not have all these properties and the substance is not considereda PBT/vPvB."

12.6. Other adverse effects: N/A

SECTION 13. Disposal considerations

13.1. Waste treatment methods

Disposal: Combustion in suitable combustion chambers; absorbing in vermiculite, dry sand, and evaporation in a safe place. Recover or recycle if possible. Incineration Controlled incineration.

Handling: Labeled and sealed containers. The waste is a flammable liquid. Risk of explosion. Avoid ignition sources, contact with skin or eyes, and inhalation of vapors.

Provisions: Establishments and companies which recover, dispose, store, transport or handle waste should comply with Dir. 2008/98/EC on waste, or other local, national or community provisions.

SECTION 14. Transport information

14.1. UN number: UN 2055

14.2. UN proper shipping name: STYRENE MONOMER, STABILIZED

14.3. Danger identification number: 39

14.4. Packing group

ADR/RID: Class 3. Classification Code: F1. Packaging group: III

IATA-DGR: Class 3. Packaging/container group: III.

IMDG: Class 3. Packaging/container group: III.

14.5. Environmental hazards

ADR/RID: N/A

IATA-DGR: N/A

IMDG: N/A

14.6. Transport in bulk in accordance with appendix II of the Marpol agreement 73/78 and the IBC code
No category assigned for the IBC code.

14.7. Special precautions for user
Labeled as flammable liquid. Store in cool well ventilated areas. Acceptable modes of transportation are air, rail, road and water (styrene monomer stabilized). Unstabilized styrene monomer is forbidden for transport on passenger and cargo aircraft.

SECTION 15. Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture
COMMISSION REGULATION (EU) No 453/2010 : REQUIREMENTS FOR THE COMPILATION OF SAFETY DATA SHEETS
Globally Harmonized System of Classification and Labelling of Chemicals (GHS).
Regulation (EC) No 1272/2008 of the European Parliament and the Council of 16 December 2008 on classification, labeling and packaging of substances and mixtures (CLP).
Regulation (EC) No 1907/2006 concerning Registration, Evaluation, Authorization and Restriction of Chemicals (REACH).
European Agreement concerning the international carriage of dangerous goods by road (ADR).
Regulation on the international transport of dangerous goods on the railway. (RID)
International maritime code of dangerous goods. (IMDG)
International Air Transport Association (IATA) regulation pertaining to air shipment.
International Bulk Chemical Code (IBC Code), MARPOL 73/78.

Commission Regulation Other hazards
N/A

15.2. Chemical safety assessment
A chemical safety assessment has been carried out.

SECTION 16. Other information

Glossary

CAS: Chemical Abstract Service
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists.
TLV: Threshold Limit Value
TWA: Time Weighted Average
STEL: Short-term Exposure Level
REL: Recommendable Exposure Limit
PEL: Permissible Exposure Limit
INSHT: Instituto Nacional de Seguridad e Higiene en el Trabajo.
VLA-ED: Environmental limit value - daily exposure
VLA-EC: Limit environmental value - short exposure
DNEL/DMEL: Derived no-effect level / Derivation of minimal effects levels
PNEC: Predicted No Effect Concentration
LD50: Lethal Dose Medium
LC50: Lethal Concentration Medium
EC50: Effective Concentration Medium
IC50: Inhibitory Concentration Medium
BOD: Biological Oxygen Demand.
NOAEL: No observable adverse effect level
NOEL: No observed effect level
NOAEC: No observed adverse effect concentration
NOEC: No observed effect concentration
N/A: Not applicable
| : Changes from the last revision

Data Bases consulted

EINECS: European Inventory of Existing Commercial Substances.
TSCA: Toxic Substances Control Act, US Environmental Protection Agency.
HSDB: US National Library of Medicine.
RTECS: US Dept. of Health & Human Services.

Hazard Class-and-Category shown in the document
N/A

Purchasing companies have an obligation to ensure that their employees are properly trained on the safe handling and use of the product in accordance with the guidelines contained in this MSDS.

Furthermore, companies purchasing this product are required to inform their employees, and individuals who could manipulate or use it within their facilities, about all indications included in the MSDS, in particular those relating to the product's risks to the health and safety of people and to the environment.

The information given in this document has been compiled based on the best existing information sources, latest available knowledge and according to the current requirements on classification, packaging and labelling of hazardous substances. It does not imply the information is exhaustive or accurate in all cases. It is the user's responsibility to determine the validity of the information contained in this Material Safety Data Sheet to apply depending on the case.

ANNEX

Scenario 1: Manufacturing of styrene (ES1)

Description of ES 1

Free short title	Manufacturing of styrene (ES1)
Systematic title based on use descriptor	ERC 1; PROC 2, 8B, 8A, 15, 1
Name of contributing environmental scenario and corresponding ERC	ERC 1 Production of chemicals
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 15 - Use of laboratory reagents in small scale laboratories PROC 1 - Use in closed process, no likelihood of exposure

1.1 Contributing Scenario (1) controlling environmental exposure for ERC 1

Operational conditions	
Annual European tonnage	**4.50E6 to/year**
Daily amount used at site	**3.43E6 kg/day**
Release times per year	**350 days/year *(justification: Survey from Styrene manufacturers)***
Local freshwater dilution factor	**41**
Local marine water dilution factor	**100**
Release fraction to air from process	**0.013 %**
Release fraction to wastewater from process	**0.0048 %**
Release fraction to soil from process	**0.010 %**
Fraction tonnage to region	**100 %**
Fraction used at main source	**100 % *(justification: Worst case estimation of local tonnage)***
STP	**yes**
River flow rate	**400000 m^3/day *(justification: Emission Scenario Document IC-2 Chemical industry:chemical used in synthesis (TGD Part IV, ECB, 2003))***
Municipal sewage treatment plant discharge	**10000000 L/day *(justification: Emission Scenario Document IC-2 Chemical industry:chemical used in synthesis (TGD Part IV, ECB, 2003))***
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 agricultural soil (Femis.agric)	**0 %** ***(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))***
Fraction released to industrial soil (Femis.ind)	**0 %** ***(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))***
Fraction released to waste water (Femis.water)	**0.0048 %** ***(justification: Mean value of measured release fractions reported in the EU Risk Assessment Report on Styrene (European Communities, 2002))***
Fraction released to air (Femis.air)	**0.013 %** ***(justification: Worst case measured release fraction reported in the EU Risk Assessment Report on Styrene (European Communities, 2002))***
Fraction used at main source	**100 %** ***(justification: Value used to reflect worst case estimation of local tonnage (largest manufacturing plant))***
Fraction of emission directed to water by local STP (Fstp.water)	**0.044 -** ***(justification: Efficiency STP 95.6% calculated from on-site monitoring data at production/processing sites)***

1.2 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	Use in contained systems [CS38]. De-hydrogenation Reactor
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employee 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**
1.3 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	**Use in contained systems [CS38]. Condensation of crude styrene - water separation**
Qualitative Risk Assessment	
General	**Ensure good work practices are implemented Provide basic employee 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**
1.4 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	Use in contained systems [CS38]. Vacuum Distillation
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employee 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

1.5 Contributing Scenario (5) 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	Additivation and stabilisation [CS69]. Addition of inhibitors or retardants in distillators
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employee 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	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
Local exhaust ventilation	dermal: 90 % *(justification: Use local exhaust ventilation with adequate effectiveness for dermal route of exposure)*
Local exhaust ventilation	inhalation: 97 % *(justification: Use local exhaust ventilation with adequate effectiveness)*

1.6 Contributing Scenario (6) 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/condensors/distillators
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employee 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)*

1.7 Contributing Scenario (7) 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 employee 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

1.8 Contributing Scenario (8) controlling industrial worker exposure for PROC 1

Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	Material transfers [CS3]. Transfer from distillator to storage tanks via pipelines.
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employee 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

1.9 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	Additivation and stabilisation [CS69]. Stabiliser addition for storage and transport
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employee 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	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
Local exhaust ventilation	dermal: 90 % *(justification: Use local exhaust ventilation with adequate effectiveness for dermal route of exposure)*
Local exhaust ventilation	inhalation: 97 % *(justification: Use local exhaust ventilation with adequate effectiveness)*

1.10 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	Material transfers [CS3]. Unloading storage tanks for road, rail or boat transport
Qualitative Risk Assessment	
General	Clear transfer lines prior to de-coupling Ensure good work practices are implemented Provide basic employee 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	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	No
Respiratory protection	no

1.11 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	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 employee 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

1.12 Contributing Scenario (12) 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 employee 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

1.13 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	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 employee 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

Scenario 2: Continuous mass polymerisation of Polystyrene (HIPS and GPPS) (ES2)

Description of ES 2

Free short title	Continuous mass polymerisation of Polystyrene (HIPS and GPPS) (ES2)
Systematic title based on use descriptor	ERC 6C; PROC 8B, 2, 8A, 15, 14, 9
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 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 15 - Use of laboratory reagents in small scale laboratories PROC 14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 9 - Transfer of chemicals into small containers (dedicated filling line)

2.1 Contributing Scenario (1) controlling environmental exposure for ERC 6C

Operational conditions	
Annual European tonnage	2.42E6 to/year
Daily amount used at site	4.83E5 kg/day
Release times per year	300 days/year
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 agricultural soil (Femis.agric)	0 % *(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))*
Fraction released to industrial soil (Femis.ind)	0 % *(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))*
Fraction released to waste water (Femis.water)	0.000012 % *(justification: Realese 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%)*
2.2 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
2.3 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]. 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

2.4 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	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

2.5 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	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

2.6 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]. 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

2.7 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	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

2.8 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)*

2.9 Contributing Scenario (9) 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

2.10 Contributing Scenario (10) 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

2.11 Contributing Scenario (11) 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

2.12 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

2.13 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

2.14 Contributing Scenario (14) 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

2.15 Contributing Scenario (15) 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

Scenario 3: Batch suspension polymerisation of Polystyrene (HIPS and GPPS) (ES3)

Description of ES 3

Free short title	Batch suspension polymerisation of Polystyrene (HIPS and GPPS) (ES3)

Systematic title based on use descriptor	ERC 6C; PROC 8B, 2, 3, 8A, 15, 14, 9
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 3 - Use in closed batch process (synthesis or formulation) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 15 - Use of laboratory reagents in small scale laboratories PROC 14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 9 - Transfer of chemicals into small containers (dedicated filling line)

3.1 Contributing Scenario (1) controlling environmental exposure for ERC 6C

Operational conditions	
Annual European 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 agricultural soil (Femis.agric)	0 % *(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))*
Fraction released to industrial soil (Femis.ind)	0 % *(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))*
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%)*
3.2 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

3.3 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

3.4 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

3.5 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

3.6 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

3.7 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)*
3.8 Contributing Scenario (8) 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

3.9 Contributing Scenario (9) 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

3.10 Contributing Scenario (10) 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

3.11 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	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

3.12 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	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

3.13 Contributing Scenario (13) 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

3.14 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

Scenario 4: Production of Expandable Polystyrene (ES4)

Description of ES 4

Free short title	Production of Expandable Polystyrene (ES4)
Systematic title based on use descriptor	ERC 6C; PROC 8B, 2, 3, 8A, 15, 14, 9
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 3 - Use in closed batch process (synthesis or formulation) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 15 - Use of laboratory reagents in small scale laboratories PROC 14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 9 - Transfer of chemicals into small containers (dedicated filling line)

4.1 Contributing Scenario (1) controlling environmental exposure for ERC 6C

Operational conditions	
Annual European 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 agricultural soil (Femis.agric)	0 % *(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))*
Fraction released to industrial soil (Femis.ind)	0 % *(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))*
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%)*
4.2 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
4.3 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

4.4 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

4.5 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

4.6 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

4.7 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)*
4.8 Contributing Scenario (8) 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

4.9 Contributing Scenario (9) 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

4.10 Contributing Scenario (10) 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

4.11 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	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

4.12 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	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

4.13 Contributing Scenario (13) 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

4.14 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

Scenario 5: Production of Styrenic Copolymers (ES5)

Description of ES 5

Free short title	Production of Styrenic Copolymers (ES5)
Systematic title based on use descriptor	ERC 6C; PROC 8B, 2, 3, 8A, 15, 9

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 3 - Use in closed batch process (synthesis or formulation) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 15 - Use of laboratory reagents in small scale laboratories PROC 9 - Transfer of chemicals into small containers (dedicated filling line)

5.1 Contributing Scenario (1) controlling environmental exposure for ERC 6C

Operational conditions	
Annual European 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 agricultural soil (Femis.agric)	0 % *(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))*
Fraction released to industrial soil (Femis.ind)	0 % *(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))*
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%)*

5.2 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

5.3 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

5.4 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

5.5 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

5.6 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
5.7 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
5.8 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)*

5.9 Contributing Scenario (9) 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
5.10 Contributing Scenario (10) 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
5.11 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	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

5.12 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	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

5.13 Contributing Scenario (13) 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

5.14 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

Scenario 6: Manufacturing of UP/VE resins and formulated resins (Gelcoat, Colour Paste, Putty, Bonding paste / Adhesive, etc.) (ES6)

Description of ES 6

Free short title	Manufacturing of UP/VE resins and formulated resins (Gelcoat, Colour Paste, Putty, Bonding paste / Adhesive, etc.) (ES6)
Systematic title based on use descriptor	ERC 2; PROC 1, 3, 4, 5, 15, 9, 8B, 8A
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 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 15 - Use of laboratory reagents in small scale laboratories PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
6.1 Contributing Scenario (1) controlling environmental exposure for ERC 2	
Operational conditions	

Annual European 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	0.010 %
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 agricultural soil (Femis.agric)	0 % *(justification: No direct release (EU Risk Assessment Report on Styrene,European Communities, 2002))*
Fraction released to industrial soil (Femis.ind)	0 % *(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))*
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%)*

6.2 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	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	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.)*
6.3 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	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	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
6.4 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	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	Gloves APF 5 80 %
Respiratory protection	no
6.5 Contributing Scenario (5) 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	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	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
6.6 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]. Mixing liquid and solid components / into final formulated resin in blending vessel; Examples are gelcoat blending and compounding
Qualitative Risk Assessment	
General	Keep lids of containers closed during blending 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	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

6.7 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	Avoid dip sampling 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	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

6.8 Contributing Scenario (8) 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	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
Carry out in a vented booth or extracted enclosure	inhalation: 90 % *(justification: Carry out in a vented booth or extracted enclosure)*

6.9 Contributing Scenario (9) 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	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	Gloves APF 5 80 %
Respiratory protection	no
LEV	inhalation: 90 % *(justification: Fill containers/cans at dedicated fill points supplied with local extract ventilation)*

6.10 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]. 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	Use bulk or semi-bulk handling systems 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	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 1.0 Bayesian model results using one specific dataset consisting of 28 measurement values representing worker exposure of 6 workers located at one site. The predicted 90th percentile full-shift exposure is 24 mg/m³. The confidence interval is 11 mg/m³ to 70 mg/m³. PROC 8b Emission sources: Far-field exposure Vapour pressure: 1300 Pa (Elevated temperature) Liquid mole fraction: 1 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: Splash loading Localised controls: None Effective housekeeping practices in place? Yes Work area: Outdoors, close to buildings Duration (mins): 480 min

6.11 Contributing Scenario (11) 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	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	Gloves APF 5 80 %
Respiratory protection	no
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)*

6.12 Contributing Scenario (12) 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	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	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Forced air circulation	inhalation: 70 % *(justification: Drain or remove substance from equipment prior to break-in or maintenance)*

6.13 Contributing Scenario (13) 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	Dispose of empty containers and wastes safely Dispose of waste in accordance with environmental legislation Reduce duration of activity to less than 60 min Alternatively: Wear a suitable respiratory protection with adequate effectiveness . 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	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.)*

Scenario 7: FRP manufacturing in an industrial setting, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.) (ES7)

Description of ES 7

Free short title	FRP manufacturing in an industrial setting, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.) (ES7)
Systematic title based on use descriptor	ERC 6D; PROC 10, 7, 13, 5, 3, 14, 8A, 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 10 - Roller application or brushing PROC 7 - Industrial spraying PROC 13 - Treatment of articles by dipping and pouring PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 15 - Use of laboratory reagents in small scale laboratories

7.1 Contributing Scenario (1) controlling environmental exposure for ERC 6D

Operational conditions	
Annual European tonnage	8.06E5 to/year
Daily amount used at site	1.61E5 kg/day
Release times per year	300 days/year *(justification: Continous 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	0.025 %
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 agricultural soil (Femis.agric)	0 % *(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))*
Fraction released to industrial soil (Femis.ind)	0 % *(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))*
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%)*

7.2 Contributing Scenario (2) 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 brushes and rollers where possible Ensure the ventilation system is regularly maintained and tested Dispose of empty containers and wastes safely 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
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

7.3 Contributing Scenario (3) 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	Ensure the ventilation system is regularly maintained and tested Dispose of empty containers and wastes safely Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Wear suitable coveralls to prevent exposure to the skin Use suitable eye protection. Wear suitable face shield Wear chemically resistant gloves in combination with intensive management supervision control.
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	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	no
Carry out in a vented booth or extracted enclosure	inhalation: 95 % *(justification: Carry out in a vented booth or extracted enclosure)*
7.4 Contributing Scenario (4) 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 environement. Examples are spray lamination, gelcoat spraying and “chop-hoop” filament winding
Qualitative Risk Assessment	
General	Carefully pour from containers Use long handled tools where possible Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Wear suitable face shield Wear suitable coveralls to prevent exposure to the skin Wear chemically resistant gloves in combination with intensive management supervision control.
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	1,500 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	90 %

7.5 Contributing Scenario (5) 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	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	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
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
7.6 Contributing Scenario (6) 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
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	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	No

Respiratory protection	no
7.7 Contributing Scenario (7) 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, etc
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	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
7.8 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	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	Put lids on containers immediately after use. 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	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

7.9 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]; 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	Put lids on containers immediately after use. 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	Gloves APF 5 80 %
Respiratory protection	no

7.10 Contributing Scenario (10) 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]; 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	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	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

7.11 Contributing Scenario (11) 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	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	Gloves APF 5 80 %
Respiratory protection	no

7.12 Contributing Scenario (12) 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	Put lids on containers immediately after use. 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	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

7.13 Contributing Scenario (13) 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 maintenance [CS5]; Maintenance of small items [CS18]. Equipment cleaning and maintenance, open indoor
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	Gloves APF 5 80 %
Respiratory protection	no
Local exhaust ventilation	inhalation: 70 % *(justification: Use local exhaust ventilation with adequate effectiveness)*

7.14 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]. 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	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	Gloves APF 5 80 %
Respiratory protection	no

7.15 Contributing Scenario (15) 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]. 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	Put lids on containers immediately after use. Contain and dispose of waste according to local regulations 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	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no

Scenario 8: FRP manufacturing in a professional setting, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.) (ES8)

Description of ES 8

Free short title	FRP manufacturing in a professional setting, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.) (ES8)
Systematic title based on use descriptor	ERC 8E; PROC 10, 11, 5, 4, 3, 8A
Name of contributing environmental scenario and corresponding ERC	ERC 8e Wide dispersive outdoor use of reactive substances in open systems
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 10 - Roller application or brushing PROC 11 - Non industrial spraying PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact) PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 3 - Use in closed batch process (synthesis or formulation) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities

8.1 Contributing Scenario (1) controlling environmental exposure for ERC 8E	
Operational conditions	
Annual European tonnage	2.42E6 to/year
Daily amount used at site	4.83E5 kg/day
Release times per year	300 days/year *(justification: Continous 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 agricultural soil (Femis.agric)	0 % *(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))*
Fraction released to industrial soil (Femis.ind)	0 % *(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))*
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%)*

8.2 Contributing Scenario (2) 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 brushes and rollers where possible 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
Ventilation	good (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 5 80 %
Respiratory protection	90 %
8.3 Contributing Scenario (3) 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 environement. Examples are spray lamination, gelcoat spraying and “chop-hoop” filament winding
Qualitative Risk Assessment	
General	Keep people not involved in the activity, away from the operation Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Wear suitable face shield Wear suitable coveralls to prevent exposure to the skin. Wear chemically resistant gloves in combination with intensive management supervision control.
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	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	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	95 %

8.4 Contributing Scenario (4) 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.
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	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
Ventilation	good (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 5 80 %

Respiratory protection	90 %
8.5 Contributing Scenario (5) 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	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
Ventilation	good (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 5 80 %

Respiratory protection	90 %
8.6 Contributing Scenario (6) 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. Put lids on containers immediately after use. 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	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	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	90 %

8.7 Contributing Scenario (7) 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	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	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 5 80 %
Respiratory protection	90 %

8.8 Contributing Scenario (8) 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	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	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 5 80 %
Respiratory protection	no

8.9 Contributing Scenario (9) 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	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	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	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no

8.10 Contributing Scenario (10) 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	Dispose of empty containers and wastes safely 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	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	no

Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no

Scenario 9: Production of Styrene Butadiene Rubber (SBR) (ES9)

Description of ES 9

Free short title	Production of Styrene Butadiene Rubber (SBR) (ES9)
Systematic title based on use descriptor	ERC 6C; PROC 8B, 2, 3, 8A, 15, 9
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 3 - Use in closed batch process (synthesis or formulation) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 15 - Use of laboratory reagents in small scale laboratories PROC 9 - Transfer of chemicals into small containers (dedicated filling line)

9.1 Contributing Scenario (1) controlling environmental exposure for ERC 6C

Operational conditions	
Annual European tonnage	2.42E6 to/year
Daily amount used at site	4.83E5 kg/day
Release times per year	300 days/year *(justification: Continous 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 agricultural soil (Femis.agric)	0 % *(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))*
Fraction released to industrial soil (Femis.ind)	0 % *(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))*
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%)*
9.2 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
9.3 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

9.4 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

9.5 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

9.6 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

9.7 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
9.8 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

9.9 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

9.10 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)*

9.11 Contributing Scenario (11) 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

9.12 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

9.13 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	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

9.14 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	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

9.15 Contributing Scenario (15) 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

9.16 Contributing Scenario (16) 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

Scenario 10: Production of Styrene Butadiene Latex (SBL) (ES10)

Description of ES 10

Free short title	Production of Styrene Butadiene Latex (SBL) (ES10)
Systematic title based on use descriptor	ERC 6C; PROC 8B, 2, 3, 8A, 15, 9
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 3 - Use in closed batch process (synthesis or formulation) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 15 - Use of laboratory reagents in small scale laboratories PROC 9 - Transfer of chemicals into small containers (dedicated filling line)

10.1 Contributing Scenario (1) controlling environmental exposure for ERC 6C

Operational conditions	
Annual European tonnage	2.42E6 to/year
Daily amount used at site	4.83E5 kg/day
Release times per year	300 days/year *(justification: Continous 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 agricultural soil (Femis.agric)	0 % *(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))*
Fraction released to industrial soil (Femis.ind)	0 % *(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))*
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%)*

10.2 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

10.3 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

10.4 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

10.5 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

10.6 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

10.7 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

10.8 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)*

10.9 Contributing Scenario (9) 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

10.10 Contributing Scenario (10) 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
10.11 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	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
10.12 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	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
10.13 Contributing Scenario (13) 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

10.14 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

Scenario 11: Production of Styrene Isoprene Copolymers (ES11)

Description of ES 11

Free short title	Production of Styrene Isoprene Copolymers (ES11)
Systematic title based on use descriptor	ERC 6C; PROC 8B, 2, 3, 8A, 15, 9
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 3 - Use in closed batch process (synthesis or formulation) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 15 - Use of laboratory reagents in small scale laboratories PROC 9 - Transfer of chemicals into small containers (dedicated filling line)

11.1 Contributing Scenario (1) controlling environmental exposure for ERC 6C

Operational conditions	
Annual European tonnage	2.42E6 to/year
Daily amount used at site	4.83E5 kg/day
Release times per year	300 days/year *(justification: Continous 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 agricultural soil (Femis.agric)	0 % *(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))*
Fraction released to industrial soil (Femis.ind)	0 % *(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))*
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%)*

11.2 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

11.3 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

11.4 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

11.5 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

11.6 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

11.7 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

11.8 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)*

11.9 Contributing Scenario (9) 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

11.10 Contributing Scenario (10) 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

11.11 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	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

11.12 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	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

11.13 Contributing Scenario (13) 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

11.14 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

Scenario 12: Production of other Styrene based polymeric dispersions (ES12)

Description of ES 12

Free short title	Production of other Styrene based polymeric dispersions (ES12)
Systematic title based on use descriptor	ERC 6C; PROC 8B, 2, 3, 8A, 15, 9
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 3 - Use in closed batch process (synthesis or formulation) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 15 - Use of laboratory reagents in small scale laboratories PROC 9 - Transfer of chemicals into small containers (dedicated filling line)

12.1 Contributing Scenario (1) controlling environmental exposure for ERC 6C

Operational conditions	
Annual European tonnage	2.42E6 to/year
Daily amount used at site	4.83E5 kg/day
Release times per year	300 days/year *(justification: Continous 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 agricultural soil (Femis.agric)	0 % *(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))*
Fraction released to industrial soil (Femis.ind)	0 % *(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))*
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%)*
12.2 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
12.3 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

12.4 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

12.5 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

12.6 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

12.7 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

12.8 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)*

12.9 Contributing Scenario (9) 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

12.10 Contributing Scenario (10) 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

12.11 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	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

12.12 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	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

12.13 Contributing Scenario (13) 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

12.14 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

Scenario 13: Production of filled Polyols (ES13)

Description of ES 13

Free short title	Production of filled Polyols (ES13)
Systematic title based on use descriptor	ERC 6C; PROC 8B, 2, 3, 8A, 15, 9
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 3 - Use in closed batch process (synthesis or formulation) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 15 - Use of laboratory reagents in small scale laboratories PROC 9 - Transfer of chemicals into small containers (dedicated filling line)

13.1 Contributing Scenario (1) controlling environmental exposure for ERC 6C

Operational conditions	
Annual European tonnage	2.42E6 to/year
Daily amount used at site	4.83E5 kg/day
Release times per year	300 days/year *(justification: Continous 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 agricultural soil (Femis.agric)	0 % *(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))*
Fraction released to industrial soil (Femis.ind)	0 % *(justification: No direct release to soil (EU Risk Assessment Report on Styrene,European Communities, 2002))*
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%)*

13.2 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

13.3 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

13.4 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

13.5 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

13.6 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

13.7 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

13.8 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)*

13.9 Contributing Scenario (9) 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

13.10 Contributing Scenario (10) 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
13.11 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	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
13.12 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	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
13.13 Contributing Scenario (13) 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

13.14 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

Scenario 14: Consumer use of liquid UP resin for repair purposes (ES 14)

Description of ES 14

Free short title	Consumer use of liquid UP resin for repair purposes (ES 14)

Systematic title based on use descriptor	ERC 8B; PC 9a
Name of contributing environmental scenario and corresponding ERC	ERC 8b Wide dispersive indoor use of reactive substances in open systems
Name(s) of contributing consumer scenarios and corresponding PCs/ACs	PC 9a Coatings and Paints, thinners, paint removers
14.1 Contributing Scenario (1) controlling environmental exposure for ERC 8B	
Operational conditions	
Annual European tonnage	1.34E5 to/year
Daily amount used at site	73.589 kg/day
Release times per year	365 days/year
Local freshwater dilution factor	10
Local marine water dilution factor	100
Release fraction to air from process	0.100 %
Release fraction to wastewater from process	2 %
Release fraction to soil from process	0 %
Fraction tonnage to region	10 %
Fraction used at main source	0.200 %
STP	yes
River flow rate	18000 m^3/day
Municipal sewage treatment plant discharge	2000000 L/day
Other modified EUSES values	
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - *(justification: Efficiency STP 91.9%)*

14.2 Contributing Scenario (2) controlling consumer exposure for PC 9a	
Name of contributing scenario	PC 9a Coatings and Paints, thinners, paint removers
Calculation model	Exposure estimates were determined by ESIG exposure assessment tool (http://www.esig.org)
Product subcategory	Solvent rich, high solid, water borne paint
Frequency and duration of use	
Frequency of use	1,825 times/year *(justification: Frequency: 5 events per day)*
Exposure time	2.2 h
Product characteristics	
Spray application	no
Product ingredient fraction by weight (inhalation)	35 %
Product ingredient fraction by weight (dermal)	35 %
Amounts used	
Amounts used	1,000 g
Human factors not influenced by risk management	
Skin surface area dermal	inside hands / one hand / palm of hands
Skin surface area oral	-
Tranfer factor dermal	100 %
Other given operational conditions affecting consumers exposure	
Room volume	20 m^3 *(justification: Volume garage 34 m3 (RIVM general fact sheet))*
Release fraction to air	100.0 %

Scenario 15: Consumer use of Resin paste used as fillers/putties (ES 15)

Description of ES 15

Free short title	Consumer use of Resin paste used as fillers/putties (ES 15)
Systematic title based on use descriptor	ERC 8B; PC 9b
Name of contributing environmental scenario and corresponding ERC	ERC 8b Wide dispersive indoor use of reactive substances in open systems
Name(s) of contributing consumer scenarios and corresponding PCs/ACs	PC 9b Filler, putties
15.1 Contributing Scenario (1) controlling environmental exposure for ERC 8B	
Operational conditions	
Annual European tonnage	1.34E5 to/year
Daily amount used at site	73.589 kg/day
Release times per year	365 days/year
Local freshwater dilution factor	10
Local marine water dilution factor	100
Release fraction to air from process	0.100 %
Release fraction to wastewater from process	2 %
Release fraction to soil from process	0 %
Fraction tonnage to region	10 %
Fraction used at main source	0.200 %
STP	yes
River flow rate	18000 m^3/day
Municipal sewage treatment plant discharge	2000000 L/day
Other modified EUSES values	
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - *(justification: STP efficiency 91.9%)*

15.2 Contributing Scenario (2) controlling consumer exposure for PC 9b	
Name of contributing scenario	PC 9b Filler, putties
Calculation model	Exposure estimates were determined by ESIG exposure assessment tool (http://www.esig.org)
Product subcategory	Fillers and putty
Frequency and duration of use	
Frequency of use	1,825 times/year *(justification: Frequency: 5 events per day)*
Exposure time	4 h
Product characteristics	
Spray application	no
Product ingredient fraction by weight (inhalation)	5.5 %
Product ingredient fraction by weight (dermal)	5.5 %
Amounts used	
Amounts used	100 g
Human factors not influenced by risk management	
Skin surface area dermal	fingertips
Skin surface area oral	-
Tranfer factor dermal	100 %
Other given operational conditions affecting consumers exposure	
Room volume	20 m^3 *(justification: Volume garage 34 m3 (RIVM general fact sheet))*
Release fraction to air	100.0 %