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

1.1 Product identifier

Trade name: group of products under trade name **Polimal® VE-2MM**:

Polimal VE-2MM, Polimal VE-2MM-1, Polimal VE-2MM-2, Polimal VE-2MM P, Polimal VE-2MM-1P, Polimal VE-2MM T, Polimal VE-2MM TP, Polimal VE-2MM TP-1, Polimal VE-2MM TP-2, Polimal VE-2MM R, Polimal VE-2MM 800

Chemical Name:	modified styrene solution of an addition product of carboxylic acids and epoxy resin.
EC Number:	not applicable
Registration number:	not applicable (mixture)

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

Identified uses: industrial and professional production of mixtures, resin compositions, mineral-resin compositions, articles and / or reinforced with fibre glass.

Uses advised against: not known.

1.3 Details of the supplier of the safety data sheet

Supplier: **CIECH SARZYNA S.A.**

Telephone/Fax: + 48 (17) 2407 416 between 7.00 - 15.00
+ 48 (17) 2407 122

e-mail address of the person responsible for this Safety Data Sheet: ZcsMsds@ciechgroup.com

1.4 Emergency telephone number

998 (fire service), 999 (rescue service), 112 (emergency phone number)

Section 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No.1272/2008 (as amended):

Flam. Liquid 3	H226	Flammable liquid and vapour
Repr. 2	H361d	Suspected of damaging the unborn child.
STOT RE 1	H372 (hearing organ)	Causes damage to hearing organs through prolonged or repeated exposure if inhaled.
Acute Tox. 4	H332	Harmful if inhaled.
Eye Irrit. 2	H319	Causes serious eye irritation.
Skin Irrit. 2	H315	Causes skin irritation.
STOT SE 3	H335	May cause respiratory irritation
Aquatic Chronic 3	H412	Harmful to aquatic life with long lasting effects.

2.2 Label elements

DANGER

(Pictograms - black symbols on a white background with red border)

Product identifier:

Polimal VE-2MM, Polimal VE-2MM-1, Polimal VE-2MM-2, Polimal VE-2MM P, Polimal VE-2MM-1P, Polimal VE-2MM T, Polimal VE-2MM TP, Polimal VE-2MM TP-1, Polimal VE-2MM TP-2, Polimal VE-2MM R, Polimal VE-2MM 800

Contains:

Styrene (Index No.: 601-026-00-0)
Methacrylic acid (Index No.: 607-088-00-5)

Hazard statements

H226	Flammable liquid and vapour
H361d	Suspected of damaging the unborn child.
H372	Causes damage to hearing organs through prolonged or repeated exposure if inhaled.
H332	Harmful if inhaled.
H319	Causes serious eye irritation.
H315	Causes skin irritation.
H335	May cause respiratory irritation
H412	Harmful to aquatic life with long lasting effects.
EUH205	Contains epoxy constituents. May produce an allergic reaction.

Precautionary statements

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P261	Avoid breathing mist/vapours/spray.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352	IF ON SKIN: Wash with plenty of water and soap.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P273	Avoid release to the environment.

2.3 Other hazards

Vapours of styrene as a mixture component may form explosive mixtures with air.

Section 3: Composition / information on ingredients

3.1 Substances

Not applicable.

3.2 Mixtures

Substance:	Content [% weight]	Classification according to Regulation (EC) No.1272/2008 (as amended)[1)]
Styrene CAS Number: 100-42-5 EC Number: 202-851-5 Index No.: 601-026-00 -0 Registration No.: 01-2119457861-32-xxxx	35÷45	**Flam. Liq. 3** H226 **Repr. 2** H361d **Acute Tox. 4** H332 **Eye Irrit. 2** H319 **Skin Irrit. 2** H315 **STOT RE 1** H372 (hearing organ) **Asp. Tox 1** H304 **STOT SE 3** H335 **Aquatic Chronic 3** H412
Methacrylic acid CAS Number: 79-41-4 EC Number: 201-204-4 Index No.: 607-088-00 -5 Registration No.: 01-2119463884-26-xxxx	1÷2	**Acute Tox. 4** H302 **Acute Tox. 4** H312 **Eye Corr. 1A** H314 **STOT SE 3** H335
Reaction product of bisphenol A and epichlorohidryn; epoxy resin (average molecular weight ≤ 700) CAS Number: 25068-38-6 EC Number: 500-033-5 Index No.: 603-074-00 -8 Registration No.: 01-2119456619-26 -0013	0,05÷0,15	**Eye Irrit. 2** H319 **Skin Irrit. 2** H315 **Skin Sens. 1** H317 **Aquatic Chronic 2** H411
N,N-Dimethylaniline CAS Number: 121-69-7 EC Number: 204-493-5 Index No.: 612-016-00 -0	0÷0,1	**Carc. 2** H351 **Acute Tox. 3** H331 **Acute Tox. 3** H311 **Acute Tox. 3** H301 **Aquatic Chronic 2** H411

1) - Full text of abbreviations, symbols and H statements - see Section 16 of this SDS.

Section 4: First Aid Measures

4.1 Description of first aid measures

Contact with skin: immediately remove the contaminated clothing and shoes. Thoroughly wash the exposed parts of the skin with soapy water. Consult a physician in case of irritation or if the symptoms become more severe. Wash contaminated clothing prior to reuse.

Contact with eyes: immediately consult a physician. Protect non-affected eye, remove contact lenses. Thoroughly wash contaminated eyes with water for 10-15 minutes. Avoid strong water jet as this

poses risk of mechanical damage to cornea. After washing wear sterile eye patch. Seek medical attention.

Ingestion: Call for medical assistance immediately and show the container or label. Do NOT induce vomiting. Do not give milk, fats or alcohol. Never give anything to drink to an unconscious person.

After exposure by inhalation: move the affected person to fresh air and provide conditions for rest in a position permitting unobstructed breathing. Do not leave the affected person without care. In case of loss of consciousness, apnoea or cardiac arrest apply CPR. Seek medical attention.

4.2 Most important symptoms and effects, both acute and delayed

In contact with skin: may cause irritation of the skin In contact with eyes: redness, lacrimation, burning sensation, pain, blurred vision. If swallowed: pain in the throat, abdominal pain, nausea. After exposure by inhalation: dizziness, unsteadiness, weakness, headaches, fatigue, nervousness. Repeated exposures to very high concentrations of styrene vapours may cause impaired hearing.

4.3 Indication of any immediate medical attention and special treatment needed

Decision on suitable further treatment is made by the doctor after assessing the condition of the affected person. In severe intoxication give anti-liver damage drugs; control heart and circulatory system function. Antidote - none. Apply symptomatic treatment.

Section 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media: water spray, foam, carbon dioxide and ABC or BC type dry powder. Select the extinguishing media depending on the materials stored in the immediate vicinity.

Unsuitable extinguishing media: compact water jets.

5.2 Special hazards arising from the substance or mixture

May polymerise releasing heat when heated. Combustion reactions may produce harmful gases containing carbon monoxide, soot, products of pyrolysis and incomplete combustion. Avoid inhaling of combustion product as they can pose a threat to health.

Vapours of the mixture components may form explosive mixtures with air. Styrene vapours are heavier than air and may travel over long distances and accumulate in hollows, canals, basements, lower parts of rooms. They may pose a risk of ignition of the return of flame to the source of the leak.

In the event of a fire to keep a safe distance from the burning materials. After putting out fire, continue to cool the containers or packaging with large amounts of water. In case of a large fire use remote fire extinguishing equipment.

5.3 Advice for firefighters

General protection measures in case of fire. Do not stay in the area at risk of fire without proper clothing. Recommended personal protective equipment for the rescue services: full protective gear, self-contained breathing apparatus. Post-extinguishing waters should be handled as described in Section 6.2.

Section 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non emergency personnel: restrict access of unauthorised persons to the affected area until all cleaning operations have been completed. Enter the area only if it is really necessary. Use personal protective equipment. Avoid contact with skin and eyes. Provide adequate ventilation. Avoid the formation and inhalation of vapours. In order to check the level of flammable gases and vapours use flammable gas detector.

For emergency responders: ensure that all activities were performed by trained personnel only. Wear protective clothing resistant to chemicals and personal protective equipment.

6.2 Environmental precautions

In case of spillage take actions in order to prevent spreading into the environment - prevent from entering the drains, water bodies, rivers, groundwater and soil. Do not use open flame, avoid sparks, eliminate sources of ignition. Notify the relevant emergency services. Warn others of the hazard. Similar precautions should be also applied for the post-extinguishing water.

6.3 Methods and material for containment and cleaning up

For large spills, embank the accumulating liquid and pump into suitable sealed and labelled containers and submit for recovery or disposal in accordance with the provisions of the Waste Act. In order to remove the remains and small amounts of spilled mixture use binding agent kits, if available, or diatomite or sand. Binding agent containing a mixture must be collected to suitable, sealed and labelled waste containers and submitted for recovery or disposal in accordance with the provisions of the Waste Act.

6.4 References to other sections

Product waste handling - see Section 13 of this SDS.
Personal protective equipment - see Section 8 of this SDS.

Section 7: Handling and storage

7.1 Precautions for safe handling

Do not allow spillage, contact with eyes, skin and splash on clothing. Avoid breathing fire vapours. Use effective and efficient room ventilation. Observe general occupational health and safety rules. Flammable mixture. Styrene vapours form explosive mixtures with air. In contact with mixture do not use an open flame, do not smoke, remove all sources of ignition, provide discharge of static electricity.

Avoid mixture contact with strong mineral acids, oxidizing agents and alkalis. Empty containers may contain residues of flammable product. Do not weld, melt, cut, solder, pierce the containers with product or in their vicinity.

7.2 Conditions for safe storage, including any incompatibilities.

Store in the original, sealed containers, in dry, ventilated and shaded storage rooms suitable for the storage of flammable materials at a temperature not exceeding 25˚C. Observe the rules of inventory management. Take all necessary measures to prevent damage to the packaging or transfer systems that may result in accidental release of a mixture to drains, water bodies, rivers and soil. Use as intended.

Material suitable for packaging: raw steel tanks or galvanized / tin-plated or coated with chemically resistant paint; high density polyethylene (HDPE) or polypropylene (PP) tanks. **Caution: styrene vapours are heavier than air and may accumulate in pits, canals, basements, lower parts of rooms.**

7.3 Special end use(s)

When processing the mixture, follow the guidelines given in the Material Safety Data Sheet and instructions relevant for the process.

Section 8: Exposure controls/personal protection

8.1 Control parameters

Exposure limit values in the work environment

Ingredient	Source	Type of exposure	Value
Styrene	Poland[1)]	MAC	50 mg/m^3
	Poland[1)]	STEL	100 mg/m^3
N,N-Dimethylaniline	Poland[1)]	MAC	12 mg/m^3
	Poland[1)]	STEL	40 mg/m^3

[1)] Maximum acceptable concentrations of the substance in the workplace in Poland in accordance with Annex No. 1 of the Ordinance of the Minister of Labour and Social Policy of 6 June 2014 on maximum acceptable concentrations and intensities of factors harmful to health in the workplace (Journal of Laws of 2014, item 817).

Styrene:

Derived no-effect level (DNEL)

Potential health effects	Route of exposure	DNEL for personnel	DNEL for general population
Acute - local effects	inhalation	**306** mg/m^3	**182.75** mg/m^3
Acute - systemic effects	inhalation	**289** mg/m^3	**174.25** mg/m^3
Long-term – systemic effects	inhalation	**85** mg/m^3	**10.2** mg/m^3
Long-term – systemic effects	transdermal	**406** mg/kg bw /24 h	**343** mg/kg bw /24 h
Long-term – systemic effects	ingestion	-	**2.1** mg/kg bw/24 h

Predicted no-effect concentration (PNEC)

Freshwater:	0.028 mg/l
Seawater:	0.014 mg/l
Wastewater treatment plant:	5 mg/l

Periodic release:	0.04 mg/l
Freshwater sediment:	0.614 mg/kg dw
Seawater sediment:	0.307 mg/kg dw
Soil:	0.2 mg/kg dw

Reaction product of bisphenol A and epichlorohydrin (average molecular weight ≤ 700):

Derived no-effect level (DNEL):

Exposure Model	Route of exposure	DNEL for the personnel	DNEL for general population
Acute - Systemic effects	transdermal	8.33 mg/kg bw/day	3.571 mg/kg bw/day
	oral		0.75mg/kg bw/day
	inhalation	12.25 mg/m^3	
Long-term - systemic effects	transdermal	8.33 mg/kg bw/day	3.571 mg/kg bw/day
	oral		0.75 mg/kg bw/day
	inhalation	12.25 mg/m^3	

Predicted no-effect concentration (PNEC)

PNEC	Result	Assessment factor
PNEC for wastewater treatment plant:	10 mg/l	10
PNEC orally:	11 mg/kg food	90
soil	0.196 mg/kg d.m	log K_{ow} = 3.84
sediment - freshwater	0.996 mg/kg d.m	log K_{ow} = 3.84
sediment - seawater	0.0996 mg/kg d.m	log K_{ow} = 3.84
freshwater	0.006 mg/l	50
seawater	0.0006 mg/l	500
water - occasional releases	0.018 mg/l	100

8.2 Exposure controls

Follow general occupational health and safety rules. Use personal protective measures listed in Section 8.2.2. Do not eat, drink or smoke when using the substance. Wash hands thoroughly with soapy water before breaks and after work. **Use local exhaust ventilation or other technical measures in order to maintain the level of styrene in air at the workplace below the acceptable limit values (MAC, STEL).** For additional information, see Section 16.

8.2.1. Appropriate engineering controls

Apply the procedures for monitoring the concentrations of hazardous substances in the air, as well as procedures for the air purity monitoring in the workplace - provided they are available and reasonable for a given function - in accordance with the relevant reference methods - standards in force in Poland. The mode, type and frequency of testing and measurements shall comply with the requirements set out in the Ordinance of the Minister of Health of 2 February 2011 on testing and measurement of factors harmful to health in the work environment (Journal of Laws, no. 33, item 166).

8.2.2. Individual protection measures, such as personal protective equipment

Personal protective equipment shall comply with the requirements of the Regulation of the Minister of Economy of 21 December 2005 on the essential requirements for personal protective equipment (Journal of Laws No. 259, item 2173) in line with the Directive 89/686/EEC. Employer shall provide protection measures appropriate to the activities, including their maintenance and cleaning.

a) Eye and face protection

Wear tight protective glasses meeting the requirements of PN- EN 166 standard.

b) Skin protection

Hand protection

Use suitable protective gloves resistant to chemical agents with a thickness of at least 0.4 mm, tested according to PN-EN 374 standard. For example, protective gloves should be made of the following materials: butyl rubber, chlorinated polyethylene, natural rubber (Latex), neoprene, nitrile-butadiene rubber. If a prolonged or frequently repeated contact with the product is expected, it is recommended to wear gloves of protection class 5 or higher (tear time above 240 minutes according to EN 374). If only a short contact with the substance is expected, it is recommended to wear gloves of protection class 3 or higher (tear time above 60 minutes according to EN 374). NOTE: when selecting gloves for a particular application and time of use in the workplace, also consider all the factors related to the workplace, including: other chemicals used, physical requirements (protection against cuts or punctures, precision of movement, protection against heat), the potential reactions of the organism to the material of gloves, as well as instructions/technical specification provided by the supplier.

Body protection

Wear protective clothing and footwear suitable for the type of the performed activities. Soiled clothing should be regularly washed.

c) Respiratory protection

Not required if the room is well ventilated. In the excessive concentration of vapours wear adequate respiratory protection, such as: respirator with a type A filter or a self-contained breathing apparatus.

8.2.3 Environmental exposure controls

In order to limit the impact on the environment and human health, follow the recommendations of this SDS. In places where the product is handled, provide efficient ventilation systems with filters preventing the emission of dusts into air. Do not pollute waters with the product or empty packaging. Protect from releasing the mixture or packaging into drains, water bodies, rivers, groundwater and soil. It is prohibited to recycle or dispose of the product, packaging and packaging waste outside systems or machines designed for this purpose, satisfying the requirements set out in the provisions of the Waste Act.

Section 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state:	viscous liquid
colour:	yellow / pink
odour:	sweet, aromatic, characteristic of styrene
odour threshold:	0.05÷0.08 ppm (for styrene)
pH value:	not applicable
melting/freezing point:	-30.6°C (for styrene)
initial boiling point:	approx. 148ºC
flash point:	33°C
evaporation rate:	not determined
flammability (solid, gas):	not applicable
upper/lower explosive limit:	not determined
vapour pressure at 50°C:	9 kPa
vapour density:	not applicable
density (25°C):	approx. 1120 kg/m^3
partition coefficient: n-octanol/water:	2.95 (for styrene)
auto-ignition temperature:	480°C
dynamic viscosity (25°C):	200÷800 mPas
kinematic viscosity (40ºC)	> 90 mm^2/s
explosive properties:	mixture is not explosive
oxidising properties:	not applicable
solubility in water at 20°C:	not determined
solubility in other solvents:	acetone, ethanol, ethyl ether, propylene carbonate

9.2 Other information: Styrene vapours form an explosive mixture with air of the following explosion limits:

Styrene:	lower	1.1% vol.	upper	8.0% vol.
Methacrylic acid:	lower	1.6% vol.	upper	8.7% vol.
N,N-Dimethylaniline:	lower	1.2% vol.	upper	7.0% vol.

For mixtures: Polimal VE-2MM, Polimal VE-2MM P, Polimal VE-2MM R, Polimal VE-2MM T, Polimal VE-2MM TP, Polimal VE-2MM 800, solvent separation test – the height of separated solvent layer - less than 3%. Time flow from the cup, according to ISO Standard 2431:1993, with a outflow nozzle diameter 6 mm - more than 40 seconds.

Section 10: Stability and reactivity

10.1 Reactivity

Undergoes radical polymerisation initiated by organic peroxides or under the influence of thermal or photochemical factors, sunlight. Polymerisation may be rapid.

10.2 Chemical stability

The product is stable when used and stored properly.

10.3 Possibility of hazardous reactions

None when handled in accordance with the intended use and conditions of use and when stored in the recommended conditions.

10.4 Conditions to avoid

Direct sunlight, sources of heat and fire, accumulation of electrostatic charges.

10.5 Incompatible materials

Oxidisers, strong mineral acids and alkalis, copper, copper alloys, brass, aluminium chloride, gum.

10.6 Hazardous decomposition products

None when used and stored as recommended - may occur in fire (see Section 5.2).

Section 11: Toxicological information

11.1 Information on toxicological effects

The product has been classified using the calculation method, using concentration limits given in Part 3 of Annex I of the CLP Regulation.

Acute toxicity estimate (ATE) for the mixture*

Route of exposure	ATEmix:
Ingestion	23,911 mg/kg
Skin	11,641 mg/kg
Inhalation	12.3 mg/dm^3 (vapours)

* Calculated in accordance with point 3.1.3.6.2.3 of the CLP regulation.

Information on the toxicological properties of the product ingredients:

Acute toxicity:

Styrene:	LC_{50}	inhalation	rat	11.8 mg/l /(4 h)
	LD_{50}	skin	rat	>2,000 mg/kg
	LD_{50}	oral	rat	5,000 mg/kg
Methacrylic acid	LD_{50}	skin	rabbit	500 mg/kg
	LD_{50}	oral	rat	1060 mg/kg
Epoxy resin	LD_{50}	skin	rat	> 2,000 mg/kg
(average	LD_{50}	oral	rat $_{(female)}$	> 2,000 mg/kg
molecular weight ≤ 700):	LD_{50}	oral	rat $_{(male)}$	> 15000 mg/kg
N,N-Dimethylaniline:	LD_{50}	oral	rat	1,120 mg/kg
	LC_{50}	inhalation	rat	>5.1 mg/l (4h)
	LD_{50}	skin	rat	1,700 mg/kg

Skin/eyes irritation:
Styrene: Causes skin and eye irritation.
Methacrylic acid: Causes severe skin burns and eye damage.
Epoxy resin: Irritant to eyes and skin.
N,N-Dimethylaniline: shows no irritant effect.

Sensitization:
Styrene: shows no sensitization on the skin and the respiratory system.
Epoxy resin: Sensitising to skin.
N,N-Dimethylaniline: shows no sensitization on the skin and the respiratory system.

Target organ toxicity, single exposure:
Styrene: May cause respiratory irritation

Target organ toxicity, repeated exposure:
Styrene: Causes damage to hearing organs through prolonged or repeated exposure if inhaled.

Carcinogenicty:
N,N-Dimethylaniline – Suspected to cause cancer

Reproductive toxicity:
Styrene: It is suspected to damage the unborn child - classification according to table 3.1 of annex VI of the CLP regulation.

Section 12: Ecological information

12.1 Toxicity

The product has been classified using the calculation method, using concentration limits given in Part 4 of Annex I to the CLP Regulation.

Information on the ecotoxicological properties of the product ingredients:

Styrene:

Acute and prolonged toxicity to fish LC50, gold fish (Pimephales promelas), static, 96 h: 4.02 mg/l

Acute toxicity to aquatic invertebrates LC50 Daphnia (Daphnia magna), static, 48 h, survival: 23 mg/l EC50, Daphnia (Daphnia magna), flow, 48h, immobilisation: 4.7 mg/l

NOEC, Daphnia (Daphnia magna), 21d, 1.01 mg/l

Toxicity to aquatic plants ErC50, Green Algae (Selenastrum capricornutum), static, inhibition of growth rate: 72 h: 4.9 mg/l

Toxicity to soil organisms: LC50, earthworm (Eisenia foetida): 14 d: 120 mg/kg

Toxicity to bacteria: EC_{50}: 500 mg/l (30 min.)

Methacrylic acid:

Fish toxicity:
LC_{50} - Oncorhynchus mykiss (rainbow trout) - 85 mg/l - 96 h
Algae toxicity:
IC_{50} - Pseudokirchneriella subcapitata (green algae) - 0.59 mg/l - 96 h

Epoxy resin (average molecular weight ≤ 700):

Fish toxicity:
LC50 Salmo gairgneri, freshwater, 96h: 2mg/l
Algae toxicity:
ErC50 Scenedesmus capricornutum, 72h: ≥ 11 mg/l

NOEC Scenedesmus capricornutum 72h: 4.2 mg/l

N,N-Dimethylaniline:

LC50: 65.6 mg/l/96h (Pimephales promelas)
EC50: 5 mg/l/48h (Daphnia magna)

IC50: 340 mg/l/96h (Desmodesmus subspicatus)

12.2 Persistence and degradability

Biodegradation of styrene: 80% /20 days – readily biologically degradable

12.3 Bioaccumulative potential

Styrene: log Pow 2.95 - significant bioaccumulation potential is not expected

12.4 Mobility in soil

Potential for mobility in soil is low.

12.5 Results of PBT and vPvB assessment

None known.

12.6 Other adverse effects

The product does not affect ozone layer depletion. Reference valuesin the air in Poland:

styrene	20 µg/m^3 1 hour	2 µg/m^3 1 calendar year
Dimethylaniline	10 µg/m 1 hour	1.3 µg/m 1 calendar year

Section 13: Disposal considerations

13.1 Waste treatment methods

The holder of product waste and packaging waste is required to handle the waste in accordance with the principles of waste management specified in the Act on packaging and packaging waste, Act on waste and the environmental protection requirements.

The produced waste and packaging waste must be stored, transported, collected, and recovered, including recycling or disposed of in accordance with the provisions of the Waste Act and the related regulations.

Unused product, as well as the contaminated packaging must be submitted to an authorized hazardous waste disposal company.

Classify waste using the appropriate names and codes in accordance with the applicable waste catalogue.

Disposal of waste into the soil and earth, drains, rivers, water bodies is prohibited.

National legislation that meet the requirements of applicable directives of the European Union:
Act on waste of 14 December 2012 (Journal of Laws of 2013, item 21 as amended).
Act of 13 June 2013 on the packaging and packaging waste management (Journal of Laws of 2013, item 888).
Ordinance of the Minister of the Environment of 09 December 2014 on waste catalogue (Journal of Laws of 2014 item 1923).

Section 14: Transport information

14.1 UN Number

1866

14.2 UN proper shipping name

RESIN IN SOLUTION, flammable

14.3 Transport hazard class(es)

3

14.4 Packing Group

III

14.5 Environmental hazards

Not applicable

14.6 Special precautions for user

When handling during the transport, use PPE in accordance with Section 8.

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable.

Additional information:

- Code for the restrictions on passage through tunnels (D/E)
- In case of carriage in tank trucks 640E special provision applies.
- Mixtures: Polimal VE-2MM, Polimal VE-2MM P, Polimal VE-2MM R, Polimal VE-2MM T, Polimal VE-2MM TP, Polimal VE-2MM 800 packed in vessels with a capacity of not more than 450 litres are not subject to ADR provisions pursuant to section 2.2.3.1.5 of ADR European Agreement (see Section 15.1 of this SDS).

Section 15: Regulatory information

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

- Act of 25 February 2011 on the chemical substances and their mixtures (Journal of Laws of 2011 No. 63, item 322 as amended),
- Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC. (Official Journal of the EU L 396/1 of 30 December 2006 as corrected and amended),
- Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, as well as amending Regulation (EC) No 1907/2006 (CLP/GHS) (Official Journal of the EU L 353/1 of 31 December 2008 as amended),
- Amendment of the Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, as well as amending Regulation (EC) No 1907/2006 (Official Journal of the EU L 16/1 of 20/01/2011),
- Regulation of the European Parliament and of the Council (EC) No. 1336/2008 of 16 December 2008 amending the Regulation (EC) No. 648/2004 to adjust it to the Regulation (EC) No. 1272/2008 on the classification, labelling and packaging of substances and mixtures (Official Journal of the EU L 354/60 of 31 December 2008),
- Commission Regulation (EC) No 790/2009 of 10 August 2009 adapting to scientific and technical progress Regulation of the European Parliament and of the Council (EC) no 1272/2008 of 16 December 2008 on the classification, labelling and packing of substances and mixtures (Official Journal of the EU L 235/52 of 5 September 2009).
- Regulation of the European Parliament and of the Council (EC) No. 1005/2009 of 16 June 2009 on ozone-depleting substances, (Official Journal of the EU L 286 of 31 October 2009 as amended),
- Ordinance of the Minister of the Environment of 26 January 2010 on the reference values for certain substances in the air (Journal of Laws of 2010 No 16, item 87),
- Government Statement of 28 May 2013 on the entry into force of amendments to Supplements A i B of the European Agreement on the international road transport of hazardous goods (ADR), signed in Geneva on 30 September 1957 (Journal of Laws no. 2013, item 815).

15.2. Chemical Safety Assessment

Not applicable.

Section 16: Other information

Explanation of abbreviations and acronyms

Flam. Liq. 3 Flammable liquid, category 3
Repr. 2 - Reproductive toxicity, category 2.
Acute Tox. 3 Acute toxicity, category 3.
Acute Tox. 4 Acute toxicity, category 4.
Eye Irrit. 2 Irritant to eyes, category 2
Skin Corr. 1A Corrosive to skin, category 1A
Skin Irrit. 2 Irritant to skin, category 2
Skin sens 1 Skin sensitization, category 1.
STOT RE 1 Effects on target organs - repeated exposure, category 1
Asp. Tox 1 Aspiration hazard, hazard category 1.
STOT SE 3 Effects on target organs - single exposure, category 3
Carc. 2 Carcinogenic, category 2.
Aquatic Chronic 2 Chronic aquatic toxicity, category 2
Aquatic Chronic 3 Chronic aquatic toxicity, category 3
H226 Flammable liquid and vapour
H301 Toxic if swallowed.
H311 Toxic in contact with skin
H331 Toxic if inhaled.
H302 Harmful if swallowed.
H312 Harmful in contact with skin.
H332 Harmful if inhaled.
H304 May be fatal if swallowed and enters airways.
H319 Causes serious eye irritation.
H314 Causes severe skin burns and eye damage.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H372 Causes damage to hearing organs through prolonged or repeated exposure if inhaled.
H335 May cause respiratory irritation
H361d Suspected of damaging the unborn child.
H351 Suspected to cause cancer.
H411 Toxic to aquatic life with long lasting effects
H412 Harmful to aquatic life with long lasting effects.
MAC Maximum acceptable concentration
STEL Maximum acceptable instantaneous concentration
DNEL *Derived no effect level* -derived level causing no changes in human health
PNEC *Predicted no effect concentration - level causing no changes in the environment*

Training:

Prior to working with the product, the user shall read this Material Safety Data Sheet, occupational health and safety regulations relevant to handling of chemicals, and in particular, receive appropriate practical training as required by the regulations - the Labour Code.

Personnel associated with the transport of hazardous materials within the scope of the ADR agreement, should be adequately trained to perform their duties (general, on-the job and safety training).

Sources of information:

- in-house studies;
- European Chemicals Agency database (as of April 2015) http://echa.europa.eu/pl/information-on-chemicals.
- SDSs of the product components,

Information assessment:

Assessment of the information identified in accordance with Chapter 1 of title II of the CLP Regulation has been performed by applying the classification criteria for each hazard class, taking into account further differentiation contained in Annex I to the CLP Regulation and including the results of the relevant specific limit concentrations (if applicable). When assessing the available information for the purposes of classification, the form/physical state of the mixture was considered, as in the form in which the mixture is marketed and may be used in accordance with reasonable expectation.

The product has been classified according to the physical and chemical properties, as well as toxicological and ecotoxicological properties of the mixture components, based on the calculation method.

Additional Information:

Further information may be obtained from the manufacturer - contact as in subsection 1.3.

This SDS has been prepared in accordance with Annex I to the Council Regulation (EC) No 453/2010 of 20 May 2010 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation, Restriction of Chemicals (REACH), (Official Journal of the EU L 133/1 of 31 May 2010).

Information in this SDS comprise our current knowledge and experience; had been provided in good faith in order to describe the mixture in terms of safety requirements. The information, however, cannot be interpreted either as a guarantee of the properties or a quality specification of the product. The customer and user are responsible for the provision of safe workplace and compliance with all the applicable regulations.

Revised section against revision 7: 1, 2, 3, 4, 5, 8, 9, 11, 12, 13, 14, 15, 16.

Information on the formation of dangerous mixture was submitted to the Inspector of Chemical Substances in Łódź in accordance with Art. 15 of the Act of 25 February 2011 on chemical substances and their mixtures (Journal of Laws No. 63, item. 322, as amended).

Annex

Additional information concerning risk management measures. Unsaturated polyester resins cause risk for health and safety mainly with regard to styrene content as reactive diluent. Hence, based on available information from the styrene producer, you can find below exposure scenarios for styrene concerning production and processing of unsaturated polyester resins.

Chapter 1	Title of exposure scenario
Title	**Industrial use. Manufacturing of UP/VE resins and formulated resins.**
Used descriptors	Sector of use: SU3, SU12
	Process category: PROC1 PROC3 PROC4, PROC5 PROC8a PROC8b PROC9 PROC15
	Environmental release category: ERC2
Controlling environmental exposure for ERC 2 - Preparation (formulation) of mixtures	
Operational conditions	
Annual European tonnage	$2{,}28*10^5$ tons/year
Daily amount used at site	$4{,}57*10^4$ kg/day
Release times per year	300 days/year
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	400 000 m^3/day
Municipal sewage treatment plant discharge	10 000 m^3/day
Risk management measures	
Reduction of sludge to soil	100% (Do not apply industrial sludge to natural soils)
Other modified EUSES values	
Fraction released to agricultural soil	0% (justification: No direct release (EU Risk Assessment Report on Styrene, European Communities, 2002))
Fraction released to waste 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	0,200% (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	0,081% (justification: Efficiency STP 91.9%)
Chapter 2	Operational conditions and risk management measures
Name of contributing scenario	Controlling industrial worker exposure for PROC1 – 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 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.
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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.)
Name of contributing scenario	controlling industrial worker exposure for PROC 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 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.
Substance's concentration in the product	Covers substance's concentration in the product up to 100%

fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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
Name of contributing scenario	controlling industrial worker exposure for PROC 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 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.
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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
Name of contributing scenario	controlling industrial worker exposure for PROC 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 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.
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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	Iinhalation: 30 % (justification: Drain down and flush system prior to equipment break-in or maintenance)
Name of contributing scenario	controlling industrial worker exposure for PROC 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 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.
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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
Name of contributing scenario	controlling industrial worker exposure for PROC 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 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.
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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
Name of contributing scenario	controlling industrial worker exposure for PROC 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 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.
Substance's concentration in the product	Covers substance's concentration in the product up to 100%

fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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
Name of contributing scenario	controlling industrial worker exposure for PROC 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 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.
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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 (inhalacja 90%)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80%
Respiratory protection	no
Forced air circulation	Iinhalation: 70 % (justification: Drain or remove substance from equipment prior to break-in or maintenance)
Name of contributing scenario	controlling industrial worker exposure for PROC 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 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.
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
fugacity	medium
Frequency and duration of use	to 1 hour/day. 5 days a 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.)
Name of contributing scenario	controlling industrial worker exposure for PROC 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 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.
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
fugacity	medium

Frequency and duration of use	>4 hours/day. 5 days a 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/m^3. The confidence interval is 11 mg/m^3 to 70 mg/m^3. 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 (minutes): 480 min
Name of contributing scenario	controlling industrial worker exposure for PROC 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 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.
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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
Local exhaust ventilation	inhalation: 90 % (justification: Fill containers/cans at dedicated fill points supplied with local extract ventilation)
Name of contributing scenario	controlling industrial worker exposure for PROC 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 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
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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)

Chapter 2	Title of exposure scenario
Title	**Industrial use. FRP manufacturing, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.)**
Used descriptors	Sector of use: SU3, SU12
	Process category: PROC3 PROC5 PROC7, PROC8A PROC10 PROC13 PROC14 PROC15
	Environmental release category: ERC6d
Controlling environmental exposure for ERC6d – industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers	
Operational conditions	
Annual European tonnage	$8{,}06*10^5$ tons/year
Daily amount used at site	$1{,}61*10^5$ 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	0,00063%
Release fraction to soil from process	0,025%
Fraction tonnage to region	10%
Fraction used at main source	60%
STP	Yes
River flow rate	18 000 m^3/day
Municipal sewage treatment plant discharge	2 000 m^3/day
Risk management meseures	
Other modified EUSES values	
Fraction released to agricultural soil	0 % (justification: No direct release to soil (EU Risk Assessment Report on Styrene, European Communities, 2002))
Fraction released to industrial soil	0 % (justification: No direct release to soil (EU Risk Assessment Report on Styrene, European Communities, 2002))
Fraction released to waste water	0.00063 % (justification: EU Risk Assessment Report, 2002)
Fraction released to air	0.102 % (justification: EU Risk Assessment Report, 2002)
Fraction used at main source	60 % (justification: Value adopted to account for Worstcase European manufacturing site)
Fraction of emission directed to water by local STP	0.081 - (justification: Efficiency STP 91.9%)

Name of contributing scenario	controlling industrial worker exposure for PROC 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 vacuum 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 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
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
Fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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
Name of contributing scenario	controlling industrial worker exposure for PROC 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 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
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
Fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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
Name of contributing scenario	controlling industrial worker exposure for PROC 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 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
Substance's concentration in the product	Covers substance's concentration in the product up to 25%
Fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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
Name of contributing scenario	controlling industrial worker exposure for PROC 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 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
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
Fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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
Name of contributing scenario	controlling industrial worker exposure for PROC 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 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
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
Fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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
Name of contributing scenario	controlling industrial worker exposure for PROC 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 employee 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
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
Fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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	Iinhalation: 95 % (justification: Carry out in a vented booth or extracted enclosure)
Name of contributing scenario	controlling industrial worker exposure for PROC 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 employee 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
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
Fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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	90,00%
Carry out in a vented booth or extracted enclosure	90,00%
Name of contributing scenario	controlling industrial worker exposure for PROC 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 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
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
Fugacity	medium

Frequency and duration of use	>4 hours/day. 5 days a 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
Name of contributing scenario	controlling industrial worker exposure for PROC 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 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
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
Fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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)
Name of contributing scenario	controlling industrial worker exposure for PROC 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 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
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
Fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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
Name of contributing scenario	controlling industrial worker exposure for PROC 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 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
Substance's concentration in the product	Covers substance's concentration in the product up to 25%
Fugacity	medium

Frequency and duration of use	>4 hours/day. 5 days a 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
Name of contributing scenario	controlling industrial worker exposure for PROC 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 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
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
Fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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
Name of contributing scenario	controlling industrial worker exposure for PROC 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 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
Substance's concentration in the product	Covers substance's concentration in the product up to 25%
Fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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
Name of contributing scenario	PROC 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 employee training to prevent/minimize exposures. In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Physical state	liquid
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
Fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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

Chapter 3	Title of exposure scenario
Title	**Professional use. FRP manufacturing, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.)**
Used descriptors	Sector of use: SU22, SU12
	Process category: PROC3 PROC4 PROC5, PROC8A PROC10 PROC11
	Environmental release category: ERC6e
Controlling environmental exposure for ERC6e – Professional use wide dispersive outdoor use of reactive substances in open systems.	
Operational conditions	
Annual European tonnage	$2{,}42*10^6$ tons/year
Daily amount used at site	$4{,}83*10^5$ 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	0,00%
Release fraction to soil from process	0
Fraction tonnage to region	10%
Fraction used at main source	60%
STP	yes
River flow rate	18 000 m^3/day
Municipal sewage treatment plant discharge	2 000 m^3/day
Risk management meseures	
Other modified EUSES values	
Fraction released to agricultural soil	0 % (justification: No direct release to soil (EU Risk Assessment Report on Styrene, European Communities, 2002))
Fraction released to industrial soil	0 % (justification: No direct release to soil (EU Risk Assessment Report on Styrene, European Communities, 2002))
Fraction released to waste water	0.000012 % (justification: EU Risk Assessment Report, 2002)
Fraction released to 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	0.081 - (justification: Efficiency STP 91.9%)
Name of contributing scenario	controlling professional worker exposure for PROC 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 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.
Substance's concentration in the product	Covers substance's concentration in the product up to 25%
Fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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
Name of contributing scenario	controlling professional worker exposure for PROC 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 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.
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
Fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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	90,00%
Name of contributing scenario	controlling professional worker exposure for PROC 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 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.
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
Fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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	90,00%
Name of contributing scenario	controlling professional worker exposure for PROC 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 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.
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
Fugacity	medium
Frequency and duration of use	to 1 hours/day. 5 days a 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
Name of contributing scenario	controlling professional worker exposure for PROC 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 indo
.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.
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
Fugacity	medium
Frequency and duration of use	Do 1 hours/day. 5 days a 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
Name of contributing scenario	controlling professional worker exposure for PROC 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 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.
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
Fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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%
Name of contributing scenario	controlling professional worker exposure for PROC 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 employee training to prevent/minimize exposures. Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.

Physical state	liquid.
Substance's concentration in the product	Covers substance's concentration in the product up to 25%
Fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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%
Name of contributing scenario	controlling professional worker exposure for PROC 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 employee training to prevent/minimize exposures. Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Physical state	liquid.
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
Fugacity	medium
Frequency and duration of use	>4 hours/day. 5 days a 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%
Name of contributing scenario	controlling professional worker exposure for PROC 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 employee 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.
Substance's concentration in the product	Covers substance's concentration in the product up to 100%
Fugacity	medium
Frequency and duration of use	to 4 hours/day. 5 days a 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	95,00%

Chapter 4	Title of exposure scenario
Title	Consumer use of liquid UP resin for repair purposes
Used descriptors	Sector of use: SU21
	Product category: PC9a
	Environmental release category: ERC8b
controlling environmental exposure for ERC 8B – Wide dispersive indoor use of reactive substances in open systems	
Operational conditions	
Annual European tonnage	$1{,}34*10^5$ tons/year
Daily amount used at site	73,589 kg/day
Release times per year	365 days/year
Local freshwater dilution factor	10
Local marinwater dilution factor	100
Release fraction to air from process	0,10%
Release fraction to wastewater from process	2,00%
Release fraction to soil from process	0
Fraction tonnage to region	10%
Fraction used at main source	0,20%
STP	Yes
River flow rate	18 000 m^3/day
Municipal sewage treatment plant discharge	2 000 m^3/day
Risk management meseures	
Other modified EUSES values	
Fraction of emission directed to water by local STP	0,081% (justification: Efficiency STP 91.9%)
Name of contributing scenario	controlling consumer exposure for 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	1,825 times/year (justification: Frequency: 5 events per day)
Exposure time	2 hours 12 minutes
Product characteristics	
Spray application	No
Product ingredient fraction by weight (inhalation)	35,00%
Product ingredient fraction by weight (dermal)	35,00%
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	-
Transfer factor dermal	100,00%
Other given operational conditions affecting consumers exposure	
Room volume	$20m^3$

Chapter 5	Title of exposure scenario
Title	Consumer use of liquid UP resin for repair purposes
Used descriptors	Sector of use: SU21
	Product category: PC9b
	Environmental release category: ERC8b
controlling environmental exposure for ERC 8B – Wide dispersive indoor use of reactive substances in open systems	
Operational conditions	
Annual European tonnage	$1{,}34*10^5$ tons/year
Daily amount used at site	73,589 kg/day
Release times per year	365 days/year
Local freshwater dilution factor	10
Local marinwater dilution factor	100
Release fraction to air from process	0,10%
Release fraction to wastewater from process	2,00%
Release fraction to soil from process	0
Fraction tonnage to region	10%
Fraction used at main source	0,20%
STP	yes
River flow rate	18 000 m^3/day
Municipal sewage treatment plant discharge	2 000 m^3/day
Risk management meseures	
Other modified EUSES values	
Fraction of emission directed to water by local STP	0,081% (justification: Efficiency STP 91.9%)
Name of contributing scenario	controlling consumer exposure for PC 9b – Filler, putties
Calculation model	Exposure estimates were determined by ESIG exposure assessment tool (http://www.esig.org)
Product subcategory	Filler, putties
Frequency and duration of use	1,825 times/year (justification: Frequency: 5 events per day)
Exposure time	4 hours
Product characteristics	
Spray application	No
Product ingredient fraction by weight (inhalation)	5,50%
Product ingredient fraction by weight (dermal)	5,50%
Amounts used:	100 g
Human factors not influenced by risk management	
Skin surface area dermal	fingertips
Skin surface area oral	-

Transfer factor dermal	100,00%
Other given operational conditions affecting consumers exposure	
Room volume	20m^3