



SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

SDS n° : FP17232

ENYDYNE H 88222 TA

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Former date 22-Sep-2022

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Version: 4

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

1.1. Product identifier

Product name	ENYDYNE H 88222 TA
Chemical Name	Unsaturated polyester resin
Pure substance/mixture	Mixture
Unique Formula Identifier (UFI)	65F1-J0R9-Y008-04R0

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

Identified uses Resins for composites. Contact us before using for food contact application.

1.3. Details of the supplier of the safety data sheet

Supplier

Polynt Composites France S.A.
Route d'Arras CS 50019 62320 Drocourt, France
Tel : (+33) 3 21 74 84 00 - Fax : (+33) 3 21 49 55 84

Polynt S.p.A.
Via Enrico Fermi, 51 24020 Scanzorosciate (BG), Italy
Tel : (+39) 035 652 111 - Fax : (+39) 035 652 421

Polynt Composites Spain, S.L.U.
Avenida República Argentina S/N 09200 Miranda de Ebro - Burgos, Spain
Tel : (+34) 947 027 202 - Fax : (+34) 947 31 45 40

Polynt Composites Poland Sp. z o.o.
ul. Grabska 11d, 32-005 Niepolomice, Poland
Tel : (+48) 12 281 42 00 - Fax : (+48) 12 281 42 01

Polynt Composites Norway AS
Lilleborggata 4, 1630 Gamle Fredrikstad, Norway
Tel : (+47) 693 570 00 - Fax : (+47) 693 570 01

Polynt Composites Stallingborough UK Ltd.
Laporte Road, Stallingborough - Near Grimsby North East Lincolnshire DN41 8DR,
United Kingdom
Tel : (+44) 1469 552 570 - Fax : (+44) 1469 552 597

The supplier of the product is, among those indicated above, the one identified on the label and / or in the sales documents

For further information, please contact

E-mail address sdsregulatory@polynt.com
Internet Address http://www.polynt.com

1.4. Emergency telephone number

This telephone number is available 24 hours per day, 7 days per week.	
Europe :	+44 1235 239 670
Middle East/Africa :	+44 1235 239 671

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East/South East Asia :	+65 3158 1412
America :	+1 215 207 0061

**Poison Information Centre
telephone number**

European emergency phone number : 112
 UK : National Poisons Emergency Number : 0344 892 0111
 Ireland : National Poisons Information Centre (NPIC) Telephone Healthcare
 Professionals : +353 (01) 809 2566. (24 hour service) Telephone Members of Public :
 +353 (01) 809 2166. (8.00 a.m. to 10.00 p.m. 7 days a week)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification of the substance or mixture - GHS/CLP (n° 1272/2008)

Skin Corrosion/Irritation	Category 2 - (H315)
Serious Eye Damage/Eye Irritation	Category 2 - (H319)
Germ cell mutagenicity	Category 1B - (H340)
Reproductive Toxicity	Category 2 - (H361d)
Carcinogenicity	Category 1B - (H350)
Specific Target Organ Toxicity (Single Exposure)	Category 3 - (H335)
Specific target organ toxicity - repeated exposure	Category 1 - (H372)
Chronic Aquatic Toxicity	Category 3 - (H412)
Flammable liquids	Category 3 - (H226)

2.2. Label elements

Contains 2,2-bis(bromomethyl)propane-1,3-diol, Styrene



Signal word

Danger

Hazard statements

H315 - Causes skin irritation
 H319 - Causes serious eye irritation
 H335 - May cause respiratory irritation
 H340 - May cause genetic defects
 H350 - May cause cancer
 H361d - Suspected of damaging the unborn child
 H372 - Causes damage to organs through prolonged or repeated exposure if inhaled
 H412 - Harmful to aquatic life with long lasting effects
 H226 - Flammable liquid and vapour

Physical hazards

EU H -Phrases

EUH208 - Contains phthalic anhydride, cobalt octoate. May produce an allergic reaction

Precautionary statements

P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
 P243 - Take action to prevent static discharges
 P260 - Do not breathe vapour
 P273 - Avoid release to the environment
 P280 - Wear protective gloves/protective clothing/eye protection/face protection
 P302 + P352 - IF ON SKIN: Wash with plenty of soap and water
 P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing
 P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
 P308 + P313 - IF exposed or concerned: Get medical advice/attention
 P403 + P233 - Store in a well-ventilated place. Keep container tightly closed

2.3. Other hazards

PBT/vPvB see section 12.5.

SECTION 3: Composition/information on ingredients**3.2. Mixtures****Hazardous components**

Chemical Name	EC-No	REACH Registration Number	CAS-No	Weight percent	GHS Classification	M-Factor (acute)	M-Factor (chronic)	Concentrati on limit (%)
Styrene	202-851-5	01-2119457861-32	100-42-5	28 - 33	Flam. Liq. 3 (H226) Repr. 2 (H361d) Acute Tox. 4 (H332) Skin Irrit. 2 (H315) Eye Irrit. 2 (H319) Asp. Tox. 1 (H304) STOT SE 3 (H335) STOT RE 1 (H372) Aquatic Chronic 3 (H412)			
Reaction products of phosphoryl trichloride and 2-methyloxirane	807-935-0	01-2119486772-26	1244733-77-4	9 - 12	Acute Tox. 4 (H302)			
Silica, amorphous, fumed, crystalline-free	231-545-4	01-2119379499-16	112945-52-5	0.1 - < 1	-			
phthalic anhydride	201-607-5	01-2119457017-41	85-44-9	0.1 - < 1	Acute Tox. 4 (H302) Skin Irrit. 2 (H315) Skin Sens. 1 (H317) Eye Dam. 1 (H318) Resp. Sens. 1 (H334) STOT SE 3 (H335)			
2,2-bis(bromomethyl) propane-1,3-diol	221-967-7	01-2119931630-46	3296-90-0	0.1 - < 1	Muta. 1B (H340) Carc. 1B (H350)			
Pentane-2,4-dione	204-634-0	01-2119458968-15	123-54-6	0.1 - < 1	Flam. Liq. 3 (H226) Acute Tox. 4 (H302) Acute Tox. 3 (H311) Acute Tox. 3 (H331)			

cobalt octoate	205-250-6	01-2119524678-29	136-52-7	0.01 - < 0.1	Skin Sens. 1A (H317) Eye Irrit. 2 (H319) Repr. 1B (H360Fd) Aquatic Acute 1 (H400) Aquatic Chronic 3 (H412)	1		
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Additional information This product contains an ingredient according to the candidate list of Annex XIV of the REACH Regulation 1907/2006/EC

For the full text of the H-Statements mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

General advice	Show this safety data sheet to the doctor in attendance Do not breathe dust/fume/gas/mist/vapours/spray
Eye Contact	Rinse thoroughly with plenty of water, also under the eyelids. Keep eye wide open while rinsing. If symptoms persist, call a physician
Skin contact	Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes If skin irritation persists, call a physician
Inhalation	Move to fresh air If not breathing, give artificial respiration Consult a physician
Ingestion	Do NOT induce vomiting Rinse mouth. Consult a physician
Protection of first-aiders	Use personal protective equipment See section 8 for more information

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

Eye Contact	Irritating to eyes
Skin contact	Irritating to skin May produce an allergic reaction.
Inhalation	Harmful: danger of serious damage to health by prolonged exposure through inhalation Irritating to respiratory system May produce an allergic reaction.
Ingestion	Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea.

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

Notes to physician	No information available
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SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	Dry chemical, Foam, Carbon dioxide (CO ₂), (closed systems)
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Extinguishing Media Which Must not be Used for Safety Reasons Do not use a solid water stream as it may scatter and spread fire.

5.2. Special hazards arising from the substance or mixture

Special exposure hazards arising from the substance or preparation itself, combustion products, resulting gases Vapours may form explosive mixtures with air. Most vapours are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks) Heating or fire can release toxic gas : Carbon monoxide

5.3. Advice for firefighters

Special protective equipment for fire-fighters Wear self-contained breathing apparatus and protective suit.

Other information Cool containers / tanks with water spray.
Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel
Personal precautions

Remove all sources of ignition
Heat, flames and sparks.
Take precautionary measures against static charges.
Ensure adequate ventilation
Use personal protective equipment

For emergency responders

Avoid breathing vapours or mists In the event of fire and/or explosion do not breathe fumes. Use personal protective equipment

6.2. Environmental precautions

Environmental precautions The product should not be allowed to enter drains, water courses or the soil.
Do not flush into surface water or sanitary sewer system

6.3. Methods and material for containment and cleaning up

Methods for cleaning up Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13)
Use clean non-sparking tools to collect absorbed material

6.4. Reference to other sections

See section 8 for more information
See Section 12 for additional Ecological Information

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling Avoid static electricity build up with connection to earth
Use only in area provided with appropriate exhaust ventilation
In case of insufficient ventilation, wear suitable respiratory equipment
For personal protection see section 8

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Prevention of fire and explosion Keep away from open flames, hot surfaces and sources of ignition Empty containers may contain flammable or explosive vapours

Hygiene measures When using, do not eat, drink or smoke Wash hands before breaks and at the end of workday. Provide regular cleaning of equipment, work area and clothing

7.2. Conditions for safe storage, including any incompatibilities

Technical measures/Storage conditions Keep in a dry, cool and well-ventilated place. Keep at temperature not exceeding 30°C. Keep away from heat and sources of ignition.

Materials to avoid Strong oxidizing agents, Peroxides, Reducing agents

Packaging material metallic GRP Tanks (Reinforced Glass Polyester)

Unsuitable materials for containers copper, Copper alloys, Bronze, Zinc

7.3. Specific end use(s)

Specific use(s) No information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational Exposure limits

Chemical Name	European Union	ACGIH OEL (Ceiling)	The United Kingdom	Ireland
Styrene 100-42-5	-	ACGIH (2020): TLV-TWA: 10 ppm TLV-STEL/C: 20 ppm Notes: OTO, A3, BEI Critical effects: CNS and hearing impairment, URT irr, peripheral neuropathy visual disorders	STEL 250 ppm STEL 1080 mg/m ³ TWA 100 ppm TWA 430 mg/m ³	TWA 20 ppm TWA 85 mg/m ³ STEL 40 ppm STEL 170 mg/m ³
phthalic anhydride 85-44-9		TWA 1 ppm	STEL 12 mg/m ³ TWA 4 mg/m ³ Sen+	TWA 4 mg/m ³ STEL 12 mg/m ³ Sensitizer
cobalt octoate 136-52-7		0.02 mg/m ³	STEL 0.3 mg/m ³ TWA 0.1 mg/m ³ Sen+	TWA 0.1 mg/m ³ Sensitizer

Special hazards arising from the substance or mixture

Biological standards

Derived No Effect Level (DNEL)

Derived No Effect Level (DNEL)				
Styrene (100-42-5)				
Type	DNEL oral	DNEL dermal	DNEL inhalation	Remark
Workers - Long Term - Systemic effect		406 mg/Kg bw/day	85 mg/m ³	
Workers - Acute Short Term - Local effect			306 mg/m ³	
Workers - Acute Short term - Systemic effect			289 mg/m ³	
General Population - Acute Short Term - Local effect			182.7 mg/m ³	
General Population - Acute Short Term - Systemic effect			174.2 mg/m ³	
General Population - Long Term - Systemic effect	2.1 mg/Kg bw/day	343 mg/Kg bw/day	10.2 mg/m ³	

Reaction products of phosphoryl trichloride and 2-methyloxirane (1244733-77-4)				
Type	DNEL oral	DNEL dermal	DNEL inhalation	Remark
Workers - Long Term - Systemic effect		2.91 mg/kg bw/day	8.2 mg/m ³	
Workers - Acute Short term - Systemic effect			22.6 mg/m ³	
General Population - Long Term - Systemic effect	0.52 mg/kg bw/day	1.04 mg/kg bw/day	1.45 mg/m ³	
General Population - Acute Short Term - Systemic effect			5.6 mg/m ³	

Silica, amorphous, fumed, crystalline-free (112945-52-5)				
Type	DNEL oral	DNEL dermal	DNEL inhalation	Remark
Workers - Long Term - Systemic effect			4 mg/m ³	

phthalic anhydride (85-44-9)				
Type	DNEL oral	DNEL dermal	DNEL inhalation	Remark
Workers - Long Term - Systemic effect		10 mg/kg bw/day	32.2 mg/m ³	
General Population - Long Term - Systemic effect	5 mg/kg bw/day	5 mg/kg bw/day	8.6 mg/m ³	

2,2-bis(bromomethyl)propane-1,3-diol (3296-90-0)				
Type	DNEL oral	DNEL dermal	DNEL inhalation	Remark
Workers - Acute Short term - Systemic effect			0.82 mg/m ³	
General Population - Long Term - Systemic effect	0.058 mg/kg bw/day		0.2 mg/m ³	

Pentane-2,4-dione (123-54-6)				
Type	DNEL oral	DNEL dermal	DNEL inhalation	Remark
Workers - Long Term - Systemic effect		12 mg/kg bw/day	84 mg/m ³	
General Population - Long Term - Systemic effect	12 mg/kg bw/day			

cobalt octoate (136-52-7)				
Type	DNEL oral	DNEL dermal	DNEL inhalation	Remark
Workers - Long Term - Local effect			235.1 µg/m ³	
General Population - Long Term - Systemic effect	175 µg/kg bw/day			
General Population - Long Term - Local effect			37 µg/m ³	

Predicted No Effect Concentration (PNEC)

PNEC Component		
Styrene (100-42-5)		
Exposure	Type	PNEC
Fresh water	PNEC Aqua	0.028 mg/L
Marine water	PNEC Aqua	0.014 mg/L
Intermittent use/release	PNEC Aqua	0.04 mg/L
Fresh water	PNEC Sediment	0.614 mg/Kg.dw
Marine water	PNEC Sediment	0.307 mg/Kg.dw
Terrestrial Compartment	PNEC Soil	0.2 mg/Kg.dw

STP microorganisms	PNEC STP	5 mg/L
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Reaction products of phosphoryl trichloride and 2-methyloxirane (1244733-77-4)		
Exposure	Type	PNEC
Fresh water	PNEC Aqua	0.32 mg/L
Intermittent use/release	PNEC Aqua	0.51 mg/L
Marine water	PNEC Aqua	0.032 mg/L
	PNEC STP	19.1 mg/L
Fresh water	PNEC Sediment	11.5 mg/kg sediment dw
Marine water	PNEC Sediment	1.15 mg/kg sediment dw
	PNEC Soil	0.34 mg/kg soil dw
Secondary Poisoning	PNEC Oral	11.6 mg/kg food

Silica, amorphous, fumed, crystalline-free (112945-52-5)		
Exposure	Type	PNEC
Secondary Poisoning	PNEC Oral	60000 mg/kg

phthalic anhydride (85-44-9)		
Exposure	Type	PNEC
Fresh water	PNEC Aqua	1 mg/L
Marine water	PNEC Aqua	0.1 mg/L
Intermittent use/release	PNEC Aqua	5.6 mg/L
	PNEC STP	10 mg/L
Fresh water	PNEC Sediment	3.8 mg/kg sediment dw
Marine water	PNEC Sediment	0.38 mg/kg sediment dw
Terrestrial Compartment	PNEC Soil	0.173 mg/kg soil dw

2,2-bis(bromomethyl)propane-1,3-diol (3296-90-0)		
Exposure	Type	PNEC
Marine water	PNEC Aqua	0.004 mg/L
Fresh water	PNEC Aqua	0.037 mg/L
	PNEC STP	21 mg/L
Fresh water	PNEC Sediment	0.037 mg/kg sediment dw
Marine water	PNEC Sediment	0.004 mg/kg sediment dw
	PNEC Soil	0.54 mg/kg soil dw
Intermittent use/release Fresh water	PNEC Aqua	0.37 mg/L

Pentane-2,4-dione (123-54-6)		
Exposure	Type	PNEC
Marine water	PNEC Aqua	0.0026 mg/L
Fresh water	PNEC Aqua	0.026 mg/L
	PNEC STP	1.32 mg/L
Fresh water	PNEC Sediment	0.155 mg/kg sediment dw
Marine water	PNEC Sediment	0.0155 mg/kg sediment dw
	PNEC Soil	0.0158 mg/kg soil dw

cobalt octoate (136-52-7)		
Exposure	Type	PNEC
Fresh water	PNEC Aqua	0.62 µg/L
Marine water	PNEC Aqua	2.36 µg/L
STP microorganisms	PNEC STP	0.37 mg/L
Fresh water	PNEC Sediment	53.8 mg/kg sediment dw
Marine water	PNEC Sediment	69.8 mg/kg sediment dw
Terrestrial Compartment	PNEC Soil	10.9 mg/kg soil dw

8.2. Exposure controls

Occupational exposure controls

Engineering measures

Apply technical measures to comply with the occupational exposure limits.
When working in confined spaces (tanks, containers, etc.), ensure that there is a supply of air suitable for breathing and wear the recommended equipment

Personal protective equipment**General Information****Respiratory protection**

Use personal protective equipment.

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)
If exposure limits are likely to be exceeded / In case of insufficient ventilation wear suitable respiratory equipment :

Breathing apparatus with filter Type A (Organic gases and vapours filter conforming to EN 14387 , APF 40 < 1 hour, APF 200 > 1 hour) / Type A(2)/P3 in combination with Particulates filter conforming to EN 143 , if exposed to dust

Eye protection

Safety glasses with side-shields. Do not wear contact lenses.

Skin and body protection

Antistatic boots. Protective shoes or boots. Wear fire/flame resistant/retardant clothing.

Hand protection

Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training

Glove material : Neoprene , Nitriles , Viton (R) or Polyvinyl alcohol

Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

Environmental exposure controls

Environmental exposure controls Do not allow material to contaminate ground water system.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Property	Values	Remark
Physical state	Liquid	
Colour	amber	
Appearance		No data available
Particle size		No data available
Odour	Styrene	
Odour Threshold	0.15 ppm	Values related to styrene
pH		No data available
pH (as aqueous solution)		No data available
Melting point/range	- 30 °C	Values related to styrene
Freezing Point		No data available
Softening point		No data available
Boiling point	145 °C	Values related to styrene
Flash point	31 °C	Values related to styrene
Flammability Limit in Air		
Upper	6,1 - 6,8%	Values related to styrene
Lower	0,9 -1,1%	Values related to styrene
Vapour pressure	6 hPa	20°C
Vapour density	3.6	Values related to styrene
Density	1.1 - 1.15 g/cm3	20°C
Specific Gravity		No data available
Bulk density		No data available
Water solubility	Insoluble in water	
Solubility in other solvents	Soluble in most organic solvents	
Partition coefficient:	3	Values related to styrene
n-octanol/water		
Autoignition temperature	490 °C	Values related to styrene
Decomposition temperature		No data available
Viscosity, kinematic	291 - 364 mm2/s	25°C
Viscosity, dynamic	320 - 400 mPa.s	25°C

9.2. Other information

Information with regards to physical hazard classes

<u>Property</u>	<u>Values</u>	<u>Remark</u>
Explosives		No data available
Flammable gases		No data available
Aerosols		No data available
Oxidising gases		No data available
Gases under pressure		No data available
Flammable liquids		No data available
Flammable solids		No data available
Pyrophoric liquids		No data available
Pyrophoric solids		No data available
Self-heating substances and mixtures		No data available
Substances and mixtures which, in contact with water, emit flammable gases		No data available
Oxidising liquids		No data available
Oxidising solids		No data available
Oxidising Properties		No data available
Organic peroxides		No data available
Corrosive to metals		No data available
Desensitised explosives		No data available
Other safety characteristics		
Sensitivity to Mechanical Impact		No data available
SAPT (self-accelerating polymerisation temperature)		No data available
Formation of explosible dust/air mixtures		No data available
Acid/alkaline reserve		No data available
Miscible		No data available
Conductivity		No data available
Corrosiveness		No data available
Gas group		No data available
Redox potential		No data available
Photocatalytic properties		No data available

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity Product may ignite and burn at temperatures exceeding the flash point

10.2. Chemical stability

Stability Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions

Hazardous reactions In use, may form flammable/explosive vapour-air mixture.

Hazardous polymerisation Polymerisation can occur.

10.4. Conditions to avoid

Conditions to avoid Heat, flames and sparks.
Exposure to light.
Take precautionary measures against static charges.

10.5. Incompatible materials

Materials to avoid Strong oxidizing agents, Peroxides, Reducing agents

10.6. Hazardous decomposition products

Hazardous decomposition products Incomplete combustion and thermolysis produces potentially toxic gases such as carbon monoxide and carbon dioxide

SECTION 11: Toxicological information

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

Acute toxicity**Inhalation**

Harmful: danger of serious damage to health by prolonged exposure through inhalation
Irritating to respiratory system May produce an allergic reaction.

Ingestion

Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea.

Chemical Name	LD50 Oral	LD50 Dermal	LC50 Inhalation	Read-across (Analogy)
Styrene 100-42-5	5000 mg/kg (Rat)	> 2000 mg/kg bw (Rat) 24h OECD 402	11.8 mg/L (Rat) 4h CSR	
Reaction products of phosphoryl trichloride and 2-methyloxirane 1244733-77-4	632 mg/kg bw (Rat) No guideline followed	> 2000 mg/kg bw (Rat) OECD 402	> 7 mg/L air (Rat) 4h OECD 403, OECD 433	
Silica, amorphous, fumed, crystalline-free 112945-52-5	> 5000 mg/kg bw (Rat) OECD 401	> 5000 mg/kg (Rabbit)	> 0.14 mg/L air (Rat) 4h (analytical) OECD 403	
phthalic anhydride 85-44-9	1530 mg/kg bw (Rat)	> 3160 mg/kg bw (Rabbit)	> 2.14 mg/L (Rat) 4h OECD 403	
2,2-bis(bromomethyl)propane-1,3-diol 3296-90-0	> 2000 mg/kg bw (Rat) OECD 401	> 5000 mg/kg bw (Rat) OECD 402		
Pentane-2,4-dione 123-54-6	760 mg/kg bw (Rat, male) 570 mg/kg bw (Rat, female)	1370 mg/kg bw (Rabbit, male) 790 mg/kg bw (Rabbit, female) 24h	5.1 mg/L (Rat) 4h Similar to OECD 403	
cobalt octoate 136-52-7	3129 mg/kg/bw (Rat) OECD 425	> 2000 mg/kg bw (Rat) OECD 402		

Skin corrosion/irritation

Chemical Name	Skin corrosion/irritation	Read-across (Analogy)
Styrene 100-42-5	Irritating to skin in vivo assay rabbit	
Reaction products of phosphoryl trichloride and 2-methyloxirane 1244733-77-4	No skin irritation in vivo assay rabbit OECD 404	
Silica, amorphous, fumed, crystalline-free 112945-52-5	No skin irritation rabbit OECD 404	
phthalic anhydride 85-44-9	Irritating to skin in vivo assay rabbit OECD 404	
2,2-bis(bromomethyl)propane-1,3-diol 3296-90-0	No skin irritation in vivo assay rabbit	
Pentane-2,4-dione 123-54-6	Mild skin irritation in vivo assay rabbit	
cobalt octoate 136-52-7	No skin corrosion in vitro study OECD 431 EU Method B. 40	

Serious Eye Damage/Eye Irritation

Chemical Name	Serious Eye Damage/Eye Irritation	Read-across (Analogy)
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Styrene 100-42-5	Irritating to eyes in vivo assay rabbit	
Reaction products of phosphoryl trichloride and 2-methyloxirane 1244733-77-4	No eye irritation in vivo assay (rabbit) OECD 405	
Silica, amorphous, fumed, crystalline-free 112945-52-5	No eye irritation rabbit OECD 405	
phthalic anhydride 85-44-9	Irritating to eyes in vivo assay rabbit Draize Test	
2,2-bis(bromomethyl)propane-1,3-diol 3296-90-0	Mild eye irritation in vivo assay rabbit	
Pentane-2,4-dione 123-54-6	Mild eye irritation in vivo assay rabbit	
cobalt octoate 136-52-7	Moderate eye irritation OECD 437 EU Method B.47 Irritating to eyes rabbit OECD 405	

Respiratory or skin sensitisation May produce an allergic reaction.

Chemical Name	Respiratory or skin sensitisation	Read-across (Analogy)
Styrene 100-42-5	Does not cause skin sensitization Does not cause respiratory sensitization CSR	
Reaction products of phosphoryl trichloride and 2-methyloxirane 1244733-77-4	Does not cause skin sensitization in vivo assay mouse EU Method B.42 OECD 429	
Silica, amorphous, fumed, crystalline-free 112945-52-5	Does not cause skin sensitization Does not cause respiratory sensitization	
phthalic anhydride 85-44-9	May cause sensitisation by inhalation and skin contact in vivo assay guinea pig OECD 406	
2,2-bis(bromomethyl)propane-1,3-diol 3296-90-0	Does not cause skin sensitization in vivo assay guinea pig OECD 406	
Pentane-2,4-dione 123-54-6	Does not cause skin sensitization in vivo assay mouse OECD 429	
cobalt octoate 136-52-7	May cause sensitisation by skin contact in vivo assay mouse OECD 429	

Mutagenic Effects May cause genetic defects**in vitro study**

Chemical Name	Ames test	Read-across (Analogy)
Styrene 100-42-5	Ambiguous In vitro gene mutation study in bacteria (S. typhimurium G46, TA1530, TA 1535, TA100, TA98, TA1538, TA 1537) OECD 471	

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Reaction products of phosphoryl trichloride and 2-methyloxirane 1244733-77-4	negative In vitro gene mutation study in bacteria (S. typhimurium TA 1535, TA 1537, TA 98 and TA 100) (Escherichia coli WP2 uvrA) OECD 471 OECD 472 EU Method B.13/14	
Silica, amorphous, fumed, crystalline-free 112945-52-5	negative In vitro gene mutation study in bacteria OECD 471	
phthalic anhydride 85-44-9	negative In vitro gene mutation study in bacteria (S. typhimurium TA 1535, TA 1537, TA 98, TA100 and TA 102) (Escherichia coli WP2 uvrA) OECD 471	
2,2-bis(bromomethyl)propane-1,3-diol 3296-90-0	positive In vitro gene mutation study in bacteria (S. typhimurium TA 1535, TA 1537, TA 98 and TA 100) OECD 471	
Pentane-2,4-dione 123-54-6	negative In vitro gene mutation study in bacteria (S. typhimurium TA 1535, TA 1537, TA 98, TA 100, TA 1538) similar to OECD 471	
cobalt octoate 136-52-7	negative In vitro gene mutation study in bacteria (S. typhimurium TA 1535, TA 1537, TA 98, TA100 and TA 102) OECD 471	Cas N°: 68956-82-1, 14024-48-7

Chemical Name	In vitro Mammalian Cell Gene Mutation Test	Read-across (Analogy)
Styrene 100-42-5	Ambiguous In vitro gene mutation study in mammalian cells hamster OECD 476	
Silica, amorphous, fumed, crystalline-free 112945-52-5	negative In vitro gene mutation study in mammalian cells OECD 476	
phthalic anhydride 85-44-9	negative In vitro gene mutation study in mammalian cells hamster OECD 476	
2,2-bis(bromomethyl)propane-1,3-diol 3296-90-0	Ambiguous In vitro gene mutation study in mammalian cells hamster similar to EU Method B.19	
Pentane-2,4-dione 123-54-6	negative In vitro gene mutation study in mammalian cells hamster similar to OECD 476	
cobalt octoate 136-52-7	negative In vitro gene mutation study in mammalian cells mouse OECD 476	Cas N°: 7440-48-4, 1308-06-1, 10124-43-3, 12016-80-7
Chemical Name	In vitro Mammalian Chromosome Aberration Test	Read-across (Analogy)
Styrene 100-42-5	positive Chromosome aberration test in vitro OECD 473 OECD 479	
Silica, amorphous, fumed, crystalline-free 112945-52-5	negative Chromosome aberration test in vitro OECD 473	

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phthalic anhydride 85-44-9	Ambiguous Chromosome aberration test in vitro hamster OECD 473	
Pentane-2,4-dione 123-54-6	negative Chromosome aberration test in vitro hamster similar to OECD 473	

in vivo assay

Chemical Name	Unscheduled DNA Synthesis (UDS)	Read-across (Analogy)
Styrene 100-42-5	negative mouse OECD 486 OECD 474	
Reaction products of phosphoryl trichloride and 2-methyloxirane 1244733-77-4	negative mouse OECD 474	
Silica, amorphous, fumed, crystalline-free 112945-52-5	negative rat	
Pentane-2,4-dione 123-54-6	negative rat EPA OPPTS 870.5395	
cobalt octoate 136-52-7	negative rat OECD 474 OECD 475	Cas N°: 68956-82-1, 14024-48-7, 10026-24-1
Chemical Name	European Union	
2,2-bis(bromomethyl)propane-1,3-diol 3296-90-0	Muta. 1B	

Carcinogenicity May cause cancer

Carcinogenicity				
Styrene (100-42-5)				
Routes of Exposure	Method	Species	Dose	Evaluation
Inhalation	OECD 453	rat	NOAEC systemic (carcinogenicity) \geq 4.34 mg/L air (nominal)	negative
Inhalation	OECD 453	mouse	LOAEC (carcinogenicity) female/male = 0.09 - 0.18 mg/L air resp., NOAEC (carcinogenicity) male = 0.09 mg/L air	positive
Oral	No information available	rat	NOAEL (carcinogenicity) \geq 2000 mg/kg bw /day	positive
Oral	No information available	mouse	LOAEL (carcinogenicity) = 150 mg/kg bw /day	positive

Silica, amorphous, fumed, crystalline-free (112945-52-5)				
Routes of Exposure	Method	Species	Dose	Evaluation
Oral	OECD 453	rat	NOAEL = 1800 - 3200 mg/kg bw/day	negative

phthalic anhydride (85-44-9)				
Routes of Exposure	Method	Species	Dose	Evaluation
Oral	No information available	mouse	NOAEL (carcinogenicity, male) = 3570 mg/kg bw/day (72w) NOAEL (carcinogenicity, female) = 1785 mg/kg bw/day (72w)	negative
Oral	No information available	rat	NOAEL (carcinogenicity) = 1000 mg/kg bw/day (105w)	negative

2,2-bis(bromomethyl)propane-1,3-diol (3296-90-0)				
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Routes of Exposure	Method	Species	Dose	Evaluation
Oral	similar to OECD 453	mouse rat	LOAEL (rats) 13 weeks = 2500 ppm LOAEL (mice) 13 weeks = 312 ppm	positive

Chemical Name	European Union
2,2-bis(bromomethyl)propane-1,3-diol 3296-90-0	Carc. 1B

Reproductive toxicity**Reproductive toxicity****Styrene (100-42-5)**

Routes of Exposure	Method	Species	Dose	Evaluation
Inhalation	No information available	rat	NOAEL/LOAEL (fertility) 60d = 100 - 200 mg/kg bw/day	positive
Oral	OECD 422	rat	NOAEL/LOAEL (fertility) 60d = 200 - 400 mg/kg bw/day	positive
Inhalation	OECD 416	rat	NOAEC (P, F1) = 0.64 mg/L air LOAEC (P, F1) = 2.13 mg/L air NOAEC (F2) = 0.21 mg/L air LOAEC (F2) = 0.64 mg/L air (70d)	negative

Reaction products of phosphoryl trichloride and 2-methyloxirane (1244733-77-4)

Routes of Exposure	Method	Species	Dose	Evaluation
Oral	OECD 416	rat	NOAEL (F1) = 99 mg/kg bw/day	negative

Silica, amorphous, fumed, crystalline-free (112945-52-5)

Routes of Exposure	Method	Species	Dose	Evaluation
Oral	OECD 415	rat	NOAEL = 497 mg/kg bw/day	negative

phthalic anhydride (85-44-9)

Routes of Exposure	Method	Species	Dose	Evaluation
Oral	No information available	mouse	NOAEL (reproductive, male) = 3570 mg/kg bw/day (72w) NOAEL (reproductive, female) = 1785 mg/kg bw/day (72w)	negative
Oral	No information available	rat	NOAEL (reproductive, female) = 1000 mg/kg bw/day (105w)	negative

cobalt octoate (136-52-7)

Routes of Exposure	Method	Species	Dose	Evaluation
Oral	Read-across (Analogy) Cas N°: 7440-48-4 OECD 422	rat	NO(A)EL (P&F1) 28d = 30 mg/kg bw/day	positive

Developmental Toxicity

Suspected of damaging the unborn child.

Developmental Toxicity**Styrene (100-42-5)**

Routes of Exposure	Method	Species	Dose	Evaluation
Inhalation	No information available	rat	NOAEC/LOAEC (maternal toxicity + developemental toxicity) >50d = 1.08 - 2.15 mg/L air	positive
Inhalation	OECD 414	rat	LOAEC (maternal toxicity) 6-15d = 1.28 mg/L air	positive

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Inhalation	OECD 414	rat	NOAEC (developmental toxicity) 6-15d \geq 2.56 mg/L air	negative
Inhalation	OECD 414	rabbit	NOAEC (maternal toxicity + developmental toxicity) 6-18d = 2.56 mg/L air	negative

Reaction products of phosphoryl trichloride and 2-methyloxirane (1244733-77-4)

Routes of Exposure	Method	Species	Dose	Evaluation
Oral	OECD 414 EPA OPPTS 870.3700	rabbit	NOAEL (maternal & developmental toxicity) = 500 mg/kg bw/day	negative

Silica, amorphous, fumed, crystalline-free (112945-52-5)

Routes of Exposure	Method	Species	Dose	Evaluation
Oral	OECD 414	rat	NOAEL (maternal toxicity) = 1350 mg/kg bw/day NOAEL (teratogenicity) = 1350 mg/kg bw/day	negative

phthalic anhydride (85-44-9)

Routes of Exposure	Method	Species	Dose	Evaluation
Oral	Read-across (Analogy) phthalic acid Cas N° : 88-99-3	rat	NOAEL (maternal toxicity) = 1000 mg/kg bw/day NOAEL (teratogenicity) = 1700 mg/kg bw/day	positive

Pentane-2,4-dione (123-54-6)

Routes of Exposure	Method	Species	Dose	Evaluation
Inhalation	OECD 414	rat	NOAEC (maternal toxicity) = 200 ppm NOAEC (fetotoxicity) = 50 ppm LOAEC (maternal toxicity) = 400 ppm LOAEC (fetotoxicity) = 200 ppm NOAEC (teratogenicity & embryotoxicity) = 400 ppm	positive

Specific target organ toxicity - single exposure

May cause irritation of respiratory tract

Specific target organ toxicity - repeated exposure

Causes damage to organs through prolonged or repeated exposure , target organ(s) : Central nervous system , Ears

STOT - repeated exposure**Styrene (100-42-5)**

Routes of Exposure	Method	Species	Dose	Remarks
Inhalation	OECD 412	rat mouse	NOAEC male (28d) = 3.47 mg/L air NOAEC (ototoxicity) 28d = 2.13 mg/L air NOAEC (28d) = 0.181 mg/L air NOAEC (28d) = 0.688 mg/L air	
Inhalation	No information available	rat	NOAEC (nasal tract) = 0.85 mg/L air NOAEC (overall) = 2.13 mg/L air NOAEC (ototoxicity) = 0.85 mg/L air LOAEC (ototoxicity) = 3.41 mg/L air NOAEC (overall) = 2.13 mg/L air	

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Oral	No information available	rat	NOAEL (toxicity) = 1000 mg/kg bw/day LOAEL (toxicity) = 2000 mg/kg bw/day	
Oral	No information available	mouse	NOAEL (toxicity) = 150 mg/kg bw /day LOAEL (toxicity) = 300 mg/kg bw /day	
Inhalation	OECD 453	rat	LOAEC local (toxicity) = 0.21 mg/L air	

Silica, amorphous, fumed, crystalline-free (112945-52-5)

Routes of Exposure	Method	Species	Dose	Remarks
Oral	OECD 408	rat	NOEL (highest dose) 4000 <= 4500 mg/kg bw/day 90d	
Inhalation	OECD 413	rat	NOEC = 1.3 mg/m³ air NOEC < 1.3 mg/m³ air 90d	
Dermal	No information available	rabbit	NOAEL >= 10000 mg/kg bw/day	

phthalic anhydride (85-44-9)

Routes of Exposure	Method	Species	Dose	Remarks
Oral	No information available	rat	NOAEL = 1250 mg/kg bw/day LOAEL = 2500 mg/kg bw/day 7 weeks	
Oral	No information available	rat	NOAEL (105 weeks) = 500 mg/kg bw/day	
Oral	No information available	mouse	LOAEL (male) = 2340 mg/kg bw/day LOAEL (female) = 1717 mg/kg bw/day 72 weeks	

2,2-bis(bromomethyl)propane-1,3-diol (3296-90-0)

Routes of Exposure	Method	Species	Dose	Remarks
Oral	similar to OECD 453	rat	LOAEL (13 weeks) = 2500 ppm	
Oral	similar to OECD 453	mouse	LOAEL (13 weeks) = 312 ppm	

Pentane-2,4-dione (123-54-6)

Routes of Exposure	Method	Species	Dose	Remarks
Inhalation	No information available	rat	NOEC (overall effects) 9d = 197 ppm LOAEC (haematology, histopathology) 9d = 805 ppm	
Dermal	No information available	rat	NOAEL (overall effects) 9d = 244 mg/kg bw/day LOAEL (haematology, histopathology) 9d = 975 mg/kg bw/day	

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Inhalation	similar to OECD 413	rat	NOEC (overall effects)= 100 ppm LOEC (haematology, urinalysis and histopathology, all reversible after 4 weeks) = 300 ppm LOAEC (food consumption, haematology, urinalysis, histopathology, gross pathology) = 650 ppm 14 weeks	
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cobalt octoate (136-52-7)				
Routes of Exposure	Method	Species	Dose	Remarks
Oral	Read-across (Analogy) cobalt dichloride hexahydrate OECD 408	rat	NOAEL (90d) = 3 mg/kg bw/day	

Aspiration hazard Due to the viscosity, this product does not present an aspiration hazard.

11.2 Information on other hazards

Endocrine disrupting properties No information available

Other information None

SECTION 12: Ecological information

12.1. Toxicity

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Do not flush into surface water or sanitary sewer system

Acute aquatic toxicity - Component Information

Chemical Name	Toxicity to algae	Toxicity to daphnia and other aquatic invertebrates.	Toxicity to fish	Toxicity to microorganisms
Styrene 100-42-5	EC50 (72h) = 4.9 mg/L (Pseudokirchnerella subcapitata) EPA OTS 797.1050	EC50 (48h) = 4.7 mg/L (Daphnia magna) NOEC = 1.9 mg/L (Daphnia magna) OECD 202	LC50 (96h) = 4.02 - 10 mg/L (Pimephales promelas) OECD 203	EC (30min) = 500 mg/L (Activated sludge of a predominantly domestic sewage) OECD 209
Reaction products of phosphoryl trichloride and 2-methyloxirane 1244733-77-4	EC50 (72h) = 82 mg/L (Pseudokirchnerella subcapitata) OECD 201, EU Method C.3			EC50 (3h) = 784 mg/L (Activated sludge) ISO 8192
Silica, amorphous, fumed, crystalline-free 112945-52-5		EL50 (24h) >= 1000 mg/L (Daphnia magna) OECD 202	LC50 (96h) > 10000 mg/L (Brachydanio rerio) OECD 203	
phthalic anhydride 85-44-9	EC50 (72h) = 68 mg/L, NOEC (72h) = 32 mg/L (Pseudokirchnerella subcapitata) OECD 201	EC50 (48h) = 71 mg/L (Daphnia magna) OECD 202	LC50 (96h) > 99 mg/L (Oryzias latipes) OECD 203	EC50 (3h) > 1000 mg/L (Activated sludge), ISO 8192 EC50 (16h) = 13 mg/L (Pseudomonas putida), ISO 10712
2,2-bis(bromomethyl)propane-1,3-diol 3296-90-0	EC50 (72h) = 37 mg/L (Desmodesmus subspicatus) NOEC (72h) = 12.5 mg/L (Desmodesmus subspicatus) OECD 201	EC50 (48h) > 100 mg/L (Daphnia magna) NOEC (48h) = 56 mg/L (Daphnia magna) OECD 202	LC50 (96h) > 100 mg/L (Oncorhynchus mykiss) NOEC (96h) = 100 mg/L (Oncorhynchus mykiss) OECD 203	EC50 (3h) = 2100 mg/L (Activated sludge, domestic) NOEC (3h) = 320 mg/L (Activated sludge, domestic) OECD 209

Pentane-2,4-dione 123-54-6	EC50 (72h) = 83.22 mg/L (Pseudokirchnerella subcapitata) NOEC (72h) = 3.2 mg/L (Pseudokirchnerella subcapitata) OECD 201	EC50 (48h) = 25.9 mg/L (Daphnia magna) NOEC (48h) = 4.3 mg/L (Daphnia magna) LOEC (48h) = 9.4 mg/L (Daphnia magna) OECD 202	LC50 (96h) = 104 mg/L (Pimephales promelas) OECD 203	EC50 (3h) = 107.6 mg/L (Activated sludge of a predominantly domestic sewage) OECD 209
cobalt octoate 136-52-7	EC50 (72h) = 144 µg Codiss./L (Pseudokirchnerella subcapitata) NOEC (72h) = 32.2 µg/L (Pseudokirchnerella subcapitata) LOEC (72h) = 52.7 µg Codiss./L (Pseudokirchnerella subcapitata) OECD 201		LC50 (96h) = 1.512 mg/L (Oncorhynchus mykiss) NOEC (96h) = 0.939 mg/L (Oncorhynchus mykiss) LOEC (96h) = 1.577 mg/L (Oncorhynchus mykiss) ASTM guideline (1996)	EC10 (30 min) = 3.73 mg/L (Activated sludge) EC50 (30 min) = 120 mg/L (Activated sludge) Read across with Cas N°: 7646-79-9 OECD 209

Chronic aquatic toxicity - Component Information

Chemical Name	Toxicity to algae	Toxicity to daphnia and other aquatic invertebrates.	Toxicity to fish	Toxicity to microorganisms
Styrene 100-42-5		NOEC (21d) = 1.01 mg/L (Daphnia magna) LOEC (21d) = 2.06 mg/L (Daphnia magna) EC50 (21d) = 1.88 mg/L (Daphnia magna) OECD 203		
phthalic anhydride 85-44-9		NOEC (reproduction) 21d = 16 mg/L, EC50 (reproduction) 21d = 42 mg/L (Daphnia magna) OECD 211	LC50 (7d) = 560 mg/L (Danio rerio), OECD 210 LOEC (total embryotoxicity) 60d = 32 mg/L, NOEC (mortality, length, weight, embryotoxicity) 60d = 10 mg/L, OECD 210	
Pentane-2,4-dione 123-54-6		NOEC (21d) = 18 mg/L (Daphnia magna) OECD 211	NOEC (34d) = 10 mg/L (Pimephales promelas) LOEC (34d) = 22 mg/L (Pimephales promelas) OECD 210	
cobalt octoate 136-52-7	EC50 (7d) = 90.1 µg/L (Lemna minor) NOEC (7d) = 3.0 µg/L (Lemna minor) LOEC (7d) = 8.8 µg/L (Lemna minor) OECD 221	NOECR (21d) = 60.8 µg/L (Daphnia magna) LC50 (21d) = 121.3 mg/L (Daphnia magna) LOECR (21d) = 93.3 µg Codiss./L (Daphnia magna) OECD 211		

Effects on terrestrial organisms - Component Information

Acute toxicity				
phthalic anhydride (85-44-9)				
Acute toxicity	Test Method	Species	Values	Remarks
plants		Lactuca sativa	EC50 (germination) = 731 mg/L	

Chronic toxicity				
Styrene (100-42-5)				
Chronic toxicity	Method	Species	Values	Remarks

Toxicity to invertebrates	OECD 207	Eisenia foetida	LC50 (14d) = 120 mg/kg soil dw LOEC (burrowing time and mean percent weight change) = 65 mg/kg soil dw LOEC (survival) = 180 mg/kg soil dw NOEC (mean percent weight change) = 34 mg/kg soil dw	
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Reaction products of phosphoryl trichloride and 2-methyloxirane (1244733-77-4)

Chronic toxicity	Method	Species	Values	Remarks
Toxicity to soil dwelling organisms.	OECD 422	Eisenia foetida	NOEC (56d) = 53 mg/kg soil dw	
plants	OECD 208	Sinapis alba	NOEC (21d) = 17 mg/kg soil dw	

2,2-bis(bromomethyl)propane-1,3-diol (3296-90-0)

Chronic toxicity	Method	Species	Values	Remarks
Toxicity to invertebrates	OECD 207	Eisenia foetida	LC50 (14d) = 540 mg/kg soil dw NOEC (14d) = 180 mg/kg soil dw	

12.2. Persistence and degradability

Chemical Name	Degradation	Evaluation
2,2-bis(bromomethyl)propane-1,3-diol 3296-90-0	Half-life for hydrolysis > 1 year (25°C, pH = 4) Half-life for hydrolysis = 1 year (25°C, pH = 9)	Hydrolysis

Chemical Name	Biodegradation	Evaluation
Styrene 100-42-5	87% (20d) similar to OECD 301D	Readily biodegradable
Reaction products of phosphoryl trichloride and 2-methyloxirane 1244733-77-4	14% (28d) OECD TG 301 E	Inherently biodegradable.
phthalic anhydride 85-44-9	68 % (10d), 74 % (30d) OECD 301 D	Readily biodegradable
2,2-bis(bromomethyl)propane-1,3-diol 3296-90-0	25 % (28d) OECD 301B	Not readily biodegradable
Pentane-2,4-dione 123-54-6	83 % (28d) OECD 301C	Readily biodegradable
cobalt octoate 136-52-7	60% (> 10d), OECD 301 B	Readily biodegradable

12.3. Bioaccumulative potential

Bioconcentration factor (BCF)		
Styrene (100-42-5)		
Method	Species	Bioconcentration factor (BCF)
Calculation method		74

Reaction products of phosphoryl trichloride and 2-methyloxirane (1244733-77-4)		
Method	Species	Bioconcentration factor (BCF)
OECD 305 C	Cyprinus carpio	14

phthalic anhydride (85-44-9)		
Method	Species	Bioconcentration factor (BCF)
Calculation method		3.16 - 3.4

Pentane-2,4-dione (123-54-6)		
Method	Species	Bioconcentration factor (BCF)
Calculation method		3.16

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Chemical Name	log Pow
Styrene 100-42-5	3
Reaction products of phosphoryl trichloride and 2-methyloxirane 1244733-77-4	2.68
phthalic anhydride 85-44-9	1.6
2,2-bis(bromomethyl)propane-1,3-diol 3296-90-0	1.08
Pentane-2,4-dione 123-54-6	0.40

12.4. Mobility in soil

Chemical Name	LogKoc	Koc
Styrene 100-42-5	2.55	352
phthalic anhydride 85-44-9	-	31
2,2-bis(bromomethyl)propane-1,3-diol 3296-90-0	< 1.25	< 17.8

12.5. Results of PBT and vPvB assessment

Chemical Name	PBT	vPvB
Styrene 100-42-5	This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).	This substance is not considered to be very persistent nor very bioaccumulating (vPvB).
Reaction products of phosphoryl trichloride and 2-methyloxirane 1244733-77-4	This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).	This substance is not considered to be very persistent nor very bioaccumulating (vPvB).
Silica, amorphous, fumed, crystalline-free 112945-52-5	This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).	This substance is not considered to be very persistent nor very bioaccumulating (vPvB).
phthalic anhydride 85-44-9	This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).	This substance is not considered to be very persistent nor very bioaccumulating (vPvB).
2,2-bis(bromomethyl)propane-1,3-diol 3296-90-0	This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).	This substance is considered to be very persistent and very bioaccumulating (vPvB).
Pentane-2,4-dione 123-54-6	This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).	This substance is not considered to be very persistent nor very bioaccumulating (vPvB).

12.6 Endocrine disrupting properties

Endocrine disrupting properties No information available

12.7 Other Adverse Effects

None known.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste from Residues/Unused Products	Dispose of in accordance with the European Directives on waste and hazardous waste. Do not flush into surface water or sanitary sewer system
Contaminated packaging	Empty containers should be taken to an approved waste handling site for recycling or disposal.
Other information	According to the European Waste Catalogue, Waste Codes are not product specific, but application specific. Waste codes should be assigned by the user based on the application for which the product was used.

SECTION 14: Transport information

14.1. UN number or ID number

ADR/RID	UN1866
IMDG/IMO	UN1866
ICAO/IATA	UN1866
ADN	UN1866

14.2. UN proper shipping name

ADR/RID	Resin solution UN1866, RESIN SOLUTION, 3, PG III, (D/E)
IMDG/IMO	Resin solution UN1866, RESIN SOLUTION, 3, PG III, (31°C c.c.)
ICAO/IATA	UN1866, RESIN SOLUTION, 3, PG III
ADN	Resin solution UN1866, RESIN SOLUTION, 3, PG III

14.3. Transport hazard class(es)

ADR/RID	Hazard class	3
IMDG/IMO	Hazard class	3
ICAO/IATA	Hazard class	3
ADN	Hazard class	3

14.4. Packing group

ADR/RID	III
IMDG/IMO	III
ICAO/IATA	III
ADN	III

14.5. Environmental hazards

ADR/RID	No
IMDG/IMO	No
Marine pollutant	No
ICAO/IATA	No
ADN	No

14.6. Special precautions for user

ADR/RID	Classification Code	F1
	Tunnel restriction code	(D/E)
	Limited quantity	5 L
IMDG/IMO		

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EmS	F-E, S-E
Limited quantity	5 L
ICAO/IATA	
ERG Code	3L
Limited quantity	10 L
ADN	
Classification Code	F1
Limited quantity	5 L
ventilation	VE01

Special precautions for users

Special precautions No information available

14.7. Maritime transport in bulk according to IMO instruments

Transport in bulk according to Annex II of MARPOL and the IBC Code not applicable

SECTION 15: Regulatory information

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

Regulation (EC) No. 1907/2006 (REACH)

Regulation (EC) No. 1272/2008 (CLP)

Regulation (EU) No. 2020/878

Directive 88/642/EEC

Directive 98/24/EC

Directive 1999/92/EC

Directive 2012/18/EU

The mixture is subject to restrictions on use, see Annex XVII of the Regulation 1907/2006/EC (REACH): Column 1, n° 3; Column 1, n° 40.

European Union

National regulatory information

The United Kingdom

Avoid exceeding of the given occupational exposure limits (see section 8).

Ireland

Avoid exceeding of the given occupational exposure limits (see section 8).

15.2. Chemical safety assessment

Chemical Safety Assessment	Yes
Exposure scenario	Relevant information for risk control are communicated in the form of exposure scenario attached to the safety data sheet.

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3

H226 - Flammable liquid and vapour

H302 - Harmful if swallowed

H304 - May be fatal if swallowed and enters airways

H311 - Toxic in contact with skin

H315 - Causes skin irritation

H317 - May cause an allergic skin reaction

H318 - Causes serious eye damage

H319 - Causes serious eye irritation

H331 - Toxic if inhaled

H332 - Harmful if inhaled

H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled

H335 - May cause respiratory irritation

H340 - May cause genetic defects

H350 - May cause cancer

H360Fd - May damage fertility. Suspected of damaging the unborn child

H361d - Suspected of damaging the unborn child

H372 - Causes damage to organs through prolonged or repeated exposure if inhaled

H400 - Very toxic to aquatic life

H412 - Harmful to aquatic life with long lasting effects

EUH208 - May produce an allergic reaction

Training Advice

Handle in accordance with good industrial hygiene and safety practice. To avoid risks to man and the environment, comply with the instructions for use.

Sources of key data used to compile the datasheet

ECHA

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Revision Note

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Disclaimer

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

End of Safety Data Sheet

Scenario 1: Manufacturing of UP/VE resins and formulated resins (Gelcoat, Coulour Paste, Putty, Bonding paste/Adhesive) (ES1)

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.

An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure.

The following scenarios contribute to the scenario *Manufacturing of UP/VE resins and formulated resins (Gelcoat, Coulour Paste, Putty, Bonding paste/Adhesive)*.

This document has been prepared using REACH-Practical-Guide-on-Safe-Use-Information-for-Mixtures-under-REACH-The-LCID-Methodology, considering exposure scenario of relevant raw materials contained in the mixture.

The corresponding release to the environment, exposure of workers resulting from these contributing scenarios is summarized below.

Table 1. Description of ES 1

Free short title	Manufacturing of UP/VE resins and formulated resins (Gelcoat, Coulour Paste, Putty, Bonding paste/Adhesive) (ES1)
Systematic title based on use descriptor	ERC 2; PROC 1, 3, 4, 5, 8a, 8b, 9, 15
Name of contributing environmental scenario and corresponding ERC	ERC 2 – Formulation into mixture
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Chemical production in closed process PROC 3 - Use in closed batch process (synthesis or formulation) PROC 4 - Chemical production where opportunity for exposure arises PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC 9 - Transfer of substance or mixture into small containers (dedicated filling line, including weighing) PROC 15 - Use of laboratory reagents in small scale laboratories
Contributing Scenario (1) controlling environmental exposure for ERC 2	
Operational conditions (referred to styrene)	
Daily amount used at site	45700 kg/day (referred to styrene)

Release times per year	300 days/year (<i>justification: Continuous release</i>)
Local freshwater dilution factor	41
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	0.0025 %
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 (<i>referred to styrene</i>)	
Fraction released to agricultural soil (Femis.agric)	0 % (<i>justification: No direct release to soil (EU Risk Assessment Report on Styrene, European Communities, 2002)</i>)
Fraction released to industrial soil (Femis.ind)	0 % (<i>justification: No direct release to soil (EU Risk Assessment Report on Styrene, European Communities, 2002)</i>)
Fraction released to waste water (Femis.water)	0.00063 % (<i>justification: EU Risk Assessment Report, 2002</i>)
Fraction released to air (Femis.air)	0.102 % (<i>justification: EU Risk Assessment Report, 2002</i>)
Fraction used at main source	60 % (<i>justification: Value adopted to account for Worst-case European manufacturing site</i>)
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - (<i>justification: Efficiency STP 91.9%</i>)
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	Use in contained batch processes. Closed processes
Qualitative Risk Assessment	
General	Use in semi-automated and predominantly enclosed filling lines. Provide a good standard of general ventilation. Natural ventilation is from windows and doors etc. Controlled ventilation means air is supplied or removed by a powered fan. Ensure good work practices are implemented. Provide basic employee training to prevent/minimize exposures. Use suitable chemically resistant gloves, tested to EN374. Use suitable eye protection.
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	enhanced (>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: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Contributing Scenario (3) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Bulk transfers. 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	Use in semi-automated and predominantly enclosed filling lines; Use bulk or semi-bulk handling systems. Drain down and flush system prior to equipment break-in or maintenance. Provide extract ventilation to points where emissions occur. Ensure good work practices are implemented. Provide basic employee training to prevent/minimize exposures. Use suitable chemically resistant gloves, tested to EN374. Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 min.-1 hour
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	enhanced (>30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	Yes
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Local exhaust ventilation	Use local exhaust ventilation with adequate effectiveness
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	Dissolving linear UP/VE polymer in blending vessel (or dissolver)
Qualitative Risk Assessment	
General	<p>Use in semi-automated and predominantly enclosed filling lines;</p> <p>Drain down and flush system prior to equipment break-in or maintenance.</p> <p>Apply vessel entry procedures including use of forced supplied air.</p> <p>Ensure good work practices are implemented.</p> <p>Provide basic employee training to prevent/minimize exposures.</p> <p>Use suitable chemically resistant gloves, tested to EN374.</p> <p>Use suitable eye protection.</p>
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: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Contributing Scenario (5) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Equipment cleaning and maintenance. Cleaning and maintenance of blending vessel, roadtankers etc.
Qualitative Risk Assessment	
General	Use in semi-automated and predominantly enclosed filling lines. Drain or remove substance from equipment prior to break-in or maintenance. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Ensure good work practices are implemented. Provide basic employee training to prevent/minimize exposures. Use suitable chemically resistant gloves, tested to EN374. Use suitable eye protection. In case of potential exposure wear a suitable respiratory protection with adequate effectiveness.
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	yes

Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	Use respiratory protection when exposure might occur
Local exhaust ventilation	Use local exhaust ventilation with adequate effectiveness
Contributing Scenario (6) controlling industrial worker exposure for PROC 4	
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Material transfers. 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	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). Provide extract ventilation to points where emissions occur. Ensure good work practices are implemented. Provide basic employee training to prevent/minimize exposures. Use suitable chemically resistant gloves, tested to EN374. Use suitable eye protection. In case of potential exposure wear a suitable respiratory protection with adequate effectiveness.
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	yes
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	Use respiratory protection when exposure might occur

Local exhaust ventilation	Use local exhaust ventilation with adequate effectiveness
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.
Qualitative Risk Assessment	
General	<p>Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour):</p> <p>Avoid dip sampling.</p> <p>Ensure good work practices are implemented.</p> <p>Provide basic employee training to prevent/minimize exposures.</p> <p>Use suitable chemically resistant gloves, tested to EN374.</p> <p>Use suitable eye protection.</p> <p>In case of potential exposure wear a suitable respiratory protection with adequate effectiveness.</p>
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 min.-1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	Good (>30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	Use respiratory protection when exposure might occur
Local exhaust ventilation	Use local exhaust ventilation with adequate effectiveness
Contributing Scenario (8) controlling industrial worker exposure for PROC 5	
Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)

Scenario subtitle	Drum/batch transfers; Pouring from small containers; Transfer from/pouring from containers; Mixing operations (open systems). Mixing liquid and solid components / into final formulated resin in blending vessel
Qualitative Risk Assessment	
General	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). Keep lids of containers closed during blending. Ensure good work practices are implemented. Provide basic employee training to prevent/minimize exposures. Use suitable chemically resistant gloves, tested to EN374. Use suitable eye protection. Wear suitable coveralls to prevent exposure to the skin. In case of potential exposure wear a suitable respiratory protection with adequate effectiveness.
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
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	Use respiratory protection when exposure occurs
Local exhaust ventilation	inhalation: 90 % (<i>justification: Use local exhaust ventilation with adequate effectiveness</i>)
Contributing Scenario (9) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Equipment cleaning and maintenance. Cleaning and maintenance of pipes, pumps, filters, etc.
Qualitative Risk Assessment	

General	<p>Drain down system prior to equipment break-in or maintenance.</p> <p>Drain or remove substance from equipment prior to break-in or maintenance.</p> <p>Ensure good work practices are implemented</p> <p>Provide basic employee training to prevent/minimize exposures</p> <p>Wear suitable coveralls to prevent exposure to the skin.</p> <p>Use suitable eye protection.</p> <p>Use suitable chemically resistant gloves, tested to EN374.</p> <p>In case of potential exposure wear a suitable respiratory protection with adequate effectiveness.</p>
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
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	Use respiratory protection when exposure occurs
Local exhaust ventilation	inhalation: 70 % (<i>justification: Use local exhaust ventilation with adequate effectiveness</i>)
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	<p>Disposal of wastes.</p> <p>Handling of non cured waste;</p> <p>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</p>
Qualitative Risk Assessment	

General	<p>Provide a good standard of general ventilation. Controlled ventilation means air is supplied or removed by a powered fan. Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Dispose of empty containers and wastes safely. Dispose of waste in accordance with environmental legislation. Use suitable chemically resistant gloves, tested to EN374. In case of potential exposure wear a suitable respiratory protection with adequate effectiveness. Use suitable eye protection.</p>
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	<1 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/outdoor
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	Use respiratory protection when exposure might occur
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	<p>Bulk transfers. All activities related to transport finished product to customer. Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) into roadtanker</p>
Qualitative Risk Assessment	

General	<p>Fill containers/cans at dedicated fill points supplied with local extract ventilation.</p> <p>Ensure good work practices are implemented</p> <p>Provide basic employee training to prevent/minimize exposures</p> <p>Use suitable chemically resistant gloves, tested to EN374.</p> <p>Use suitable eye protection.</p> <p>In case of potential exposure wear a suitable respiratory protection with adequate effectiveness.</p>
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
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	Use respiratory protection when exposure might occur
Local exhaust ventilation	inhalation: 70 % (<i>justification: Use local exhaust ventilation with adequate effectiveness</i>)
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	<p>Bulk transfers.</p> <p>All activities related to transport finished product to customer.</p> <p>Dispensing final UP/VE resin (linear UP/VE polymer + styrene + additives) / into storage tank, IBC, drum or pail.</p>
Qualitative Risk Assessment	

General	Fill containers/cans at dedicated fill points supplied with local extract ventilation. Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable chemically resistant gloves, tested to EN374. Use suitable eye protection.
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
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Local exhaust ventilation	inhalation: 90 % (<i>justification: Use local exhaust ventilation with adequate effectiveness</i>)
Contributing Scenario (13) controlling industrial worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Laboratory activities. 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	Carry out in a vented booth or extracted enclosure. Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves, tested to EN374.
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	yes
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Local exhaust ventilation	inhalation: 90 % (<i>justification: Use local exhaust ventilation with adequate effectiveness</i>)

Scenario 2: FRP manufacturing in an industrial setting, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.) (ES2)

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.

An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure.

The following scenarios contribute to the scenario *FRP manufacturing in an industrial setting, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.)*.

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The corresponding release to the environment, exposure of workers resulting from these contributing scenarios is summarized below.

Table 2. Description of ES 2

Free short title	FRP manufacturing in an industrial setting, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.) (ES2)
Systematic title based on use descriptor	ERC 6D; PROC 3, 5, 7, 8A, 10, 13, 14, 15
Name of contributing environmental scenario and corresponding ERC	ERC 6d Production of resins
Name(s) of contributing worker scenarios and corresponding PROCs	<p>PROC 3 - Use in closed batch process (synthesis or formulation)</p> <p>PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact)</p> <p>PROC 7 - Industrial spraying</p> <p>PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities</p> <p>PROC 10 - Roller application or brushing</p> <p>PROC 13 - Treatment of articles by dipping and pouring</p> <p>PROC 14 - Production of preparations or articles by tableting, compression, extrusion, pelletisation</p> <p>PROC 15 - Use of laboratory reagents in small scale laboratories</p>
Contributing Scenario (1) controlling environmental exposure for ERC 6D	
Operational conditions (referred to styrene)	
Daily amount used at site	161000 kg/day (referred to styrene)
Release times per year	300 days/year (justification: Continuous release)
Local freshwater dilution factor	10

Local marine water dilution factor	100
Release fraction to air from process	0.102 %
Release fraction to wastewater from process	0.00063 %
Release fraction to soil from process	0.025 %
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 % (<i>justification: No direct release to soil (EU Risk Assessment Report on Styrene, European Communities, 2002)</i>)
Fraction released to industrial soil (Femis.ind)	0 % (<i>justification: No direct release to soil (EU Risk Assessment Report on Styrene, European Communities, 2002)</i>)
Fraction released to waste water (Femis.water)	0.00063 % (<i>justification: EU Risk Assessment Report, 2002</i>)
Fraction released to air (Femis.air)	0.102 % (<i>justification: EU Risk Assessment Report, 2002</i>)
Fraction used at main source	60 % (<i>justification: Value adopted to account for Worst-case European manufacturing site</i>)
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - (<i>justification: Efficiency STP 91.9%</i>)
Contributing Scenario (2) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Material transfers; Automated process with (semi) closed systems; Use in contained batch processes. 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 Use suitable eye protection. Use suitable chemically resistant gloves, tested to EN374.
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: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Contributing Scenario (3) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Material transfers. 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 Use suitable eye protection. Use suitable chemically resistant gloves, tested to EN374.
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: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Contributing Scenario (4) controlling industrial worker exposure for PROC 5	
Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	Drum/batch transfers; Pouring from small containers; Transfer from/pouring from containers; Mixing operations (open systems). 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, tested to EN374. Wear suitable coveralls to prevent exposure to the skin. In case of potential exposure wear a suitable respiratory protection with adequate effectiveness.
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
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	Use respiratory protection when exposure occurs
Local exhaust ventilation	inhalation: 90 % (<i>justification: Use local exhaust ventilation with adequate effectiveness</i>)

Contributing Scenario (5) controlling industrial worker exposure for PROC 5

Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	Casting operations; Mixing operations (open systems). 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, tested to EN374. Wear suitable coveralls to prevent exposure to the skin. In case of potential exposure wear a suitable respiratory protection with adequate effectiveness.
Product characteristics	
Physical state	liquid
Concentration in substance	5-60%
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
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	Use respiratory protection when exposure occur
Local exhaust ventilation	inhalation: 90 % (<i>justification: Use local exhaust ventilation with adequate effectiveness</i>)
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	General exposures (closed systems). 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, tested to EN374. Wear suitable coveralls to prevent exposure to the skin. In case of potential exposure wear a suitable respiratory protection with adequate effectiveness.
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	Yes
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	Use respiratory protection when exposure occurs
Local exhaust ventilation	inhalation: 70 % (<i>justification: Use local exhaust ventilation with adequate effectiveness</i>)
Contributing Scenario (7) controlling industrial worker exposure for PROC 7	
Name of contributing scenario	7 - Industrial spraying
Scenario subtitle	Spraying; Spraying (automatic/robotic) 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 tested to EN374, in combination with intensive management supervision control. In case of potential exposure wear a suitable respiratory protection with adequate effectiveness.
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	Yes
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	Use respiratory protection when exposure might occur
Carry out in a vented booth or extracted enclosure	inhalation: 95 % (<i>justification: Carry out in a vented booth or extracted enclosure</i>)
Contributing Scenario (8) controlling industrial worker exposure for PROC 7	
Name of contributing scenario	7 - Industrial spraying
Scenario subtitle	Spraying; Spraying (manually) All open mould applications where resins is applied by manual spraying in an open work environment. Examples are spray lamination, gelcoat spraying and “chop-hoop” filament winding
Qualitative Risk Assessment	

General	<p>Carefully pour from containers</p> <p>Use long handled tools where possible</p> <p>Ensure good work practices are implemented</p> <p>Provide basic employee training to prevent/minimize exposures</p> <p>Use suitable eye protection.</p> <p>Wear suitable face shield.</p> <p>Wear suitable coveralls to prevent exposure to the skin</p> <p>Wear chemically resistant gloves tested to EN374 in combination with intensive management supervision control.</p> <p>Wear a suitable respiratory protection with adequate effectiveness.</p>
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	Yes
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	Yes
Local exhaust ventilation	inhalation: 95 % (<i>justification: Use local exhaust ventilation with adequate effectiveness</i>)
Contributing Scenario (9) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Equipment maintenance; Maintenance of small items. Equipment cleaning and maintenance
Qualitative Risk Assessment	

General	<p>Drain or remove substance from equipment prior to break-in or maintenance.</p> <p>Ensure good work practices are implemented</p> <p>Provide basic employee training to prevent/minimize exposures</p> <p>Use suitable eye protection.</p> <p>Use suitable chemically resistant gloves, tested to EN374.</p> <p>Wear suitable coveralls to prevent exposure to the skin.</p> <p>In case of potential exposure wear a suitable respiratory protection with adequate effectiveness.</p>
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
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	Use respiratory protection when exposure might occur
Local exhaust ventilation	inhalation: 70 % (<i>justification: Use local exhaust ventilation with adequate effectiveness</i>)
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	<p>Disposal of wastes.</p> <p>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</p>
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, tested to EN374. Wear suitable coveralls to prevent exposure to the skin. In case of potential exposure wear a suitable respiratory protection with adequate effectiveness.
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/outdoor
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	Yes
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	Use respiratory protection when exposure might occur
Local exhaust ventilation	inhalation: 90 % (<i>justification: Use local exhaust ventilation with adequate effectiveness</i>)
Contributing Scenario (11) controlling industrial worker exposure for PROC 10	
Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	Rolling, Brushing; Roller, spreader, flow application 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	<p>Use long handled brushes and rollers where possible</p> <p>Ensure the ventilation system is regularly maintained and tested</p> <p>Dispose of empty containers and wastes safely</p> <p>Ensure good work practices are implemented</p> <p>Provide basic employee training to prevent/minimize exposures</p> <p>Use suitable eye protection.</p> <p>Use suitable chemically resistant gloves, tested to EN374.</p> <p>Wear suitable coveralls to prevent exposure to the skin</p> <p>In case of potential exposure wear a suitable respiratory protection with adequate effectiveness.</p>
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	Yes
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	Use respiratory protection when exposure occur
Local exhaust ventilation	inhalation: 70 % (<i>justification: Use local exhaust ventilation with adequate effectiveness</i>)
Contributing Scenario (12) controlling industrial worker exposure for PROC 10	
Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	<p>Dipping, immersion and pouring;</p> <p>Rolling, Brushing;</p> <p>Roller, spreader, flow application</p> <p>Application of repair putties; Application of bonding pastes / adhesives.</p>
Qualitative Risk Assessment	

General	<p>Ensure good work practices are implemented</p> <p>Provide basic employee training to prevent/minimize exposures</p> <p>Use suitable eye protection.</p> <p>Use suitable chemically resistant gloves, tested to EN374.</p> <p>Wear suitable coveralls to prevent exposure to the skin.</p> <p>Wear a suitable respiratory protection with adequate effectiveness.</p>
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	Yes
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	yes
Local exhaust ventilation	inhalation: 70 % (<i>justification: Use local exhaust ventilation with adequate effectiveness</i>)
Contributing Scenario (13) controlling industrial worker exposure for PROC 13	
Name of contributing scenario	13 - Treatment of articles by dipping and pouring
Scenario subtitle	<p>Dipping, immersion and pouring;</p> <p>Continuous process.</p> <p>Continuous processes with open impregnation steps, such as pultrusion with open impregnation baths and (semi-) continuous production of flat laminates</p>
Qualitative Risk Assessment	

General	<p>Ensure good work practices are implemented</p> <p>Provide basic employee training to prevent/minimize exposures</p> <p>Use suitable eye protection.</p> <p>Use suitable chemically resistant gloves, tested to EN374.</p> <p>Wear suitable coveralls to prevent exposure to the skin.</p> <p>In case of potential exposure wear a suitable respiratory protection with adequate effectiveness.</p>
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
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	Use respiratory protection when exposure occurs
Local exhaust ventilation	inhalation: 90 % (<i>justification: Use local exhaust ventilation with adequate effectiveness</i>)
Contributing Scenario (14) controlling industrial worker exposure for PROC 14	
Name of contributing scenario	14 - Production of preparations or articles by tableting, compression, extrusion, pelletisation
Scenario subtitle	<p>Material transfers;</p> <p>Production or preparation or articles by tableting, compression, extrusion or pelletisation;</p> <p>Treatment by heating;</p> <p>Batch processes at elevated temperatures.</p> <p>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</p>
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, tested to EN374. In case of potential exposure wear a suitable respiratory protection with adequate effectiveness.
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	Yes
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	Use respiratory protection when exposure occurs
Local exhaust ventilation	inhalation: 70 % (<i>justification: Use local exhaust ventilation with adequate effectiveness</i>)
Contributing Scenario (15) controlling industrial worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Laboratory activities. 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 Use suitable eye protection. Use suitable chemically resistant gloves, tested to EN374.
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	Yes
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	No
Local exhaust ventilation	inhalation: 90 % (<i>justification: Use local exhaust ventilation with adequate effectiveness</i>)

Scenario 3: FRP manufacturing in a professional setting, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.) (ES3)

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.

An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure.

The following scenarios contribute to the scenario *FRP manufacturing in a professional setting, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.)*.

This document has been prepared using REACH-Practical-Guide-on-Safe-Use-Information-for-Mixtures-under-REACH-The-LCID-Methodology, considering exposure scenario of relevant raw materials contained in the mixture.

The corresponding release to the environment, exposure of workers resulting from these contributing scenarios is summarized below.

Table 2. Description of ES 3

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 6C; PROC 3, 4, 5, 8A, 10, 11
Name of contributing environmental scenario and corresponding ERC	ERC 6c Production of plastics
Name(s) of contributing worker scenarios and corresponding PROCs	<p>PROC 3 - Use in closed batch process (synthesis or formulation)</p> <p>PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact)</p> <p>PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities</p> <p>PROC 10 - Roller application or brushing</p> <p>PROC 11 - Non industrial spraying</p>
Contributing Scenario (1) controlling environmental exposure for ERC 6C	
Operational conditions (referred to styrene)	
Daily amount used at site	48300 kg/day (referred to styrene)
Release times per year	300 days/year (justification: Continuous release)
Local freshwater dilution factor	10
Local marine water dilution factor	100
Release fraction to air from process	0.102 %
Release fraction to wastewater from process	0.000012 %

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 % (<i>justification: No direct release to soil (EU Risk Assessment Report on Styrene, European Communities, 2002)</i>)
Fraction released to industrial soil (Femis.ind)	0 % (<i>justification: No direct release to soil (EU Risk Assessment Report on Styrene, European Communities, 2002)</i>)
Fraction released to waste water (Femis.water)	0.000012 % (<i>justification: EU Risk Assessment Report, 2002</i>)
Fraction released to air (Femis.air)	0.102 % (<i>justification: EU Risk Assessment Report, 2002</i>)
Fraction used at main source	60 % (<i>justification: Value adopted to account for worst-case European manufacturing site</i>)
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - (<i>justification: Efficiency STP 91.9%</i>)
Contributing Scenario (2) controlling professional worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Use in contained batch processes. 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, tested to EN374. In case of potential exposure wear a suitable respiratory protection with adequate effectiveness.
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	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: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	Use respiratory protection when exposure might occur
Contributing Scenario (3) controlling professional worker exposure for PROC 4	
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Use in contained batch processes. 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, tested to EN374. Wear suitable coveralls to prevent exposure to the skin. In case of potential exposure wear a suitable respiratory protection with adequate effectiveness.
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: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	Use respiratory protection when exposure occurs

Contributing Scenario (4) controlling professional worker exposure for PROC 5

Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	Material transfers; Pouring from small containers. 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, tested to EN374. Wear suitable coveralls to prevent exposure to the skin. In case of potential exposure wear a suitable respiratory protection with adequate effectiveness.
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	Yes
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	Use respiratory protection when exposure occurs
Local exhaust ventilation	Use local exhaust ventilation with adequate effectiveness
Contributing Scenario (5) controlling professional worker exposure for PROC 8A	

Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Equipment maintenance; Maintenance of small items. Equipment cleaning and maintenance
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, tested to EN374. Wear suitable coveralls to prevent exposure to the skin. In case of potential exposure wear a suitable respiratory protection with adequate effectiveness.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	Yes
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	Use respiratory protection when exposure might occur
Local exhaust ventilation	Use local exhaust ventilation with adequate effectiveness
Contributing Scenario (6) controlling professional worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Disposal of wastes. 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	<p>Dispose of empty containers and wastes safely</p> <p>Ensure good work practices are implemented</p> <p>Provide basic employee training to prevent/minimize exposures</p> <p>Use suitable eye protection.</p> <p>Use suitable chemically resistant gloves, tested to EN374.</p> <p>Wear suitable coveralls to prevent exposure to the skin.</p> <p>In case of potential exposure wear a suitable respiratory protection with adequate effectiveness.</p>
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	Use respiratory protection when exposure occurs
Local exhaust ventilation	Use local exhaust ventilation with adequate effectiveness
Contributing Scenario (7) controlling professional worker exposure for PROC 10	
Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	<p>Rolling, Brushing;</p> <p>Roller, spreader, flow application</p> <p>All open mould applications where resins is applied by brushing, rolling and other low energy spreading operations;</p> <p>Examples are handlamination, gelcoatbrushing, semi-continuous production of flat panels and laminates</p>
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, tested to EN374. Wear suitable coveralls to prevent exposure to the skin. In case of potential exposure wear a suitable respiratory protection with adequate effectiveness.
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	yes
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	Use respiratory protection when exposure occurs
Local exhaust ventilation	Use local exhaust ventilation with adequate effectiveness
Contributing Scenario (8) controlling professional worker exposure for PROC 10	
Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	Dipping, immersion and pouring; Rolling, Brushing; Roller, spreader, flow application Application of repair putties; Application of bonding pastes / adhesives.
Qualitative Risk Assessment	

General	<p>Ensure good work practices are implemented</p> <p>Provide basic employee training to prevent/minimize exposures</p> <p>Use suitable eye protection.</p> <p>Use suitable chemically resistant gloves, tested to EN374.</p> <p>Wear suitable coveralls to prevent exposure to the skin.</p> <p>Wear a suitable respiratory protection with adequate effectiveness.</p>
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: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	yes
Contributing Scenario (9) controlling professional worker exposure for PROC 10	
Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	<p>Dipping, immersion and pouring;</p> <p>Rolling, Brushing;</p> <p>Roller, spreader, flow application</p> <p>Application of floorings, mastics, coatings, castings</p>
Qualitative Risk Assessment	
General	<p>Ensure good work practices are implemented</p> <p>Provide basic employee training to prevent/minimize exposures</p> <p>Use suitable eye protection.</p> <p>Use suitable chemically resistant gloves, tested to EN374.</p> <p>Wear suitable coveralls to prevent exposure to the skin.</p> <p>Wear a suitable respiratory protection with adequate effectiveness.</p>
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	yes
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	yes
Local exhaust ventilation	Use local exhaust ventilation with adequate effectiveness
Contributing Scenario (10) controlling professional worker exposure for PROC 11	
Name of contributing scenario	11 - Non industrial spraying
Scenario subtitle	Spraying; Spraying (manually) All open mould applications where resins is applied by manual spraying in an open work environment. Examples are spray lamination, gelcoat spraying and “chop-hoop” filament winding
Qualitative Risk Assessment	
General	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, tested to EN374, in combination with intensive management supervision control. Wear a suitable respiratory protection with adequate effectiveness.
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	yes
Conditions and measures related to personal protection, hygiene and health evaluation: see details on sec.8 of SDS	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	yes
Local exhaust ventilation	Use local exhaust ventilation with adequate effectiveness