

**SAFETY DATA SHEET**

Revision Date: 14.02.2020

Print Date: 10.04.2020

SDS Number: R0022223

Version: 3.3

Aropol™ M 650 TB RESIN
™ Trademark, INEOS or its subsidiaries, registered
in various countries
936611

Conforms to EU Regulation 1907/2006/EC as amended. - SDSGHS_NL

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1 Product identifier**

Trade name : Aropol™ M 650 TB
RESIN
™ Trademark, INEOS or its subsidiaries, registered in
various countries

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

Recommended use : Reserved for industrial and professional use.

Restrictions on use Consumer use

1.3 Details of the supplier of the safety data sheet

INEOS Composites Hispania S.L.
Carretera Reial 137-139
08960 Sant Just Desvern - Barcelona
Spain
+34 93 206 51 20 (in Spain)

sds.composites@ineos.com

1.4 Emergency telephone number

001-800-424-9300/001-703-527-3887, or contact
your local emergency telephone number at 030
274 88 88. Exclusively for medical professionals in
case of acute poisoning.

Regulatory Information Number

+34 93 206 51 20 (in Spain), or contact your local
CSR contact person

Product Information

+34 93 206 51 20 (in Spain)

SECTION 2: Hazards identification**2.1 Classification of the substance or mixture****Classification (REGULATION (EC) No 1272/2008)**

Flammable liquids, Category 3 H226: Flammable liquid and vapour.

Skin irritation, Category 2 H315: Causes skin irritation.

Eye irritation, Category 2 H319: Causes serious eye irritation.

Reproductive toxicity, Category 2 H361d: Suspected of damaging the unborn child.

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Specific target organ toxicity - single
 exposure, Category 3, Respiratory
 system

H335: May cause respiratory irritation.

Specific target organ toxicity - repeated
 exposure, Category 1, Auditory organs

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

Long-term (chronic) aquatic hazard,
 Category 3

H412: Harmful to aquatic life with long lasting
 effects.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms :



Signal word : Danger

Hazard statements : H226 Flammable liquid and vapour.
 H315 Causes skin irritation.
 H319 Causes serious eye irritation.
 H335 May cause respiratory irritation.
 H361d Suspected of damaging the unborn child.
 H372 Causes damage to organs (Auditory
 organs) through prolonged or repeated
 exposure if inhaled.
 H412 Harmful to aquatic life with long lasting
 effects.

Precautionary statements : **Prevention:**
 P201 Obtain special instructions before use.
 P210 Keep away from heat, hot surfaces, sparks,
 open flames and other ignition sources. No
 smoking.
 P260 Do not breathe dust/ fume/ gas/ mist/
 vapours/ spray.
 P273 Avoid release to the environment.
 P280 Wear protective gloves/ protective clothing/
 eye protection/ face protection.
Response:
 P370 + P378 In case of fire: Use dry sand, dry chemical
 or alcohol-resistant foam to extinguish.

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Hazardous components which must be listed on the label:

Styrene

Additional Labelling:

EUH208 Contains cobalt bis(2-ethylhexanoate). May produce an allergic reaction.

2.3 Other hazards

Additional advice

No information available.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Hazardous components

Chemical name	CAS-No. EC-No. Registration number	Classification (REGULATION (EC) No 1272/2008)	Concentration (%)
Styrene	100-42-5 202-851-5 01-2119457861-32-XXXX	Flam. Liq.3; H226 Acute Tox.4; H332 Skin Irrit.2; H315 Eye Irrit.2; H319 Repr.2; H361d STOT SE3; H335 STOT RE1; H372 Asp. Tox.1; H304 Aquatic Chronic3; H412	>= 25,00 - < 40,00
methacrylic acid	79-41-4 201-204-4 01-2119463884-26-0044	Acute Tox.4; H302 Acute Tox.4; H332 Acute Tox.3; H311 Skin Corr.1A; H314 Eye Dam.1; H318 STOT SE3; H335	>= 0,10 - < 0,50
2-phenylpropene	98-83-9 202-705-0 01-2119472426-35-XXXX	Flam. Liq.3; H226 Eye Irrit.2; H319 Repr.2; H361 STOT SE3; H335 Aquatic Chronic2; H411	>= 0,30 - < 0,50
cobalt bis(2-ethylhexanoate)	136-52-7 205-250-6 01-2119524678-29-XXXX	Eye Irrit.2; H319 Skin Sens.1A; H317 Repr.1B; H360Fd	>= 0,00 - < 0,10

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Aquatic Acute1;
H400
Aquatic Chronic3;
H412

For explanation of abbreviations see section 16.

SECTION 4: First aid measures**4.1 Description of first aid measures**

- General advice : Move out of dangerous area.
Call a POISON CENTRE or doctor/physician if exposed or you feel unwell.
Show this safety data sheet to the doctor in attendance.
Do not leave the victim unattended.
- If inhaled : Move to fresh air.
IF INHALED: Call a POISON CENTER/ doctor if you feel unwell.
Keep patient warm and at rest.
If unconscious, place in recovery position and seek medical advice.
- In case of skin contact : Remove contaminated clothing. If irritation develops, get medical attention.
If on skin, rinse well with water.
Wash contaminated clothing before re-use.
If on clothes, remove clothes.
- In case of eye contact : Immediately flush eye(s) with plenty of water.
Remove contact lenses.
Protect unharmed eye.
- If swallowed : Obtain medical attention.
Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.
If symptoms persist, call a physician.

4.2 Most important symptoms and effects, both acute and delayed

- Symptoms : No symptoms known or expected.
- Risks : Causes skin irritation.

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Causes serious eye irritation.
May cause respiratory irritation.
Suspected of damaging the unborn child.
Causes damage to organs through prolonged or repeated
exposure if inhaled.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment : No hazards which require special first aid measures.

SECTION 5: Firefighting measures**5.1 Extinguishing media**

Suitable extinguishing media : Use extinguishing measures that are appropriate to local
circumstances and the surrounding environment.
Water spray
Foam
Alcohol-resistant foam
Carbon dioxide (CO₂)
Dry chemical

Unsuitable extinguishing media : High volume water jet

5.2 Special hazards arising from the substance or mixture

Specific hazards during firefighting : Never use welding or cutting torch on or near drum (even
empty) because product (even just residue) can ignite
explosively.
Beware of vapours accumulating to form explosive
concentrations. Vapours can accumulate in low areas.
Do not allow run-off from fire fighting to enter drains or water
courses.

Hazardous combustion products : Hydrocarbons
carbon dioxide and carbon monoxide

5.3 Advice for firefighters

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus.

Specific extinguishing : Product is compatible with standard fire-fighting agents.

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methods

Further information : Do not use a solid water stream as it may scatter and spread fire.
Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Use a water spray to cool fully closed containers.

SECTION 6: Accidental release measures**6.1 Personal precautions, protective equipment and emergency procedures**

Personal precautions : Evacuate personnel to safe areas.
Remove all sources of ignition.
Use personal protective equipment.
Ensure adequate ventilation.
Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed.
Comply with all applicable federal, state, and local regulations.
Suppress (knock down) gases/vapours/mists with a water spray jet.

6.2 Environmental precautions

Environmental precautions : Prevent product from entering drains.
Prevent further leakage or spillage if safe to do so.
If the product contaminates rivers and lakes or drains inform respective authorities.

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).

6.4 Reference to other sections

For further information see Section 8 and Section 13 of the safety data sheet.

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SECTION 7: Handling and storage

7.1 Precautions for safe handling

- Advice on safe handling : Open drum carefully as content may be under pressure.
Avoid formation of aerosol.
Provide sufficient air exchange and/or exhaust in work rooms.
Do not breathe vapours/dust.
Do not smoke.
Container hazardous when empty.
Take precautionary measures against static discharges.
Avoid exposure - obtain special instructions before use.
Avoid contact with skin and eyes.
Smoking, eating and drinking should be prohibited in the application area.
For personal protection see section 8.
Dispose of rinse water in accordance with local and national regulations.
- Advice on protection against fire and explosion : Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours). No sparking tools should be used. Keep away from open flames, hot surfaces and sources of ignition. Use only explosion-proof equipment.
- Hygiene measures : Wash hands before breaks and at the end of workday. When using do not eat or drink. When using do not smoke.

7.2 Conditions for safe storage, including any incompatibilities

- Requirements for storage areas and containers : Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Observe label precautions. No smoking.
- Other data : No decomposition if stored and applied as directed.

7.3 Specific end use(s)

- Specific use(s) : No data available

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SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure Limits

Components	CAS-No.	Value type (Form of exposure)	Control parameters	Basis
2-phenylpropene	98-83-9	STEL	100 ppm 492 mg/m ³	2000/39/EC
		TWA	50 ppm 246 mg/m ³	2000/39/EC
		TLV-8hr	20 mg/m ³	NL WG

Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006:

Styrene : End Use: Workers
 Exposure routes: Inhalation
 Potential health effects: Short-term exposure, Systemic effects
 Value: 289 mg/m³
 End Use: Workers
 Exposure routes: Inhalation
 Potential health effects: Short-term exposure, Local effects
 Value: 306 mg/m³
 End Use: Workers
 Exposure routes: Inhalation
 Potential health effects: Long-term exposure, Systemic effects
 Value: 85 mg/m³
 End Use: Workers
 Exposure routes: Skin contact
 Potential health effects: Long-term exposure, Systemic effects
 Value: 406 mg/kg
 End Use: Consumers
 Exposure routes: Inhalation
 Potential health effects: Short-term exposure, Systemic effects
 Value: 174,25 mg/m³
 End Use: Consumers
 Exposure routes: Inhalation
 Potential health effects: Short-term exposure, Local effects
 Value: 182,75 mg/m³
 End Use: Consumers
 Exposure routes: Skin contact
 Potential health effects: Long-term exposure, Systemic effects
 Value: 343 mg/kg

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End Use: Consumers

Exposure routes: Ingestion

Potential health effects: Long-term exposure, Systemic effects

Value: 2,1 mg/kg

End Use: Consumers

Exposure routes: Inhalation

Potential health effects: Long-term exposure, Systemic effects

Value: 10,2 mg/m³**Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006:**

Styrene

: Fresh water

Value: 0,028 mg/l

Fresh water

Value: 0,04 mg/lIntermittent use/release

Marine water

Value: 0,014 mg/l

Sewage treatment plant

Value: 5 mg/l

Fresh water sediment

Value: 0,614 mg/kg

Marine sediment

Value: 0,307 mg/kg

Soil

Value: 0,2 mg/kg

8.2 Exposure controls**Engineering measures**

Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below exposure guidelines (if applicable) or below levels that cause known, suspected or apparent adverse effects.

Personal protective equipment

Eye protection

: Wear chemical splash goggles when there is the potential for exposure of the eyes to liquid, vapor or mist.

Use eye protection according to EN 166.

Hand protection

Remarks

: The suitability for a specific workplace should be discussed with the producers of the protective gloves.

Skin and body protection

: Wear as appropriate:

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Impervious clothing
Safety shoes
Flame-resistant clothing
Choose body protection according to the amount and
concentration of the dangerous substance at the work place.
Discard gloves that show tears, pinholes, or signs of wear.

Protective clothing complying with EN 13688.
Safety shoes complying with EN ISO 20345.

SECTION 9: Physical and chemical properties**9.1 Information on basic physical and chemical properties**

Appearance	: liquid
Colour	: yellow
Odour	: pungent
Odour Threshold	: 0,2 ppm Value for Component
pH	: Not applicable
Melting point/freezing point	: -30 °C Value for Component
Initial boiling point and boiling range	: 146 °C Value for Component
Flash point	: 32 °C
Evaporation rate	: 0,49 n-Butyl Acetate = 1
Flammability (solid, gas)	: No data available
Upper explosion limit	: Upper flammability limit 6,1 %(V) Value for Component
Lower explosion limit	: Lower flammability limit

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1,1 %(V)
Value for Component

Vapour pressure : 6,7 hPa (20 °C)
Value for Component

Relative vapour density : 3,6
Value for Component

Relative density : No data available

Density : 1,09 - 1,15 g/cm3 (23 °C)

Solubility(ies)

Water solubility : insoluble

Solubility in other solvents : No data available

Partition coefficient: n-octanol/water : No data available

Decomposition temperature : No data available

Viscosity

Viscosity, dynamic : 1.100 - 1.300 mPa.s (23 °C)
Method: Brookfield

Viscosity, kinematic : > 20,5 mm2/s (40 °C)

Oxidizing properties : No data available

9.2 Other information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No decomposition if stored and applied as directed.

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

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Hazardous reactions : Hazardous polymerisation may occur.
Vapours may form explosive mixture with air.

10.4 Conditions to avoid

Conditions to avoid : Exposure to air.
Exposure to sunlight.

Heat, flames and sparks.

10.5 Incompatible materials

Materials to avoid : Acids
aluminum
aluminum chloride
Bases
Copper
Copper alloys
halogens
iron chloride
metal salts
Strong oxidizing agents
Peroxides

10.6 Hazardous decomposition products

Hazardous decomposition products : No hazardous decomposition products are known.

SECTION 11: Toxicological information**11.1 Information on toxicological effects**

Information on likely routes of exposure : Inhalation
Skin contact
Eye Contact
Ingestion

Acute toxicity

Not classified based on available information.

Components:

Styrene

Acute oral toxicity : LD50 Oral (Rat): > 2.000 mg/kg

Acute inhalation toxicity : LC50 (Rat): 11,8 mg/l, 2770 ppm
Exposure time: 4 h



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Test atmosphere: vapour

No observed adverse effect level (Humans): 100 ppm

Exposure time: 7 h

Test atmosphere: vapour

Acute dermal toxicity : LD50 (Rat): > 2.000 mg/kg
Method: OECD Test Guideline 402
Assessment: No adverse effect has been observed in acute
dermal toxicity tests.

Components:

methacrylic acid

Acute oral toxicity : LD50 (Mouse): 1.250 mg/kg

LD50 (Rat, male): 1.320 mg/kg
Method: OECD Test Guideline 401

Acute inhalation toxicity : LC50 (Rat): 7,1 mg/l
Exposure time: 4 h
Test atmosphere: vapour
Method: OECD Test Guideline 403
Assessment: The component/mixture is classified as acute
inhalation toxicity, category 4.

Acute dermal toxicity : LD50 (Rabbit): 500 - 1.000 mg/kg

Components:

2-phenylpropene

Acute oral toxicity : LD50 (Rat): 4.900 mg/kg

Acute inhalation toxicity : LC50 (Rat): ca. 22,85 mg/l
Exposure time: 6 h
Test atmosphere: vapour

Acute dermal toxicity : LD50 (Rabbit): 14,6 g/kg

Components:

cobalt bis(2-ethylhexanoate)

Acute oral toxicity : LD50 (Rat, female): ca. 3.129 mg/kg

Acute inhalation toxicity : LC50 (Rat): > 10 mg/l
Exposure time: 1 h
Test atmosphere: dust/mist
Assessment: Not classified as acutely toxic by inhalation



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under GHS.

Acute dermal toxicity : LD50 (Rabbit): > 5.000 mg/kg

Skin corrosion/irritation

Causes skin irritation.

Product:

Result: Repeated exposure may cause skin dryness or cracking.

Remarks: May cause skin irritation and/or dermatitis.

Components:

Styrene

Species: Rabbit

Result: Irritating to skin.

Species: human skin

Result: No skin irritation

methacrylic acid

Method: OECD Test Guideline 404

Result: Corrosive after 3 minutes or less of exposure

2-phenylpropene

Species: Rabbit

Result: Slight, transient irritation

cobalt bis(2-ethylhexanoate)

Result: No skin irritation

Serious eye damage/eye irritation

Causes serious eye irritation.

Product:

Remarks: Vapours may cause irritation to the eyes, respiratory system and the skin., Causes serious eye irritation.

Components:

Styrene

Result: Irritating to eyes.

Remarks: Vapour during processing may be irritating to the respiratory tract and to the eyes.

methacrylic acid

Result: Corrosive

2-phenylpropene

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Species: Rabbit

Result: Irritating to eyes.

cobalt bis(2-ethylhexanoate)

Species: Rabbit

Method: OECD Test Guideline 405

Result: Irritating to eyes.

Respiratory or skin sensitisation

Skin sensitisation: Not classified based on available information.

Respiratory sensitisation: Not classified based on available information.

Components:

Styrene

Exposure routes: Skin contact

Species: Guinea pig

Assessment: Does not cause skin sensitisation.

Exposure routes: inhalation (vapour)

Species: Humans

Assessment: Does not cause respiratory sensitisation.

methacrylic acid

Test Type: Buehler Test

Species: Guinea pig

Assessment: Did not cause sensitisation on laboratory animals.

Method: OECD Test Guideline 406

cobalt bis(2-ethylhexanoate)

Test Type: Local lymph node assay

Species: Mouse

Assessment: The product is a skin sensitiser, sub-category 1A.

Method: OECD Test Guideline 429

Remarks: Information given is based on data obtained from similar substances.

Germ cell mutagenicity

Not classified based on available information.

Components:

methacrylic acid

Genotoxicity in vitro

: Test Type: Ames test

Method: OECD Test Guideline 471

Result: negative

: Test Type: Chromosome aberration test in vitro

Method: OECD Test Guideline 487

Result: negative

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Genotoxicity in vivo

: Test Type: Mammalian bone marrow sister chromatid
exchange
Test species: Rat (male)
Cell type: Bone marrow
Method: OECD Test Guideline 475
Result: negative

Test Type: chromosome aberration assay
Test species: Mouse (male)
Method: OECD Test Guideline 478
Result: negative

Test Type: chromosome aberration assay
Test species: Mouse (male)
Cell type: peripheral blood cells
Method: OECD Test Guideline 474
Result: negative

2-phenylpropene

Genotoxicity in vitro

: Test Type: Ames test
Test species: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

cobalt bis(2-ethylhexanoate)

Genotoxicity in vitro

: Test Type: Ames test
Result: negative

Genotoxicity in vivo

: Test Type: In vivo micronucleus test
Result: negative

Carcinogenicity

Not classified based on available information.

Reproductive toxicity

Suspected of damaging the unborn child.

Components:

Styrene

Reproductive toxicity -
Assessment

: Some evidence of adverse effects on development, based on
animal experiments.

methacrylic acid

Effects on fertility

: Species: Rat
Application Route: Oral



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Fertility: No observed adverse effect level (Mating/Fertility):

400 mg/kg body weight

Symptoms: No effects on fertility No effects on reproduction
parameters

Method: OECD Test Guideline 416

Effects on foetal
development

: Species: Rabbit

Application Route: Oral

Developmental Toxicity: No observed adverse effect level F1:
450 mg/kg body weight

Symptoms: No specific developmental abnormalities

Method: OECD Test Guideline 414

2-phenylpropene

Reproductive toxicity -
Assessment: Some evidence of adverse effects on sexual function and
fertility, and/or on development, based on animal experiments.

cobalt bis(2-ethylhexanoate)

Reproductive toxicity -
Assessment: Clear evidence of adverse effects on sexual function and
fertility, based on animal experiments., Some evidence of
adverse effects on development, based on animal
experiments.

STOT - single exposure

May cause respiratory irritation.

Components:

Styrene

Assessment: May cause respiratory irritation.

methacrylic acid

Exposure routes: Inhalation

Target Organs: Respiratory Tract

Assessment: May cause respiratory irritation.

2-phenylpropene

Exposure routes: Inhalation

Target Organs: Respiratory Tract

Assessment: May cause respiratory irritation.

STOT - repeated exposure

Causes damage to organs (Auditory organs) through prolonged or repeated exposure if inhaled.

Components:

Styrene

Exposure routes: inhalation (vapour)

Target Organs: Auditory system

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Assessment: Causes damage to organs through prolonged or repeated exposure.

Repeated dose toxicity**Components:**

Styrene

Species: Human

85 mg/m³

Application Route: inhalation (vapour)

Species: Human

615 mg/kg

Application Route: Skin contact

methacrylic acid

Species: Rat, male and female

NOAEC: 352 mg/m³

Application Route: inhalation (dust/mist/fume)

Exposure time: 90 Days

Group: yes

Symptoms: Local irritation, Reduced body weight

Aspiration toxicity

Not classified based on available information.

Components:

Styrene

May be fatal if swallowed and enters airways.

Further information**Product:**

Remarks: Solvents may degrease the skin.

SECTION 12: Ecological information**12.1 Toxicity****Components:**

Styrene

Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): 4,02 mg/l
Exposure time: 96 hToxicity to daphnia and other : EC50 (Daphnia magna (Water flea)): 4,7 mg/l
aquatic invertebrates Exposure time: 48 h

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- Toxicity to algae : ErC50 (Pseudokirchneriella subcapitata (green algae)): 4,9 mg/l
Exposure time: 72 h
- EC10 (Pseudokirchneriella subcapitata (green algae)): 0,28 mg/l
Exposure time: 96 h
- Toxicity to bacteria : EC50 (activated sludge): ca. 500 mg/l
Exposure time: 0,5 h
- Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC: 1,01 mg/l
Exposure time: 21 d
Species: Daphnia magna (Water flea)
- Toxicity to soil dwelling organisms : NOEC: 34 mg/kg
Exposure time: 14 d
Species: Eisenia fetida (earthworms)
Method: OECD Test Guideline 207
- methacrylic acid
Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 85 mg/l
Exposure time: 96 h
Test Type: flow-through test
- Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 130 mg/l
Exposure time: 48 h
Test Type: flow-through test
- Toxicity to algae : EC50 (Pseudokirchneriella subcapitata (green algae)): 20 mg/l
End point: Biomass
Exposure time: 72 h
Test Type: flow-through test
Method: OECD Test Guideline 201
- Toxicity to fish (Chronic toxicity) : NOEC: 10 mg/l
Exposure time: 35 d
Species: Danio rerio (zebra fish)
Test Type: flow-through test
Method: OECD Test Guideline 210
- Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC: 53 mg/l
Exposure time: 21 d
Species: Daphnia magna (Water flea)

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Test Type: flow-through test
Method: OECD Test Guideline 211

2-phenylpropene

Toxicity to fish

: LC50 (Danio rerio (zebra fish)): 2,97 mg/l
Exposure time: 96 h
Test Type: static test
Method: OECD Test Guideline 203

Toxicity to daphnia and other
aquatic invertebrates

: EC50 (Daphnia magna (Water flea)): 1,645 mg/l
Exposure time: 48 h
Test Type: static test
Method: OECD Test Guideline 202

Toxicity to algae

: EC50 (Pseudokirchneriella subcapitata (green algae)): 11,441
mg/l
End point: Growth inhibition
Exposure time: 72 h
Test Type: static test
Method: OECD Test Guideline 201

Toxicity to daphnia and other
aquatic invertebrates
(Chronic toxicity)

: NOEC: 0,401 mg/l
Exposure time: 21 d
Species: Daphnia magna (Water flea)
Test Type: semi-static test
Method: OECD Test Guideline 211

cobalt bis(2-ethylhexanoate)
M-Factor (Short-term (acute)
aquatic hazard)

: 1

Ecotoxicology Assessment
Short-term (acute) aquatic
hazard

: Acute aquatic toxicity Category 1

Long-term (chronic) aquatic
hazard

: Chronic aquatic toxicity Category 3

12.2 Persistence and degradability

Components:

Styrene

Biodegradability

: Result: Readily biodegradable.
Biodegradation: > 60 %
Exposure time: 10 d

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methacrylic acid

Biodegradability

: Inoculum: activated sludge
Result: Readily biodegradable.
Biodegradation: 87 %
Exposure time: 28 d

2-phenylpropene

Biodegradability

: Test Type: aerobic
Inoculum: activated sludge
Result: Not readily biodegradable.
Biodegradation: 21 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

cobalt bis(2-ethylhexanoate)

Biodegradability

: Result: Readily biodegradable.
Biodegradation: 60 %
Exposure time: 10 d
Method: OECD Test Guideline 301B

12.3 Bioaccumulative potential

Components:

Styrene

Bioaccumulation

: Bioconcentration factor (BCF): < 100

Partition coefficient: n-octanol/water

: log Pow: 2,96 (25 °C)

methacrylic acid

Bioaccumulation

: Bioconcentration factor (BCF): 1,0
Remarks: Bioaccumulation is unlikely.

Partition coefficient: n-octanol/water

: log Pow: 0,93

2-phenylpropene

Partition coefficient: n-octanol/water

: log Pow: 3,48

12.4 Mobility in soil

Components:

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Styrene
Distribution among : Koc: 352
environmental compartments

12.5 Results of PBT and vPvB assessment**Components:**

Styrene
Assessment : This substance is not considered to be persistent,
bioaccumulating and toxic (PBT).. This substance is not
considered to be very persistent and very bioaccumulating
(vPvB)..

12.6 Other adverse effects**Product:**

Additional ecological : An environmental hazard cannot be excluded in the event of
information unprofessional handling or disposal., Toxic to aquatic life.

SECTION 13: Disposal considerations**13.1 Waste treatment methods**

Product : The product should not be allowed to enter drains, water
courses or the soil.
Do not contaminate ponds, waterways or ditches with
chemical or used container.
Send to a licensed waste management company.

Contaminated packaging : Empty remaining contents.
Dispose of as unused product.
Empty containers should be taken to an approved waste
handling site for recycling or disposal.
Do not re-use empty containers.
Do not burn, or use a cutting torch on, the empty drum.

SECTION 14: Transport information**SECTION 14: Transport information****14.1 UN number**

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ADN: UN1866**ADR:** UN1866**INTERNATIONAL AIR TRANSPORT ASSOCIATION - CARGO:** UN1866**INTERNATIONAL AIR TRANSPORT ASSOCIATION - PASSENGER:** UN1866**INTERNATIONAL MARITIME DANGEROUS GOODS:** UN1866**RID:** UN1866**14.2 UN proper shipping name****ADN:** RESIN SOLUTION**ADR:** RESIN SOLUTION**INTERNATIONAL AIR TRANSPORT ASSOCIATION - CARGO:** Resin solution**INTERNATIONAL AIR TRANSPORT ASSOCIATION - PASSENGER:** Resin solution**INTERNATIONAL MARITIME DANGEROUS GOODS:** RESIN SOLUTION**RID:** RESIN SOLUTION**14.3 Transport hazard class(es)****ADN:** 3**ADR:** 3**INTERNATIONAL AIR TRANSPORT ASSOCIATION - CARGO:** 3**INTERNATIONAL AIR TRANSPORT ASSOCIATION - PASSENGER:** 3**INTERNATIONAL MARITIME DANGEROUS GOODS:** 3**RID:** 3**14.4 Packing group****ADN:** III**ADR:** III**INTERNATIONAL AIR TRANSPORT ASSOCIATION - CARGO:** III**INTERNATIONAL AIR TRANSPORT ASSOCIATION - PASSENGER:** III**INTERNATIONAL MARITIME DANGEROUS GOODS:** III**RID:** III**14.5 Environmental hazards****ADN:** Not applicable**ADR:** Not applicable**INTERNATIONAL AIR TRANSPORT ASSOCIATION - CARGO:** Not applicable**INTERNATIONAL AIR TRANSPORT ASSOCIATION - PASSENGER:** Not applicable**INTERNATIONAL MARITIME DANGEROUS GOODS:** Not applicable**RID:** Not applicable**14.6 Special precautions for user**

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Not applicable

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

Ship Type: Not applicable

Hazard code(s): Not applicable

Pollutant Category: Not applicable

Dangerous goods descriptions (if indicated above) may not reflect quantity, end-use or region-specific exceptions that can be applied. Consult shipping documents for descriptions that are specific to the shipment.

SECTION 15: Regulatory information**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59) : Not applicable

REACH - List of substances subject to authorisation (Annex XIV) : Not applicable

Regulation (EC) No 1005/2009 on substances that deplete the ozone layer : Not applicable

Regulation (EC) No 850/2004 on persistent organic pollutants : Not applicable

Regulation (EC) No 649/2012 of the European Parliament and the Council concerning the export and import of dangerous chemicals : Not applicable

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.

P5c	FLAMMABLE LIQUIDS	Quantity 1 5.000 t	Quantity 2 50.000 t
-----	-------------------	-----------------------	------------------------

Other regulations : Take note of Directive 92/85/EEC regarding maternity protection or stricter national regulations, where applicable.

Take note of Directive 94/33/EC on the protection of young people at work or stricter national regulations, where



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applicable.

Contains a substance which is subject to the SZW-list of reproductive toxic substances (Ministry of Social Affairs and Employment). styrene

The components of this product are reported in the following inventories:

DSL	: All components of this product are on the Canadian DSL
AICS	On the inventory, or in compliance with the inventory
ENCS	Not in compliance with the inventory
KECI	On the inventory, or in compliance with the inventory
PICCS	Not in compliance with the inventory
IECSC	Not in compliance with the inventory
TSCA	On TSCA Inventory

Inventories

AICS (Australia), DSL (Canada), IECSC (China), REACH (European Union), ENCS (Japan), ISHL (Japan), KECI (Korea), NZIoC (New Zealand), PICCS (Philippines), TCSI (Taiwan), TSCA (USA)

15.2 Chemical safety assessment

No data available

SECTION 16: Other information

Further information

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Classification procedure:

H226 Flammable liquid and vapour.
 H315 Causes skin irritation.

Based on product data or assessment
 Calculation method

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H319	Causes serious eye irritation.	Calculation method
H361d	Suspected of damaging the unborn child.	Calculation method
H335	May cause respiratory irritation.	Calculation method
H372	Causes damage to organs through prolonged or repeated exposure if inhaled.	Calculation method
H412	Harmful to aquatic life with long lasting effects.	Calculation method

Full text of H-Statements

H226	Flammable liquid and vapour.
H302	Harmful if swallowed.
H304	May be fatal if swallowed and enters airways.
H311	Toxic in contact with skin.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H360Fd	May damage fertility. Suspected of damaging the unborn child.
H361	Suspected of damaging fertility or 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.
H411	Toxic to aquatic life with long lasting effects.
H412	Harmful to aquatic life with long lasting effects.

Other information : The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. This SDS has been prepared by INEOS's Environmental Health and Safety Department (+34 93 206 51 20 (in Spain)).

Sources of key data used to compile the Safety Data Sheet



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INEOS internal data including own and sponsored test reports
The UNECE administers regional agreements implementing harmonised classification for labelling (GHS) and transport.

List of abbreviations and acronyms that could be, but not necessarily are, used in this safety data sheet :

ACGIH : American Conference of Industrial Hygienists
BEI : Biological Exposure Index
CAS : Chemical Abstracts Service (Division of the American Chemical Society).
CMR : Carcinogenic, Mutagenic or Toxic for Reproduction
FG : Food grade
GHS : Globally Harmonized System of Classification and Labeling of Chemicals.
H-statement : Hazard Statement
IATA : International Air Transport Association.
IATA-DGR : Dangerous Goods Regulation by the "International Air Transport Association" (IATA).

ICAO : International Civil Aviation Organization
ICAO-TI (ICAO) : Technical Instructions by the "International Civil Aviation Organization"
IMDG : International Maritime Code for Dangerous Goods
ISO : International Organization for Standardization
logPow : octanol-water partition coefficient
LCxx : Lethal Concentration, for xx percent of test population
LDxx : Lethal Dose, for xx percent of test population.
ICxx : Inhibitory Concentration for xx of a substance
Ecxx : Effective Concentration of xx
N.O.S.: Not Otherwise Specified
OECD : Organization for Economic Co-operation and Development
OEL : Occupational Exposure Limit
P-Statement : Precautionary Statement
PBT : Persistent , Bioaccumulative and Toxic
PPE : Personal Protective Equipment
STEL : Short-term exposure limit
STOT : Specific Target Organ Toxicity
TLV : Threshold Limit Value
TWA : Time-weighted average
vPvB : Very Persistent and Very Bioaccumulative
WEL : Workplace Exposure Level
GAM : Water Hazard Class for the Netherlands
ADR : Agreement concerning the International Carriage of Dangerous Goods by Road.
ADNR: Regulation for the Carriage of Dangerous Substances on the Rhine
CLP : Classification, Labelling and Packaging
CSA : Chemical Safety Assessment
CSR : Chemical Safety Report

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DNEL : Derived No Effect Level.

EINECS : European Inventory of Existing Commercial Chemical Substances.

ELINCS : European List of Notified Chemical Substances

GV: Exposure limits (DK)

PEC : Predicted Effect Concentration

PEL : Permissible Exposure Limits

PNEC : Predicted No Effect Concentration

REACH : Registration, Evaluation, Authorisation and Restriction of Chemicals

RID : Regulation Concerning the International Transport of Dangerous Goods by Rail

WGK : German Water Hazard Class

NL / EN

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Version: 1

PRODUCTS THAT CONTAIN STYENE

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

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.)*.

Table 7. Description of ES 7

Free short title	FRP manufacturing in an industrial setting, using UP/VE resins and/or formulated resins (gelcoat, bonding paste, putty etc.) (ES7)
Systematic title based on use descriptor	ERC 6D; PROC 10, 7, 13, 5, 3, 14, 8A, 15
Name of contributing environmental scenario and corresponding ERC	ERC 6d Production of resins/rubbers
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 10 - Roller application or brushing PROC 7 - Industrial spraying PROC 13 - Treatment of articles by dipping and pouring PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact) PROC 3 - Use in closed batch process (synthesis or formulation) PROC 14 - Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 15 - Use of laboratory reagents in small scale laboratories
7.1 Contributing Scenario (1) controlling environmental exposure for ERC 6D	
Operational conditions	
Annual European tonnage	8.06E5 to/year
Daily amount used at site	7.61E5 kg/day
Release times per year	300 days/year (<i>justification: Continuous release</i>)

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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 Worstcase European manufacturing site</i>)
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - (<i>justification: Efficiency STP 97.9%</i>)
7.2 Contributing Scenario (2) controlling industrial worker exposure for PROC 10	
Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	Rolling, Brushing [CS51]; Roller, spreader, flow application [CS98] All open mould applications where resins is applied by brushing, rolling and other low energy spreading operations; Examples are handlamination, gelcoatbrushing, filament winding
Qualitative Risk Assessment	
General	Use long handled brushes and rollers where possible Ensure the ventilation system is regularly maintained and tested Dispose of empty containers and wastes safely Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin
Product characteristics	

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Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
7.3 Contributing Scenario (3) controlling industrial worker exposure for PROC 7	
Name of contributing scenario	7 - Industrial spraying
Scenario subtitle	Spraying [CS10]; Spraying (automatic/robotic) [CS97] All open mould applications where resins is applied by automated spraying or by robot in a spray cabin without direct worker involvement. Examples are spray lamination, gelcoat spraying and "chop-hoop" filament winding
Qualitative Risk Assessment	
General	Ensure the ventilation system is regularly maintained and tested Dispose of empty containers and wastes safely Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Wear suitable coveralls to prevent exposure to the skin Use suitable eye protection. Wear suitable face shield Wear chemically resistant gloves in combination with intensive management supervision control.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	

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Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,500 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Carry out in a vented booth or extracted enclosure	inhalation: 95 % (<i>justification: Carry out in a vented booth or extracted enclosure</i>)
7.4 Contributing Scenario (4) controlling industrial worker exposure for PROC 7	
Name of contributing scenario	7 - Industrial spraying
Scenario subtitle	Spraying [CS10]; Spraying (manually) [CS97] All open mould applications where resins is applied by manual spraying in an open work environment. Examples are spray lamination, gelcoat spraying and "chop-hoop" filament winding
Qualitative Risk Assessment	
General	Carefully pour from containers Use long handled tools where possible Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable eye protection. Wear suitable face shield Wear suitable coveralls to prevent exposure to the skin Wear chemically resistant gloves in combination with intensive management supervision control.
Product characteristics	
Physical state	liquid
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

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Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	90 %
7.5 Contributing Scenario (5) controlling industrial worker exposure for PROC 10	
Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	Dipping, immersion and pouring [CS4]; Rolling, Brushing [CS51]; Roller, spreader, flow application [CS98] Application of repair putties; Application of bonding pastes / adhesives.
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	5-25%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %

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Respiratory protection	no
7.6 Contributing Scenario (6) controlling industrial worker exposure for PROC 13	
Name of contributing scenario	13 - Treatment of articles by dipping and pouring
Scenario subtitle	Dipping, immersion and pouring [CS4]; Continuous process [CS54]. Continuous processes with open impregnation steps, such as pultrusion with open impregnation baths and (semi-) continuous production of flat laminates
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
7.7 Contributing Scenario (7) controlling industrial worker exposure for PROC 5	
Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	Casting operations [CS32]; Mixing operations (open systems) [CS30]. Casting and mixing operations in (semi-) open containers. Examples are centrifugal casting, casting of polymer concrete and artificial marble and the manufacturing of SMC / BMC/ TMC, etc
Qualitative Risk Assessment	



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General	Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	5-25%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
7.8 Contributing Scenario (8) controlling industrial worker exposure for PROC 5	
Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	General exposures (closed systems) [CS15]. Mixing liquid and solid components / into final formulated resin in blending vessel; Examples are gelcoat blending and compounding, formulation of repair putties, bonding pastes, chemical anchoring, etc
Qualitative Risk Assessment	
General	Put lids on containers immediately after use. Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %

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Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
7.9 Contributing Scenario (9) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Material transfers [CS3]; Automated process with (semi) closed systems [CS93]; Use in contained batch processes [CS37]. Resin injection and transfer processes, such as vacuum infusion, RTM, impregnation of sewer relining sleeves
Qualitative Risk Assessment	
General	Put lids on containers immediately after use. Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
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	

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Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
7.10 Contributing Scenario (10) controlling industrial worker exposure for PROC 14	
Name of contributing scenario	14 - Production of preparations or articles by tableting, compression, extrusion, pelletisation
Scenario subtitle	Material transfers [CS3]; Production or preparation or articles by tableting, compression, extrusion or pelletisation [CS100]; Treatment by heating [CS129]; Batch processes at elevated temperatures [CS136]. Processes where curing of UP / VE resins takes place at high temperature. Examples are pultrusion with injection dies and processing of SMC / BMC / TMC, etc
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	5-25%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no

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7.11 Contributing Scenario (11) controlling industrial worker exposure for PROC 3

Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Material transfers [CS3]. Product delivery/storage - delivery of bulk and packaged products - outdoor / indoor
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no

7.12 Contributing Scenario (12) controlling industrial worker exposure for PROC 5

Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	Drum/batch transfers [CS8]; Pouring from small containers [CS9]; Transfer from/pouring from containers [CS22]; Mixing operations (open systems) [CS30]. Loading of mixing equipment; Preparation of material for application; (liquid products) - batch, indoor
Qualitative Risk Assessment	
General	Put lids on containers immediately after use. Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable eye protection.

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	Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
7.13 Contributing Scenario (13) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Equipment maintenance [CS5]; Maintenance of small items [CS18]. Equipment cleaning and maintenance, open indoor
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	

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Exposed skin surface	960 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
Local exhaust ventilation	inhalation: 70 % (<i>justification: Use local exhaust ventilation with adequate effectiveness</i>)
7.14 Contributing Scenario (14) controlling industrial worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Laboratory activities [CS36]. Quality control work of samples from blending vessel; R&D work including handling of samples from 1 kg to 1 drum
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no

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7.15 Contributing Scenario (15) controlling industrial worker exposure for PROC 8A

Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Disposal of wastes [CS28]. Handling of non cured waste; Waste management / handling and storage of waste for removal for off-site treatment or for on-site treatment like incineration and/or biological waste water treatment
Qualitative Risk Assessment	
General	Put lids on containers immediately after use. Contain and dispose of waste according to local regulations Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no

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

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.)*.

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Table 8. Description of ES 8

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

8.1 Contributing Scenario (1) controlling environmental exposure for ERC 8E

Operational conditions

Annual European tonnage	8.42E6 to/year
Daily amount used at site	4.83E5 kg/day
Release times per year	300 days/year (<i>justification: Continuous production</i>)
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>)

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Fraction released to air (Femis.air)	0.102 % (justification: EU Risk Assessment Report, 2002)
Fraction used at main source	60 % (justification: Value adopted to account for worst-case European manufacturing site)
Fraction of emission directed to water by local STP (Fstp.water)	0.081 - (justification: Efficiency STP 97.9%)
8.2 Contributing Scenario (2) controlling professional worker exposure for PROC 10	
Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	Rolling, Brushing [CS51]; Roller, spreader, flow application [CS98] All open mould applications where resins is applied by brushing, rolling and other low energy spreading operations; Examples are handlamination, gelcoatbrushing, semi-continuous production of flat panels and laminates
Qualitative Risk Assessment	
General	Use long handled brushes and rollers where possible Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	90 %
8.3 Contributing Scenario (3) controlling professional worker exposure for PROC 11	
Name of contributing scenario	11 - Non industrial spraying
Scenario subtitle	Spraying [CS10]; Spraying (manually) [CS97] All open mould

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	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 in combination with intensive management supervision control.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,500 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	95 %

8.4 Contributing Scenario (4) controlling professional worker exposure for PROC 10

Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	Dipping, immersion and pouring [CS4]; Rolling, Brushing [CS51]; Roller, spreader, flow application [CS98] Application of repair putties; Application of bonding pastes / adhesives.
Qualitative Risk Assessment	

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General	Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	5-25%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	90 %
8.5 Contributing Scenario (5) controlling professional worker exposure for PROC 10	
Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	Dipping, immersion and pouring [CS4]; Rolling, Brushing [CS51]; Roller, spreader, flow application [CS98] Application of floorings, mastics, coatings, castings

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Qualitative Risk Assessment

General	Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
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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
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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
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Conditions and measures related to personal protection, hygiene and health evaluation

Protective gloves	Gloves APF 5 80 %
Respiratory protection	90 %

8.6 Contributing Scenario (6) controlling professional worker exposure for PROC 5

Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
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Scenario subtitle	Material transfers [CS3]; Pouring from small containers [CS9]. Preparation of material for application (liquids) - transfer of material from one container to another; Formulating / blending resins, gelcoats, bonding pastes, putties etc. in blending vessels
Qualitative Risk Assessment	
General	Use drum pumps. Put lids on containers immediately after use. Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	90 %

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8.7 Contributing Scenario (7) controlling professional worker exposure for PROC 4

Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Use in contained batch processes [CS37]. Sewer relining operation
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm ²
Other given operational conditions affecting workers exposure	
Location	outdoors (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	90 %
8.8 Contributing Scenario (8) controlling professional worker exposure for PROC 3	

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Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Use in contained batch processes [CS37]. Application of chemical anchoring
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employee training to prevent/minimize exposures In case of potential exposure: Use suitable eye protection. Use suitable chemically resistant gloves.
Product characteristics	
Physical state	liquid
Concentration in substance	5-25%
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm ²
Other given operational conditions affecting workers exposure	
Location	outdoors (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
8.9 Contributing Scenario (9) controlling professional worker exposure for PROC 8A	

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Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Equipment maintenance [CS5]; Maintenance of small items [CS18]. Equipment cleaning and maintenance, open indoor
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no
8.10 Contributing Scenario (10) controlling professional worker exposure for PROC 8A	

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Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Disposal of wastes [CS28]. Handling of non cured waste; Waste management / handling and storage of waste for removal for off-site treatment or for on-site treatment like incineration and/or biological waste water treatment
Qualitative Risk Assessment	
General	Dispose of empty containers and wastes safely Ensure good work practices are implemented Provide basic employe training to prevent/minimize exposures Use suitable eye protection. Use suitable chemically resistant gloves. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm ²
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 5 80 %
Respiratory protection	no

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