

Syntor Fine Chemicals Ltd

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2015/830

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Product Name	Boron trichloride dimethyloctylamine complex
Product code	FPB018
Synonyms	Trichloro(N, N-dimethyloctylamine) boron, Boron, trichloro(N,N-dimethyl-1-octanamine)-
Chemical Formula	C ₁₀ H ₂₃ BCl ₃ N
CAS No.	34762-90-8
EC No.	252-200-4
REACH Registration No.	01-2120087201-65-XXXX

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

Identified Use(s)	<ul style="list-style-type: none">Industrial use as latent curing agent / catalyst, mainly epoxy resinsProduction of resins for electric insulation
Uses Advised Against	Not known.

1.3 Details of the supplier of the safety data sheet

Company Identification	Syntor Fine Chemicals Ltd
Address of Supplier	11 Boleyn Court, Manor Park Runcorn, WA7 1SR tertiary, United Kingdom
Telephone	+ 44(0) 1928 579 865
Fax	+44 (0) 1928 579 734
E-mail	mr@syntor.co.uk
Website	www.syntor.co.uk

1.4 Emergency telephone number

Company	+44 (0) 7720 149 777
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SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Regulation (EC) No. 1272/2008 (CLP)	Skin Sens. 1B :May cause an allergic skin reaction. Repr. 2 :Suspected of damaging fertility or the unborn child. Aquatic Acute 1 :Very toxic to aquatic life. Aquatic Chronic 1 :Very toxic to aquatic life with long lasting effects.
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2.2 Label elements

	According to Regulation (EC) No. 1272/2008 (CLP)
Product Name	Boron trichloride dimethyloctylamine complex

Hazard Pictogram(s)



GHS08



GHS07



GHS09

Signal Word(s)

Warning.

Hazard Statement(s)

H317: May cause an allergic skin reaction.
H361: Suspected of damaging fertility or the unborn child.
H410: Very toxic to aquatic life with long lasting effects.

Precautionary Statement(s)

P201: Obtain special instructions before use.
P261: Avoid breathing dust.
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 water.

P501: Dispose of contents in accordance with local, state or national legislation.

2.3 Other hazards

None known.

2.4 Additional Information

For full text of H/P Statements see section 16.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

HAZARDOUS INGREDIENT(S)	CAS No.	EC No. / REACH Registration No.	%W/W	Hazard Statement(s)	Hazard Pictogram(s)
Trichloro(N, N-dimethyloctylamine) boron	34762-90-8	252-200-4 / 01-2120087201-65- XXXX	≥ 98.0 - ≤100.0	Skin Sens. 1B H317 Repr. 2 H361 Aquatic Acute 1 H400 Aquatic Chronic 1 H410	GHS08 GHS07 GHS09

3.2 Mixtures

Not applicable.

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

Inhalation	If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.
Skin Contact	Wash with plenty of water. Take off immediately all contaminated clothing and wash it before reuse. If skin irritation or rash occurs: Get medical advice/attention.
Eye Contact	Flush eyes with water for at least 15 minutes while holding eyelids open. If symptoms persist, obtain medical attention.
Ingestion	Wash out mouth with water. Do not induce vomiting. Do not give anything by mouth to an unconscious person. Seek medical advice.

4.2 Most important symptoms and effects, both acute and delayed

May cause an allergic skin reaction.

4.3 Indication of any immediate medical attention and special treatment needed

IF exposed or concerned: Get medical advice/attention.

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable Extinguishing media	As appropriate for surrounding fire. Extinguish with carbon dioxide, dry chemical, foam or waterspray.
Unsuitable extinguishing media	None known.

5.2 Special hazards arising from the substance or mixture

May decompose in a fire, giving off toxic and irritant vapours. Hazardous decomposition products: Carbon monoxide, Carbon dioxide, Nitrogen oxides, Hydrogen chloride, Dimethyloctyl amine (DMOA), Boron trichloride (BCl₃).

5.3 Advice for firefighters

Fire fighters should wear complete protective clothing including self-contained breathing apparatus. Water spray should be used to cool containers. Dike fire control water for later disposal.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Provide adequate ventilation. Stop leak if safe to do so. Avoid dust generation. Avoid breathing dust.

Wear appropriate personal protective equipment, avoid direct contact.

6.2 Environmental precautions

Avoid release to the environment. Spillages or uncontrolled discharges into watercourses must be alerted to the appropriate regulatory body.

6.3 Methods and material for containment and cleaning up

Sweep up spilled substance. Use vacuum equipment for collecting spilt materials, where practicable. Collect spillage. Transfer to a lidded container for disposal or recovery.

6.4 Reference to other sections

See Also Section 8, 13

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Provide adequate ventilation. Avoid breathing dust. Do not get in eyes, on skin, or on clothing. Wear protective gloves/protective clothing/eye protection/face protection. Contaminated work clothing should not be allowed out of the workplace. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.

7.2 Conditions for safe storage, including any incompatibilities

Store locked up. Keep container tightly closed. Keep in a cool, dry, well ventilated place.

Storage temperature

Ambient.

Storage life

Stable under normal conditions.

Incompatible materials

Strong oxidising agents.

7.3 Specific end use(s)

- Industrial use as latent curing agent / catalyst, mainly epoxy resins
- Production of resins for electric insulation

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

8.1.1 Occupational Exposure Limits

SUBSTANCE.	CAS No.	LTEL (8 hr TWA ppm)	LTEL (8 hr TWA mg/m ³)	STEL (ppm)	STEL (mg/m ³)	Note
Trichloro(N, N-dimethyloctylamine) boron	34762-90-8					Not established

Source: UK Workplace Exposure Limits EH40/2005 (Third edition, published 2018)

DNEL / DMEL	Oral	Inhalation	Dermal
Industry - Long Term - Local effects			
Industry - Long Term - Systemic effects		3.5 mg/m ³	1 mg/kg bw/day
Industry - Short term - Local effects			
Industry - Short term - Systemic effects			
Consumer - Long Term - Local effects			
Consumer - Long Term - Systemic effects			
Consumer - Short term - Local effects			
Consumer - Short term - Systemic effects			

Environment	PNEC
Fresh water	0.00013 mg/l
Sea water	0.000013 mg/l
Sedimentation (Fresh water)	0.043 mg/kg
Sedimentation (Sea water)	0.0043 mg/kg
Sewage treatment plant (STP)	100 mg/l
Soil	0.0085 mg/kg

8.2 Exposure controls

8.2.1. Appropriate engineering controls Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

8.2.2. Personal protection equipment



Eye Protection

Wear eye protection with side protection (EN166).



Skin protection

Wear protective clothing and gloves: Impervious gloves (EN 374).

Breakthrough time of the glove material: refer to the information provided by the gloves' producer.



Respiratory protection

Where engineering controls are not fitted or inadequate wear suitable respiratory protective equipment. A suitable dust mask or dust respirator with filter type P (EN143 or EN405) may be appropriate.



Thermal hazards

Not applicable.

8.2.3. Environmental Exposure Controls Avoid release to the environment.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Solid. Crystallised Melt. Colour : colourless to yellow.
Odour	Slight sweet odour.
Odour threshold	Not established.
pH	4.5 (0.1% aqueous solution)
Melting point/freezing point	25 - 35°C
Initial boiling point and boiling range	Not applicable.
Flash Point	>93.3°C [Closed cup]
Evaporation rate	Not applicable.
Flammability (solid, gas)	Non-flammable.
Upper/lower flammability or explosive limits	Not available.
Vapour pressure	Not applicable.
Vapour density	Not applicable.
Relative density	1.1 g/ml
Solubility(ies)	Solubility (Water) : 0.00094 g/L at 20 °C. Very slightly soluble. Solubility (Other) : Not known.
Partition coefficient: n-octanol/water	Log Pow: 5.77
Auto-ignition temperature	278°C @ 1013 hPa
Decomposition Temperature (°C)	Not available.
Viscosity	Not applicable.

Explosive properties Not explosive.

Oxidising properties Not oxidising.

9.2 Other information

Molecular weight 274.47

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

None anticipated.

10.2 Chemical Stability

May decompose to irritating or corrosive components on exposure to water, moisture or heat.

10.3 Possibility of hazardous reactions

No hazardous reactions known if used for its intended purpose.

10.4 Conditions to avoid

Keep away from moisture.

10.5 Incompatible materials

Strong oxidising agents.

10.6 Hazardous decomposition products

Carbon monoxide, Carbon dioxide, Nitrogen oxides, Hydrogen chloride, Dimethyloctyl amine (DMOA), Boron trichloride (BCl₃).

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity - Ingestion

Low oral toxicity.

LD50 (oral, rat) mg/kg: 5000

Acute toxicity - Skin Contact

Low acute toxicity.

LD50 (skin, rat) mg/kg: 2500

Skin corrosion/irritation

Non-irritant.

Serious eye damage/irritation

Not classified.

Skin sensitization data

May cause an allergic skin reaction.

Respiratory sensitization data

Not classified.

Germ cell mutagenicity

No evidence of mutagenic effects.

Carcinogenicity

No evidence of carcinogenic effects.

Reproductive toxicity

Suspected of damaging fertility or the unborn child.

Effects on fertility

Lowest-observed-adverse-effect level (NOAEL):

300 mg/kg bw/day (subacute; rat)

Developmental Toxicity

Lowest-observed-adverse-effect level (NOAEL):

1000 mg/kg bw/day (subacute; rat)

Lactation

Not classified.

STOT - single exposure

None anticipated.

STOT - repeated exposure

None anticipated.

Aspiration hazard

Not classified.

11.2 Other information

Not known.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Very toxic to aquatic life with long lasting effects.

Toxicity - Aquatic invertebrates

LC50/ EC50 (Daphnia magna): 0.75 mg/l

Toxicity - Algae

LC50/ EC50 (Pseudokirchneriella subcapitata): 0.13 mg/l

12.2 Persistence and Degradation

Inherently biodegradable.

12.3 Bioaccumulative potential

The substance has low potential for bioaccumulation.

12.4 Mobility in soil

Very slightly soluble. The substance is predicted to have low mobility in soil.

Koc: 3251

12.5 Results of PBT and vPvB assessment

Not classified as PBT or vPvB.

12.6 Other adverse effects

Not known.

SECTION 13: DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods**

Recover or recycle if possible. Dispose of wastes in an approved waste disposal facility. Dispose of this material and its container to hazardous or special waste collection point.

13.2 Additional Information

Disposal should be in accordance with local, state or national legislation.

SECTION 14: TRANSPORT INFORMATION**14.1 UN number**

UN No. 3077

14.2 UN proper shipping nameUN proper shipping name ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
(Boron trichloride dimethyloctylamine complex)**14.3 Transport hazard class(es)**

ADR/RID

ADR/RID Class 9

ADR Classification Code M7

Special Provisions 274 335 375 601

Limited Quantities 5 kg

Excepted Quantities E1

Emergency Action Code 2Z

Mixed Packing Instructions for Packages P002 IBC08 LP02 R001

Special Packing Provisions for Packages PP12 B3

Mixed Packing Instructions for Packages MP10

Packing Instructions for Portable Tanks T1 BK1 BK2 BK3

Special Provisions for Portable Tanks TP33

Tank Code for Tanks SGAV LGBV

Vehicle for Tank Carriage AT

ADR Transport Category 3

Tunnel Restriction Code -

Special Provisions for Carriage - Packages V13

Packages

Special Provisions for Carriage - Bulk VC1 VC2

Special Provisions for Carriage - Loading, Unloading and Handling CV13

Unloading and Handling

ADR HIN 90

IMDG

IMDG Class 9

Special Provisions 274 335 375 601

Limited Quantities	5 kg
Excepted Quantities	E1
Mixed Packing Instructions for Packages	P002 IBC08 LP02 R001
Special Packing Provisions for Packages	PP12 B3
Packing Instructions for Portable Tanks	T1 BK1 BK2 BK3
Special Provisions for Portable Tanks	TP33
IMDG EMS	F-A, S-F
Stowage and Handling	Category A SW23
ICAO/IATA	
IATA Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Boron trichloride dimethyloctylamine complex)
Excepted Quantities	E1
Passenger and Cargo Aircraft Limited	Y956
Quantities Packing Instructions	
Passenger and Cargo Aircraft Limited	30Kg
Quantities Max net Qty	
Passenger and Cargo Aircraft Packing	956
Instructions	
Passenger and Cargo Aircraft Max net	400Kg
Qty	
Cargo Aircraft Packing Instructions	956
Cargo Aircraft Max net Qty	400Kg
Special Provisions	A97, A158, A179, A197
Emergency Response Guidebook (ERG)	9L
Code	
Labels	
Labels	9

**14.4 Packing group**

Packing group III

14.5 Environmental hazards

Environmental hazards Classified as a Marine Pollutant.

14.6 Special precautions for user

Special precautions for user Not known.

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

No information available

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

European Regulations - Authorisations and/or Restrictions On Use

Candidate List of Substances of Very High Concern for Authorisation Not listed

High Concern for Authorisation

REACH: ANNEX XIV list of substances subject to authorisation Not listed

REACH: Annex XVII Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles Not listed

Community Rolling Action Plan (CoRAP) Not listed

Regulation (EC) N° 850/2004 of the European Parliament and of the Council on persistent organic pollutants

Not listed

Regulation (EC) N° 1005/2009 on substances that deplete the ozone layer

Not listed

Regulation (EU) N° 649/2012 of the European Parliament and of the Council concerning the export and import of hazardous chemicals

Not listed

National regulations

Wassergefährdungsklasse (Germany)

WGK 3: Highly hazardous to water.

15.2 Chemical Safety Assessment

A REACH chemical safety assessment has been carried out.

SECTION 16: OTHER INFORMATION

The following sections contain revisions or new statements:

1-16

LEGEND

Hazard Pictogram(s)



GHS08



GHS07



GHS09

Hazard classification

Aquatic Acute 1 : Hazardous to the aquatic environment, Acute, Category 1
 Aquatic Chronic 1 : Hazardous to the aquatic environment, Chronic, Category 1
 Repr. 2 : Reproductive toxicity, Category 2
 Skin Sens. 1B : Skin sensitization, Category 1B

Hazard Statement(s)

H317: May cause an allergic skin reaction.
 H361: Suspected of damaging fertility or the unborn child.
 H400: Very toxic to aquatic life.
 H410: Very toxic to aquatic life with long lasting effects.

Precautionary Statement(s)

P201: Obtain special instructions before use.
 P202: Do not handle until all safety precautions have been read and understood.
 P261: Avoid breathing dust.
 P272: Contaminated work clothing should not be allowed out of the workplace.
 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 water.
 P308+P313: IF exposed or concerned: Get medical advice/attention.
 P333+P313: If skin irritation or rash occurs: Get medical advice/attention.
 P362+P364: Take off contaminated clothing and wash it before reuse.
 P391: Collect spillage.
 P405: Store locked up.

P501: Dispose of contents in accordance with local, state or national legislation.

Acronyms

ADN : European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
 ADR : European Agreement concerning the International Carriage of Dangerous Goods by Road
 CAS : Chemical Abstracts Service
 CLP : Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures
 DNEL : Derived No Effect Level
 EC : European Community
 EINECS : European Inventory of Existing Commercial Chemical Substances
 IATA : International Air Transport Association
 IBC : Intermediate Bulk Container
 ICAO : International Civil Aviation Organization
 IMDG : International Maritime Dangerous Goods
 LTEL : Long term exposure limit
 PBT : Persistent, Bioaccumulative and Toxic
 PNEC : Predicted No Effect Concentration
 REACH : Registration, Evaluation, Authorisation and Restriction of Chemicals
 RID : Regulations concerning the International Carriage of Dangerous Goods by Rail
 STEL : Short term exposure limit
 STOT : Specific Target Organ Toxicity
 UN : United Nations
 vPvB : very Persistent and very Bioaccumulative

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Information contained in this publication or as otherwise supplied to Users is believed to be accurate and is given in good faith, but it is for the Users to satisfy themselves of the suitability of the product for their own particular purpose.

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Exposure Scenario 1: Manufacture

SECTION 1:	Title of exposure scenario	
	Manufacture	
Contributing scenario controlling environmental exposure		
Manufacture		ERC1
Contributing scenario controlling worker exposure		

Manufacture		PROC3
Manufacture		PROC8b
SECTION 2:	Operational conditions and risk management measures	
2.1	Contributing scenario controlling environmental exposure:	
	Manufacture	
Frequency and duration of use		
<ul style="list-style-type: none"> Daily use at site: ≤ 0.51 tonnes/day <i>Manufacturing takes place batch-wise. As a reasonable worst case assumption, a maximum daily production of 510 kg is assumed for the point source.</i> Annual use at a site: ≤ 40 tonnes/year <i>Manufacturing takes place on single site.</i> Percentage of EU tonnage used at regional scale: = 100 % 		
Conditions and measures related to municipal sewage treatment plant		
Municipal STP: Yes [Effectiveness, Water: 31.46%] Discharge rate of STP: $\geq 2E3$ m ³ /day Application of the STP sludge on agricultural soil: No <i>Waste are incinerated</i>		
Conditions and measures related to external treatment of waste for disposal		
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)		
Other given operational conditions affecting environmental exposure		
Flow rate of receiving surface water: $\geq 1.8E4$ m ³ /day		
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil		
<u>Water</u> Initial release factor: 5E-5% Final release factor: 5E-5% Local release rate: 2.55E-4 kg/day	<u>Air</u> Initial release factor: 1E-5% Final release factor: 1E-5% Local release rate: 5.1E-5 kg/day	<u>Soil</u> Final release factor: 1E-4%
2.2	Contributing scenario controlling worker exposure:	
	Manufacture (PROC3)	
Product characteristics		
Dustiness of material: Low The substance is a solid melt at room temperature with a low melting point.		
Concentration of substance in preparation / mixture or article		
Substance as such		
Frequency and duration of use		
Duration of activity: < 8 hour(s)		
Technical conditions and measures to control dispersion from source towards the worker		

- general ventilation: Basic general ventilation (1-3 air changes per hour)
- Containment: Closed batch process with occasional controlled exposure
- Local exhaust ventilation: Yes [Effectiveness, Inhalation: 90%]
- Local exhaust ventilation: No [Effectiveness, Dermal: 0%]
- Occupational Health and Safety Management System: Advanced

Conditions and measures related to personal protection, hygiene and health evaluation

- Skin protection: Yes. Wear impervious gloves (EN374). [Effectiveness, Dermal: 80%]
- Respiratory protection: No [Effectiveness, Inhalation: 0%]
- Good work practices (W-4): Ensure these are implemented (Ensure good work practices are implemented.)
Risk management measure related to skin sensitisation potential of the substance.
- Specific employee training (W-4): To prevent/minimize exposures (Provide specific employee training to prevent/minimize exposures.)
Risk management measure related to skin sensitisation potential of the substance.
- Supervision (W-4): Check that RMMs are used correctly (Supervision in place to check that the RMMs in place are being used correctly and OCs followed.)
Risk management measure related to skin sensitisation potential of the substance.
- General measures for sensitizers (R43): Yes [E3] (Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.)

Other given operational conditions affecting workers exposure

- Indoor use.
- Process temperature (Solid): Heat/warm up so that epoxy resin polymerises.
- Skin surface potentially exposed: One hand face only (240 cm²)

2.3	Contributing scenario controlling worker exposure: Manufacture (PROC8b)
Product characteristics	
Dustiness of material: Low The substance is a solid melt at room temperature with a low melting point.	
Concentration of substance in preparation / mixture or article	
Substance as such	
Frequency and duration of use	
Duration of activity: < 8 hour(s)	
Technical conditions and measures to control dispersion from source towards the worker	
<ul style="list-style-type: none"> • general ventilation: Basic general ventilation (1-3 air changes per hour) • Containment: Semi-closed process with occasional controlled exposure • Local exhaust ventilation: Yes [Effectiveness, Inhalation: 95%] • Local exhaust ventilation: No [Effectiveness, Dermal: 0%] 	

- Occupational Health and Safety Management System: Advanced

Conditions and measures related to personal protection, hygiene and health evaluation

- Skin protection: Yes. Wear impervious gloves (EN374). [Effectiveness, Dermal: 95%]
- Respiratory protection: No [Effectiveness, Inhalation: 0%]
- Good work practices (W-4): Ensure these are implemented (Ensure good work practices are implemented.)
Risk management measure related to skin sensitisation potential of the substance.
- Specific employee training (W-4): To prevent/minimize exposures (Provide specific employee training to prevent/minimize exposures.)
Risk management measure related to skin sensitisation potential of the substance.
- Supervision (W-4): Check that RMMs are used correctly (Supervision in place to check that the RMMs in place are being used correctly and OCs followed.)
Risk management measure related to skin sensitisation potential of the substance.
- General measures for sensitizers (R43): Yes [E3] (Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.)

Other given operational conditions affecting workers exposure

- Indoor use.
- Process temperature (Solid): Heat/warm up so that epoxy resin polymerises.
- Skin surface potentially exposed: Two hands (960 cm²)

SECTION 3:		Exposure estimation	
3.1. Environment			
Protection target	Exposure concentration (Local PEC, Predicted Exposure Concentration)	Risk characterisation ratio (RCR)	
Fresh water	8.7E-6mg/L	0.067	
Sedimentation (Fresh water)	0.003 mg/kg dw	0.665	
Sea water	8.704E-7 mg/L	0.067	
Sedimentation (Sea water)	2.861E-4 mg/kg dw	0.665	
Sewage treatment plant	8.739E-5 mg/L	< 0.01	
Agricultural soil	1.214E-6 mg/kg dw	< 0.01	
3.2. Worker			
Contributing scenario controlling worker exposure: Manufacture (PROC3)			
Exposure route	Exposure concentration (Targeted Risk Assessment - Worker 3.0)	Risk characterisation ratio (RCR)	
Inhalation, Systemic effects, Long Term	0.01 mg/m ³	<0.01	

Inhalation, Local effects, Long Term		
Inhalation, Local effects, Acute		
Dermal, Systemic effects, Long Term	0.138 mg/kg bw/day	0.138
Dermal, Local effects, Long Term		
Combined routes, Systemic effects, Long Term		0.141
Contributing scenario controlling worker exposure: Manufacture (PROC8b)		
Exposure route	Exposure concentration (Targeted Risk Assessment - Worker 3.0)	Risk characterisation ratio (RCR)
Inhalation, Systemic effects, Long Term	0.005 mg/m ³	<0.01
Inhalation, Local effects, Long Term		
Inhalation, Local effects, Acute		
Dermal, Systemic effects, Long Term	0.686 mg/kg bw/day	0.686
Dermal, Local effects, Long Term		
Combined routes, Systemic effects, Long Term		0.687
SECTION 4:	Guidance to check compliance with the Exposure Scenario	
4.1. Health		
Evaluation guidance to downstream user	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels	
4.2. Environment		
Evaluation guidance to downstream user	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling could be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use, additional RMMs or a site-specific chemical safety assessment is required.	

Exposure Scenario 2: Formulation

SECTION 1:	Title of exposure scenario	
	Formulation	
Contributing scenario controlling environmental exposure		
Formulation		ERC2
Contributing scenario controlling worker exposure		

Formulation	PROC3	
Formulation	PROC 8b	
Formulation	PROC9	
SECTION 2:	Operational conditions and risk management measures	
2.1	Contributing scenario controlling environmental exposure: Formulation	
Frequency and duration of use		
<ul style="list-style-type: none"> Daily use at site: ≤ 0.03 tonnes/day <i>As default for the formulation stage, 45 emission days per site were taken into account (1.3 t/a per site)</i> Annual use at a site: ≤ 1.3 tonnes/year Percentage of EU tonnage used at regional scale: = 10 % <i>Industrial formulation takes place throughout the entire EU. As a reasonable worst case assumption 10 regions with equal distribution of the EU tonnage is assumed (1.3 t/a per region).</i> 		
Conditions and measures related to municipal sewage treatment plant		
Municipal STP: Yes [Effectiveness, Water: 31.46%] Discharge rate of STP: $\geq 2E3$ m ³ /day Application of the STP sludge on agricultural soil: No. <i>Waste are incinerated</i>		
Conditions and measures related to external treatment of waste for disposal		
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)		
Other given operational conditions affecting environmental exposure		
Flow rate of receiving surface water: $\geq 1.8E4$ m ³ /day		
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil		
<u>Water</u> Initial release factor: 2.5E-4% Final release factor: 2.5E-4% Local release rate: 7.5E-5 kg/day	<u>Air</u> Initial release factor: 1E-4% Final release factor: 1E-4% Local release rate: 3E-5 kg/day	<u>Soil</u> Final release factor: 0%
2.2	Contributing scenario controlling worker exposure: Formulation (PROC3)	
Product characteristics		
Dustiness of material: Low The substance is a solid melt at room temperature with a low melting point.		
Concentration of substance in preparation / mixture or article		
Substance as such		
Frequency and duration of use		
Duration of activity: < 8 hour(s)		
Technical conditions and measures to control dispersion from source towards the worker		
<ul style="list-style-type: none"> general ventilation: Basic general ventilation (1-3 air changes per hour) 		

- Containment: Closed batch process with occasional controlled exposure
- Local exhaust ventilation: Yes [Effectiveness, Inhalation: 90%]
- Local exhaust ventilation: No [Effectiveness, Dermal: 0%]
- Occupational Health and Safety Management System: Advanced

Conditions and measures related to personal protection, hygiene and health evaluation

- Skin protection: Yes. Wear impervious gloves (EN374). [Effectiveness, Dermal: 80%]
- Respiratory protection: No [Effectiveness, Inhalation: 0%]
- Good work practices (W-4): Ensure these are implemented (Ensure good work practices are implemented.)
Risk management measure related to skin sensitisation potential of the substance.
- Specific employee training (W-4): To prevent/minimize exposures (Provide specific employee training to prevent/minimize exposures.)
Risk management measure related to skin sensitisation potential of the substance.
- Supervision (W-4): Check that RMMs are used correctly (Supervision in place to check that the RMMs in place are being used correctly and OCs followed.)
Risk management measure related to skin sensitisation potential of the substance.
- General measures for sensitizers (R43): Yes [E3] (Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.)

Other given operational conditions affecting workers exposure

- Indoor use.
- Process temperature (Solid): Heat/warm up so that epoxy resin polymerises.
- Skin surface potentially exposed: One hand face only (240 cm²)

2.3

Contributing scenario controlling worker exposure:

Formulation (PROC8b)

Product characteristics

Dustiness of material: Low

The substance is a solid melt at room temperature with a low melting point.

Concentration of substance in preparation / mixture or article

Substance as such

Frequency and duration of use

Duration of activity: < 8 hour(s)

Technical conditions and measures to control dispersion from source towards the worker

- general ventilation: Basic general ventilation (1-3 air changes per hour)
- Containment: Semi-closed process with occasional controlled exposure
- Local exhaust ventilation: Yes [Effectiveness, Inhalation: 95%]
- Local exhaust ventilation: No [Effectiveness, Dermal: 0%]
- Occupational Health and Safety Management System: Advanced

Conditions and measures related to personal protection, hygiene and health evaluation

- Skin protection: Yes. Wear impervious gloves (EN374). [Effectiveness, Dermal: 95%]
- Respiratory protection: No [Effectiveness, Inhalation: 0%]
- Good work practices (W-4): Ensure these are implemented (Ensure good work practices are implemented.)

Risk management measure related to skin sensitisation potential of the substance.

- Specific employee training (W-4): To prevent/minimize exposures (Provide specific employee training to prevent/minimize exposures.)

Risk management measure related to skin sensitisation potential of the substance.

- Supervision (W-4): Check that RMMs are used correctly (Supervision in place to check that the RMMs in place are being used correctly and OCs followed.)

Risk management measure related to skin sensitisation potential of the substance.

- General measures for sensitizers (R43): Yes [E3] (Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.)

Other given operational conditions affecting workers exposure

- Indoor use.
- Process temperature (Solid): Heat/warm up so that epoxy resin polymerises.
- Skin surface potentially exposed: Two hands (960 cm²)

2.4

Contributing scenario controlling worker exposure:

Formulation (PROC9)

Product characteristics

Dustiness of material: Low

The substance is a solid melt at room temperature with a low melting point.

Concentration of substance in preparation / mixture or article

Substance as such

Frequency and duration of use

Duration of activity: < 8 hour(s)

Technical conditions and measures to control dispersion from source towards the worker

- general ventilation: Basic general ventilation (1-3 air changes per hour)
- Containment: Semi-closed process with occasional controlled exposure
- Local exhaust ventilation: Yes [Effectiveness, Inhalation: 90%]
- Local exhaust ventilation: No [Effectiveness, Dermal: 0%]
- Occupational Health and Safety Management System: Advanced

Conditions and measures related to personal protection, hygiene and health evaluation

- Skin protection: Yes. Wear impervious gloves (EN374). [Effectiveness, Dermal: 95%]
- Respiratory protection: No [Effectiveness, Inhalation: 0%]
- Good work practices (W-4): Ensure these are implemented (Ensure good work practices are implemented.)
Risk management measure related to skin sensitisation potential of the substance.
- Specific employee training (W-4): To prevent/minimize exposures (Provide specific employee training to prevent/minimize exposures.)
Risk management measure related to skin sensitisation potential of the substance.
- Supervision (W-4): Check that RMMs are used correctly (Supervision in place to check that the RMMs in place are being used correctly and OCs followed.)
Risk management measure related to skin sensitisation potential of the substance.
- General measures for sensitizers (R43): Yes [E3] (Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.)

Other given operational conditions affecting workers exposure		
<ul style="list-style-type: none"> Indoor use. Process temperature (Solid): Heat/warm up so that epoxy resin polymerises. Skin surface potentially exposed: Two hands face (480 cm²) 		
SECTION 3:	Exposure estimation	
3.1. Environment		
Protection target	Exposure concentration (Local PEC, Predicted Exposure Concentration)	Risk characterisation ratio (RCR)
Fresh water	2.561E-6mg/L	0.02
Sedimentation (Fresh water)	8.417E-4 mg/kg dw	0.196
Sea water	2.565E-7 mg/L	0.02
Sedimentation (Sea water)	8.431E-5 mg/kg dw	0.196
Sewage treatment plant	2.57E-5 mg/L	< 0.01
Agricultural soil	1.209E-6 mg/kg dw	< 0.01
3.2. Worker		
Contributing scenario controlling worker exposure: Formulation (PROC3)		
Exposure route	Exposure concentration (Targeted Risk Assessment - Worker 3.0)	Risk characterisation ratio (RCR)
Inhalation, Systemic effects, Long Term	0.01 mg/m ³	<0.01
Inhalation, Local effects, Long Term		
Inhalation, Local effects, Acute		
Dermal, Systemic effects, Long Term	0.138 mg/kg bw/day	0.138
Dermal, Local effects, Long Term		
Combined routes, Systemic effects, Long Term		0.141
Contributing scenario controlling worker exposure: Formulation (PROC8b)		
Exposure route	Exposure concentration (Targeted Risk Assessment - Worker 3.0)	Risk characterisation ratio (RCR)
Inhalation, Systemic effects, Long Term	0.005 mg/m ³	<0.01
Inhalation, Local effects, Long Term		
Inhalation, Local effects, Acute		
Dermal, Systemic effects, Long Term	0.686 mg/kg bw/day	0.686

Dermal, Local effects, Long Term		
Combined routes, Systemic effects, Long Term		0.687
Contributing scenario controlling worker exposure: Formulation (PROC9)		
Exposure route	Exposure concentration (Targeted Risk Assessment - Worker 3.0)	Risk characterisation ratio (RCR)
Inhalation, Systemic effects, Long Term	0.01 mg/m ³	<0.01
Inhalation, Local effects, Long Term		
Inhalation, Local effects, Acute		
Dermal, Systemic effects, Long Term	0.343 mg/kg bw/day	0.343
Dermal, Local effects, Long Term		
Combined routes, Systemic effects, Long Term		0.346
SECTION 4:	Guidance to check compliance with the Exposure Scenario	
4.1. Health		
Evaluation guidance to downstream user	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels	
4.2. Environment		
Evaluation guidance to downstream user	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling could be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use, additional RMMs or a site-specific chemical safety assessment is required.	

Exposure Scenario 3: Use at industrial site

SECTION 1:	Title of exposure scenario	
	Use at industrial site	
Contributing scenario controlling environmental exposure		
Use at industrial site		ERC6d

Contributing scenario controlling worker exposure		
Industrial use	PROC8b	
Industrial use	PROC13	
Industrial use	PROC14	
SECTION 2:	Operational conditions and risk management measures	
2.1	Contributing scenario controlling environmental exposure: Use at industrial site	
Frequency and duration of use		
<ul style="list-style-type: none"> Daily use at site: ≤ 0.003 tonnes/day <i>Industrial use takes place batch-wise. 200 emission days are considered. As a reasonable worst case assumption, a maximum daily use of 3 kg/d is assumed for the largest point source.</i> Annual use at a site: ≤ 0.43 tonnes/year <i>At a reasonable worst case assumption, within a region 3 sites with equal tonnage distribution is assumed (1.3 t/a per site)</i> Percentage of EU tonnage used at regional scale: = 10 % <i>Industrial formulation takes place throughout the entire EU. As a reasonable worst case assumption 10 regions with equal distribution of the EU tonnage is assumed (1.3 t/a per region).</i> 		
Conditions and measures related to municipal sewage treatment plant		
Municipal STP: Yes [Effectiveness, Water: 31.46%] Discharge rate of STP: $\geq 2E3$ m ³ /day Application of the STP sludge on agricultural soil: No. <i>Sludge are incinerated</i>		
Conditions and measures related to external treatment of waste for disposal		
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)		
Other given operational conditions affecting environmental exposure		
Flow rate of receiving surface water: $\geq 1.8E4$ m ³ /day		
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil		
<u>Water</u> Initial release factor: 0.005% Final release factor: 0.005% Local release rate: 1.5E-4 kg/day	<u>Air</u> Initial release factor: 35% Final release factor: 35% Local release rate: 1.05 kg/day	<u>Soil</u> Final release factor: 0%
2.2	Contributing scenario controlling worker exposure: Industrial use (PROC8b)	
Product characteristics		
Dustiness of material: Low The substance is a solid melt at room temperature with a low melting point.		
Concentration of substance in preparation / mixture or article		
Substance as such		
Frequency and duration of use		

Duration of activity: < 8 hour(s)

Technical conditions and measures to control dispersion from source towards the worker

- general ventilation: Basic general ventilation (1-3 air changes per hour)
- Containment: Semi-closed process with occasional controlled exposure
- Local exhaust ventilation: Yes [Effectiveness, Inhalation: 95%]
- Local exhaust ventilation: No [Effectiveness, Dermal: 0%]
- Occupational Health and Safety Management System: Advanced

Conditions and measures related to personal protection, hygiene and health evaluation

- Skin protection: Yes. Wear impervious gloves (EN374). [Effectiveness, Dermal: 80%]
- Respiratory protection: No [Effectiveness, Inhalation: 0%]
- Good work practices (W-4): Ensure these are implemented (Ensure good work practices are implemented.)
Risk management measure related to skin sensitisation potential of the substance.
- Specific employee training (W-4): To prevent/minimize exposures (Provide specific employee training to prevent/minimize exposures.)
Risk management measure related to skin sensitisation potential of the substance.
- Supervision (W-4): Check that RMMs are used correctly (Supervision in place to check that the RMMs in place are being used correctly and OCs followed.)
Risk management measure related to skin sensitisation potential of the substance.
- General measures for sensitizers (R43): Yes [E3] (Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.)

Other given operational conditions affecting workers exposure

- Indoor use.
- Process temperature (Solid): Heat/warm up so that epoxy resin polymerises.
- Skin surface potentially exposed: Two hands (960 cm²)

2.3

Contributing scenario controlling worker exposure:

Industrial use (PROC13)

Product characteristics

Dustiness of material: Low

The substance is a solid melt at room temperature with a low melting point.

Concentration of substance in preparation / mixture or article

Substance as such

Frequency and duration of use

Duration of activity: < 8 hour(s)

Technical conditions and measures to control dispersion from source towards the worker

- general ventilation: Basic general ventilation (1-3 air changes per hour)
- Containment: No
- Local exhaust ventilation: Yes [Effectiveness, Inhalation: 90%]
- Local exhaust ventilation: No [Effectiveness, Dermal: 0%]
- Occupational Health and Safety Management System: Advanced

Conditions and measures related to personal protection, hygiene and health evaluation

- Skin protection: Yes. Wear impervious gloves (EN374). [Effectiveness, Dermal: 95%]
- Respiratory protection: No [Effectiveness, Inhalation: 0%]
- Good work practices (W-4): Ensure these are implemented (Ensure good work practices are implemented.)
Risk management measure related to skin sensitisation potential of the substance.
- Specific employee training (W-4): To prevent/minimize exposures (Provide specific employee training to prevent/minimize exposures.)
Risk management measure related to skin sensitisation potential of the substance.
- Supervision (W-4): Check that RMMs are used correctly (Supervision in place to check that the RMMs in place are being used correctly and OCs followed.)
Risk management measure related to skin sensitisation potential of the substance.
- General measures for sensitizers (R43): Yes [E3] (Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.)

Other given operational conditions affecting workers exposure

- Indoor use.
- Process temperature (Solid): Heat/warm up so that epoxy resin polymerises.
- Skin surface potentially exposed: Two hands face (480 cm²)

2.4**Contributing scenario controlling worker exposure:**

Industrial use (PROC14)

Product characteristics

Dustiness of material: Low

The substance is a solid melt at room temperature with a low melting point.

Concentration of substance in preparation / mixture or article

Substance as such

Frequency and duration of use

Duration of activity: < 8 hour(s)

Technical conditions and measures to control dispersion from source towards the worker

- Basic general ventilation (1-3 air changes per hour)
- Containment: No
- Local exhaust ventilation: Yes [Effectiveness, Inhalation: 90%]
- Local exhaust ventilation: No [Effectiveness, Dermal: 0%]
- Occupational Health and Safety Management System: Advanced

Conditions and measures related to personal protection, hygiene and health evaluation

- Skin protection: Yes. Wear impervious gloves (EN374). [Effectiveness, Dermal: 90%]
- Respiratory protection: No [Effectiveness, Inhalation: 0%]
- Good work practices (W-4): Ensure these are implemented (Ensure good work practices are implemented.)

Risk management measure related to skin sensitisation potential of the substance.

- Specific employee training (W-4): To prevent/minimize exposures (Provide specific employee training to prevent/minimize exposures.)
Risk management measure related to skin sensitisation potential of the substance.

- Supervision (W-4): Check that RMMs are used correctly (Supervision in place to check that the RMMs in place are being used correctly and OCs followed.)

Risk management measure related to skin sensitisation potential of the substance.

- General measures for sensitizers (R43): Yes [E3] (Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.)

Other given operational conditions affecting workers exposure

- Indoor use.
- Process temperature (Solid): Heat/warm up so that epoxy resin polymerises.
- Skin surface potentially exposed: Two hands face (480 cm²)

SECTION 3:

Exposure estimation

3.1. Environment

Protection target	Exposure concentration (Local PEC, Predicted Exposure Concentration)	Risk characterisation ratio (RCR)
Fresh water	5.119E-6mg/L	0.039
Sedimentation (Fresh water)	0.002 mg/kg dw	0.391
Sea water	5.123E-7 mg/L	0.039
Sedimentation (Sea water)	1.684E-4 mg/kg dw	0.392
Sewage treatment plant	5.141E-5 mg/L	< 0.01
Agricultural soil	2.575E-4 mg/kg dw	0.303

3.2. Worker

Contributing scenario controlling worker exposure: Industrial use (PROC8b)

Exposure route	Exposure concentration (Targeted Risk Assessment - Worker 3.0)	Risk characterisation ratio (RCR)
Inhalation, Systemic effects, Long Term	0.005 mg/m ³	<0.01
Inhalation, Local effects, Long Term		
Inhalation, Local effects, Acute		
Dermal, Systemic effects, Long Term	0.686 mg/kg bw/day	0.686
Dermal, Local effects, Long Term		
Combined routes, Systemic effects, Long Term		0.687

Contributing scenario controlling worker exposure: Industrial use (PROC13)

Exposure route	Exposure concentration (Targeted Risk Assessment - Worker 3.0)	Risk characterisation ratio (RCR)
Inhalation, Systemic effects, Long Term	0.01 mg/m ³	<0.01
Inhalation, Local effects, Long Term		
Inhalation, Local effects, Acute		
Dermal, Systemic effects, Long Term	0.686 mg/kg bw/day	0.686
Dermal, Local effects, Long Term		
Combined routes, Systemic effects, Long Term		0.688

Contributing scenario controlling worker exposure: Industrial use (PROC14)		
Exposure route	Exposure concentration (Targeted Risk Assessment - Worker 3.0)	Risk characterisation ratio (RCR)
Inhalation, Systemic effects, Long Term	0.01 mg/m ³	<0.01
Inhalation, Local effects, Long Term		
Inhalation, Local effects, Acute		
Dermal, Systemic effects, Long Term	0.343 mg/kg bw/day	0.343
Dermal, Local effects, Long Term		
Combined routes, Systemic effects, Long Term		0.346
SECTION 4:	Guidance to check compliance with the Exposure Scenario	
4.1. Health		
Evaluation guidance to downstream user	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels	
4.2. Environment		
Evaluation guidance to downstream user	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling could be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use, additional RMMs or a site-specific chemical safety assessment is required.	