CVC Thermoset Specialties
An Emerald Performance Materials® Company

Safety Data Sheet
according to Regulation (EC) 1907/2006 (REACH)

Revision date: 2019-04-03
Supercedes: 2019-01-09

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

1.1. Product identifier:

Product trade name:	HYPRO* 1300X47 CTBN
Company product number:	X47
REACH registration number:	Mixture
Other means of identification:	Not Available

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

Uses:	Elastomeric modifier for thermoset resins. See Annex for covered uses.
Uses advised against:	Consumer use of liquid UP (unsaturated polyester) resins for repair purposes and consumer use of resin paste as fillers/putties.

1.3. Details of the supplier of the safety data sheet:

Manufacturer/Supplier:	CVC Thermoset Specialties 844 N. Lenola Road Moorestown, New Jersey 08057 United States Telephone: +1-856-533-3000 FAX: +1-856-533-3003
EU Only Representative:	Penman Consulting bvba Avenue des Arts 10 B-1210 Brussels Belgium Telephone: +32 (0) 2 305 0698 email: pcbvba09@penmanconsulting.com
For further information about this SDS:	Email: CTS.info@emeraldmaterials.com

1.4. Emergency telephone number:

ChemTel (24 hours): 1-800-255-3924 (USA); +1-813-248-0585 (outside USA); 1-300-954-583 (Australia); 000-800-100-4086 (India).

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture:

Product classification according to Regulation (EC) 1272/2008 (CLP) as amended:

Flammable Liquid, category 3, H226
Skin Irritation, category 2, H315
Eye Irritation, category 2, H319
Reproductive Toxicity, category 2, H361
STOT, repeated exposure, category 1, H372

2.2. Label elements:

Product labeling according to Regulation (EC) 1272/2008 (CLP) as amended:

CLP label - Contains: Styrene

Hazard pictogram(s):

Signal word:
Danger

Hazard statements:
H226 Flammable liquid and vapour.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H361 Suspected of damaging fertility or the unborn child.
H372 Causes damage to organs through prolonged or repeated exposure.

Precautionary statements:
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.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313 IF exposed or concerned: Get medical advice/attention.
P337+P313 If eye irritation persists: Get medical advice/attention.
P370+P378 In case of fire: Use carbon dioxide, dry chemical, foam to extinguish.

Supplemental information: No Additional Information

Precautionary statements are listed according to the United Nations Globally Harmonized System of Classification and Labelling of Chemicals (GHS) - Annex III and ECHA Guidance on Labelling and Packaging. Regulations in individual countries/regions may determine which statements are required on the product label. See product label for specifics.

2.3. Other hazards:

PBT/vPvB criteria: Not Available
Other hazards: Hazardous polymerization may occur upon depletion of inhibitor.

See Section 11 for toxicological information.

SECTION 3: Composition/information on ingredients

3.2. Mixture:

CAS-No.	Chemical Name	Weight%	Classification	H Statements
0000100-42-5	Styrene	15-<20	Acute Tox. 4 Inhalation- Aquatic Chronic 3- Asp. Tox. 1- Eye Irrit. 2- Flam. Liq. 3- Repr. 2- Skin Irrit. 2- STOT RE 1- STOT SE 3 RTI	H226-304-315-319-332-335-361-372-412

CAS-No.	Chemical Name	Weight%	REACH Registration No.	EC/List Number
0000100-42-5	Styrene	15-<20	01-2119457861-32-0286	202-851-5

See Section 16 for full text of H (Hazard) statements (EC 1272/2008).

Notes: This material contains inhibitor(s).

Amounts specified are typical and do not represent a specification. Remaining components are proprietary, non-hazardous, and/or present at amounts below reportable limits.

SECTION 4: First aid measures

4.1. Description of first aid measures:

General: If irritation or other symptoms occur or persist from any route of exposure, remove the affected individual from the area: see a physician/get medical attention.

Eye contact: Immediately flush eyes with plenty of clean water for an extended time, not less than fifteen (15) minutes. Flush longer if there is any indication of residual chemical in the eye. Ensure adequate flushing of the eyes by separating the eyelids with fingers and roll eyes in a circular motion. If eye irritation persists: Get medical advice/attention.

Skin contact: Immediately remove contaminated clothing and shoes. Wash the affected area with plenty of soap and water

until no evidence of the chemical remains (at least 15-20 minutes). Launder clothing before reuse. If skin irritation occurs: Get medical advice/attention.

Inhalation: If affected, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Call a POISON CENTER or doctor/physician if you feel unwell.

Ingestion: Do not induce vomiting. Never give anything by mouth to an unconscious person. Rinse out the mouth with water. Get medical attention immediately.

Protection of first aid responders: Wear proper personal protective clothing and equipment.

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

Dizziness, Drowsiness, Headache, Irritation, Nausea. Pre-existing skin problems may be aggravated by prolonged or repeated contact. Persons with sensitive airways (e.g., asthmatics) may react to vapors. See section 11 for additional information.

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

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media:

Suitable: Use water spray, ABC dry chemical, "alcohol" foam or CO2. Use water to keep fire-exposed containers cool. If a leak or spill has not ignited, use water spray to disperse the vapors and to protect emergency responders attempting to stop a leak. Water spray may be used to flush spills away from exposures and to dilute spills to nonflammable mixtures.

Unsuitable: Do not use direct water stream. May spread fire.

5.2. Special hazards arising from the substance or mixture:

Unusual fire/explosion hazards: Issue warning: combustible liquid. Eliminate all ignition sources. Ventilate the area. If spill is large, be prepared to isolate the hazard area. Deny access to the spill area to persons who are not involved in the cleanup and/or who have not been properly trained in spill management of hazardous/flammable liquids. Vapors may explode if ignited in an enclosed area. Run off to sewer may cause a fire or explosion hazard. Protect product from flames of any kind; maintain proper clearance when using heat devices, etc. Hot vapor or mists may be susceptible to spontaneous combustion when mixed with air. Ignition temperatures decrease with increasing vapor volume and vapor/air contact time and are influenced by pressure changes. Therefore, ignition may occur below published ignition temperatures. Use of this product in processes involving elevated-temperatures, vacuum if subject to sudden ingress of air, sudden escape of vapor or mist, etc., must be thoroughly evaluated to assure safe operation. Closed container may rupture (due to build up in pressure) when exposed to extreme heat. Product may burn if an ignition source is present. Gives off volatile vapors that are heavier than air and may travel along the ground or may be moved by ventilation and ignited by flame, sparks, heaters, or other ignition sources at distant locations (flashback potential). High temperatures, inhibitor depletion, accidental impurities, or exposure to radiation or oxidizers may cause spontaneous polymerizing reaction generating heat/pressure. Closed containers may rupture or explode under runaway polymerization.

Hazardous combustion products: Irritating or toxic substances will be emitted upon burning, combustion or decomposition. See section 10 (10.6 Hazardous decomposition products) for additional information.

5.3. Advice for firefighters:

Use water/water spray to keep fire-exposed containers cool. Water spray may be used to flush spills away from exposures and to dilute spills to non-combustible mixtures. Do not flush combustible liquids into sewer as a fire or vapor explosion hazard may result. Never direct a hose stream directly onto a burning flammable/combustible liquid. Solid or straight hose stream will cause fire to spread if directed onto a burning spill or into an open container of burning liquid. Wear self-contained breathing apparatus (SCBA) equipped with a full facepiece and operated in a pressure-demand mode (or other positive pressure mode) and approved protective clothing. Personnel without suitable respiratory protection must leave the area to prevent significant exposure to hazardous gases from combustion, burning or decomposition. In an enclosed or poorly ventilated area, wear SCBA during cleanup immediately after a fire as well as during the attack phase of firefighting operations.

See section 9 for additional information.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures:

See Section 8 for recommendations on the use of personal protective equipment. Eliminate ignition sources. Ventilate areas of spill. Personal Protective Equipment must be worn.

6.2. Environmental precautions:

Do not flush liquid into public sewer, water systems or surface waters.

6.3. Methods and material for containment and cleaning up:

Contain by diking with sand, earth or other non-combustible material. Wear proper personal protective clothing and equipment. Absorb spill with an inert material. Place into labeled, closed container; store in safe location to await disposal. Change contaminated clothing and launder before reuse. Contaminated monomer(s) may be unstable. Add inhibitor to prevent polymerization. Absorbent can act as a contaminant (removes inhibitor) in liquid monomer(s) materials. CAUTION: Spilled liquid and dried film are slippery. Use care to avoid falls.

6.4. References to other sections:

See Section 8 for recommendations on the use of personal protection and Section 13 for waste disposal.

SECTION 7: Handling and storage

7.1. Precautions for safe handling:

As with any chemical product, use good laboratory/workplace procedures. Do not cut, puncture, or weld on or near the container. Wash thoroughly after handling this product. Always wash up before eating, smoking or using the facilities. Use under well-ventilated conditions. Avoid eye and skin contact. Avoid inhalation of aerosol, mist, spray, fume or vapor. Avoid drinking, tasting, swallowing or ingesting this product. Wash contaminated clothing before reuse. Discard shoes contaminated with this product. Provide eyewash fountains and safety showers in the work area. Bond and ground all containers when transferring chemical. Eliminate ignition sources (e.g., sparks, static buildup, excessive heat, etc.). Use spark-proof tools and equipment. Vapors may travel to distant ignition sources.

7.2. Conditions for safe storage, including any incompatibilities:

Store in combustible storage area and away from heat and open flame. Keep away from heat, sparks and open flames. Store under well-ventilated conditions. Keep container upright, when not in use, to prevent leakage. Avoid storing containers in direct sunlight as vapors may accumulate in the head space creating pressure. Store this material away from incompatible substances (see section 10). Do not store in open, unlabeled or mislabeled containers. Keep container closed when not in use. To prevent polymerization, container opened previously SHOULD NOT BE BLANKETED with nitrogen or other inert gas. Check inhibitor levels periodically. Product can accumulate static charge when handled. Equipment should be grounded. Emptied container may contain residual vapors or liquid which may ignite or explode. Do not reuse empty container without commercial cleaning or reconditioning. Bond and ground all containers when transferring chemical. Store product where temperatures are below 122°F (50°C).

7.3. Specific end use(s):

Further information concerning special risk management measures: see annex of this safety data sheet (exposure scenarios).

SECTION 8: Exposure controls / personal protection

8.1. Control parameters:

Occupational exposure limits (OEL):

Chemical Name	EU OELV	EU IOELV	ACGIH - TWA/Ceiling	ACGIH - STEL
Styrene	N/E	N/E	20 ppm TWA	40 ppm STEL

Chemical Name	UK WEL	Ireland OEL
Styrene	100 ppm TWA, 250 ppm STEL	85 mg/m3 TWA (as 100% pure crystalline enzyme), 40 ppm STEL

N/E=Not established (no exposure limits established for the listed substances for listed country/region/organization).

Derived No Effect Levels (DNELs):

Styrene

Population	Route	Acute (local)	Acute (systemic)	Long Term (local)	Long Term (systemic)
Workers	Inhalation	306 mg/m3	289 mg/m3	N/E	85 mg/m3
Workers	Dermal	N/E	N/E	N/E	406 mg/kg bw/day
General population	Inhalation	N/E	N/E	N/E	10,2 mg/m3
General population	Oral	N/E	N/E	N/E	2,1 mg/kg bw/day
Humans via the environment	Inhalation	N/E	N/E	N/E	2,4 ppm
Humans via the environment	Oral	N/E	N/E	N/E	2,1 mg/kg bw/day

Predicted No Effect Concentration (PNECs):

Styrene

Compartment	PNEC
Freshwater	0,028 mg/L
Freshwater sediment	0,614 mg/kg dw
Marine water	0.014 mg/L
Marine water sediment	0,307 mg/kg dw
Intermittent releases	0,04 mg/L
Soil	0,2 mg/kg dw
STP	5 mg/L
Oral	No potential for bioaccumulation

8.2. Exposure controls:

Appropriate engineering controls: Always provide effective general and, when necessary, local exhaust ventilation to draw spray, aerosol, fume, mist and vapor away from workers to prevent routine inhalation. Ventilation must be adequate to maintain the ambient workplace atmosphere below the exposure limit(s) outlined in the SDS. Eliminate ignition sources (e.g., sparks, static buildup, excessive heat, etc.).

Individual protection measures, such as personal protective equipment:

Eye/face protection: Safety glasses or goggles required.

Hand protection: Avoid skin contact when mixing or handling the material by wearing impervious and chemical resistant gloves. In case of prolonged immersion or frequently repeated contact, gloves with breakthrough times greater than 480 minutes (protection class 6) are recommended. For brief contact or splash applications, gloves with breakthrough times of 30 minutes or greater are recommended (protection class 2 or greater). Suggested materials for protective gloves: Nitrile rubber, Polyvinyl alcohol (PVA), Viton. The protective gloves to be used must comply with the specifications of the EC directive 89/686/EEC and the resultant standard EN 374. Suitability and durability of a glove is dependent on usage (e.g. frequency and duration of contact, other chemicals which may be handled, chemical resistance of glove material and dexterity). Always seek advice of the glove supplier as to the most suitable glove material.

Skin and body protection: Use good laboratory/workplace procedures including personal protective clothing: labcoat, safety glasses and protective gloves.

Respiratory protection: Wear an approved respirator (e.g., an organic vapor respirator, a full face air purifying respirator for organic vapors, or a self-contained breathing apparatus) whenever exposure to aerosol, mist, spray, fume or vapor exceed the applicable exposure limit(s) of any chemical substance listed in this SDS.

Further information: Eyewash fountains and safety showers are recommended in the work area.

Environmental exposure controls: See Sections 6 and 12.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties:

Form:	Liquid	**pH:**	Not Available
Appearance:	Yellow	**Relative density:**	Not Available
Odour:	Styrene	**Partition coefficient (n-octanol/water):**	Not Available
Odour threshold:	Not Available	**% Volatile by weight:**	18%
Solubility in water:	Negligible	**VOC:**	Not Available
Evaporation rate:	Not Available	**Boiling point °C:**	Not Available
Vapour pressure:	Not Available	**Boiling point °F:**	Not Available
Vapour density:	(Styrene) Heavier than air	**Flash point:**	55 °C (131 °F) Setaflash
Viscosity:	7,200 cP @ 25°C (77°F)	**Autoignition temperature:**	490°C (914°F) (Styrene)

Melting point/Freezing point:	Not Available	**Flammability (solid, gas):**	Not Applicable (liquid)
Oxidising properties:	Not oxidizing	**Flammability or explosive limits:**	LFL/LEL: 0.9% (Styrene)
Explosive properties:	Not explosive		UFL/UEL: 6.8% (Styrene)
Decomposition temperature:	Not Available		
SAPT:	108 °C (226 °F)		

9.2. Other information:

Amounts specified are typical and do not represent a specification.

SECTION 10: Stability and reactivity

10.1. Reactivity:

Exothermic reactions including polymerization may occur in contact with amines.

10.2. Chemical stability:

This product is stable. Stable, however may polymerize at elevated temperatures or upon depletion of inhibitor.

10.3. Possibility of hazardous reactions:

Hazardous polymerization will occur. Stable, however may polymerize at elevated temperatures or upon depletion of inhibitor.

10.4. Conditions to avoid:

Excessive heat and ignition sources. Excessive heat or ignition sources, direct sunlight, Ultraviolet radiation, lack or depletion of polymerization inhibitor, contamination with incompatible materials.

10.5. Incompatible materials:

Avoid contact with acids or bases and amines. Oxidizing agents may cause decomposition yielding carbon monoxide and carbon dioxide, heat, and pressure. Intense heat may be generated if product comes in contact with strong basic materials or strongly basic amines. Avoid contact with strong oxidants, highly halogenated compounds in presence of iron, inorganic nitrates, or triethyl aluminum. Avoid contact with strong oxidizing agents and reducing agents. Depending on the amount and specific materials involved, contact can result in intense heat, boiling, flame development, explosion or toxic gas generation.

10.6. Hazardous decomposition products:

No Information

SECTION 11: Toxicological information

11.1. Information on toxicological effects:

Information on likely routes of exposure:

General: Caution must be exercised through the prudent use of protective equipment and handling procedures to minimize exposure. Health effects are particularly evident when product is heated. Overexposure will cause central nervous system depression.

Eyes: Causes serious eye irritation. May cause redness of the eyes, tearing and blurred vision.

Skin: Causes skin irritation. Repeated or prolonged contact may cause irritation, dermatitis, defatting and drying or cracking of the skin.

Inhalation: Excessive inhalation can cause respiratory tract irritation, dizziness, fatigue, weakness, nausea and headache. Inhalation of fumes and vapors from processing, combustion or decomposition may cause irritation of the respiratory tract and mucous membranes.

Ingestion: Ingestion may cause nausea, vomiting and diarrhea.

Acute toxicity information: Not classified (based on available data, the classification criteria are not met). No toxicity studies have been conducted on this product. POLYMER: Note: These results are typical for this family of polymers. The high molecular weight of this polymer makes absorption by the body highly unlikely thus greatly diminishing the likelihood of toxic effects by the chemical itself. Oral, Rat, adult, LD50 >34 g/kg. Dermal, Rabbit, adult, LD50 >3 g/kg. ATEmix

(oral): >5000 mg/kg. ATEmix (dermal): >5000 mg/kg. ATEmix (inhal.): >20 mg/L, 4 hours (vapor).

Chemical Name	Inhalation LC50	Species	Oral LD50	Species	Dermal LD50	Species
Styrene	11.8 mg/L (4 hours)	Rat/ adult	5000 mg/kg	Rat/ adult	>2000 mg/kg	Rat/ adult

Skin corrosion/irritation: Causes skin irritation - Category 2.

Chemical Name	Skin irritation	Species
Styrene	Irritant	Rabbit/ adult

Serious eye damage/irritation: Causes serious eye irritation - Category 2.

Chemical Name	Eye irritation	Species
Styrene	Irritant	Rabbit/ adult

Respiratory or skin sensitization: Not classified (no relevant information found).

Chemical Name	Skin sensitisation	Species
Styrene	Non-sensitizer	Weight of evidence

Carcinogenicity: Not classified (no relevant information found). STYRENE: Data from other long-term animal studies and from epidemiology studies of workers exposed to styrene do not provide a basis to conclude that styrene is carcinogenic. An increased incidence of lung tumors was observed in mice from a recent inhalation study - LOAEC (Lowest-Observed-Adverse-Effect-Concentration), inhalation, mouse - 0.09-0.18 mg/L. These tumours are not considered to be relevant to humans. Additional animal study data: NOAEL (no-observed-adverse-effect-level) (carcinogenicity), oral, rat: 2000 mg/kg bw/day; LOAEL (Lowest-Observed-Adverse-Effect-Level) (carcinogenicity), oral, mouse: 150 mg/kg bw/day. NOAEC (no-observed-adverse-effect-concentration)(carcinogenicity), inhalation, rat: >=4.34 mg/L (no effects observed). U.S. NTP 14th RoC - Reasonably anticipated to be a human carcinogen; IARC - upgraded from 2B to 2A in 2018, monograph publication pending.

Germ cell mutagenicity: No Information STYRENE: Styrene was not mutagenic in in-vitro assays such as the Ames test without metabolic activation but in the presence of metabolic systems has given both negative and positive responses. Styrene has induced chromosomal aberrations and sister chromatid exchanges in-vitro dependent on the metabolic activation system. Some cytogenetic studies on workers exposed to styrene have shown increases in chromosomal damage, although these effects do not appear to be related to styrene exposure levels and are not supported by the data observed in the animal studies.

Reproductive toxicity: Suspected of damaging fertility or the unborn child - Category 2. STYRENE: Reviews of the developmental and reproductive data indicate that styrene does not cause birth defects in orally-dosed rats, and inhalation-exposed laboratory animals. Other developmental effects have been reported at exposure levels that are maternally toxic. Developmental toxicity, inhalation, rats: NOAEC (no-observed-adverse-effect-concentration) = 150 ppm.

Specific target organ toxicity (STOT) - single exposure: No Information STYRENE: Acute inhalation literature data (human) - NOAEC (No-Observed-Adverse-Effect-Concentration): 7 hours exposure = 100 ppm; 1 hour exposure = 216 ppm (no effects on the Central Nervous System (CNS)) (Stewart et al., 1968); Some minor impairment observed in neurobehavioral test performance at 200 ppm for 1.5 hour (Oltramare et al., 1974).

Specific target organ toxicity (STOT) - repeated exposure: Causes damage to organs through prolonged or repeated exposure - Category 1. STYRENE: Repeated dose toxicity study, oral, mouse, 2 years: NOAEL (no-observed-adverse-effect-level) = 150 mg/kg bw/day (systemic effects). Repeated dose toxicity study, inhalation, 4 weeks, male rat: NOAEC (no-observed-adverse-effect-concentration) = 500 ppm (2.13 mg/L) (ototoxicity). Long-term inhalation literature studies (human): NOAEC (color vision effects) = 50 ppm (8-hour TWA)(Seeber et al., 2009); NOAEC (ototoxicity) = 20 ppm (Triebig et al., 2009).

Aspiration hazard: Not classified (based on available data, the classification criteria are not met).

Other toxicity information: No additional information available.

SECTION 12: Ecological information

12.1. Toxicity:

No ecological testing has been conducted on this product.

Chemical Name	Species	Acute	Acute	Chronic
Styrene	Fish	LC50 4.02 mg/L (96 hours)	LC50 10 mg/L(96 hours)	N/E
Styrene	Invertebrates	EC50 4.7 mg/L (48 hours)	LC50 9.5 mg/L(96 hours)	NOEC 1.01 mg/L (21 days)
Styrene	Algae	EC50 4.9 mg/L (72 hours)	EC50 6.3 mg/L(96 hours)	EC10 0.28 mg/L(96 hours)
Styrene	Micro-organisms	EC50 500 mg/L (30 minutes)		

12.2. Persistence and degradability:

No specific information available.

Chemical Name	Biodegradation
Styrene	Readily biodegradable

12.3. Bioaccumulative potential:

No specific information available.

Chemical Name	Bioconcentration Factor (BCF)	Log Kow
Styrene	74 (calculated)	2.96 (OECD 107)

12.4. Mobility in soil:

No specific information available.

Chemical Name	Mobility in soil (Koc/Kow)
Styrene	352 (estimated)

12.5. Results of PBT and vPvB assessment:

Not Available

12.6. Other adverse effects:

No additional information available.

SECTION 13: Disposal considerations

13.1. Waste treatment methods:

Dispose of unused contents (incineration) in accordance with national and local regulations. Dispose of container in accordance with national and local regulations. Ensure the use of properly authorized waste management companies, where appropriate. After addition of excess inhibitor, dispose material in accordance with local regulations.

See Section 8 for recommendations on the use of personal protective equipment.

SECTION 14: Transport information

The information below is provided to assist in documentation. It may supplement the information on the package. The package in your possession may carry a different version of the label depending on the date of manufacture. Depending on inner packaging quantities and packaging instructions, it may be subject to specific regulatory exceptions.

14.1. UN number: UN2055

14.2. UN proper shipping name:

Styrene monomer solution, stabilized

14.3. Transport hazard class(es):

U.S. DOT hazard class: 3
Canada TDG hazard class: 3
Europe ADR/RID hazard class: 3
IMDG Code (ocean) hazard class: 3
ICAO/IATA (air) hazard class: 3

A "N/A" listing for the hazard class indicates the product is not regulated for transport by that regulation.

14.4. Packing group: III

14.5. Environmental hazards:

Marine pollutant: Not Applicable

Hazardous substance (USA): A shipment in a single package greater than 5,000 lbs. may exceed the reportable quantity (RQ) for one or more components.

14.6. Special precautions for user:

Not Applicable

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

Chemical Name	Category
Styrene	Category Y

Notes: For surface shipment within the United States, flammable liquids with a flash point of 100-141 F (38-60 C) may be

reclassified: In containers of 119 gallons capacity or less: NOT REGULATED. In containers of more than 119 gallons capacity: COMBUSTIBLE LIQUID.

SECTION 15: Regulatory information

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

Europe REACh (EC) 1907/2006: Applicable components are registered, exempt or otherwise compliant. REACh is only relevant to substances either manufactured or imported into the EU. Emerald Performance Materials has met its obligations under the REACh regulation. REACh information regarding this product is provided for informational purposes only. Each Legal Entity may have differing REACh obligations, depending on their place in the supply chain. For material manufactured outside of the EU, the importer of record must understand and meet their specific obligations under the regulation.

EU Authorizations and/or restrictions on use: Not Applicable

Other EU information: No Additional Information

National regulations: No Additional Information

Chemical inventories:

Regulation	Status
Australian Inventory of Chemical Substances (AICS):	Y
Canadian Domestic Substances List (DSL):	Y
Canadian Non-Domestic Substances List (NDSL):	N
China Inventory of Existing Chemical Substances (IECSC):	Y
European EC Inventory (EINECS, ELINCS, NLP):	Y
Japan Existing and New Chemical Substances (ENCS):	Y
Japan Industrial Safety and Health Law (ISHL):	Y
Korean Existing and Evaluated Chemical Substances (KECL):	Y
New Zealand Inventory of Chemicals (NZIoC):	Y
Philippines Inventory of Chemicals and Chemical Substances (PICCS):	N
Taiwan Inventory of Existing Chemicals:	Y
U.S. Toxic Substances Control Act (TSCA) (Active):	Y

A "Y" listing indicates all intentionally added components are either listed or are otherwise compliant with the regulation. A "N" listing indicates that for one or more components: 1) there is no listing on the public inventory (or is not on the ACTIVE inventory for U.S. TSCA); 2) no information is available; or 3) the component has not been reviewed. A "Y" for New Zealand may mean that a qualified group standard may exist for the components in this product.

15.2. Chemical safety assessment:

A chemical safety assessment has been carried out for the substance or mixture.

SECTION 16: Other information

Hazard (H) Statements in the Composition section (Section 3):

H226	Flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H361	Suspected of damaging fertility or the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H412	Harmful to aquatic life with long lasting effects.

Reason for revision: Changes in Section(s): 9, Annex

Evaulation method for classification of mixtures: Calculation method, On basis of test data

Legend:

* : Trademark owned by Emerald Performance Materials, LLC.
ACGIH: American Conference of Governmental Industrial Hygienists
EU OELV: European Union Occupational Exposure Limit Value
EU IOELV: European Union Indicative Occupational Exposure Limit Value
N/A: Not Applicable

N/E: None Established
STEL: Short Term Exposure Limit
TWA: Time Weighted Average (exposure for 8-hour workday)

Users Responsibility/Disclaimer of Liability:
The information set forth herein is based on our current knowledge, and is intended to describe the product solely with respect to health, safety and the environment. As such, it must not be interpreted as a guarantee of any specific property of the product. As a result, the customer shall be solely responsible for deciding whether said information is suitable and beneficial.

Safety Data Sheet Preparer:
Product Compliance Department
Emerald Performance Materials, LLC
1499 SE Tech Center Place, Suite 300
Vancouver, WA 98683
United States

Annex

Exposure Scenarios

Substance information:

Name of substance: Styrene.
EC# 202-851-5 / CAS# 100-42-5
REACH Registration number: 01-2119457861-32-0286

List of exposure scenarios:

ES1: Manufacturing (formulation) of UP/VE (Unsaturated polyester/Epoxy vinyl ester) resins and formulated resins
ES2: Use at industrial sites - FRP manufacturing using UP/VE resins and/or formulated resins

General remarks:

Based on the use of styrene in this product as a solvent, the only exposure scenarios listed are for the formulation (manufacturing) and industrial use of UP/VE resins and formulated resins.

EasyTRA 4.1.0 is a graphical user interface which works in compliance with ECETOC Targeted Risk Assessment (ECETOC TRA V3) and uses algorithms on the basis of the latest versions of ECHA REACH Guidance chapters R12 (as of March 2010), R14, R15 and R16 (as of October 2012) and EUSES.

The environmental exposure assessments have been obtained with EasyTRA 4.1.0, EUSES and calculations per compartment are based on the algorithms of the EU TGD 2003 Risk Assessment Spreadsheet Model 1.24a (https://www.easytra.com/).

The first tier worker exposure assessments have been performed using EasyTRA 4.1.0 (ECETOC TRA v3). When needed, a second tier worker inhalation exposure assessment has been performed using Advanced REACH Tool (ART v1.5).
Note that for all worker activities it is assumed that a good standard of occupational hygiene is implemented, which consists of the following elements:
- Minimisation of manual phases/work tasks.
- Minimisation of splashes and spills.
- Avoidance of contact with contaminated tools and objects.
- Regular cleaning of equipment and work area.
- Training staff on good practice.
- Management/supervision in place to check that RMMs in place are being used correctly and OCs followed.
- Good standard of personal hygiene.
- In case of potential exposure, use of suitable eye protection and substance/task appropriate gloves.
- Full skin coverage with appropriate light-weight barrier material.

Exposure scenario (1): Manufacturing (formulation) of UP/VE (Unsaturated polyester/Epoxy vinyl ester) resins and formulated resins

1. Exposure scenario (1)

Short title of the exposure scenario:
Manufacturing (formulation) of UP/VE (Unsaturated polyester/Epoxy vinyl ester) resins and formulated resins

List of use descriptors:
Process category (PROC): PROC1, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15
Environmental release category (ERC): ERC2

List of names of contributing worker scenarios and corresponding PROCs:

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition.
PROC4 Chemical production where opportunity for exposure arises.
PROC5 Mixing or blending in batch processes. Covers mixing or blending of solid or liquid materials in the context of manufacturing or formulating sectors, as well as upon end use.
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Transfer includes loading, filling, dumping, bagging and weighing.
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities. Transfer includes loading, filling, dumping, bagging.
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing). Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage.
PROC15 Use as laboratory reagent. Use of substances at small scale laboratory (< 1 l or 1 kg present at workplace).

Name of contributing environmental scenario and corresponding ERCs:

ERC2 Formulation into mixture.

Further explanations:

CS1: General exposures (PROC1).
CS2: Process sampling (PROC4).
CS3: Material transfers (PROC4).
CS8: Drum/batch transfers (PROC5).
CS9: Pouring from small containers (PROC5).
CS14: Bulk transfers (PROC3, PROC8b, PROC9).
CS15: General exposures (closed systems) (PROC3).
CS22: Transfer from/pouring from containers (PROC5).
CS28: Disposal of wastes (PROC8a).
CS30: Mixing operations (open systems) (PROC5).
CS36: Laboratory activities (PROC15).
CS37: Use in contained batch processes (PROC1).
CS39: Equipment cleaning and maintenance (PROC3, PROC8a).

For further information on standardized use descriptors see the European Chemical Agency (ECHA) Guidance on information requirements and chemical safety assessment, Chapter R.12: Use descriptor system (http://guidance.echa.europa.eu/docs/guidance_document/information_requirements_r12_en.pdf).

2. Conditions of use affecting exposure

2.1 Control of workers exposure

General:	Generally accepted standards of occupational hygiene are implemented and maintained. - Where appropriate, replacement of task by automated and/or closed processes. - Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. - Clear transfer lines prior to de-coupling. - Drain down and flush system prior to equipment break-in or maintenance. - In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. - Avoid inhalation and direct contact with the substance or product. - Wear gloves (tested to EN374) and suitable eye protection at all times when handling the substance or product. - Wear suitable coveralls to prevent exposure to the skin. - Wear a suitable respiratory protection with adequate effectiveness. - Provide specific employee training to prevent/minimize exposures. - Ensure good work practices are implemented. - Clear spills immediately. - Disposal - This material and its container must be disposed of in a safe manner. - Consider the need for risk based health surveillance. - In case of vapours: Handle in a fume cupboard or under extract ventilation. - Use drum pumps; carefully pour from container; put lids on containers immediately after use.
Product characteristics:	Concentration of substance: - PROC1, PROC3, PROC4, PROC5, PROC9, PROC15: Up to 50%. - PROC8a, PROC8b: Up to 100%. Physical state: liquid. Vapour pressure: 0,5-10 kPa at 20°C. Fugacity: Medium.
Amounts used:	This information is not relevant for assessment of worker's exposure.

Frequency and duration of use/exposure:	Duration: 5 days/week - PROC1, PROC3 (CS14, CS15), PROC4 (CS3), PROC5, PROC8b, PROC9, PROC15: >4-8 hours/day. - PROC3 (CS39), PROC8a (CS39): 1-4 hours/day. - PROC4 (CS2), PROC8a (CS28): 15 minutes-1 hour/day.
Human factors not influenced by risk management:	Exposed skin surface: - PROC1, PROC3, PROC15: 240 cm2 (one hand, face side only). - PROC4, PROC5, PROC9: 480 cm2 (two hands, face side only). - PROC8a, PROC8b: 960 cm2 (two hands).
Other given operational conditions affecting workers exposure:	Location: - PROC1, PROC3 (CS15, CS39), PROC4, PROC5, PROC8a, PROC9, PROC15: Indoor use. - PROC3 (CS14), PROC8b: Outdoor use. Domain: Industrial use. Assessment tool used: - PROC1, PROC3, PROC4, PROC5, PROC8a, PROC9, PROC15: EasyTRA 4.1.0 (ECETOC TRA v3) for inhalation and dermal exposure. - PROC8b: EasyTRA 4.1.0 (ECETOC TRA v3) for dermal exposures. Advanced REACH Tool (ART v1.5) for inhalation exposure.
Technical conditions and measures to control dispersion from source towards the worker:	General ventilation: - PROC3 (CS14), PROC8b: Outdoors (outdoor use). - PROC5, PROC9, PROC15: Basic general ventilation (1-3 air changes per hour): 0%. - PROC1, PROC3 (CS15, CS39), PROC4, PROC8a: Good general ventilation (3-5 air changes per hour): 30%. Containment: - PROC1: Closed system (minimal contact during routine operations). - PROC3: Closed batch process with occasional controlled exposure. - PROC4, PROC8b, PROC9: Semi-closed process with occasional controlled exposure. - PROC5, PROC8a, PROC15: No. Local exhaust ventilation: - PROC1, PROC3, PROC4, PROC8a (CS28), PROC8b: Not required. - PROC5, PROC8a (CS39), PROC9, PROC15: Yes (90% effectiveness). Occupational Health and Safety Management System: Advanced.
Conditions and measures related to personal protection, hygiene and health evaluation:	Respiratory protection: - PROC1, PROC3 (CS14, CS15), PROC4, PROC5, PROC8a (CS28), PROC8b, PROC9, PROC15: Not required. - PROC3 (CS39), PROC8a (CS39): Wear a respirator conforming to EN140 with Type A filter or better (Effectiveness Inhalation: 95%). Where appropriate, apply vessel entry procedures including use of forced supplied air. Drain down and flush system prior to equipment break-in or maintenance. Dermal protection: Wear chemical resistant gloves (tested to EN 374) - APF 5 (minimum efficiency dermal: 80%).
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	Assumes a good basic standard of occupational hygiene is implemented.
2.2 Control of environmental exposure	
General:	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance.
Product characteristics:	Physical state: liquid. Vapour pressure: 0,5-10 kPa at 20 °C
Amounts used:	Maximum daily use at a site: 45700 kg/day. Maximum annual use at a site: 228000 tons/year. Fraction of the main local source: 0,60. Percentage of tonnage used at regional scale: 10 %.
Frequency and duration of use:	Emission days: 300 days/year.
Environmental factors not influenced by risk management:	Flow rate of receiving surface water: >=400000 m3/day. Local freshwater dilution factor: 41. Local marine water dilution factor: 100.

Other given operational conditions affecting environmental exposure:	Industrial use. Release fraction to air from process: 0,002. Release fraction to wastewater from process: 0,000049. Release fraction to soil from process: 0,0.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil:	Do not apply industrial sludge to natural soils. Equipment cleaning: Equipment cleaning with minimized emissions to wastewater.
Conditions and measures related to municipal sewage treatment plant:	Municipal Sewage Treatment Plant (STP): Yes (freshwater). Size of municipal sewage system/treatment plant: >=10000 m3/day. Fraction of emissions degraded in STP: Efficiency=91,9%.
Conditions and measures related to external treatment of waste for disposal:	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste:	External recovery and recycling of waste should comply with applicable local and/or national regulations.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	Spills are cleaned immediately. All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Health

Information for contributing scenario (1): PROC4 (CS3), PROC8a (CS39), PROC8b

Assessment method: EasyTRA 4.1.0 and Advanced REACH Tool (ART v1.5). Only highest figures are presented here.

Exposure estimation:

	Route	Exposure estimate	RCR	Notes
Worker, long-term, systemic	Dermal	2,743 mg/kg bw/day	0,00676	PROC8b
Worker, long-term, systemic	Inhalation	30,377 mg/m3	0,357	PROC4 (CS3), PROC8a (CS39)
Worker, long-term, systemic	Combined routes	N/A	0,359	PROC4 (CS3), PROC8a (CS39)

Environment

Information for contributing scenario (2): ERC2

Assessment method: EasyTRA 4.1.0

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0,000643 mg/L	0,023	
Freshwater sediment	0,024949 mg/kg dw	0,023	
Marine water	0,000199 mg/L	0,014	
Marine water sediment	0,007737 mg/kg dw	0,014	
Soil	0,002059 mg/kg dw	0,0103	
STP	0,01814 mg/L	0,00363	
Man via environment-Combined routes	N/A	0,000054	

RCR=Risk characterization ratio (PEC/PNEC or Exposure estimate/DNEL); PEC=Predicted environmental concentration.

4. Guidance to the Downstream User to evaluate whether he works inside the boundaries set by the ES

Health:	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Indoor/outdoor use, PROC5, PROC8a, PROC9, PROC15: LEV used, with gloves. Respiratory protection: PROC3 (CS39), PROC8a (CS39): Wear a respirator conforming to EN140 with Type A filter or better. Concentration of substance: PROC1, PROC3, PROC4, PROC5, PROC9, PROC15: Up to 50%. PROC8a, PROC8b: Up to 100%.
Environment:	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure scenario (2): Use at industrial sites - FRP manufacturing using UP/VE resins and/or formulated resins

1. Exposure scenario (2)

Short title of the exposure scenario:

Use at industrial sites - FRP manufacturing using UP/VE resins and/or formulated resins

List of use descriptors:

Process category (PROC): PROC3, PROC5, PROC7, PROC8b, PROC10, PROC13, PROC14, PROC15.
Environmental release category (ERC): ERC6d

List of names of contributing worker scenarios and corresponding PROCs:

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition.
PROC5 Mixing or blending in batch processes. Covers mixing or blending of solid or liquid materials in the context of manufacturing or formulating sectors, as well as upon end use.
PROC7 Industrial spraying. Air dispersive techniques i.e. dispersion into air (= atomization) by e.g. pressurized air, hydraulic pressure or centrifugation, applicable for liquids and powders.
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities. Transfer includes loading, filling, dumping, bagging.
PROC10 Roller application or brushing. This includes application of paints, coatings, removers, adhesives or cleaning agents to surfaces with potential exposure arising from splashes.
PROC13 Treatment of articles by dipping and pouring.
PROC14 Tabletting, compression, extrusion, pelletisation, granulation. This covers processing of mixtures and/or substances into a defined shape for further use.
PROC15 Use as laboratory reagent. Use of substances at small scale laboratory (< 1 l or 1 kg present at workplace).

Name of contributing environmental scenario and corresponding ERCs:

ERC6d Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article).

Further explanations:

CS3: Material transfers (PROC3, PROC14).
CS4: Dipping, immersion and pouring (PROC10, PROC13).
CS5: Equipment maintenance (PROC8b).
CS8: Drum/batch transfers (PROC5).
CS9: Pouring from small containers (PROC5).
CS10: Spraying (PROC7).
CS15: General exposures (closed systems) (PROC5).
CS18: Maintenance of small items (PROC8b).
CS22: Transfer from/pouring from containers (PROC5).
CS28: Disposal of wastes (PROC8b).
CS30: Mixing operations (open systems) (PROC5).
CS32: Casting operations (PROC5).
CS34 (CS10): Spraying (manually) (PROC7).
CS36: Laboratory activities (PROC15).
CS37: Use in contained batch processes (PROC3).
CS51:Rolling, Brushing (PROC10).
CS54: Continuous process (PROC13).
CS93: Automated process with (semi) closed systems (PROC3).
CS97: Spraying (automatic/robotic) (PROC7).
CS98: Roller, spreader, flow application (PROC10).
CS100: Production or preparation or articles by tabletting, compression, extrusion or pelletisation (PROC14).
CS129: Treatment by heating (PROC14).
CS136: Batch processes at elevated temperatures (PROC14).

For further information on standardized use descriptors see the European Chemical Agency (ECHA) Guidance on information requirements and chemical safety assessment, Chapter R.12: Use descriptor system (http://guidance.echa.europa.eu/docs/guidance_document/information_requirements_r12_en.pdf).

2. Conditions of use affecting exposure

2.1 Control of workers exposure

General:	Generally accepted standards of occupational hygiene are implemented and maintained. - Where appropriate, replacement of task by automated and/or closed processes. - Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. - Clear transfer lines prior to de-coupling. - Drain down and flush system prior to equipment break-in or maintenance. - In case of potential exposure: Restrict access to authorised persons. Minimise number of staff exposed. - Avoid inhalation and direct contact with the substance or product. - Wear gloves (tested to EN374) and suitable eye protection at all times when handling the substance or product. - Wear suitable coveralls to prevent exposure to the skin. - Wear a suitable respiratory protection with adequate effectiveness. - Provide specific employee training to prevent/minimize exposures. - Ensure good work practices are implemented. - Clear spills immediately. - Disposal - This material and its container must be disposed of in a safe manner. - Consider the need for risk based health surveillance. - In case of vapours: Handle in a fume cupboard or under extract ventilation. - Use drum pumps; carefully pour from container; put lids on containers immediately after use.
Product characteristics:	Concentration of substance: - PROC5 (CS30, CS32), PROC10 (CS4), PROC14: 5-25%. - PROC3, PROC5 (CS8, CS9, CS15, CS22), PROC7, PROC8b, PROC10 (CS51, CS98), PROC13, PROC15: Up to 50%. Physical state: liquid. Vapour pressure: 0,5-10 kPa at 20°C. Fugacity: Medium.
Amounts used:	This information is not relevant for assessment of worker's exposure.
Frequency and duration of use/exposure:	Duration: 5 days/week - PROC3, PROC5, PROC7, PROC8b (CS28), PROC10, PROC13, PROC14, PROC15: >4-8 hours/day. - PROC8b (CS5, CS18): 1-4 hours/day.
Human factors not influenced by risk management:	Exposed skin surface: - PROC3, PROC15: 240 cm2 (one hand, face side only). - PROC5, PROC13, PROC14: 480 cm2 (two hands, face side only). - PROC8b, PROC10: 960 cm2 (two hands). - PROC7: 1500 cm2 (two hands and upper wrists).
Other given operational conditions affecting workers exposure:	Location: Indoor use. Domain: Industrial use. Assessment tool used: EasyTRA 4.1.0 (ECETOC TRA v3) for inhalation and dermal exposure.

Technical conditions and measures to control dispersion from source towards the worker:	General ventilation: - PROC5 (CS8, CS9, CS22, CS30, CS32), PROC8b, PROC10 (CS4), PROC13, PROC15: Basic general ventilation (1-3 air changes per hour): 0%. - PROC3: Good general ventilation (3-5 air changes per hour): 30%. - PROC5 (CS15), PROC7 (CS34 (CS10)), PROC10 (CS51, CS98), PROC14: Enhanced general ventilation (5-10 air changes per hour): 70%. - PROC7 (CS10, CS97): Carry out in a vented booth or extracted enclosure (95% effectiveness). Containment: - PROC3: Closed batch process with occasional controlled exposure. - PROC8b: Semi-closed process with occasional controlled exposure. - PROC5, PROC7, PROC10, PROC13, PROC14, PROC15: No. Local exhaust ventilation: - PROC3, PROC14, PROC15: Not required. - PROC8b (CS5, CS18): Yes (70% effectiveness). - PROC5, PROC8b (CS28), PROC10, PROC13: Yes (90% effectiveness). - PROC7 (CS10, CS97): Carry out in a vented booth or extracted enclosure (95% effectiveness). - PROC7 (CS34 (CS10)): Yes (95% effectiveness). Occupational Health and Safety Management System: Advanced.
Conditions and measures related to personal protection, hygiene and health evaluation:	Respiratory protection: - PROC3, PROC5, PROC14, PROC15: Not required. - PROC7 (CS10, CS97), PROC8b, PROC10, PROC13: Wear a respirator conforming to EN140 with Type A filter or better (Effectiveness Inhalation: 95%). - PROC7 (CS34 (CS10)): Wear a respirator conforming to EN140 with Type A1/P3 filter or better (Effectiveness Inhalation: 97,5%). Dermal protection: - PROC3, PROC5, PROC7 (CS10, CS97), PROC8b, PROC10 (CS51, CS98), PROC14, PROC15: Wear chemical resistant gloves (tested to EN 374) - APF 5 (minimum efficiency dermal: 80%). - PROC7 (CS34 (CS10)), PROC10 (CS4), PROC13: Wear chemical resistant gloves (tested to EN 374) - APF 20 (minimum efficiency dermal: 95%).
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	Assumes a good basic standard of occupational hygiene is implemented.
2.2 Control of environmental exposure	
General:	Control any potential exposure using measures such as contained or enclosed systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance.
Product characteristics:	Physical state: liquid. Vapour pressure: 0,5-10 kPa at 20 °C
Amounts used:	Maximum daily use at a site: 161000 kg/day. Maximum annual use at a site: 806000 tons/year. Fraction of the main local source: 0,60. Percentage of tonnage used at regional scale: 10 %.
Frequency and duration of use:	Emission days: 300 days/year.
Environmental factors not influenced by risk management:	Flow rate of receiving surface water: >=18,000 m3/day (default). Local freshwater dilution factor: 10 (default). Local marine water dilution factor: 100 (default).
Other given operational conditions affecting environmental exposure:	Industrial use. Release fraction to air from process: 0,00102. Release fraction to wastewater from process: 0,0000063. Release fraction to soil from process: 0.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil:	Do not apply industrial sludge to natural soils. Equipment cleaning: Equipment cleaning with minimized emissions to wastewater.
Conditions and measures related to municipal sewage treatment plant:	Municipal Sewage Treatment Plant (STP): Yes (freshwater). Size of municipal sewage system/treatment plant: >=2000 m3/day (standard town). Fraction of emissions degraded in STP: Efficiency=91,9%.

Conditions and measures related to external treatment of waste for disposal:	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste:	External recovery and recycling of waste should comply with applicable local and/or national regulations.
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply:	Spills are cleaned immediately. All risk management measures utilised must also comply with all relevant local regulations.

3. Exposure estimation and reference to its source

Health

Information for contributing scenario (1): PROC7 (CS10, CS97), PROC14

Assessment method: EasyTRA 4.1.0

Exposure estimation:

	Route	Exposure estimate	RCR	Notes
Worker, long-term, systemic	Dermal	4,286 mg/kg bw/day	0,0106	PROC7 (CS10, CS97)
Worker, long-term, systemic	Inhalation	39,056 mg/m3	0,4595	PROC14
Worker, long-term, systemic	Combined routes	N/A	0,4605	PROC14

Environment

Information for contributing scenario (2): ERC6d

Assessment method: EasyTRA 4.1.0

Exposure estimation:

Compartment	PEC	RCR	Notes
Freshwater	0,004307 mg/L	0,154	
Freshwater sediment	0.167096 mg/kg dw	0,154	
Marine water	0,000429 mg/L	0,0306	
Marine water sediment	0,016633 mg/kg dw	0,0306	
Soil	0,043737 mg/kg dw	0,219	
STP	0,041079 mg/L	0,00822	
Man via environment-Combined routes	N/A	0,000054	

RCR=Risk characterization ratio (PEC/PNEC or Exposure estimate/DNEL); PEC=Predicted environmental concentration.

4. Guidance to the Downstream User to evaluate whether he works inside the boundaries set by the ES

Health:	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Indoor use, PROC5, PROC7, PROC8b, PROC10, PROC13: LEV used, with gloves. Respiratory protection: PROC7, PROC8b, PROC10, PROC13: Wear a respirator conforming to EN140 with Type A filter or better. Concentration of substance: PROC5 (CS30, CS32), PROC10 (CS4), PROC14: 5-25%. PROC3, PROC5 (CS8, CS9, CS15, CS22, CS30), PROC7, PROC8b, PROC10 (CS51, CS98), PROC13, PROC15: Up to 50%.
Environment:	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.