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

1.1. Product identifier

Chemical description : Ferric chloride solution (40%).
Type of product : Mixture.
Reach registration number : 01-2119497998-05

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

Identified use(s) : See table on the front page of the annex.

* Use(s) advised against : This product is not recommended for any industrial, professional or consumer use other than identified in table on the front page of the annex.
Not for use in ornamental articles, in tricks and jokes and in games (in accordance with Annex XVII to Regulation (EC) No 1907/2006) (3. Liquid substances or mixtures, which are fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: (a) hazard classes 2.1 to 2.4, 2.6 and 2.7, 2.8 types A and B, 2.9, 2.10, 2.12, 2.13 categories 1 and 2, 2.14 categories 1 and 2, 2.15 types A to F, (b) hazard classes 3.1 to 3.6, 3.7 adverse effects on sexual function and fertility or on development, 3.8 effects other than narcotic effects, 3.9 and 3.10, (c) hazard class 4.1, (d) hazard class 5.1).

1.3. Details of the supplier of the safety data sheet

Company identification : BRENNTAG N.V. - Nijverheidslaan 38 - BE-8540 DEERLIJK
TEL: +32(0)56/77.69.44 - FAX: +32(0)56/77/57/11
E-MAIL: info@brenntag.be - Website: www.brenntag.be

BRENNTAG Nederland B.V. - Donker Duyvisweg 44 - NL-3316 BM DORDRECHT
TEL: +31(0)78/65.44.944 - FAX: +31(0)78/65.44.919
E-MAIL: info@brenntag.nl - Website: www.brenntag.nl

1.4. Emergency telephone number

Emergency phone number : Belgium : Antipoison Center - Brussels
TEL: +32(0)70/245.245

The Netherlands : National Poisoning Information Center - Bilthoven
TEL: +31(0)30/274.88.88 (Only for the purpose of informing medical personnel in cases of acute intoxications)

SECTION 2. Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

Corrosive to metals - Category 1 - Warning (Met. Corr. 1; H290)
Acute toxicity, oral - Category 4 - Warning (Acute Tox. 4, oral; H302)
Skin irritation - Category 2 - Warning (Skin Irrit. 2; H315)
Serious eye damage - Category 1 - Danger (Eye Dam. 1; H318)

2.2. Label elements

Label in accordance with Regulation (EC) No 1272/2008

• Dangerous ingredient(s) : Ferric chloride
• Hazard pictogram(s)

• Signal word : Danger
• Hazard statements : H290 - May be corrosive to metals. H302 - Harmful if swallowed. H315 - Causes skin irritation. H318 - Causes serious eye damage.

SECTION 2. Hazards identification (continued)

* • Precautionary statements

- Prevention : P280 - Wear protective gloves/eye protection/face protection.
- Response : P301+P312 - IF SWALLOWED: Call a POISON CENTER/doctor/… if you feel unwell. P302+P352 - IF ON SKIN : Wash with plenty of soap and water. P305+ P351+P338+P310 - IF IN EYES : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor.
- Disposal considerations : P501 - Dispose of this material and its container to hazardous or special waste collection point.

2.3. Other hazards

Physical/chemical hazards : When contact with metals corrosion may occur and generate extremely flammable hydrogen gas.
The substance decomposes by heating or burning in formation of toxic and corrosive vapours.

Hazards for the health : A health dangerous concentration in the air will not or very slowly be reached by evaporation of this substance at app. 20°C; by spraying much faster.

Hazards for the environment : Product causes a strong drop of the pH-value of water and soil.
This product is no substance or contains no PBT or vPvB (in accordance with Annex XIII).

Hazards for the safety : No significant danger.

SECTION 3. Composition/information on ingredients

3.2. Mixtures

HARMFUL COMPONENT(S)

	Name component(s)		Weight %	CAS nr	EINECS nr	Index nr	Reach nr	CLASSIFICATION
	Ferric chloride	:	39 -41 %	7705-08-0	231-729-4	-----	01-2119497998-05	Acute Tox. 4 (oral); H302 Skin Irrit. 2; H315 Eye Dam. 1; H318
*	Hydrochloric acid ...%	:	1 -2 %	7647-01-0	231-595-7	017-002-01-X	01-2119484862-27	Met. Corr. 1; H290 Skin Corr. 1A; H314 STOT SE 3; H335

* Note B (Regulation (EC) No 1272/2008) applies to the product or one or more of its components.

Note: SCL applicable (Hydrochloric acid ...%)

The full text of the (EU)H-statements is in section 16.

SECTION 4. First aid measures

4.1. Description of first aid measures

General : CALL A PHYSICIAN IN ALL CIRCUMSTANCES.
Never give anything by mouth to an unconscious person.

First Aid Measures

- Inhalation : Remove victim into fresh air.
Allow the affected person to rest in semi-sitting position.
If not breathing, give artificial respiration.
Consult a doctor.

* - Skin Contact : Remove contaminated clothing.
Rinse skin immediately with mild soap and plenty of water. (shower if necessary).
Consult doctor if irritation develops.

SECTION 4. First aid measures (continued)

* - Eye Contact : Rinse immediately thoroughly and long (at least 15 min.) with plenty of water.
Remove contact lenses.
Immediately call a POISON CENTER or doctor/physician.
Keep rinsing or dripping the eye during transport.

- Ingestion : DO NOT INDUCE VOMITING. Rinse mouth with water.
Call a POISON CENTER or doctor/physician if you feel unwell.

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

See section 11.

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

For specialist advice doctors should contact the NVIC or the Belgian Poison center.

SECTION 5. Firefighting measures

5.1. Extinguishing media

Extinguishing Media

- Suitable : Extinguishing powder , Foam , Carbon dioxide (CO2) , Water spray .
- Insuitable : Heavy water stream .

5.2. Special hazards arising from the substance or mixture

Special Exposure Hazards : Fire may liberate toxic and stinging vapours. (E.g. Chlorine , Hydrogen chloride).

5.3. Advice for firefighters

Special Protective Equipment for Firefighters : Use self-contained breathing apparatus and wear protective clothes when in close proximity to fire.

Special Procedures : Apply water spray or fog to cool nearby equipment. Avoid fire-fighting water to enter environment.

SECTION 6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal Precautions : Evacuate all personnel immediately and ventilate area.
Avoid breathing vapour and contact with skin, eyes and clothing. Wear recommended personal protective equipment. (See section 8)

6.2. Environmental precautions

Environmental Precautions : Shut off leaks if without risks.
Dike in the spilled product as much as possible with inert material.
Prevent entry of product in public water, sewers or soil.
Notify authorities if product enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

Methods for Cleaning Up : Collect the spillage in closable, suitable disposal containers.
Clean up any spills as soon as possible, using an inert absorbent material.
Dilute spilled liquid immediately with plenty of water and neutralise with base.

6.4. Reference to other sections

For personal protection, see section 8.
For the removal of the waste product, see section 13.

SECTION 7. Handling and storage

7.1. Precautions for safe handling

Handling : STRONG HYGIENE ! AVOID FOG TRANSFORMATION !
Avoid breathing vapour and contact with skin, eyes and clothing. Wear recommended personal protective equipment. (See section 8)
Avoid heating, splashing and formation of vapour when emptying, pouring, diluting or dissolving the product.
When using, do not eat, drink or smoke.
Emergency eye wash fountains and showers should be available in the immediate vicinity of any potential exposure.

7.2. Conditions for safe storage, including any incompatibilities

Storage : Keep only in the original, safely locked container in a well ventilated, cool and dark place.
All dangerous products should be placed on a drip tray or should be barreled.
Keep away from : Bases , Light metals , Halogenated hydrocarbons .

Packaging Material : Polyethylene , Polypropylene , PVC , Polyester , Glass .

Insuitable Packaging Material : Light metals (Aluminium , Copper , Iron , Tin , Nickel).

7.3. Specific end use(s)

For identified uses, see subsection 1.2 and/or exposure scenarios.

SECTION 8. Exposure controls/personal protection

8.1. Control parameters

Occupational Exposure Limits : For harmful components :
Ferric chloride : Limit value (BE) : 1 mg Fe/m³ (2014)
Hydrochloric acid ...% : Limit value (BE) : 5 ppm (8 mg/m³) (2014)
Hydrochloric acid ...% : Short time value (BE) : 10 ppm (15 mg/m³) (2014)
Hydrochloric acid ...% : Limit value (TWA 8 h) (NL) : 5 ppm (8 mg/m³) (2007)
Hydrochloric acid ...% : Limit value (TWA 15 min) (NL) : 10 ppm (15 mg/m³) (2007)

* Biological limit values : For harmful components :
• Hydrochloric acid ...% : Biological limit values : They will be included when available.

DNELs : For harmful components :
• Ferric chloride : Worker, acute - systemic effects, inhalation : 5,9 mg/m³
• Ferric chloride : Worker, acute - systemic effects, dermal : 1,7 mg/kg bw/day
• Ferric chloride : Worker, long-term - systemic effects, inhalation : 5,9 mg/m³
• Ferric chloride : Worker, long-term - systemic effects, dermal : 1,7 mg/kg bw/day
• Ferric chloride : Consumer, acute - systemic effects, inhalation : 0,5 mg/m³
• Ferric chloride : Consumer, acute - systemic effects, dermal : 0,29 mg/kg bw/day
• Ferric chloride : Consumer, acute - systemic effects, oral : 0,29 mg/kg bw/day
• Ferric chloride : Consumer, long-term - systemic effects, inhalation : 0,5 mg/m³
• Ferric chloride : Consumer, long-term - systemic effects, dermal : 0,29 mg/kg bw/day
• Ferric chloride : Consumer, long-term - systemic effects, oral : 0,29 mg/kg bw/day
• Hydrochloric acid ...% : Worker, acute - local effects, inhalation : 15 mg/m³
• Hydrochloric acid ...% : Worker, long-term - local effects, inhalation : 8 mg/m³

PNECs : For harmful components :
• Ferric chloride : Fresh water sediment : 49500 mg/kg
• Ferric chloride : Marine water sediment : 8 mg/m³
• Ferric chloride : Soil : 55000 mg/kg
• Ferric chloride : Sewage treatment plant : 1455 mg/l
• Hydrochloric acid ...% : Fresh water sediment : Not relevant.
• Hydrochloric acid ...% : Marine water sediment : Not relevant.
• Hydrochloric acid ...% : Fresh water : 0,036 mg/l
• Hydrochloric acid ...% : Marine water : 0,036 mg/l

SECTION 8. Exposure controls/personal protection (continued)

- Hydrochloric acid ...% : Soil : 0,036 mg/l
- Hydrochloric acid ...% : Intermittent release : 0,045 mg/l
- Hydrochloric acid ...% : Sewage treatment plant : 0,036 mg/l

8.2. Exposure controls

Engineering Measures	: Ventilation , Local exhaust .
Personal Protection Equipment	
- Respiratory protection	: CE-approved mask for acid gases and vapours (type E, yellow).
- Skin protection	: Corrosion-proof protective clothing.
- Hand protection	: Suitable material for safety gloves (EN 374): As the product is a mixture of several substances, the durability of the glove materials can't be calculated in advance and has to be tested before use. - material : Nitril rubber - thickness : 0,7 mm - breakthrough time > 480' - material :
- Eye/Face protection	: Closed safety glasses or face shield.
Environmental exposure controls	: See sections 6, 7, 12 and 13.

SECTION 9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

	Physical State (20°C)	: Liquid .
	Form/Colour	: Dark brown .
	Odour	: Pungent odour .
	Odour threshold	: No data available.
*	pH value	: app. 1
	Melting/Freezing point	: -50 °C
	Boiling Point/Range (1013 hPa)	: 100 - 105 °C
	Flash point	: Not applicable.
	Evaporation rate	: No data available.
	Explosion limits in air	: Not applicable.
	Vapour pressure	: No data available.
*	Relative vapour density (air=1)	: No data available.
*	Relative density of saturated vapour/air mixture (air=1)	: No data available.
	Relative density	: 1,4
	Density (20°C)	: 1,41 - 1,45 kg/l (40% sol.)
	Solubility in water	: Complete solubility
	Log P Octanol/Water (20°C)	: -4
	Auto-ignition temperature	: No data available.
	Minimum ignition energy	: Not applicable.
	Decomposition temperature	: 315 °C
	Viscosity (20°C)	: 5 - 20 mPas (Dynamic)
	Explosive properties	: No chemical groups associated with explosive properties .
	Oxidizing properties	: No chemical groups associated with oxidizing properties .

SECTION 10. Stability and reactivity

10.1. Reactivity

Reactivity : Reacts violently with lyes.

10.2. Chemical stability

Stability : Stable at normal circumstances .

10.3. Possibility of hazardous reactions

Hazardous reactions : Contact with metallic substances may release inflammable hydrogen gas. Creation of: Hydrochloric acid).

10.4. Conditions to avoid

Conditions to avoid : High temperatures , Freezing .

10.5. Incompatible materials

Materials to avoid : Bases , Light metals , Halogenated hydrocarbons , Metals .

10.6. Hazardous decomposition products

Hazardous Decomposition Products : Chlorine , Hydrogen chloride , Hydrogen gas .

SECTION 11. Toxicological information

11.1. Information on toxicological effects

Acute toxicity

- Inhalation : Symptoms include: Sore throat , Cough .
  For harmful components :
  • Ferric chloride : LC50 (Rat, inhalation, 4 h) : No data available.
  • Hydrochloric acid ...% : LC50 (Rat, inhalation, 30') : 8,3 mg/l (Dust and fog)
- Skin contact : Symptoms include: Redness , Pain , Burns .
  For harmful components :
  • Ferric chloride : LD50 (Rat, dermal) : >2000 mg/kg (OECD Guideline 402)
  • Hydrochloric acid ...% : LD50 (Rabbit, dermal) : No data available.
- Ingestion : Harmful if swallowed.
  Symptoms include: Abdominal pain , Nausea , Vomiting , Diarrhea , Unconsciousness .
  For harmful components :
  • Ferric chloride : LD50 (Rat, oral) : 450-900 mg/kg
  • Hydrochloric acid ...% : LD50 (Rat, oral) : No data available.

Skin corrosion/irritation : Causes skin irritation.

Serious eye damage/irritation : Causes serious eye damage.

Aspiration hazard : Not considered hazardous.

Respiratory or skin sensitisation : Not sensitive .

Carcinogenicity : Not listed as carcinogenic .

Mutagenicity : Not listed as mutagenic .

Reproductive toxicity : Not listed for reproductive toxicity .

Specific target organ toxicity - single exposure : To human : Listed not for organ toxicity .
For animals : No effects known.

Specific target organ toxicity - repeated exposure : To human : Listed not for organ toxicity .
For animals : Product may affect liver, resulting in organ abnormalities.

SECTION 12. Ecological information

12.1. Toxicity

SECTION 12. Ecological information (continued)

Ecotoxicity : For harmful components :
- Ferric chloride : LC50 (Fish, 96 h) : 20,3-59 mg/l (Lepomis macrochirus)
- Ferric chloride : EC50 (Algae, 72 h) : 6,9 mg/l (Pseudokirchneriella subcapitata)
- Ferric chloride : EC50 (Daphnia magna, 48 h) : 9,6-27,9 mg/l
- Ferric chloride : NOEC (Algae, 72 h) : 2,4 mg/l (Pseudokirchneriella subcapitata) (OECD Guideline 201)
- Ferric chloride : NOEC (Daphnia magna, 21 d) : 0,74 mg/l
- Hydrochloric acid ...% : LC50 (Fish, 96 h) : 20,5 mg/l (pH 3,25-3,5) (Lepomis macrochirus)
- Hydrochloric acid ...% : EC50 (Algae, 72 h) : 0,73 mg/l (pH 4,7) (Chlorella vulgaris) (OECD Guideline 201)
- Hydrochloric acid ...% : EC50 (Daphnia magna, 48 h) : 0,45 mg/l (pH 4,9) (OECD Guideline 202)

12.2. Persistence and degradability

Persistence and degradability : For harmful components :
- Ferric chloride : Persistence and degradability : Inorganic .
- Hydrochloric acid ...% : Persistence and degradability : Inorganic .

12.3. Bioaccumulative potential

Bioaccumulation : For harmful components :
- Ferric chloride : Bioaccumulation : Not applicable.
- Hydrochloric acid ...% : Bioaccumulation : Bioaccumulation not expected .

12.4. Mobility in soil

Mobility : For harmful components :
- Ferric chloride : Mobility : No data available.
- Hydrochloric acid ...% : Mobility : Adsorption to solid soil phase is not expected.

12.5. Results of PBT and vPvB assessment

Evaluation : For harmful components :
- Ferric chloride : PBT/vPvB : No
- Hydrochloric acid ...% : PBT/vPvB : No

12.6. Other adverse effects

Photochemical ozone creation potential : No data available.

Ozone depletion potential : No data available.

Endocrine disrupting potential : No data available.

Global warming potential : No data available.

SECTION 13. Disposal considerations

13.1. Waste treatment methods

Waste from residues/Unused products : The product has to be destroyed according to national or local legislation, by a company specialised in handling hazardous waste products.

European list of waste products : XXXXXX - European waste product code. This code is assigned on the basis of the most current applications and can not be representative for pollutions which are arisen at the effective use of the product. The producer of the waste has to evaluate its process himself and has to grant the appropriate waste coding. See Decision 2001/118/EC.

Removal contaminated packaging : Packing is to be used exclusively for the packing of this product.
After use, empty and close the packing very carefully.
In case of returned packing, the empty packing can be offered back to the supplier.

SECTION 14. Transport information

14.1. UN number

UN Number : 2582

14.2. UN proper shipping name

ADR/RID Name : UN 2582 Ferric chloride solution, 8, III, (E)
ADN Name : UN 2582 Ferric chloride solution , 8, III
IMDG Name : UN 2582 Ferric chloride solution, 8, III
IATA Name : UN 2582 Ferric chloride solution , 8, III

14.3. Transport hazard classe(s)

Class : 8

14.4. Packing group

* Packaging Group : III

14.5. Environmental hazards

Environmentally hazard : No
Marine pollutant : No

14.6. Special precautions for user

Danger number : 80
Hazard Label(s) : 8
EmS-N° : F-A , S-B

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

Type ship : No data available.
Pollution category : No data available.

SECTION 15. Regulatory information

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

NFPA n° : 3-0-0
Relevant EU Rule(s) : Directive 98/24/EC of the Council of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work
Decision 2001/118/EC of the Commission of 16 January 2001 amending Decision 2000/532/EC as regards the list of wastes
Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006
Regulation (EU) No 453/2010 of 20 May 2010 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (Reach)

National regulations
- Germany : WGK : 1
* - Netherlands : Water damaging : B
Decontamination exertion : 3

15.2. Chemical Safety Assessment

A chemical safety assessment has been carried out for the components that make up this material.

SECTION 16. Other information

* This safety data sheet has been drawn up in accordance with Regulation (EC) No 1907/2006 and the corresponding current changes.
This safety data sheet is exclusively made for industrial/professional use.

* Has changed compared to previous revision.

* Changes : General revision .

* Sources of used key data : The information contained herein is based on the present state of our knowledge (Producer(s))
See also on the webaddress:
http://apps.echa.europa.eu/registered/registered-sub.aspx#search

(EU)H-statement(s) : H290 - May be corrosive to metals.
H302 - Harmful if swallowed.
H315 - Causes skin irritation.
H318 - Causes serious eye damage.

* Classification procedure : Met. Corr. 1; H290 - Based on test data (producer of component)
Acute Tox. 4, oral; H302 - Calculation method
Skin Irrit. 2; H315 - Additivity method
Eye Dam. 1; H318 - Additivity method

* List of abbrevations and acronyms : Acute Tox. 4, oral : Acute toxicity, oral - Category 4
ADN (Accord européen relatif au transport international des marchandises Dangereuses par voie de Navigation interieur) : European agreement concerning the international carriage of dangerous goods by inland waterways
ADR (Accord européen relatif au transport international des marchandises Dangereuses par Route) : European agreement concerning the international carriage of dangerous goods by road
CO : Carbon monoxide
DNEL (Derived No Effect Level) : an estimated safe exposure level
EC50 : median Effective Concentration
EmS (Emergency Schedule) : the first code refers to the relevant fire schedule and the second code refers to the relevant spillage schedule
Eye Dam. 1 : Serious eye damage - Category 1
IATA (International Air Transport Association) : provisions concerning the international carriage of dangerous goods by air
IMDG (International Maritime Dangerous Goods code)
LC50 : median Lethal Concentration
LD50 : median Lethal Dose
M-Factor : a multiplying factor that is applied to the concentration of a substance classified as hazardous to the aquatic environment (Aquatic Acute 1; H400 or Aquatic Chronic 1; H410) and is used to derive by the summation method the classification of a mixture in which the substance is present
Met. Corr. 1 : Corrosive to metals - Category 1
NFPA (National Fire Protection Association) or fire diamant
NOEC (No Observed Effect Concentration)
NVIC : National Poisoning Information Center
OECD : Organisation for Economic Cooperation and Development
PBT : persistent, bioaccumulative and toxic
PNEC (Predicted No Effect Concentration) : concentration below which exposure to a substance is not expected to cause adverse effects
PVC : Polyvinyl chloride
RCP (Reciproke Calculation Procedure)
REACH : Registration, Evaluation, Authorisation and restriction of Chemicals
RID (Règlement concernant le transport International ferroviaire des marchandises Dangereuses) : Regulation concerning the International carriage of Dangerous goods by rail
SCL (Specific Concentration Limits)
Skin Irrit. 2 : Skin irritation - Category 2
TWA (Time-Weighted Average) : the average exposure over a specified period

SECTION 16. Other information (continued)

WGK (Wassergefahrdungsklasse) : a German classification of substances that indicate the environmental hazard for surface water
vPvB : very persistent and very bioaccumulative

This information is to our knowledge correct and complete on the date of issue of this safety data sheet. The information only concerns the product and does not give any guarantee for the quality and the completeness of the properties of the product, or in case of mixing or using in any other process. It remains the responsibility of the user to assure himself that the information is suitable and complete concerning the special use he makes of the product.
BRENNTAG denies all responsibility for loss or damage resulting from the use of these data.

End of document

No.	Short title	Main User Group (SU)	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Article Category (AC)	Specified
1	Manufacture of substance	3	NA	NA	1, 2, 3, 8b	1	NA	ES950
2	Formulation & (re)packing of substances and mixtures	3	NA	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15	2, 5	NA	ES952
3	Use in adhesives and sealants	21	NA	1	NA	8c, 8f	4, 7, 8, 11, 13	ES978
4	Use in agrochemicals	22	NA	NA	1, 2, 8a, 8b, 11, 13	8a, 8d	NA	ES970
5	Use in agrochemicals	21	NA	12, 27	NA	8a, 8d	NA	ES976
6	Use in laboratories	3	NA	NA	15	4	NA	ES1500
7	Use in laboratories	22	NA	NA	15	8a	NA	ES969
8	Use in process water treatment	3	NA	NA	2, 5, 8a, 8b	4	NA	ES954
9	Use in sewage water treatment	3	NA	NA	2, 5, 8a, 8b	5	NA	ES956
10	Use in process water treatment	22	NA	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 15	8c, 8f	NA	ES7412
11	Use in gas treatment	3	NA	NA	2, 8a, 8b	2, 4, 6b	NA	ES958
12	Use as processing aid	3	NA	NA	2, 3, 4, 8b, 9, 15, 22, 26	4, 5, 6a, 6b	NA	ES960
13	Use in metal surface treatment.	3	NA	NA	5, 7, 8a, 8b, 13	2, 6b	NA	ES962
14	Use in metal surface treatment.	21	NA	14	NA	8a, 8d	NA	ES974
15	Use in adhesives and sealants	3	NA	NA	5, 7, 8a, 8b, 9, 10, 12, 13, 14	5	NA	ES966
16	Use in adhesives and sealants	22	NA	NA	8a, 8b, 9, 10, 11, 13, 19	8c, 8f	NA	ES972

1. Short title of Exposure Scenario 1: Manufacture of substance		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	
Environmental Release Categories	ERC1: Manufacture of substances	
2.1 Contributing scenario controlling environmental exposure for: ERC1		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
Amount used	Annual amount per site	145000 ton(s)/year
	Daily amount per site	483,333 tonnes
Frequency and duration of use	Continuous exposure	300 days/year
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	0,0015 %
	Emission or Release Factor: Soil	0 %
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Given the highly controlled conditions used in the manufacture of the substance to prevent the release of gases, it can be assumed that the release in any form to air is effectively zero
	Water	Wastewater release into municipal STP.
	Soil	Soil emission controls are not applicable as there is no direct release to soil.
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	10.000 m3/d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Disposal methods	Can be landfilled or incinerated, when in compliance with local regulations.

	Air emission controls are not applicable as there is no direct release to air.	
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
	Physical Form (at time of use)	liquid
	Vapour pressure	< 0,0001 hPa
	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours (unless stated differently).	
Human factors not influenced by risk management	Exposed skin areas	Palm of one hand (240cm2) (PROC1, PROC3)
	Exposed skin areas	Palms of both hands (480 cm2) (PROC2)
	Breathing volume	10 m3/day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use.	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures(PROC1, PROC2, PROC3)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Wear suitable protective clothing.(PROC1, PROC2, PROC3)	
	Wear chemically resistant gloves. (Efficiency: 90 %)(PROC1, PROC2, PROC3)	
2.3 Contributing scenario controlling worker exposure for: PROC8b		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours (unless stated differently).	
Human factors not influenced by risk management	Exposed skin areas	Palms of both hands (480 cm2) (PROC8b)
	Breathing volume	10 m3/day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use.	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)	
Organisational measures to prevent /limit releases, dispersion	Provide basic employee training to prevent/minimize exposures	

and exposure	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Wear suitable protective clothing. Wear chemically resistant gloves. (Efficiency: 90 %)

3. Exposure estimation and reference to its source

Environment

Used EUSES model.

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC1	---	Water	PEC	< 0,0001mg/L	< 0,0001
ERC1	---	Soil	PEC	53g/kg	0,9636
ERC1	---	Fresh water sediment	PEC	45g/kg	0,9091

Workers

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2, PROC3	worst-case	Worker - inhalative, long-term - systemic	1,8mg/m³	0,39
PROC1, PROC2, PROC3	worst-case	Worker - dermal, long-term - systemic	0,14mg/kg bw/day	0,11
PROC8b	worst-case	Worker - inhalative, long-term - systemic	1,8mg/m³	0,39
PROC8b	worst-case	Worker - dermal, long-term - systemic	0,14mg/kg bw/day	0,11

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

The environmental emission has been evaluated using EUSES 2.1 (http://ecb.jrc.ec.europa.eu/euses), in which default values have been used, unless otherwise indicated.
For scaling see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Ensure that good work practices are implemented

1. Short title of Exposure Scenario 2: Formulation & (re)packing of substances and mixtures	
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelettisation PROC15: Use as laboratory reagent
Environmental Release Categories	ERC2: Formulation of preparations ERC5: Industrial use resulting in inclusion into or onto a matrix

2.1 Contributing scenario controlling environmental exposure for: ERC2, ERC5		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
Amount used	Annual amount per site	50 ton(s)/year
	Daily amount per site	166,67 kg
Frequency and duration of use	Continuous exposure	300 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	2 %
	Emission or Release Factor: Soil	0 %
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Wastewater release into municipal STP.

Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
	Sludge Treatment	Disposal or recovery, Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Disposal methods	Can be landfilled or incinerated, when in compliance with local regulations.
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
	Physical Form (at time of use)	liquid
	Vapour pressure	< 0,0001 hPa
	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours (unless stated differently).	
Human factors not influenced by risk management	Exposed skin areas	Palm of one hand (240cm2) (PROC1, PROC3)
	Exposed skin areas	Palms of both hands (480 cm2) (PROC2)
	Breathing volume	10 m3/day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use.	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures(PROC1, PROC2, PROC3)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Wear suitable protective clothing.(PROC1, PROC2, PROC3)	
	Wear chemically resistant gloves. (Efficiency: 90 %)(PROC1, PROC2, PROC3)	
2.3 Contributing scenario controlling worker exposure for: PROC4, PROC5, PROC9, PROC14, PROC15		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
	Physical Form (at time of use)	liquid
	Vapour pressure	< 0,0001 hPa

Amount used	Amount per Day	420 kg
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours (unless stated differently).	
Human factors not influenced by risk management	Exposed skin areas	Palms of both hands (480 cm2) (PROC4, PROC5, PROC9, PROC14)
	Exposed skin areas	Palm of one Hand 240 cm² (PROC15)
Other operational conditions affecting workers exposure	Indoor use.	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures(PROC4, PROC5, PROC9, PROC14, PROC15)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Wear suitable protective clothing.(PROC4, PROC5, PROC9, PROC14, PROC15)	
	Wear chemically resistant gloves. (Efficiency: 90 %)(PROC4, PROC5, PROC9, PROC14, PROC15)	
2.4 Contributing scenario controlling worker exposure for: PROC8a, PROC8b		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
	Physical Form (at time of use)	solid
Amount used	Amount per Day	166,67 kg
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours (unless stated differently).	
Human factors not influenced by risk management	Exposed skin areas	Palms of both hands (480 cm2) (PROC8b)
	Exposed skin areas	Two hands 960 cm² (PROC8a)
	Breathing volume	10 m3/day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use.	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)(PROC8a, PROC8b)	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures(PROC8a, PROC8b)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Wear suitable protective clothing.(PROC8a, PROC8b)	
	Wear chemically resistant gloves. (Efficiency: 90 %)(PROC8a, PROC8b)	

3. Exposure estimation and reference to its source

Environment

Used EUSES model.

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC2, ERC5	---	Water	PEC	< 0,0001mg/L	< 0,0001
ERC2, ERC5	---	Soil	PEC	50,1g/kg	0,9109
ERC2, ERC5	---	Fresh water sediment	PEC	45g/kg	0,9091

Workers

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2, PROC3	worst-case	Worker - inhalative, long-term - systemic	1,8mg/m³	0,39
PROC1, PROC2, PROC3	worst-case	Worker - dermal, long-term - systemic	0,7mg/kg bw/day	0,54
PROC4, PROC5, PROC9, PROC14, PROC15	worst-case	Worker - inhalative, long-term - systemic	1,8mg/m³	0,39
PROC4, PROC5, PROC9, PROC14, PROC15	worst-case	Worker - dermal, long-term - systemic	0,7mg/kg bw/day	0,54
PROC8a, PROC8b	worst-case	Worker - inhalative, long-term - systemic	1,8mg/m³	0,39
PROC8a, PROC8b	worst-case	Worker - dermal, long-term - systemic	0,7mg/kg bw/day	0,54

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

The environmental emission has been evaluated using EUSES 2.1 (http://ecb.jrc.ec.europa.eu/euses), in which default values have been used, unless otherwise indicated.
For scaling see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Ensure that good work practices are implemented

1. Short title of Exposure Scenario 3: Use in adhesives and sealants		
Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)	
Chemical product category	PC1: Adhesives, sealants	
Article categories	AC4: Stone, plaster, cement, glass and ceramic articles AC7: Metal articles AC8: Paper articles AC11: Wood articles AC13: Plastic articles	
Environmental Release Categories	ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix	
2.1 Contributing scenario controlling environmental exposure for: ERC8c, ERC8f		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 50%
Amount used	Annually total	900 tonnes
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	0,02 %
	Emission or Release Factor: Soil	0 %
2.2 Contributing scenario controlling consumer exposure for: PC1		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 50%
	Physical Form (at time of use)	liquid
	Vapour pressure	< 0,0001 hPa
Frequency and duration of use	Frequency of use	365 days/year
Other given operational conditions affecting consumers exposure	Indoor use.	
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Consumer Measures	Avoid contact with skin.
3. Exposure estimation and reference to its source		

Environment

Used EUSES model.

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8c, ERC8f	---	Fresh water sediment	PEC	45g/kg	0,9091
ERC8c, ERC8f	---	Water	PEC	< 0,0001mg/L	< 0,0001

Consumers

ConsExpo 4.1

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PC1	---	Consumer - dermal, long-term - systemic	0,0008mg/kg bw/day	0,001

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

The environmental emission has been evaluated using EUSES 2.1 (http://ecb.jrc.ec.europa.eu/euses), in which default values have been used, unless otherwise indicated.
For scaling see: http://www.rivm.nl/en/healthanddisease/productsafety/ConsExpo.jsp
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

1. Short title of Exposure Scenario 4: Use in agrochemicals		
Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)	
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC11: Non industrial spraying PROC13: Treatment of articles by dipping and pouring	
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems	
2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8d		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
Amount used	Annual amount per site	24 ton(s)/year
	Daily amount per site	200 kg
Frequency and duration of use	Continuous exposure	120 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
Other given operational conditions affecting environmental exposure	Number of emission days per year	120
	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	5 %
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Wastewater release into municipal STP.
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture

Conditions and measures related to external treatment of waste for disposal	Disposal methods	Can be landfilled or incinerated, when in compliance with local regulations.
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC8a, PROC8b		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
	Physical Form (at time of use)	liquid
	Vapour pressure	< 0,0001 hPa
	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	120 days/year
	Covers daily exposures up to 8 hours (unless stated differently).	
Human factors not influenced by risk management	Exposed skin areas	Palm of one hand (240cm2) (PROC1)
	Exposed skin areas	Palms of both hands (480 cm2) (PROC2, PROC8b)
	Exposed skin areas	Two hands 960 cm² (PROC8a)
	Breathing volume	10 m3/day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use.	
Technical conditions and measures to control dispersion from source towards the worker	Ensure that a mechanical ventilation is in place(PROC2, PROC8a, PROC8b)	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves. (Efficiency: 90 %)(PROC1, PROC2, PROC8a, PROC8b)	
	Wear a respirator conforming to EN140 with Type A/P2 filter or better. (Efficiency: 90 %)(PROC2, PROC8a, PROC8b)	
	Use suitable eye protection. Wear suitable protective clothing.(PROC1, PROC2, PROC8a, PROC8b)	
2.3 Contributing scenario controlling worker exposure for: PROC11, PROC13		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
	Physical Form (at time of use)	liquid
	Vapour pressure	< 0,0001 hPa
Frequency and duration of use	Frequency of use	120 days/year(PROC13)
	Covers daily exposures up to 8 hours (unless stated differently).(PROC13)	
	Frequency of use	3 days/week(PROC11)
Human factors not influenced by risk management	Exposed skin areas	Hands and forearms. 1500 cm² (PROC11)
	Exposed skin areas	Palms of both hands (480 cm2) (PROC13)

	Breathing volume	10 m3/day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use.	
Technical conditions and measures to control dispersion from source towards the worker	Carry out in a vented booth or extracted enclosure. Provide local exhaust ventilation (LEV). Avoid carrying out operation for more than 4 hours.(Indoor PROC11)	
	Ensure containment of the emission source(Outdoor PROC11)	
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day.(PROC11, PROC13)	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves. (Efficiency: 90 %)(PROC11, PROC13)	
	Use suitable eye protection. Wear suitable protective clothing.(PROC11, PROC13)	
	If no LEV or vented laminar spray booth available. Wear a full face respirator TM3 conforming to EN147 with type A filter or better (Efficiency: 95 %)(Indoor PROC11)	
	or Wear a full face respirator TM3 conforming to EN147 with type A filter or better (Efficiency: 95 %)(Outdoor PROC11)	

3. Exposure estimation and reference to its source

Environment

Used EUSES model.

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8a, ERC8d	---	Soil	PEC	50g/kg	0,9091
ERC8a, ERC8d	---	Fresh water sediment	PEC	45g/kg	0,9091
ERC8a, ERC8d	---	Water	PEC	< 0,0001mg/L	< 0,0001

Workers

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC2, PROC8a, PROC8b	worst-case	Worker - inhalative, long-term - systemic	2,2mg/m³	0,48
PROC1, PROC2, PROC8a, PROC8b	worst-case	Worker - dermal, long-term - systemic	0,27mg/kg bw/day	0,21
PROC11, PROC13	worst-case	Worker - dermal, long-term - systemic	0,27mg/kg bw/day	0,21

PROC11	worst-case	Worker - inhalative, long-term - systemic	3,3mg/m³	0,48

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

The environmental emission has been evaluated using EUSES 2.1 (http://ecb.jrc.ec.europa.eu/euses), in which default values have been used, unless otherwise indicated.
For scaling see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Ensure that good work practices are implemented

1. Short title of Exposure Scenario 5: Use in agrochemicals		
Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)	
Chemical product category	PC12: Lawn and garden preparations, including fertilizers (- Fertilizers) PC27: Plant protection products	
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems	
2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8d		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 40 %
Frequency and duration of use	Continuous exposure	365 days/year
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	0,05 %
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
2.2 Contributing scenario controlling consumer exposure for: PC12, PC27		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 40 %
	Physical Form (at time of use)	liquid
	Vapour pressure	< 0,0001 hPa
Frequency and duration of use	Frequency of use	365 days/year
Other given operational conditions affecting consumers exposure	Indoor and outdoor use.	
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Consumer Measures	Wear suitable gloves.

3. Exposure estimation and reference to its source

Environment

Used EUSES model.

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8a, ERC8d	---	Fresh water sediment	PEC	45g/kg	0,9091
ERC8a, ERC8d	---	Water	PEC	< 0,0001mg/L	< 0,0001

Consumers

ConsExpo 4.1

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PC12, PC27	worst-case	Consumer - dermal, long-term - systemic	0,28mg/kg bw/day	0,4
PC12, PC27	worst-case	Consumer - inhalative, long-term - systemic	0,59mg/m³	0,54

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

The environmental emission has been evaluated using EUSES 2.1 (http://ecb.jrc.ec.europa.eu/euses), in which default values have been used, unless otherwise indicated.
For scaling see: http://www.rivm.nl/en/healthanddisease/productsafety/ConsExpo.jsp
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

1. Short title of Exposure Scenario 6: Use in laboratories		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Process categories	PROC15: Use as laboratory reagent	
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles	
2.1 Contributing scenario controlling environmental exposure for: ERC4		
As no environmental hazard was identified no environmental related exposure assessment and risk characterization was performed.		
2.2 Contributing scenario controlling worker exposure for: PROC15		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
	Physical Form (at time of use)	liquid
	Vapour pressure	< 0,0001 hPa
	Physical Form (at time of use)	solid
Amount used	Worker contact is generally very low as most operations are remotely controlled and sampling/analysis events are of short duration.	
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).	
Human factors not influenced by risk management	Exposed skin areas	Palm of one hand (240cm2)
	Breathing volume	10 m3/day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use.	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV).	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures Clean equipment and the work area every day.	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves.	
	Wear chemical resistant protective eye glasses. If no LEV: Wear respiratory protection Particle filter:P2	
3. Exposure estimation and reference to its source		

Environment

No exposure assessment presented for the environment.

Workers

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC15	worst-case	Worker - dermal, long-term - systemic	0,03mg/kg bw/day	0,02
PROC15	worst-case	Consumer - inhalative, long-term - systemic	1,8mg/m³	0,39

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

For scaling see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Ensure that good work practices are implemented

1. Short title of Exposure Scenario 7: Use in laboratories		
Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)	
Process categories	PROC15: Use as laboratory reagent	
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems	

2.1 Contributing scenario controlling environmental exposure for: ERC8a

As no environmental hazard was identified no environmental related exposure assessment and risk characterization was performed.

2.2 Contributing scenario controlling worker exposure for: PROC15		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
	Physical Form (at time of use)	liquid
	Vapour pressure	< 0,0001 hPa
	Physical Form (at time of use)	solid
Amount used	Worker contact is generally very low as most operations are remotely controlled and sampling/analysis events are of short duration.	
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).	
Human factors not influenced by risk management	Exposed skin areas	Palm of one hand (240cm2)
Other operational conditions affecting workers exposure	Indoor use.	
Technical conditions and measures to control dispersion from source towards the worker	Ensure that a mechanical ventilation is in place	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves. (Efficiency: 90 %)	
	Wear a full face respirator conforming to EN136 with Type A/P2 filter or better. (Efficiency: 90 %)	
	Use suitable eye protection. Wear suitable protective clothing.	

3. Exposure estimation and reference to its source

Environment

No exposure assessment presented for the environment.

Workers

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC15	worst-case	Worker - inhalative, long-term - systemic	2,01mg/m³	0,43
PROC15	worst-case	Worker - dermal, long-term - systemic	0,01mg/m³	0,01

Exposure is considered negligible.

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

For scaling see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Ensure that good work practices are implemented

1. Short title of Exposure Scenario 8: Use in process water treatment		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Process categories	PROC2: Use in closed, continuous process with occasional controlled exposure PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles	
2.1 Contributing scenario controlling environmental exposure for: ERC4		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
Amount used	Annual amount per site	540 ton(s)/year
	Daily amount per site	1800 kg
Frequency and duration of use	Continuous exposure	300 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	1 %
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Wastewater release into municipal STP.
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Disposal methods	Can be landfilled or incinerated, when in

		compliance with local regulations.
2.4 Contributing scenario controlling worker exposure for: PROC2, PROC8a, PROC8b		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
	Physical Form (at time of use)	liquid
	Vapour pressure	< 0,0001 hPa
	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours (unless stated differently).	
Human factors not influenced by risk management	Exposed skin areas	Palms of both hands (480 cm2) (PROC2, PROC8b)
	Exposed skin areas	Two hands 960 cm² (PROC8a)
	Breathing volume	10 m3/day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use.	
Technical conditions and measures to control dispersion from source towards the worker	Ensure that a mechanical ventilation is in place(PROC8a, PROC8b)	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures(PROC2, PROC8a, PROC8b)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Wear suitable protective clothing.(PROC2, PROC8a, PROC8b)	
	Wear chemically resistant gloves. (Efficiency: 90 %)(PROC2, PROC8a, PROC8b)	
	Wear a respirator conforming to EN140 with Type A/P2 filter or better. (Efficiency: 90 %)(PROC8a, PROC8b)	
2.5 Contributing scenario controlling worker exposure for: PROC5		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
	Physical Form (at time of use)	liquid
	Vapour pressure	< 0,0001 hPa
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours (unless stated differently).	
Human factors not influenced by risk management	Exposed skin areas	Palms of both hands (480 cm2)
	Breathing volume	10 m3/day
	Body weight	70 kg

Other operational conditions affecting workers exposure	Indoor use.
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Wear suitable protective clothing. Wear chemically resistant gloves. (Efficiency: 90 %)

3. Exposure estimation and reference to its source

Environment

Used EUSES model.

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC4	---	Fresh water sediment	PEC	45g/kg	0,9091
ERC4	---	Soil	PEC	50g/kg	0,9091
ERC4	---	Water	PEC	< 0,0001mg/L	< 0,0001

Workers

Used ECETOC TRA model.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC2, PROC8a, PROC8b	worst-case	Worker - inhalative, long-term - systemic	2,01mg/m³	0,43
PROC2, PROC8a, PROC8b	worst-case	Worker - dermal, long-term - systemic	0,3mg/kg bw/day	0,23
PROC5	worst-case	Worker - inhalative, long-term - systemic	2,01mg/m³	0,43
PROC5	worst-case	Worker - dermal, long-term - systemic	0,3mg/kg bw/day	0,23

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

The environmental emission has been evaluated using EUSES 2.1 (http://ecb.jrc.ec.europa.eu/euses), in which default values have been used, unless otherwise indicated.
For scaling see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Ensure that good work practices are implemented

1. Short title of Exposure Scenario 9: Use in sewage water treatment		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Process categories	PROC2: Use in closed, continuous process with occasional controlled exposure PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	
Environmental Release Categories	ERC5: Industrial use resulting in inclusion into or onto a matrix	
2.1 Contributing scenario controlling environmental exposure for: ERC5		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
Amount used	Annual amount per site	73 ton(s)/year (ERC4, ERC5)
	Daily amount per site	200 kg (ERC4, ERC5)
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10 (ERC4, ERC5)
	Dilution Factor (River)	25 (ERC2)
	Dilution Factor (Coastal Areas)	250 (ERC2)
	Other data. Other information	Local freshwater dilution factor:: 10 - 40 (ERC2)
	Other data. Other information	Local marine water dilution factor:: 100 - 400 (ERC2)
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	1
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Wastewater release into municipal STP.
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage	2.000 m3/d

	treatment plant effluent	
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Disposal methods	Can be landfilled or incinerated, when in compliance with local regulations.
2.3 Contributing scenario controlling worker exposure for: PROC2, PROC8a, PROC8b		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
	Physical Form (at time of use)	liquid
	Vapour pressure	< 0,0001 hPa
	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	365 days/year
	Covers daily exposures up to 8 hours (unless stated differently).	
Human factors not influenced by risk management	Exposed skin areas	Palms of both hands (480 cm2) (PROC2, PROC8b)
	Exposed skin areas	Two hands 960 cm² (PROC8a)
	Breathing volume	10 m3/day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use.	
Technical conditions and measures to control dispersion from source towards the worker	Ensure that a mechanical ventilation is in place(PROC8a, PROC8b)	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures(PROC2, PROC8a, PROC8b)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Wear suitable protective clothing.(PROC2, PROC8a, PROC8b)	
	Wear a respirator conforming to EN140 with Type A/P2 filter or better. (Efficiency: 90 %)(PROC8b)	
	Wear chemically resistant gloves. (Efficiency: 90 %)(PROC2, PROC8a, PROC8b)	
2.4 Contributing scenario controlling worker exposure for: PROC5		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
	Physical Form (at time of use)	liquid

	Vapour pressure	< 0,0001 hPa
Frequency and duration of use	Frequency of use	365 days/year
	Covers daily exposures up to 8 hours (unless stated differently).	
Human factors not influenced by risk management	Exposed skin areas	Palms of both hands (480 cm2)
	Breathing volume	10 m3/day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use.	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Wear suitable protective clothing.	
	Wear chemically resistant gloves. (Efficiency: 90 %)	

3. Exposure estimation and reference to its source

Environment

Used EUSES model.

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC4, ERC5	---	Fresh water sediment	PEC	45g/kg	0,9091
ERC4, ERC5	---	Soil	PEC	50,8g/kg	0,9236
ERC4, ERC5	---	Water	PEC	< 0,0001mg/L	< 0,0001

Workers

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC2, PROC8a, PROC8b	worst-case	Worker - inhalative, long-term - systemic	2,01mg/m³	0,43
PROC2, PROC8a, PROC8b	worst-case	Worker - dermal, long-term - systemic	0,3mg/kg bw/day	0,23
PROC5	worst-case	Worker - inhalative, long-term - systemic	2,01mg/m³	0,43
PROC5	worst-case	Worker - dermal, long-term - systemic	0,3mg/kg bw/day	0,23

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

Exposure Scenario

The environmental emission has been evaluated using EUSES 2.1 (http://ecb.jrc.ec.europa.eu/euses), in which default values have been used, unless otherwise indicated.
For scaling see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Ensure that good work practices are implemented

1. Short title of Exposure Scenario 10: Use in process water treatment	
Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15: Use as laboratory reagent
Environmental Release Categories	ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix

2.1 Contributing scenario controlling environmental exposure for: ERC8c, ERC8f		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	25
	Dilution Factor (Coastal Areas)	250
	Other data. Other information	Local freshwater dilution factor:10 - 40
	Other data. Other information	Local marine water dilution factor:100 - 400
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	It is required that the flow of release to municipal wastewater or to surface water do not cause significant in pH changes
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
	Physical Form (at time of use)	Aqueous solution
	Vapour pressure	ca. 0,1 hPa
Frequency and duration of use	Frequency of use	220 days/year
	Covers daily exposures up to 8 hours (unless stated differently).	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently.	
Technical conditions and measures to control dispersion from source towards the worker	Provide for sufficient ventilation.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.	
Conditions and measures related to personal protection, hygiene and health evaluation	Chemically resistant gloves tested to EN374.(except PROC1, PROC2)	

3. Exposure estimation and reference to its source

Environment

Exposure is considered negligible.

Workers

MEASE

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15	---	Dermal worker exposure	< 0,69mg/kg bw/day	< 0,403

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

If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (www.ebrc.de/mease.html) to estimate the associated exposure
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 11: Use in gas treatment		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Process categories	PROC2: Use in closed, continuous process with occasional controlled exposure PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	
Environmental Release Categories	ERC2: Formulation of preparations ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC6b: Industrial use of reactive processing aids	
2.1 Contributing scenario controlling environmental exposure for: ERC2, ERC4, ERC6b		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
Amount used	Annual amount per site	2,409 ton(s)/year
	Daily amount per site	6,6 kg
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	1
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Due to enclosed process air emissions are unlikely, except during transfer to and from the digester
	Water	Wastewater release into municipal STP.
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Disposal methods	Can be landfilled or incinerated, when in

		compliance with local regulations.
2.2 Contributing scenario controlling worker exposure for: PROC2, PROC8a, PROC8b		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
	Physical Form (at time of use)	liquid
	Vapour pressure	< 0,0001 hPa
	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	365 days/year
	Covers daily exposures up to 8 hours (unless stated differently).	
Human factors not influenced by risk management	Exposed skin areas	Palms of both hands (480 cm2) (PROC2, PROC8b)
	Exposed skin areas	Two hands 960 cm² (PROC8a)
	Breathing volume	10 m3/day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use.	
Technical conditions and measures to control dispersion from source towards the worker	Ensure that a mechanical ventilation is in place(PROC8a, PROC8b)	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures(PROC2, PROC8a, PROC8b)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Wear suitable protective clothing.(PROC2, PROC8a, PROC8b)	
	Wear chemically resistant gloves. (Efficiency: 90 %)(PROC2, PROC8a, PROC8b)	
	Wear a respirator conforming to EN140 with Type A/P2 filter or better. (Efficiency: 90 %)(PROC8a, PROC8b)	

3. Exposure estimation and reference to its source

Environment

Used EUSES model.

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC2, ERC4, ERC6b	---	Fresh water sediment	PEC	45g/kg	0,9091
ERC2, ERC4, ERC6b	---	Water	PEC	< 0,0001mg/L	< 0,0001
ERC2, ERC4, ERC6b	---	Soil	PEC	50,1g/kg	0,9109

Workers

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC2, PROC8a, PROC8b	worst-case	Worker - inhalative, long-term - systemic	2,01mg/m³	0,43
PROC2, PROC8a, PROC8b	worst-case	Worker - dermal, long-term - systemic	0,3mg/kg bw/day	---

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

The environmental emission has been evaluated using EUSES 2.1 (http://ecb.jrc.ec.europa.eu/euses), in which default values have been used, unless otherwise indicated.
For scaling see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Ensure that good work practices are implemented

1. Short title of Exposure Scenario 12: Use as processing aid	
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Process categories	PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15: Use as laboratory reagent PROC22: Potentially closed processing operations with minerals/metals at elevated temperature; industrial setting PROC26: Handling of solid inorganic substances at ambient temperature
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC5: Industrial use resulting in inclusion into or onto a matrix ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates) ERC6b: Industrial use of reactive processing aids

2.1 Contributing scenario controlling environmental exposure for: ERC4, ERC5, ERC6a, ERC6b		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
Amount used	Annual amount per site	6000 ton(s)/year
	Daily amount per site	20 tonnes
Frequency and duration of use	Continuous exposure	300 days/year
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	0,5 %
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Wastewater release into municipal STP.
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant

	Flow rate of sewage treatment plant effluent	2.000 m3/d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Disposal methods	Can be landfilled or incinerated, when in compliance with local regulations.
2.2 Contributing scenario controlling worker exposure for: PROC2, PROC3		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
	Physical Form (at time of use)	liquid
	Vapour pressure	< 0,0001 hPa
	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours (unless stated differently).	
Human factors not influenced by risk management	Exposed skin areas	Palms of both hands (480 cm2) (PROC2)
	Exposed skin areas	Palm of one hand (240cm2) (PROC3)
	Breathing volume	10 m3/day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use.	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures(PROC2, PROC3)	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves. Use suitable eye protection. (Efficiency: 90 %)(PROC2, PROC3)	
2.3 Contributing scenario controlling worker exposure for: PROC4, PROC9, PROC15, PROC22, PROC26		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
	Physical Form (at time of use)	liquid
	Vapour pressure	< 0,0001 hPa
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours (unless stated differently).	

Human factors not influenced by risk management	Exposed skin areas	Palms of both hands (480 cm2) (PROC4, PROC9)
	Exposed skin areas	Palm of one hand (240cm2) (PROC15)
	Exposed skin areas	More than hands and forearms. 1980 cm^2 (PROC22, PROC26)
	Breathing volume	10 m3/day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use.	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures(PROC4, PROC9, PROC15, PROC22, PROC26)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection.(PROC4, PROC9, PROC15, PROC22, PROC26)	
	Wear chemically resistant gloves. (Efficiency: 90 %)(PROC4, PROC9, PROC15, PROC22, PROC26)	

2.4 Contributing scenario controlling worker exposure for: PROC8b

Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours (unless stated differently).	
Human factors not influenced by risk management	Exposed skin areas	Palms of both hands (480 cm2) (PROC8b)
	Breathing volume	10 m3/day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use.	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection.	
	Wear chemically resistant gloves. (Efficiency: 90 %)	

3. Exposure estimation and reference to its source

Environment

Used EUSES model.

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR

ERC4, ERC5, ERC6a, ERC6b	---	Soil	PEC	50,8g/kg	0,9236
ERC4, ERC5, ERC6a, ERC6b	---	Fresh water sediment	PEC	45g/kg	0,9091
ERC4, ERC5, ERC6a, ERC6b	---	Water	PEC	< 0,0001mg/L	< 0,0001

Workers

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC2, PROC3	worst-case	Worker - dermal, long-term - systemic	0,7mg/kg bw/day	0,54
PROC2, PROC3	worst-case	Worker - inhalative, long-term - systemic	1,8mg/m³	0,39
PROC4, PROC9, PROC15, PROC22, PROC26	worst-case	Worker - dermal, long-term - systemic	0,7mg/kg bw/day	0,54
PROC4, PROC9, PROC15, PROC22, PROC26	worst-case	Worker - inhalative, long-term - systemic	1,8mg/m³	0,39
PROC8b	worst-case	Worker - dermal, long-term - systemic	0,7mg/kg bw/day	0,54
PROC8b	worst-case	Worker - inhalative, long-term - systemic	1,8mg/m³	0,39

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

The environmental emission has been evaluated using EUSES 2.1 (http://ecb.jrc.ec.europa.eu/euses), in which default values have been used, unless otherwise indicated.
For scaling see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Ensure that good work practices are implemented

1. Short title of Exposure Scenario 13: Use in metal surface treatment.		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Process categories	PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC7: Industrial spraying PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC13: Treatment of articles by dipping and pouring	
Environmental Release Categories	ERC2: Formulation of preparations ERC6b: Industrial use of reactive processing aids	
2.1 Contributing scenario controlling environmental exposure for: ERC2, ERC6b		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
Amount used	Annual amount per site	50,100 ton(s)/year
	Daily amount per site	167 kg
Frequency and duration of use	Continuous exposure	300 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	2 %
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Wastewater release into municipal STP.
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge

	Disposal methods	Can be landfilled or incinerated, when in compliance with local regulations.
2.2 Contributing scenario controlling worker exposure for: PROC5, PROC7, PROC13		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
	Physical Form (at time of use)	liquid
	Vapour pressure	< 0,0001 hPa
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours (unless stated differently).	
Human factors not influenced by risk management	Exposed skin areas	Palms of both hands (480 cm2) (PROC5, PROC13)
	Exposed skin areas	Palm of one hand (240cm2) (PROC7)
	Breathing volume	10 m3/day
	Body weight	70 kg
Technical conditions and measures to control dispersion from source towards the worker	Spraying	Use product only in closed system.
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures Regular cleaning of equipment and work area	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves. Use suitable eye protection.	
2.3 Contributing scenario controlling worker exposure for: PROC8a, PROC8b		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours (unless stated differently).	
Human factors not influenced by risk management	Exposed skin areas	Palms of both hands (480 cm2)
	Breathing volume	10 m3/day
	Body weight	70 kg
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV).	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures Regular cleaning of equipment and work area	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves.	
	Use suitable eye protection.	

3. Exposure estimation and reference to its source

Environment

Used EUSES model.

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC2, ERC6b	---	Fresh water sediment	PEC	45g/kg	0,9091
ERC2, ERC6b	---	Soil	PEC	51,8g/kg	0,9418
ERC2, ERC6b	---	Water	PEC	< 0,0001mg/L	< 0,0001

Workers

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC5, PROC7, PROC13	worst-case	Worker - dermal, long-term - systemic	0,14mg/kg bw/day	0,11
PROC5, PROC7, PROC13	worst-case	Worker - inhalative, long-term - systemic	1,8mg/m³	0,39
PROC8a, PROC8b	worst-case	Worker - dermal, long-term - systemic	0,14mg/kg bw/day	0,11
PROC8a, PROC8b	worst-case	Worker - inhalative, long-term - systemic	1,8mg/m³	0,39

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

The environmental emission has been evaluated using EUSES 2.1 (http://ecb.jrc.ec.europa.eu/euses), in which default values have been used, unless otherwise indicated.
For scaling see: http://www.ecetoc.org/tra
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Additional good practice advice beyond the REACH Chemical Safety Assessment

Ensure that good work practices are implemented

1. Short title of Exposure Scenario 14: Use in metal surface treatment.	
Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Chemical product category	PC14: Metal surface treatment products, including galvanic and electroplating products
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8d

No exposure assessment presented for the environment.

2.2 Contributing scenario controlling consumer exposure for: PC14

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 40 %
	Physical Form (at time of use)	liquid
	Vapour pressure	< 0,0001 hPa
Other given operational conditions affecting consumers exposure	Indoor and outdoor use.	
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Consumer Measures	Wear suitable gloves.

3. Exposure estimation and reference to its source

Environment

No exposure assessment presented for the environment.

Consumers

ConsExpo 4.1

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PC14	worst-case	Consumer - dermal, long-term - systemic	< 0,36mg/kg bw/day	< 0,86

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

For scaling see: http://www.rivm.nl/en/healthanddisease/productsafety/ConsExpo.jsp

Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

1. Short title of Exposure Scenario 15: Use in adhesives and sealants	
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Process categories	PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC7: Industrial spraying PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC10: Roller application or brushing PROC12: use of blowing agents in manufacture of foam PROC13: Treatment of articles by dipping and pouring PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelettisation
Environmental Release Categories	ERC5: Industrial use resulting in inclusion into or onto a matrix

2.1 Contributing scenario controlling environmental exposure for: ERC5		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Amount used	Annual amount per site	60 ton(s)/year
	Daily amount per site	200 kg
Frequency and duration of use	Continuous exposure	300 days/year
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	2 %
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Wastewater release into municipal STP.
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture

Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Disposal methods	Can be landfilled or incinerated, when in compliance with local regulations.
2.2 Contributing scenario controlling worker exposure for: PROC5, PROC8a, PROC8b, PROC9, PROC12, PROC14		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
	Physical Form (at time of use)	liquid
	Vapour pressure	< 0,0001 hPa
	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours (unless stated differently).	
Human factors not influenced by risk management	Exposed skin areas	Palms of both hands (480 cm2) (PROC5, PROC8b, PROC9, PROC14)
	Exposed skin areas	Two hands 960 cm² (PROC8a)
	Exposed skin areas	Palm of one Hand 240 cm² (PROC12)
	Breathing volume	10 m3/day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use.	
Technical conditions and measures to control dispersion from source towards the worker	Ensure that a mechanical ventilation is in place(PROC5, PROC8a, PROC8b, PROC9, PROC12, PROC14)	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures(PROC5, PROC8a, PROC8b, PROC9, PROC12)	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves. (Efficiency: 90 %)(PROC5, PROC8a, PROC8b, PROC9, PROC12)	
	Wear a respirator conforming to EN140 with Type A/P2 filter or better. (Efficiency: 90 %)(PROC5, PROC8a, PROC8b, PROC9, PROC12, PROC14)	
	Use suitable eye protection. Wear suitable protective clothing.(PROC5, PROC8a, PROC8b, PROC9, PROC12, PROC14)	
2.3 Contributing scenario controlling worker exposure for: PROC7, PROC10, PROC13		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%

	Physical Form (at time of use)	liquid
	Vapour pressure	< 0,0001 hPa
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours (unless stated differently).	
	Exposure duration	240 min(PROC7)
Human factors not influenced by risk management	Exposed skin areas	Hands and forearms. 1500 cm² (PROC7)
	Exposed skin areas	Two hands 960 cm² (PROC10)
	Exposed skin areas	Palms of both hands (480 cm2) (PROC13)
	Breathing volume	10 m3/day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use.(PROC10, PROC13)	
	Indoor and outdoor use.(PROC7)	
Technical conditions and measures to control dispersion from source towards the worker	Ensure that a mechanical ventilation is in place(PROC10)	
	Carry out in a vented booth or extracted enclosure. Provide local exhaust ventilation (LEV).(Indoor PROC7)	
	Ensure containment of the emission source(Outdoor PROC7)	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures(PROC7, PROC10, PROC13)	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves. (Efficiency: 90 %)(PROC7, PROC10, PROC13)	
	Use suitable eye protection. Wear suitable protective clothing.(PROC7, PROC10, PROC13)	
	If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn. Wear a full face respirator TM3 conforming to EN147 with type A filter or better (Efficiency: 95 %)(Indoor PROC7)	
	or Wear a full face respirator TM3 conforming to EN147 with type A filter or better (Efficiency: 95 %)(Outdoor PROC7)	

3. Exposure estimation and reference to its source

Environment

Used EUSES model.

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC5	---	Soil	PEC	50g/kg	0,9091
ERC5	---	Fresh water sediment	PEC	45g/kg	0,9091
ERC5	---	Water	PEC	< 0,0001mg/L	< 0,0001

Workers

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC5, PROC8a, PROC8b, PROC9, PROC12, PROC14	worst-case	Worker - inhalative, long-term - systemic	2,2mg/m³	0,48
PROC5, PROC8a, PROC8b, PROC9, PROC12, PROC14	worst-case	Worker - dermal, long-term - systemic	0,3mg/kg bw/day	0,21
PROC10, PROC13	worst-case	Worker - inhalative, long-term - systemic	2,2mg/m³	0,48
PROC7, PROC10, PROC13	worst-case	Worker - dermal, long-term - systemic	0,3mg/kg bw/day	0,21
PROC7	worst-case	Worker - inhalative, long-term - systemic	3,3mg/m³	0,72

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

The environmental emission has been evaluated using EUSES 2.1 (http://ecb.jrc.ec.europa.eu/euses), in which default values have been used, unless otherwise indicated.
For scaling see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Ensure that good work practices are implemented

1. Short title of Exposure Scenario 16: Use in adhesives and sealants		
Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)	
Process categories	PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC10: Roller application or brushing PROC11: Non industrial spraying PROC13: Treatment of articles by dipping and pouring PROC19: Hand-mixing with intimate contact and only PPE available	
Environmental Release Categories	ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix	
2.1 Contributing scenario controlling environmental exposure for: ERC8c, ERC8f		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
Amount used	Annual amount per site	12,300 ton(s)/year
	Daily amount per site	41 kg
Frequency and duration of use	Continuous exposure	300 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	2 %
	Emission or Release Factor: Soil	0 %
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Disposal methods	Collect all unused material for disposal as hazardous waste in compliance with local and national regulations
2.2 Contributing scenario controlling worker exposure for: PROC8a, PROC8b, PROC9, PROC19		

Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
	Physical Form (at time of use)	liquid
	Vapour pressure	< 0,0001 hPa
	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours (unless stated differently).	
Human factors not influenced by risk management	Exposed skin areas	Two hands 960 cm² (PROC8a)
	Exposed skin areas	Palms of both hands (480 cm2) (PROC8b, PROC9)
	Exposed skin areas	More than hands and forearms. 1980 cm² (PROC19)
	Breathing volume	10 m3/day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use.	
Technical conditions and measures to control dispersion from source towards the worker	Ensure that a mechanical ventilation is in place(PROC8a, PROC8b, PROC9, PROC19)	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures(PROC8a, PROC8b, PROC9, PROC19)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Wear suitable protective clothing.(PROC8a, PROC8b, PROC9, PROC19)	
	Wear a respirator conforming to EN140 with Type A/P2 filter or better. (Efficiency: 90 %)(PROC8a, PROC8b, PROC9, PROC19)	
	Wear chemically resistant gloves. (Efficiency: 90 %)(PROC8a, PROC8b, PROC9, PROC19)	
2.3 Contributing scenario controlling worker exposure for: PROC10, PROC11, PROC13		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations of substance in product: 80%-100%
	Physical Form (at time of use)	liquid
	Vapour pressure	< 0,0001 hPa
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours (unless stated differently).	
	Exposure duration	240 min(PROC11)
	Frequency of use	3 days/week(PROC11)
Human factors not influenced by risk management	Exposed skin areas	Two hands 960 cm² (PROC10)
	Exposed skin areas	Hands and forearms. 1500 cm² (PROC11)

	Exposed skin areas	Palms of both hands (480 cm2) (PROC13)
	Breathing volume	10 m3/day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use.(PROC10, PROC13)	
	Indoor and outdoor use.(PROC11)	
Technical conditions and measures to control dispersion from source towards the worker	Carry out in a vented booth or extracted enclosure. Provide local exhaust ventilation (LEV).(Indoor PROC11)	
	Ensure containment of the emission source(Outdoor PROC11)	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures Clean equipment and the work area every day.(PROC10, PROC11, PROC13)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Wear suitable protective clothing.(PROC10, PROC11, PROC13)	
	Wear chemically resistant gloves. (Efficiency: 90 %)(PROC10, PROC11, PROC13)	
	If no LEV or vented laminar spray booth available. Wear a full face respirator TM3 conforming to EN147 with type A filter or better (Efficiency: 95 %)(Indoor PROC11)	
	or Wear a full face respirator TM3 conforming to EN147 with type A filter or better (Efficiency: 95 %)(Outdoor PROC11)	

3. Exposure estimation and reference to its source

Environment

Used EUSES model.

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8c, ERC8f	---	Soil	PEC	50g/kg	0,9091
ERC8c, ERC8f	---	Fresh water sediment	PEC	45g/kg	0,9091
ERC8c, ERC8f	---	Water	PEC	< 0,0001mg/L	< 0,0001

Workers

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC8a, PROC8b, PROC9, PROC19	worst-case	Worker - inhalative, long-term - systemic	2,2mg/m³	0,48
PROC8a,	worst-case	Worker - dermal, long-	0,27mg/kg bw/day	0,21

PROC8b, PROC9, PROC19		term - systemic		
PROC11	worst-case	Worker - inhalative, long-term - systemic	3,3mg/m³	0,72
PROC11	worst-case	Worker - dermal, long-term - systemic	0,3mg/kg bw/day	0,21
PROC10, PROC13	worst-case	Worker - dermal, long-term - systemic	0,27mg/kg bw/day	0,21

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

The environmental emission has been evaluated using EUSES 2.1 (http://ecb.jrc.ec.europa.eu/euses), in which default values have been used, unless otherwise indicated.
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Additional good practice advice beyond the REACH Chemical Safety Assessment

Ensure that good work practices are implemented

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