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

1.1. Product identifier

Chemical description : Ammonia , Ammonium hydrate , solution (>10<25%) .

Type of product : Pure product in solution .

Reach registration number : Not registered, regarded by ECHA as a mixture of Ammonia anhydrous (REACH Registration Nr 01-2119488876-14) and water.

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 regarded as dangerous according to the definitions in Council Directive 67/548/EEC and Directive 1999/45/EC).

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

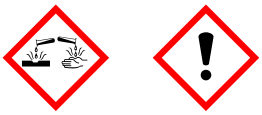
Skin corrosion - Category 1B - Danger (Skin Corr. 1B; H314)
Specific Target Organ Toxicity - Single exposure - Respiratory tract irritation - Category 3 - Warning (STOT SE 3; H335)
Hazardous to the aquatic environment - Chronic hazard - Category 3 (Aquatic Chronic 3; H412)

2.2. Label elements

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

• Dangerous ingredient(s) : Ammonia ...%

• Hazard pictogram(s)



• Signal word : Danger

• Hazard statements : H314 - Causes severe skin burns and eye damage. H335 - May cause respiratory irritation. H412 - Harmful to aquatic life with long lasting effects.

• Precautionary statements

- Prevention : P260 - Do not breathe fume/gas/mist/vapours/spray. P280 - Wear protective gloves/protective clothing/eye protection/face protection.

SECTION 2. Hazards identification (continued)

- Response : P303+P361+P353 - IF ON SKIN (or hair) : Remove immediately all contaminated clothing. Rinse skin with water/shower. P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing. P305+P351+P338 - IF IN EYES : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P310 - Immediately call a POISON CENTER/ doctor/…

2.3. Other hazards

Physical/chemical hazards : Contact with halogenes, mercuric and silver oxides liberates shock-sensitive compounds.
Attacks metals with liberation of hydrogen gas.

Hazards for the health : A health dangerous concentration in the air will very quickly be reached by evaporation of this substance at app. 20°C.

Hazards for the environment : Product causes a strong rise 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 : Vapour is lighter than air.

SECTION 3. Composition/information on ingredients

3.1. Substances

Name component(s)		Weight %	CAS nr	EINECS nr	Index nr	Reach nr	CLASSIFICATION
Ammonia ...%	:	> 10 < 25 %	1336-21-6	215-647-6	007-001-01-2	----	Skin Corr. 1B; H314 STOT SE 3; H335 Aquatic Acute 1; H400 Aquatic Chronic 2; H411

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

Note B (Regulation (EC) No 1272/2008) applies to the product or one or more of its components.
Note: SCL applicable
Note: M-factor=1

Ammonia, anhydrous (CAS 7664-41-7/EINECS 231-635-3) has been registered . Reach registration number : 01-2119488876-14.

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.
Take the patient IMMEDIATELY to the hospital.

- Skin Contact : Remove contaminated clothing and shoes.
Rinse skin immediately with plenty of water. (shower if necessary).
Consult a doctor.

- Eye Contact : Rinse immediately thoroughly and long (at least 15 min.) with plenty of water.
Remove contact lenses.
Take to eye doctor afterwards.
Keep rinsing or dripping the eye during transport.

SECTION 4. First aid measures (continued)

- Ingestion : DO NOT INDUCE VOMITING. Rinse mouth with water.
  Take the patient IMMEDIATELY to the hospital.

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 , Alcohol resistant foam , Carbon dioxide (CO2) , Water spray .
- Insuitable : None .

5.2. Special hazards arising from the substance or mixture

Special Exposure Hazards : Fire may liberate Nitrogen oxides (NOx) and Carbon monoxide.

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 liquid enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

Methods for Cleaning Up : Collect the spillage in closable, corrosion resistant, suitable disposal containers.
Dilute spilled liquid immediately with plenty of water - neutralise with acid.
Rinse abundantly with water.

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 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

SECTION 7. Handling and storage (continued)

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 : Acids , Halogens , Several metals (+ Alloys) .
Protection against Fire and Explosion	:	Remove all sources of ignition (open fire, sparks, smoking, ...). Open packings carefully, content may be under pressure .
Packaging Material	:	Polyethylene , Polypropylene , Stainless steel .
Insuitable Packaging Material	:	Polyester , PVC , Several metals .

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	:	Ammonia ...% : Limit value (BE) : 20 ppm (14 mg/m³) (2014) (Gas) Ammonia ...% : Short time value (BE) : 50 ppm (36 mg/m³) (2014) (Gas) Ammonia ...% : Limit value (TWA 8 h) (NL) : 20 ppm (14 mg/m³) (2007) (Gas) Ammonia ...% : Limit value (TWA 15 min) (NL) : 50 ppm (36 mg/m³) (2007) (Gas)
Biological limit values	:	They will be included when available.
DNELs	:	• Ammonia ...% : Worker, acute - local effects, inhalation : 36 mg/m³ • Ammonia ...% : Worker, acute - systemic effects, inhalation : 47,6 mg/m³ • Ammonia ...% : Worker, acute - systemic effects, dermal : 6,8 mg/kg bw/day • Ammonia ...% : Worker, long-term - local effects, inhalation : 14 mg/m³ • Ammonia ...% : Worker, long-term - systemic effects, inhalation : 47,6 mg/m³ • Ammonia ...% : Worker, long-term - systemic effects, dermal : 6,8 mg/kg bw/day
PNECs	:	• Ammonia ...% : Fresh water : 0,0011 mg/l • Ammonia ...% : Marine water : 0,0011 mg/l • Ammonia ...% : Intermittent release : 0,0068 mg/l

8.2. Exposure controls

Engineering Measures	:	Ventilation , Local exhaust .
Personal Protection Equipment		
- Respiratory protection	:	CE-approved mask for Ammonia gases (type K, green).
- Skin protection	:	Corrosion-proof protective clothing.
- Hand protection	:	Suitable material for safety gloves (EN 374): The suitability of the gloves and the breakthrough time for a specific workplace should be discussed with the producers of the protective gloves. - material : Butyl rubber - thickness : 0,5 mm - breakthrough time : > 480'
- 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

See technical data sheet for detailed information.

	Physical State (20°C)	: Liquid .
	Form/Colour	: Colourless .
	Odour	: Pungent smell (Odour of ammonia)
	Odour threshold	: 5 - 25 ppm
*	pH value	: 12 - 14
	Melting/Freezing point	: -53 to -37 °C
*	Boiling Point/Range (1013 hPa)	: 36 to 45 °C
	Flash point	: Not applicable.
	Evaporation rate	: Not applicable.
*	Explosion limits in air	: 14 - 30,2 vol.%
*	Vapour pressure (20°C)	: 47 - 52 kPa
	Relative vapour density (air=1)	: 0,59
	Relative density of saturated vapour/air mixture (air=1)	: 0,8
	Relative density (water=1)	: 0,9
	Density (20°C)	: 0,909 - 0,924 g/cm³
	Solubility in water	: Good soluble in koud water .
	Miscible with	: Alcohol , Chloroform .
	Log P Octanol/Water (20°C)	: -1,3 (calculated)
	Auto-ignition temperature	: 651 °C
	Minimum ignition energy	: 680 mJ
	Decomposition temperature	: 450 °C
*	Viscosity	: 1,2 -1,3 mm²/s (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 acids .

10.2. Chemical stability

Stability : Product decomposes under influence of light and high temperatures.

10.3. Possibility of hazardous reactions

Hazardous reactions : Contact with metallic substances may release inflammable hydrogen gas. Contact with halogenes, mercuric and silver oxides may create explosive compounds.

10.4. Conditions to avoid

Conditions to avoid : High temperatures (>35°C), Direct sunlight .

10.5. Incompatible materials

Materials to avoid : Acids , Halogens , Several metals : Mercury ! Silver ! ... (+ Alloys).

10.6. Hazardous decomposition products

Hazardous Decomposition Products : Nitrogen oxides .

SECTION 11. Toxicological information

11.1. Information on toxicological effects

Acute toxicity

- Inhalation	: Inhalation can cause pneumonia and/or pulmonary oedema, but only after signs of corrosive effects on the mucous membranes of the eyes and/or the upper respiratory tract. If big quantities : Vocal cord edema . Symptoms include: Tears , Sore throat , Cough , Difficulty in breathing . • Ammonia ...% : LC50 (Rat, inhalation, 1 h) : 7850-13770 mg/m³(Air)
- Skin contact	: • Ammonia ...% : LD50 (Rabbit, dermal) : No data available. Symptoms include: Redness , Pain , Burning feeling , Blisters .
- Ingestion	: Symptoms include: Sore throat , Stomachache , Vomiting , Nausea . • Ammonia ...% : LD50 (Rat, oral) : 350 mg/kg (OECD Guideline 401)
Skin corrosion/irritation	: Causes severe burns.
Serious eye damage/irritation	: Causes serious eye damage.
Aspiration hazard	: At high concentrations : May cause lung disorders.
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 : Respiratory tract irritation .
Specific target organ toxicity - repeated exposure	: To human : Listed not for organ toxicity . For animals : No effects known.

SECTION 12. Ecological information

12.1. Toxicity

Ecotoxicity	: • Ammonia ...% : LC50 (Fish, 96 h) : 0,068 mg/l (Oncorhynchys gorbuscha) (Read across) • Ammonia ...% : EC50 (Algae, 18 d) : 2700 mg/l (Chlorella vulgaris) • Ammonia ...% : EC50 (Daphnia magna, 48 h) : 101 mg/l • Ammonia ...% : NOEC (Daphnia magna) : 0,79 mg/l (96 h)

12.2. Persistence and degradability

Persistence and degradability	: • Ammonia ...% : Persistence and degradability : Can be inherently biodegradable

12.3. Bioaccumulative potential

Bioaccumulation	: • Ammonia ...% : Bioaccumulation : Low .

12.4. Mobility in soil

Mobility	: • Ammonia ...% : Mobility : Adsorption to solid soil phase is possible.

12.5. Results of PBT and vPvB assessment

Evaluation	: • Ammonia ...% : PBT/vPvB : No

12.6. Other adverse effects

Photochemical ozone creation potential	: No data available.
Ozone depletion potential	: None .
Endocrine disrupting potential	: No data available.
Global warming potential	: None .

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 : 2672

14.2. UN proper shipping name

ADR/RID Name : UN 2672 Ammonia solution, 8, III, (E)
ADN Name : UN 2672 Ammonia solution , 8, III
IMDG Name : UN 2672 Ammonia solution , 8, III, MARINE POLLUTANT
IATA Name : UN 2672 Ammonia 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 : Yes

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 : 2
Pollution category : Y

SECTION 15. Regulatory information

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

Inventories : Australian inventory (AICS): Listed in inventory.
Canadian inventory (DSL): Listed in inventory.
Canadian inventory (NDSL): Not listed in inventory.
Chinese inventory (IECS): Listed in inventory.
European inventory (EINECS): Listed in inventory.
Japanese inventory (ENCS): Listed in inventory.
Korean inventory (KECI): Listed in inventory.
Philippine inventory (PICCS): Listed in inventory.

SECTION 15. Regulatory information (continued)

NFPA n° : 3-0-0

Relevant EU Rule(s) : Directive 96/82/EC of the Council of 9 December 1996 on the control of major-accident hazards involving dangerous substances
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)

The restrictions in Annex XVII to Regulation (EC) No 1907/2006 must be observed.

National regulations

* - Germany : WGK : 2

- Netherlands : Water damaging : 5
Decontamination exertion : B

15.2. Chemical Safety Assessment

A chemical safety assessment has been carried out for the material.

SECTION 16. Other information

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

* Has changed compared to previous revision.

Changes : Section 14

Sources of used key data : See also on the webaddress:
http://apps.echa.europa.eu/registered/registered-sub.aspx#search

(EU)H-statement(s) : H314 - Causes severe skin burns and eye damage.
H335 - May cause respiratory irritation.
H400 - Very toxic to aquatic life.
H411 - Toxic to aquatic life with long lasting effects.

Classification procedure

List of abbrevations and acronyms : 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
Aquatic Acute 1 : Hazardous to the aquatic environment - Acute hazard - Category 1
Aquatic Chronic 2 : Hazardous to the aquatic environment - Chronic hazard - Category 2
Aquatic Chronic 3 : Hazardous to the aquatic environment - Chronic hazard - Category 3
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
IATA (International Air Transport Association) : provisions concerning the international carriage of dangerous goods by air

SECTION 16. Other information (continued)

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
NFPA (National Fire Protection Association) or fire diamant
NOEC (No Observed Effect Concentration)
NOx : Nitrogen oxides
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
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 Corr. 1B : Skin corrosion - Category 1B
STOT SE 3 : Specific Target Organ Toxicity - Single exposure - Category 3
TWA (Time-Weighted Average) : the average exposure over a specified period
UVCB : substance of Unknown or Variable composition, Complex reaction product or Biological material
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	8	NA	1, 2, 8a, 8b, 15	1	NA	ES14639
2	Use as an intermediate	3	NA	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 15	6a	NA	ES14653
3	Formulation & (re)packing of substances and mixtures	3	NA	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 15	2	NA	ES14651
4	Industrial use	3	NA	NA	1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 15, 19	4, 5, 6b, 7	NA	ES14655
5	Professional use	22	NA	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 10, 11, 13, 15, 19, 20	8b, 8e, 9a, 9b	NA	ES14657
6	Consumer use	21	NA	9a, 16, 35, 39	NA	8b, 8e, 9a, 9b	NA	ES17818

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	
Sectors of end-use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products)	
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 PROC15: Use as laboratory reagent	
Environmental Release Categories	ERC1: Manufacture of substances	
Activity	Manufacture of substance or use as an intermediate, process chemical or extracting agent. Includes recycling/recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).	
2.1 Contributing scenario controlling environmental exposure for: ERC1		
Amount used	Annual amount per site	950000 tonnes
	Amounts used in the EU (tonnes/year)	6,5 Million tonnes/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18.000 m3/d
	Dilution Factor (River)	10
Other given operational conditions affecting environmental exposure	Number of emission days per year	330
	Emission or Release Factor: Air	140000 kg/day
	Indoor use.	
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	Exhaust air purification with scrubber
	Water	Wastewaters are generally treated on site by chemical and/or biological methods before release to the municipal STP or to the environment., Do not release wastewater directly into environment., All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments. (Degradation effectiveness: 100 %)
	All production steps are enclosed and the level of containment is high	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	On-site waste water treatment

	Sludge Treatment	Do not apply industrial sludge to natural soils., Do not apply STP sludge on agricultural soil, All sludge is collected and incinerated or sent to landfill.
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Solid wastes should be disposed of via landfill or incineration
Conditions and measures related to external recovery of waste	Recovery Methods	There is no envisaged external recovery of waste.
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC8b, 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)	gaseous
	Vapour pressure	8600 hPa
Frequency and duration of use	Frequency of use	220 days/year
	Avoid carrying out operation for more than 4 hours.	
Human factors not influenced by risk management	Breathing volume	10 m3/8 hours
	Exposed skin surface	480 cm²
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV).(except PROC1)	
	Handle substance within a closed system. Transfer via enclosed lines. Pipelines and vessels are sealed and insulated Store substance within a closed system. Provide extraction ventilation at points where emissions occur.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures. Employees must be trained in the proper use of PPE, and when to use it Ensure control measures are regularly inspected and maintained. Exposure and biological monitoring of operators is regularly performed Monitor effectiveness of control measures	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency: 90 %)	
	Wear respiratory protection (Efficiency: 95 %)	
	Wear suitable protective clothing, aprons, shield and suits	

3. Exposure estimation and reference to its source

Environment

EUSES 2.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC1	Highest exposure	Fresh water	PEC	0,000133mg/l	0,121

ERC1	Highest exposure	Marine water	PEC	0,0000315mg/l	0,029

Workers

ECETOC TRA

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	Indoor use., with gloves, (90% efficiency), liquid, Gaseous form	worker dermal, short and long term - systemic	0,03mg/kg bw/day	0,01
PROC2	Indoor use., with gloves, (90% efficiency), liquid, Gaseous form	worker dermal, short and long term - systemic	0,01mg/kg bw/day	0,02
PROC8b	Indoor use., with gloves, (90% efficiency), liquid, Gaseous form	worker dermal, short and long term - systemic	0,07mg/kg bw/day	0,01
PROC15	Indoor use., with gloves, (90% efficiency), liquid, Gaseous form	worker dermal, short and long term - systemic	< 0,01mg/kg bw/day	0,01
PROC1	Indoor use., without respiratory protection, without local exhaust ventilation, liquid, Gaseous form	Worker - inhalative, short-term - local and systemic	0,01mg/m³	< 0,001
PROC2	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, liquid, Gaseous form	worker inhalation, acute and long term - systemic	0,11mg/m³	0
PROC2	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, long-term - local	0,11mg/m³	0,01
PROC2	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, short-term - local	0,11mg/m³	< 0,01
PROC8b	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, liquid, Gaseous form	worker inhalation, acute and long term - systemic	0,10mg/m³	0,00
PROC8b	Indoor use., with local exhaust ventilation, with	Worker - inhalative, short-term - local	0,10mg/m³	< 0,01

	RPE (95%), during 1 - 4 hours, liquid, Gaseous form			
PROC8b	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, long-term - local	0,10mg/m³	0,01
PROC15	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, liquid, Gaseous form	worker inhalation, acute and long term - systemic	0,11mg/m³	0
PROC15	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, short-term - local	0,11mg/m³	< 0,01
PROC15	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, long-term - local	0,11mg/m³	0,01

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

Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Health
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For further information on the assessment method, see: http://www.ecetoc.org/tra

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 2: Use as an intermediate		
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) PROC15: Use as laboratory reagent	
Environmental Release Categories	ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)	
Activity	Use of substance as an intermediate (not related to Strictly Controlled Conditions). Includes recycling/recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).	
2.1 Contributing scenario controlling environmental exposure for: ERC6a		
Readily biodegradable.		
Amount used	Annual amount per site	800000 ton(s)/year
	Amounts used in the EU (tonnes/year)	3,8 Million tonnes/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	10
Other given operational conditions affecting environmental exposure	Number of emission days per year	330
	Emission or Release Factor: Air	105000 kg/day
	Indoor use.	
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and	Air	Exhaust air purification with scrubber
	Water	Wastewaters are generally treated on site by chemical and/or biological methods before release

measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site		to the municipal STP or to the environment., Do not release wastewater directly into environment., All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments. (Degradation effectiveness: 100 %)
	All production steps are enclosed and the level of containment is high	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	On-site waste water treatment
	Sludge Treatment	Do not apply industrial sludge to natural soils., Do not apply STP sludge on agricultural soil, All sludge is collected and incinerated or sent to landfill.
	Type of Sewage Treatment Plant	Domestic sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
	Percentage removed from waste water	100 %
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Solid wastes should be disposed of via landfill or incineration
Conditions and measures related to external recovery of waste	Recovery Methods	There is no envisaged external recovery of waste.
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)	liquid, gaseous
	Vapour pressure	8600 hPa
Frequency and duration of use	Frequency of use	220 days/year
	Avoid carrying out operation for more than 4 hours.	
Human factors not influenced by risk management	Breathing volume	10 m3/8 hours
	Exposed skin surface	480 cm²
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV).(except PROC1)	
	Handle substance within a closed system. Transfer via enclosed lines. Pipelines and vessels are sealed and insulated Store substance within a closed system.	

	Provide extraction ventilation at points where emissions occur.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures. Employees must be trained in the proper use of PPE, and when to use it Ensure control measures are regularly inspected and maintained. Exposure and biological monitoring of operators is regularly performed Monitor effectiveness of control measures	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency: 90 %)	
	Wear respiratory protection (Efficiency: 95 %)	
	Wear suitable protective clothing, aprons, shield and suits	

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

Activity	application as solution	
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 25 %.
	Physical Form (at time of use)	Aqueous solution
	Vapour pressure	287 hPa
Frequency and duration of use	Frequency of use	220 days/year
	Avoid carrying out operation for more than 4 hours.	
Human factors not influenced by risk management	Breathing volume	10 m3/8 hours
	Exposed skin surface	480 cm²
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV).(except PROC1)	
	Handle substance within a closed system. Transfer via enclosed lines. Pipelines and vessels are sealed and insulated Store substance within a closed system. Provide extraction ventilation at points where emissions occur.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures. Employees must be trained in the proper use of PPE, and when to use it Ensure control measures are regularly inspected and maintained. Exposure and biological monitoring of operators is regularly performed Monitor effectiveness of control measures	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency: 90 %)	
	Wear respiratory protection (Efficiency: 95 %)	
	Wear suitable protective clothing, aprons, shield and suits	

3. Exposure estimation and reference to its source

Environment

EUSES 2.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC6a	Highest exposure	Fresh water	PEC	0,00219mg/l	0,076
ERC6a	Highest exposure	Marine water	PEC	0,0000205mg/l	0,019

Workers

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Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	Indoor use., with gloves, (90% efficiency), without local exhaust ventilation, liquid, Gaseous form	worker dermal, short and long term - systemic	0,03mg/kg bw/day	0,01
PROC2, PROC3, PROC5, PROC8a, PROC15	Indoor use., with gloves, (90% efficiency), with local exhaust ventilation, liquid, Gaseous form	worker dermal, short and long term - systemic	0,01mg/kg bw/day	< 0,01
PROC4, PROC8b, PROC9	Indoor use., with gloves, (90% efficiency), with local exhaust ventilation, liquid, Gaseous form	worker dermal, short and long term - systemic	0,07mg/kg bw/day	0,01
PROC1	Indoor use., without local exhaust ventilation, without respiratory protection, liquid, Gaseous form	worker inhalation, acute and long term - systemic	0,01mg/m³	< 0,01
PROC1	Indoor use., without local exhaust ventilation, without respiratory protection, liquid, Gaseous form	Worker - inhalative, short-term - local	0,01mg/m³	< 0,01
PROC1	Indoor use., without local exhaust ventilation, without respiratory protection, liquid, Gaseous form	Worker - inhalative, long-term - local	0,01mg/m³	< 0,01
PROC2, PROC3, PROC4, PROC5, PROC8b, PROC15	Highest exposure, Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, liquid, Gaseous form	worker inhalation, acute and long term - systemic	0,21mg/m³	0
PROC5, PROC8a, PROC9	Highest exposure, Indoor use., with RPE (95%), with local exhaust	worker inhalation, acute and long term - systemic	0,53mg/m³	0,01

	ventilation, during 1 - 4 hours, liquid, Gaseous form			
Relevant for all PROCs	Highest exposure, Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, short-term - local	0,53mg/m³	0,01
PROC2, PROC8b, PROC15	Highest exposure, Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, long-term - local	0,11mg/m³	0,01
PROC3, PROC4	Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, long-term - local	0,21mg/m³	0,02
PROC5, PROC8a	Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, long-term - local	0,53mg/m³	0,04
PROC9	Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, long-term - local	0,43mg/m³	0,03
PROC1	Indoor use., with gloves, (90% efficiency), without local exhaust ventilation, Aqueous form, Concentrations >= 0% - <= 25%	worker dermal, short and long term - systemic	0,03mg/kg bw/day	0,01
PROC2, PROC3, PROC5, PROC8a, PROC15	Indoor use., with gloves, (90% efficiency), with local exhaust ventilation, Aqueous form, Concentrations >= 0% - <= 25%	worker dermal, short and long term - systemic	0,01mg/kg bw/day	< 0,01
PROC4, PROC8b, PROC9	Indoor use., with gloves, (90% efficiency), with local exhaust ventilation, Aqueous form, Concentrations >= 0% -	worker dermal, short and long term - systemic	0,07mg/kg bw/day	0,01

	<= 25%			
PROC1	Indoor use., without local exhaust ventilation, without respiratory protection, Aqueous form, Concentrations >= 0% - <= 25%	worker inhalation, acute and long term - systemic	0,01mg/m³	< 0,01
PROC1	Indoor use., without local exhaust ventilation, without respiratory protection, Aqueous form, Concentrations >= 0% - <= 25%	Worker - inhalative, short-term - local	0,01mg/m³	< 0,01
PROC1	Indoor use., without local exhaust ventilation, without respiratory protection, Aqueous form, Concentrations >= 0% - <= 25%	Worker - inhalative, long-term - local	0,01mg/m³	< 0,01
PROC2, PROC3, PROC4, PROC5, PROC8b, PROC15	Highest exposure, Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, Aqueous form, Concentrations >= 0% - <= 25%	worker inhalation, acute and long term - systemic	0,21mg/m³	0
PROC5, PROC8a, PROC9	Highest exposure, Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours	worker inhalation, acute and long term - systemic	0,53mg/m³	0,01
Relevant for all PROCs	Highest exposure, Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, Aqueous form, Concentrations >= 0% - <= 25%	Worker - inhalative, short-term - local	0,53mg/m³	0,01
PROC2, PROC8b, PROC15	Highest exposure, Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, Aqueous form, Concentrations >= 0% - <= 25%	Worker - inhalative, long-term - local	0,11mg/m³	0,01
PROC3, PROC4	Indoor use., with RPE (95%), with local exhaust	Worker - inhalative, long-term - local	0,21mg/m³	0,02

	ventilation, during 1 - 4 hours, Aqueous form, Concentrations >= 0% - <= 25%			
PROC5, PROC8a	Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, Aqueous form, Concentrations >= 0% - <= 25%	Worker - inhalative, long-term - local	0,53mg/m³	0,04
PROC9	Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, Aqueous form, Concentrations >= 0% - <= 25%	Worker - inhalative, long-term - local	0,43mg/m³	0,03

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

Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Health
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For further information on the assessment method, see: http://www.ecetoc.org/tra

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 3: 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) PROC15: Use as laboratory reagent	
Environmental Release Categories	ERC2: Formulation of preparations	
Activity	Formulation, mixing/ blending in batch or continuous processes, pelletting, compression, transfer and packaging, Loading (including marine vessel/barge, rail/road car and IBC loading) including its distribution	
2.1 Contributing scenario controlling environmental exposure for: ERC2		
Readily biodegradable.		
Amount used	Annual amount per site	1 Million tonnes/year
	Amounts used in the EU (tonnes/year)	3,8 Million tonnes/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18.000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	10
Other given operational conditions affecting environmental exposure	Number of emission days per year	330
	Emission or Release Factor: Air	74000 kg/day
	Emission or Release Factor: Water	2 %
	Indoor use.	
Technical conditions and measures at process level (source) to prevent release	Air	Exhaust air purification with scrubber
	Water	Wastewaters are generally treated on site by

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		chemical and/or biological methods before release to the municipal STP or to the environment., Do not release wastewater directly into environment., All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments. (Degradation effectiveness: 100 %)
	All production steps are enclosed and the level of containment is high	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	On-site waste water treatment
	Sludge Treatment	Do not apply industrial sludge to natural soils., Do not apply STP sludge on agricultural soil, All sludge is collected and incinerated or sent to landfill.
	Type of Sewage Treatment Plant	Domestic sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
	Percentage removed from waste water	100 %
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Solid wastes should be disposed of via landfill or incineration
Conditions and measures related to external recovery of waste	Recovery Methods	There is no envisaged external recovery of waste.
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)	liquid, gaseous
	Vapour pressure	8600 hPa
Frequency and duration of use	Frequency of use	220 days/year
	Avoid carrying out operation for more than 4 hours.	
Human factors not influenced by risk management	Breathing volume	10 m3/8 hours
	Exposed skin surface	480 cm²
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV).(except PROC1)	
	Handle substance within a closed system. Transfer via enclosed lines. Pipelines and vessels are sealed and insulated Store substance within a closed system. Provide extraction ventilation at points where emissions occur.	
Organisational measures to	Ensure operatives are trained to minimise exposures.	

prevent /limit releases, dispersion and exposure	Employees must be trained in the proper use of PPE, and when to use it Ensure control measures are regularly inspected and maintained. Exposure and biological monitoring of operators is regularly performed Monitor effectiveness of control measures	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency: 90 %)	
	Wear respiratory protection (Efficiency: 95 %)	
	Wear suitable protective clothing, aprons, shield and suits	
2.3 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15		
Activity	application as solution	
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
	Physical Form (at time of use)	Aqueous solution
	Vapour pressure	287 hPa
Frequency and duration of use	Frequency of use	220 days/year
	Avoid carrying out operation for more than 4 hours.	
Human factors not influenced by risk management	Breathing volume	10 m3/8 hours
	Exposed skin surface	480 cm²
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV).(except PROC1)	
	Handle substance within a closed system. Transfer via enclosed lines. Pipelines and vessels are sealed and insulated Store substance within a closed system. Provide extraction ventilation at points where emissions occur.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures. Employees must be trained in the proper use of PPE, and when to use it Ensure control measures are regularly inspected and maintained. Exposure and biological monitoring of operators is regularly performed Monitor effectiveness of control measures	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency: 90 %)	
	Wear respiratory protection (Efficiency: 95 %)	
	Wear suitable protective clothing, aprons, shield and suits	

3. Exposure estimation and reference to its source

Environment

EUSES 2.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC2	Highest exposure	Fresh water	PEC	0,00013mg/l	0,045
ERC2	Highest exposure	Marine water	PEC	0,0000120mg/l	0,011

Workers

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Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	Indoor use., with gloves, (90% efficiency), without local exhaust ventilation, liquid, Gaseous form	worker dermal, short and long term - systemic	0,03mg/kg bw/day	0,01
PROC2, PROC3, PROC5, PROC8a, PROC15	Indoor use., with gloves, (90% efficiency), with local exhaust ventilation, liquid, Gaseous form	worker dermal, short and long term - systemic	0,01mg/kg bw/day	< 0,01
PROC4, PROC8b, PROC9	Indoor use., with gloves, (90% efficiency), with local exhaust ventilation, liquid, Gaseous form	worker dermal, short and long term - systemic	0,07mg/kg bw/day	0,01
PROC1	Indoor use., without local exhaust ventilation, without respiratory protection, liquid, Gaseous form	worker inhalation, acute and long term - systemic	0,01mg/m³	< 0,01
PROC1	Indoor use., without local exhaust ventilation, without respiratory protection, liquid, Gaseous form	Worker - inhalative, short-term - local	0,01mg/m³	< 0,01
PROC1	Indoor use., without local exhaust ventilation, without respiratory protection, liquid, Gaseous form	Worker - inhalative, long-term - local	0,01mg/m³	< 0,01
PROC2, PROC3, PROC4, PROC5, PROC8b, PROC15	Highest exposure, Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, liquid, Gaseous form	worker inhalation, acute and long term - systemic	0,21mg/m³	0
PROC5, PROC8a, PROC9	Highest exposure, Indoor use., with RPE (95%), with local exhaust	worker inhalation, acute and long term - systemic	0,53mg/m³	0,01

	ventilation, during 1 - 4 hours, liquid, Gaseous form			
Relevant for all PROCs	Highest exposure, Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, short-term - local	0,53mg/m³	0,01
PROC2, PROC8b, PROC15	Highest exposure, Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours	Worker - inhalative, long-term - local	0,11mg/m³	0,01
PROC3, PROC4	Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, long-term - local	0,21mg/m³	0,02
PROC5, PROC8a	Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, long-term - local	0,53mg/m³	0,04
PROC9	Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, long-term - local	0,43mg/m³	0,03
PROC1	Indoor use., with gloves, (90% efficiency), without local exhaust ventilation, Aqueous form, Concentrations >= 0% - <= 25%	worker dermal, short and long term - systemic	0,03mg/kg bw/day	0,01
PROC2, PROC3, PROC5, PROC8a, PROC15	Indoor use., with gloves, (90% efficiency), with local exhaust ventilation, Aqueous form, Concentrations >= 0% - <= 25%	worker dermal, short and long term - systemic	0,01mg/kg bw/day	< 0,01
PROC4, PROC8b, PROC9	Indoor use., with gloves, (90% efficiency), with local exhaust ventilation, Aqueous form, Concentrations >= 0% - <= 25%	worker dermal, short and long term - systemic	0,07mg/kg bw/day	0,01

PROC1	Indoor use., without local exhaust ventilation, without respiratory protection, Aqueous form, Concentrations >= 0% - <= 25%	worker inhalation, acute and long term - systemic	0,01mg/m³	< 0,01
PROC1	Indoor use., without local exhaust ventilation, without respiratory protection, Aqueous form, Concentrations >= 0% - <= 25%	Worker - inhalative, short-term - local	0,01mg/m³	< 0,01
PROC1	Indoor use., without local exhaust ventilation, without respiratory protection, Aqueous form, Concentrations >= 0% - <= 25%	Worker - inhalative, long-term - local	0,01mg/m³	< 0,01
PROC2, PROC3, PROC4, PROC5, PROC8b, PROC15	Highest exposure, Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, Aqueous form, Concentrations >= 0% - <= 25%	worker inhalation, acute and long term - systemic	0,21mg/m³	0
PROC5, PROC8a, PROC9	Highest exposure, Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, Aqueous form, Concentrations >= 0% - <= 25%	worker inhalation, acute and long term - systemic	0,53mg/m³	0,01
Relevant for all PROCs	Highest exposure, Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, Aqueous form, Concentrations >= 0% - <= 25%	Worker - inhalative, short-term - local	0,53mg/m³	0,01
PROC2, PROC8b, PROC15	Highest exposure, Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, Aqueous form, Concentrations >= 0% - <= 25%	Worker - inhalative, long-term - local	0,11mg/m³	0,01
PROC3, PROC4	Indoor use., with RPE	Worker - inhalative, long-	0,21mg/m³	0,02

	(95%), with local exhaust ventilation, during 1 - 4 hours, Aqueous form, Concentrations >= 0% - <= 25%	term - local		
PROC5, PROC8a	Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, Aqueous form, Concentrations >= 0% - <= 25%	Worker - inhalative, long-term	0,53mg/m³	0,04
PROC9	Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, Aqueous form, Concentrations >= 0% - <= 25%	Worker - inhalative, long-term	0,43mg/m³	0,03

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

Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Health
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For further information on the assessment method, see: http://www.ecetoc.org/tra

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 4: Industrial use		
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) 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 PROC13: Treatment of articles by dipping and pouring PROC15: Use as laboratory reagent PROC19: Hand-mixing with intimate contact and only PPE available	
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 ERC6b: Industrial use of reactive processing aids ERC7: Industrial use of substances in closed systems	
2.1 Contributing scenario controlling environmental exposure for: ERC4, ERC5, ERC6b, ERC7		
Readily biodegradable.		
Amount used	Annual amount per site	25000 ton(s)/year
	Amounts used in the EU (tonnes/year)	354000 ton(s)/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18.000 m3/d
	Dilution Factor (River)	10
Other given operational conditions affecting environmental exposure	Number of emission days per year	330
	Emission or Release Factor: Air	70000 kg/day
	Indoor use.	
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and	Air	Exhaust air purification with scrubber
	Water	Wastewaters are generally treated on site by chemical and/or biological methods before release

measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site		to the municipal STP or to the environment., Do not release wastewater directly into environment., All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments. (Degradation effectiveness: 100 %)
	All production steps are enclosed and the level of containment is high	
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	On-site waste water treatment
	Sludge Treatment	Do not apply industrial sludge to natural soils., Do not apply STP sludge on agricultural soil, All sludge is collected and incinerated or sent to landfill.
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Solid wastes should be disposed of via landfill or incineration
Conditions and measures related to external recovery of waste	Recovery Methods	There is no envisaged external recovery of waste.
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC13, 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, gaseous
	Vapour pressure	8600 hPa
Frequency and duration of use	Frequency of use	220 days/year
	Avoid carrying out operation for more than 4 hours.	
Human factors not influenced by risk management	Breathing volume	10 m3/8 hours
	Exposed skin surface	480 cm²
Other operational conditions affecting workers exposure	Indoor	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV).(except PROC1)	
	Handle substance within a closed system. Transfer via enclosed lines. Pipelines and vessels are sealed and insulated Store substance within a closed system. Provide extraction ventilation at points where emissions occur.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures. Employees must be trained in the proper use of PPE, and when to use it Ensure control measures are regularly inspected and maintained. Exposure and biological monitoring of operators is regularly performed Monitor effectiveness of control measures	
Conditions and measures related	Wear chemically resistant gloves (tested to EN374) in combination with specific	

to personal protection, hygiene and health evaluation	activity training. (Efficiency: 90 %)
	Wear respiratory protection (Efficiency: 95 %)
	Wear suitable protective clothing, aprons, shield and suits

2.3 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC15, PROC19

Activity	application as solution	
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 25 %.
	Physical Form (at time of use)	Aqueous solution
	Vapour pressure	287 hPa
Frequency and duration of use	Frequency of use	220 days/year
	Avoid carrying out operation for more than 4 hours.	
Human factors not influenced by risk management	Breathing volume	10 m3/8 hours
	Exposed skin surface	480 cm²
Other operational conditions affecting workers exposure	Indoor	
	Limit the substance content in the mixture to 10 %.(PROC19)	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV).(except PROC1)	
	Handle substance within a closed system. Transfer via enclosed lines. Pipelines and vessels are sealed and insulated Store substance within a closed system. Provide extraction ventilation at points where emissions occur.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures. Employees must be trained in the proper use of PPE, and when to use it Ensure control measures are regularly inspected and maintained. Exposure and biological monitoring of operators is regularly performed Monitor effectiveness of control measures	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency: 90 %)	
	Wear respiratory protection (Efficiency: 95 %)	
	Wear suitable protective clothing, aprons, shield and suits	

3. Exposure estimation and reference to its source

Environment

EUSES 2.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC4	Highest exposure	Fresh water	PEC	0,000108mg/l	0,098
ERC4	Highest exposure	Marine water	PEC	0,0000231mg/l	0,021

ERC5	Highest exposure	Fresh water	PEC	0,0000558mg/l	0,051
ERC5	Highest exposure	Marine water	PEC	0,0000121mg/l	0,011
ERC6b	Highest exposure	Fresh water	PEC	< 0,000001mg/l	0,0001
ERC6b	Highest exposure	Marine water	PEC	< 0,000001mg/l	0,0002
ERC7	Highest exposure	Fresh water	PEC	< 0,000001mg/l	0,005
ERC7	Highest exposure	Marine water	PEC	< 0,000001mg/l	0,0011

Workers

ECETOC TRA

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	Indoor use., with gloves, (90% efficiency), without local exhaust ventilation	worker dermal, short and long term - systemic	0,03mg/kg bw/day	0,01
PROC2, PROC3, PROC5, PROC8a, PROC15	Indoor use., with gloves, (90% efficiency), with local exhaust ventilation	worker dermal, short and long term - systemic	0,01mg/kg bw/day	< 0,01
PROC4, PROC8b, PROC9	Indoor use., with gloves, (90% efficiency), with local exhaust ventilation	worker dermal, short and long term - systemic	0,07mg/kg bw/day	0,01
PROC1	Indoor use., without local exhaust ventilation, without respiratory protection, liquid, Gaseous form	worker inhalation, acute and long term - systemic	0,01mg/m³	< 0,01
PROC1	Indoor use., without local exhaust ventilation, without respiratory protection, liquid, Gaseous form	Worker - inhalative, short-term - local	0,01mg/m³	< 0,01
PROC1	Indoor use., without local exhaust ventilation, without respiratory protection, liquid, Gaseous form	Worker - inhalative, long-term - local	0,01mg/m³	< 0,01
PROC2, PROC3, PROC4, PROC8b, PROC15	Highest exposure, Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4	worker inhalation, acute and long term - systemic	0,21mg/m³	0

	hours, liquid, Gaseous form			
PROC5, PROC8a, PROC9, PROC13	Highest exposure, Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, liquid, Gaseous form	worker inhalation, acute and long term - systemic	0,53mg/m³	0,01
Relevant for all PROCs	Highest exposure, Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, short-term - local	0,53mg/m³	0,01
PROC2, PROC8b, PROC15	Highest exposure, Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, long-term - local	0,11mg/m³	0,01
PROC3, PROC4	Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, long-term - local	0,21mg/m³	0,02
PROC5, PROC8a, PROC13	Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, long-term - local	0,53mg/m³	0,04
PROC9	Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, long-term - local	0,43mg/m³	0,03
PROC19	Reduced concentration, 10% w/w, with gloves, (90% efficiency)	worker dermal, short and long term - systemic	1,41mg/kg bw/day	0,2
PROC2, PROC8b, PROC15	Highest exposure, Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, Aqueous form, Concentrations >= 0% - <= 25%	worker inhalation, acute and long term - systemic	0,13mg/m³	0
PROC3, PROC4	Indoor use., with RPE (95%), with local exhaust	worker inhalation, acute and long term - systemic	0,26mg/m³	0,01

	ventilation, during 1 - 4 hours, Aqueous form, Concentrations >= 0% - <= 25%			
PROC5, PROC7, PROC8a, PROC9, PROC10, PROC13	Highest exposure, Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, Aqueous form, Concentrations >= 0% - <= 25%	worker inhalation, acute and long term - systemic	0,66mg/m³	0,01
PROC1, PROC2, PROC3, PROC4, PROC8b, PROC9, PROC15	Highest exposure, Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, Aqueous form, Concentrations >= 0% - <= 25%	Worker - inhalative, short-term - local	0,53mg/m³	0,01
PROC5, PROC7, PROC8a, PROC10, PROC13	Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, Aqueous form, Concentrations >= 0% - <= 25%	Worker - inhalative, short-term - local	0,66mg/m³	0,02
PROC2, PROC8b, PROC15	Highest exposure, Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, Aqueous form, Concentrations >= 0% - <= 25%	Worker - inhalative, long-term - local	0,13mg/m³	0,01
PROC3, PROC4	Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, Aqueous form, Concentrations >= 0% - <= 25%	Worker - inhalative, long-term - local	0,26mg/m³	0,02
PROC5, PROC7, PROC8a, PROC10, PROC13	Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, Aqueous form, Concentrations >= 0% - <= 25%	Worker - inhalative, long-term - local	0,66mg/m³	0,05
PROC9	Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, Aqueous form,	Worker - inhalative, long-term - local	0,53mg/m³	0,04

	Concentrations >= 0% - <= 25%			
PROC19	Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, Aqueous form, Reduced concentration, (max. 10% solution)	worker inhalation, acute and long term - systemic	6,56mg/m³	0,14
PROC19	Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, Aqueous form, Reduced concentration, (max. 10% solution)	Worker - inhalative, short-term - local	6,56mg/m³	0,18
PROC19	Indoor use., with RPE (95%), with local exhaust ventilation, during 1 - 4 hours, Aqueous form, Reduced concentration, (max. 10% solution)	Worker - inhalative, long-term	6,56mg/m³	0,47

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

Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Health
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For further information on the assessment method, see: http://www.ecetoc.org/tra

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 5: Professional use	
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) PROC10: Roller application or brushing PROC11: Non industrial spraying PROC13: Treatment of articles by dipping and pouring PROC15: Use as laboratory reagent PROC19: Hand-mixing with intimate contact and only PPE available PROC20: Heat and pressure transfer fluids in dispersive, professional use but closed systems
Environmental Release Categories	ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8e: Wide dispersive outdoor use of reactive substances in open systems ERC9a: Wide dispersive indoor use of substances in closed systems ERC9b: Wide dispersive outdoor use of substances in closed systems

2.1 Contributing scenario controlling environmental exposure for: ERC8b, ERC8e, ERC9a, ERC9b		
Readily biodegradable.		
Frequency and duration of use	Continuous exposure	Dispersive use.
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	Exhaust air purification with scrubber
	Water	Ensure proper process control to avoid excess waste discharge (temperature, concentration, pH, time)., All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments.
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	On-site waste water treatment, or, Municipal sewage treatment plant
	Percentage removed from waste water	90 %

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC15, PROC19, PROC20		
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, gaseous
	Vapour pressure	8600 hPa
Frequency and duration of use	Frequency of use	220 days/year
	Avoid carrying out operation for more than 4 hours.	
Human factors not influenced by risk management	Breathing volume	10 m3/8 hours
	Exposed skin surface	480 cm²
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV).(except PROC1)	
	Handle substance within a closed system. Transfer via enclosed lines. Pipelines and vessels are sealed and insulated Store substance within a closed system. Provide extraction ventilation at points where emissions occur.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures. Employees must be trained in the proper use of PPE, and when to use it Ensure control measures are regularly inspected and maintained. Exposure and biological monitoring of operators is regularly performed Monitor effectiveness of control measures	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency: 90 %)	
	Wear respiratory protection (Efficiency: 95 %)	
	Wear suitable protective clothing, aprons, shield and suits	

2.3 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC15, PROC19, PROC20		
Activity	application as solution	
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 25 %.
	Physical Form (at time of use)	Aqueous solution
	Vapour pressure	287 hPa
Frequency and duration of use	Frequency of use	220 days/year
	Avoid carrying out operation for more than 4 hours.	
Human factors not influenced by risk management	Breathing volume	10 m3/8 hours
	Exposed skin surface	480 cm²
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV).(except PROC1)	
	Handle substance within a closed system. Transfer via enclosed lines.	

	Pipelines and vessels are sealed and insulated Store substance within a closed system. Provide extraction ventilation at points where emissions occur.
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures. Employees must be trained in the proper use of PPE, and when to use it Ensure control measures are regularly inspected and maintained. Exposure and biological monitoring of operators is regularly performed Monitor effectiveness of control measures
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency: 90 %)
	Wear respiratory protection (Efficiency: 95 %)
	Wear suitable protective clothing, aprons, shield and suits

3. Exposure estimation and reference to its source

Environment

Used EUSES model. The use is assessed to be safe.

Workers

ECETOC TRA

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	Indoor use., with gloves, (90% efficiency), without local exhaust ventilation	worker dermal, short and long term - systemic	0,03mg/kg bw/day	0,01
PROC2, PROC3, PROC5, PROC8a, PROC15, PROC20	Indoor use., with gloves, (90% efficiency), with local exhaust ventilation	worker dermal, short and long term - systemic	0,01mg/kg bw/day	< 0,01
PROC4, PROC8b, PROC9, PROC13	Indoor use., with gloves, (90% efficiency), with local exhaust ventilation	worker dermal, short and long term - systemic	0,07mg/kg bw/day	0,01
PROC11	Indoor use., with gloves, (90% efficiency), with local exhaust ventilation	worker dermal, short and long term - systemic	0,21mg/kg bw/day	0,03
PROC10	Indoor use., with gloves, (90% efficiency), with local exhaust ventilation	worker dermal, short and long term - systemic	0,14mg/kg bw/day	0,02
PROC19	Indoor use., with gloves, (90% efficiency), with local exhaust ventilation, 10% dermal uptake	worker dermal, short and long term - systemic	1,41mg/kg bw/day	0,2
PROC2,	Highest exposure, Indoor	worker inhalation, acute	0,13mg/m³	0

PROC15, PROC8b	use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, liquid, Gaseous form	and long term - systemic		
PROC2, PROC15, PROC8b	Highest exposure, Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, short-term - local	0,13mg/m³	< 0,01
PROC2, PROC15, PROC8b	Highest exposure, Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, long-term - local	0,13mg/m³	0,01
PROC3, PROC4, PROC20	Highest exposure, Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, liquid, Gaseous form	worker inhalation, acute and long term - systemic	0,26mg/m³	0,01
PROC3, PROC4, PROC20	Highest exposure, Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, short-term - local	0,26mg/m³	0,01
PROC3, PROC4, PROC20	Highest exposure, Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, long-term - local	0,26mg/m³	0,02
PROC5, PROC8a, PROC13	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, liquid, Gaseous form	worker inhalation, acute and long term - systemic	0,53mg/m³	0,01
PROC5, PROC8a, PROC13	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, short-term - local	0,53mg/m³	0,01
PROC5, PROC8a, PROC13	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, long-term - local	0,53mg/m³	0,04
PROC9	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4	worker inhalation, acute and long term - systemic	0,43mg/m³	0,01

	hours, liquid, Gaseous form			
PROC9	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, short-term - local	0,43mg/m³	0,01
PROC9	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, liquid, Gaseous form	Worker - inhalative, long-term - local	0,43mg/m³	0,03
PROC5, PROC8a, PROC10, PROC13	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, Concentrations >= 0% - <= 25%	worker inhalation, acute and long term - systemic	0,66mg/m³	0,01
PROC5, PROC8a, PROC10, PROC13	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, Concentrations >= 0% - <= 25%	Worker - inhalative, short-term - local	0,66mg/m³	0,02
PROC5, PROC8a, PROC10, PROC13	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, Concentrations >= 0% - <= 25%	Worker - inhalative, long-term - local	0,66mg/m³	0,05
PROC9	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, Concentrations >= 0% - <= 25%	worker inhalation, acute and long term - systemic	0,53mg/m³	0,01
PROC9	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, Concentrations >= 0% - <= 25%	Worker - inhalative, short-term - local	0,53mg/m³	0,01
PROC9	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, Concentrations >= 0% - <= 25%	Worker - inhalative, long-term - local	0,53mg/m³	0,04
PROC11	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, Concentrations >= 0% - <= 25%	worker inhalation, acute and long term - systemic	5,26mg/m³	0,11

PROC11	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, Concentrations >= 0% - <= 25%	Worker - inhalative, short-term - local	5,26mg/m³	0,15
PROC11	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, Concentrations >= 0% - <= 25%	Worker - inhalative, long-term - local	5,26mg/m³	0,38
PROC19	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, Concentrations >= 0% - <= 25%	worker inhalation, acute and long term - systemic	6,56mg/m³	0,14
PROC19	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, Concentrations >= 0% - <= 25%	Worker - inhalative, short-term - local	6,56mg/m³	0,18
PROC19	Indoor use., with local exhaust ventilation, with RPE (95%), during 1 - 4 hours, Concentrations >= 0% - <= 25%	Worker - inhalative, long-term - local	6,56mg/m³	0,47

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

Environment
The product is not expected to harm the environment when used properly according to directions
Health
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For further information on the assessment method, see: http://www.ecetoc.org/tra

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 6: Consumer use		
Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)	
Chemical product category	PC9a: Coatings and paints, thinners, paint removers PC16: Heat transfer fluids PC35: Washing and cleaning products (including solvent based products) PC39: Cosmetics, personal care products	
Environmental Release Categories	ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8e: Wide dispersive outdoor use of reactive substances in open systems ERC9a: Wide dispersive indoor use of substances in closed systems ERC9b: Wide dispersive outdoor use of substances in closed systems	
Activity	Note: this Exposure Scenario is only relevant for an appropriated use according to the quality grade of the substance delivered	
2.1 Contributing scenario controlling environmental exposure for: ERC8b, ERC8e, ERC9a, ERC9b		
No exposure assessment presented for the environment.		
2.2 Contributing scenario controlling consumer exposure for: PC9a, PC39		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 0,15%
	Physical Form (at time of use)	Aqueous solution
Frequency and duration of use	Frequency of use	1 times/month
	Single exposure	
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Consumer Measures	Wear suitable gloves. Use suitable eye protection.
2.3 Contributing scenario controlling consumer exposure for: PC16		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 0,05%
	Physical Form (at time of use)	Aqueous solution
Frequency and duration of use	Single exposure(Closed system PC16)	
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Consumer Measures	Wear suitable gloves. Use suitable eye protection.
2.4 Contributing scenario controlling consumer exposure for: PC35		

Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 4%
	Physical Form (at time of use)	Aqueous solution
Frequency and duration of use	Frequency of use	1 Times per week
	Single exposure	
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Consumer Measures	Wear suitable gloves. Use suitable eye protection.

3. Exposure estimation and reference to its source

Environment

No exposure assessment presented for the environment.

Consumers

Consumers

The ConsExpo model has been used to estimate consumer exposures unless otherwise indicated. Predicted exposures are not expected to exceed the applicable exposure limits when the operational conditions/risk management measures given in section 2 are implemented.

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

Health
The ConsExpo model has been used to estimate consumer exposures unless otherwise indicated.

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VAT number	BE0405317567	NL001375945B01
recall procedure available	Yes	
emergency number (24/365)	+32 (0)56 77 69 44	+31 (0)78 6544 944
QUALITY SYSTEMS		
ISO 9001	Yes	Yes
ISO 14001	Yes	Yes
ISO 22000	Yes	Yes
FSSC 22000	Yes	Yes
GMP+ -feed	Yes	Yes
OHSAS18001	-	Yes
ESAD	Yes	Yes
other	-	AEO