

**ETHYL ACETATE****Code : 12489****SECTION 1. Identification of the substance/mixture and of the company/undertaking****1.1. Product identifier**

Chemical description : Ethyl acetate , Ethyl ethanoate , Acetoxy ethane .  
Type of product : Pure product .  
Reach registration number : 01-2119475103-46

**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).  
Not for use in aerosol dispensers for entertainment and decorative purposes (in accordance with Annex XVII to Regulation (EC) No 1907/2006) (40. Substances meeting the criteria of flammability in Directive 67/548/EEC and classified as flammable, highly flammable or extremely flammable regardless of whether they appear in Part 3 of Annex VI to Regulation (EC) No 1272/2008 or not).

**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 : België : 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 Directive 67/548/EEC or 1999/45/EC**

Highly flammable (F; R11)  
Irritant (Xi; R36)  
Other (-; R66-67)

**Classification according to Regulation (EC) No 1272/2008**

Flammable liquids - Category 2 - Danger (Flam. Liq. 2; H225)  
Eye irritation - Category 2 - Warning (Eye Irrit. 2; H319)  
Specific Target Organ Toxicity - Single exposure - Narcotic effects - Category 3 - Warning (STOT SE 3; H336)  
Specific Target Organ Toxicity - Repeated exposure - Skin dryness or cracking (STOT RE; EUH066)

**2.2. Label elements****Label in accordance with Regulation (EC) No 1272/2008**

- Dangerous ingredient(s) : Ethyl acetate

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**SECTION 2. Hazards identification (continued)**

• Hazard pictogram(s)



• Signal word

: Danger

• Hazard statements

: H225 - Highly flammable liquid and vapour. H319 - Causes serious eye irritation. H336 - May cause drowsiness or dizziness. EUH066 - Repeated exposure may cause skin dryness or cracking.

• Precautionary statements

- Prevention

: P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P261 - Avoid breathing dust, fume, gas, mist, vapours, spray. P280 - Wear protective gloves and eye or face protection.

\* - Response

: P303+P361+P353 - IF ON SKIN (or hair) : Remove immediately all contaminated clothing. Rinse skin with water/shower. P304+P340 - IF INHALED : Remove to fresh air and keep at rest in a position comfortable for breathing. P312 - Call a POISON CENTER or doctor if you feel unwell.

**2.3. Other hazards**

Physical/chemical hazards

: The product decomposes slowly on exposure to light or water.

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; even faster by spraying.

Hazards for the environment

: No significant danger. This product is no substance or contains no PBT or vPvB (in accordance with Annex XIII).

Hazards for the safety

: Vapour may form explosive mixture with air.

**SECTION 3. Composition/information on ingredients**

**3.1. Substances**

Name component(s)	Weight %	CAS nr	EINECS nr	Index nr	Reach nr	CLASSIFICATION
Ethyl acetate	: > 99.5 %	141-78-6	205-500-4	607-022-00-5	01-2119475103-46	F; R11 R66 R67 Xi; R36 ----- Flam. Liq. 2; H225 Eye Irrit. 2; H319 STOT SE 3; H336 STOT RE; EUH066

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

**SECTION 4. First aid measures**

**4.1. Description of first aid measures**

General

: In case of doubt or persistent symptoms, call a physician. 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. Get immediate medical advice/attention.

- Skin Contact

: Remove contaminated clothing. Rinse skin immediately with plenty of water. ( at least 20 ' ) (shower if necessary). Consult doctor if irritation develops.

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- Eye Contact : Rinse immediately thoroughly and long (at least 15 min.) with plenty of water. Remove contact lenses. Consult eye doctor.
- \* - Ingestion : DO NOT INDUCE VOMITING. Rinse mouth with water. Give 2 glasses of water to drink. Get immediate medical advice/attention.

**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 NVCI or the Belgian Poison center.

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

Extinguishing Media

- Suitable : Extinguishing powder , Alcohol resistant foam , Carbon dioxide (CO<sub>2</sub>) , Water spray .
- Insuitable : Heavy water stream .

**5.2. Special hazards arising from the substance or mixture**

Special Exposure Hazards : Fire may liberate carbon oxides (CO) and smoke.

**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 : Eliminate every possible source of ignition (open fire, sparks, smoking, ...). 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 and eliminate as hazardous waste. Residue is to be washed down with plenty of water.

**6.4. Reference to other sections**

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

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**SECTION 7. Handling and storage**

**7.1. Precautions for safe handling**

- \* Handling : AVOID FOG TRANSFORMATION !  
Avoid breathing vapour and contact with skin, eyes and clothing. Wear recommended personal protective equipment. (See section 8)  
When using, do not eat, drink or smoke.  
Wash hands before and after working with the product.  
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 dry, cool, dark, well ventilated and fireproof place.  
All dangerous products should be placed on a drip tray or should be barreled.  
Keep away from : Oxidizing agents , Strong acids , Strong bases .
- \* Protection against Fire and Explosion : Remove all sources of ignition (open fire, sparks, smoking, ...).  
Vapour is heavier than air and spreads along the ground with risk of ignition on distance.  
Do not use compressed air to either agitate or transfer contents of storage containers (tanks) / shipping drums containing this material.  
Take measures against electrostatic discharges.  
Use explosionproof equipment.  
Use spark-arm implement.  
Sufficiently earthen.
- Packaging Material : Stainless steel , Polypropylene , Glass .
- \* Insuitable Packaging Material : Several synthetics , Aluminium .

**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 : Ethyl acetate : Limit value (BE) : 400 ppm (1461 mg/m<sup>3</sup>) (2014)
- Biological limit values : They will be included when available.
- DNELs :
  - Ethyl acetate : Worker, acute - local effects, inhalation : 1468 mg/m<sup>3</sup>
  - Ethyl acetate : Worker, acute - systemic effects, inhalation : 1468 mg/m<sup>3</sup>
  - Ethyl acetate : Worker, long-term - local effects, inhalation : 734 mg/m<sup>3</sup>
  - Ethyl acetate : Worker, long-term - systemic effects, dermal : 63 mg/kg bw/ day
  - Ethyl acetate : Worker, long-term - systemic effects, inhalation : 34 mg/m<sup>3</sup>
  - Ethyl acetate : Consumer, acute - local effects, inhalation : 734 mg/m<sup>3</sup>
  - Ethyl acetate : Consumer, acute - systemic effects, inhalation : 734 mg/m<sup>3</sup>
  - Ethyl acetate : Consumer, long-term - local effects, inhalation : 367 mg/m<sup>3</sup>
  - Ethyl acetate : Consumer, long-term - systemic effects, dermal : 37 mg/kg bw/ day
  - Ethyl acetate : Consumer, long-term - systemic effects, oral : 4,5 mg/kg bw/ day
  - Ethyl acetate : Consumer, long-term - systemic effects, inhalation : 367 mg/m<sup>3</sup>
- PNECs :
  - Ethyl acetate : Fresh water : 0,26 mg/l
  - Ethyl acetate : Marine water : 0,026 mg/l
  - Ethyl acetate : Fresh water sediment : 0,34 mg/kg
  - Ethyl acetate : Marine water sediment : 0,034 mg/kg
  - Ethyl acetate : Soil : 0,22 mg/kg
  - Ethyl acetate : Sewage treatment plant : 650 mg/l

**8.2. Exposure controls**

Engineering Measures : Ventilation , ( Through the floor ), Local exhaust .

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**SECTION 8. Exposure controls/personal protection (continued)**

Personal Protection Equipment

- Respiratory protection : CE-approved mask for organic vapours and solvents (type A, brown).
- Skin protection : Suitable 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 : 0,7 mm  
- breakthrough time : 120'
- 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 : Clear , Colourless .
- Odour : Fruity odour .
- Odour threshold : 6 - 75 ppm
- pH value : Not applicable.
- Melting/Freezing point : -84 °C
- Boiling Point/Range (1013 hPa) : 77 °C
- Flash point : -4 °C
- Fire hazard : P1
- Evaporation rate : 4,5 - 6 ( Butyl acetate = 1)  
0,4 - 2,4 ( Ether =1)
- \* Explosion limits in air : 2 - 12 vol.%
- Vapour pressure (20°C) : 9,83 kPa
- \* Vapour pressure (50°C) : 37,9 kPa
- \* Relative vapour density (air=1) : 3,0
- \* Relative density of saturated vapour/air mixture (air=1) : 1,2
- Density (20°C) : 0,900 kg/l
- Solubility in water (20°C) : 8 g/100 ml
- Soluble in : Acetone , Benzene , Chloroform .
- Miscible with : Alcohol , Ether .
- Log P Octanol/Water (20°C) : 0,68 ( experimental )
- Auto-ignition temperature : 427 °C
- \* Minimum ignition energy : 0,46mJ
- Decomposition temperature : No data available.
- Viscosity (20°C) : 0,44 mPa.s ( Dynamic )
- Explosive properties : No chemical groups associated with explosive properties .
- Oxidizing properties : No chemical groups associated with oxidizing properties .

**9.2. Other information**

- Surface tension (20°C) : 24 mN/m
- \* Specific leading : 4,6\*10E4 pS/m
- % Volatiles (by weight) : > 99,5

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**SECTION 10. Stability and reactivity**

**10.1. Reactivity**

Reactivity : Reacts violently with oxidizing agents, strong acids and strong lyes.

**10.2. Chemical stability**

Stability : Stable at normal circumstances  
Unstable upon contact with moisture , Light , Air .

**10.3. Possibility of hazardous reactions**

- \* Hazardous reactions : The product decomposes slowly on exposure to light or water.  
Attacks many metals with liberation hydrogen gas, which is flammable and forms explosive mixture with air.

**10.4. Conditions to avoid**

Conditions to avoid : High temperatures .

**10.5. Incompatible materials**

- \* Materials to avoid : Oxidizing agents , Strong acids , Strong bases , Aluminium .

**10.6. Hazardous decomposition products**

Hazardous Decomposition Products : Acetic acid , Ethanol , Carbon oxides .

**SECTION 11. Toxicological information**

**11.1. Information on toxicological effects**

Acute toxicity

- \* - Inhalation : High concentrations may produce central nervous system depression and loss of consciousness (diminuation of consciousness).  
Symptoms include: Sore throat , Cough , Confusion , Dizziness , Sleepiness , Unconsciousness .  
• Ethyl acetate : LC50 (Rat, inhalation, 6 h) : 22,5 mg/l
- \* - Skin contact : Symptoms include: Redness , Pain , Dry skin .  
• Ethyl acetate : LD50 (Rabbit, dermal) : >20000 mg/kg
- \* - Ingestion : After swallowing, some drops of liquid can enter the lungs (aspiration), which may cause pneumonia.  
Symptoms include: Nausea , See "Inhalation" .  
• Ethyl acetate : LD50 (Rabbit, oral) : 4934 mg/kg ( OECD Guideline 401)
- \* Skin corrosion/irritation : Skin contact can damage eczema.
- \* Serious eye damage/irritation : Rabbit : Not irritant ( OECD Guideline 405)  
Causes serious eye irritation. ( Classification of the substance according to Annex VI (of the Regulation (EC) no 1272/2008) under discussion as the classification does not correspond to the conclusion from the test )
- Aspiration hazard : Long contact 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 : Vapours may cause drowsiness and dizziness.
- \* Specific target organ toxicity - repeated exposure : To human : Repeated exposure may cause skin dryness or cracking.

**ETHYL ACETATE****Code : 12489****SECTION 12. Ecological information****12.1. Toxicity**

- \* Ecotoxicity : • Ethyl acetate : LC50 (Fish, 96 h) : 230 mg/l (Pimephales Promelas)  
• Ethyl acetate : EC50 (Daphnia magna, 48 h) : 165 mg/l  
• Ethyl acetate : NOEC (Algae, 72 h) : >100 mg/l (Desmodesmus subspicatus)  
• Ethyl acetate : NOEC (Daphnia magna, 21 d) : 2,4 mg/l ( OECD Guideline 201)

**12.2. Persistence and degradability**

Persistence and degradability : • Ethyl acetate : Persistence and degradability : Readily biodegradable .

**12.3. Bioaccumulative potential**

Bioaccumulation : • Ethyl acetate : Bioaccumulation : Bioaccumulation not expected .

**12.4. Mobility in soil**

- \* Mobility : • Ethyl acetate : Mobility : Low adsorption potential in soil.

**12.5. Results of PBT and vPvB assessment**

Evaluation : • Ethyl acetate : 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 : 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 : 1173

**14.2. UN proper shipping name**

ADR/RID Name : UN 1173 Ethyl acetate, 3, II, (D/E)

ADN Name : UN 1173 Ethyl acetate , 3, II

IMDG Name : UN 1173 Ethyl acetate , 3, II, (-4°C)

- \* IATA Name : UN 1173 Ethyl acetate, 3, II

**14.3. Transport hazard classe(s)**

Class : 3

**14.4. Packing group**

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**SECTION 14. Transport information (continued)**

Packaging Group : II

**14.5. Environmental hazards**

Environmentally hazard : No

Marine pollutant : No

**14.6. Special precautions for user**

Danger number : 33

Hazard Label(s) : 3

EmS-N° : F-E , S-D

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

Type ship : 3

Pollution category : Z

**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.  
 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.  
 Inventory of the United States (TSCA): Listed in inventory.

NFPA n° : 1-3-0

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  
 Directive 1999/13/EC of the Council of 11 March 1999 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain activities and installations  
 Directive 2004/42/CE of the European Parliament and of the Council of 21 April 2004 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products and amending Directive 1999/13/EC  
 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 : 11  
 Decontamination exertion : B

**15.2. Chemical Safety Assessment**

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



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**SECTION 16. Other information**

This safety data sheet has been drawn up in accordance with Regulation (EU) No 453/2010.  
This safety data sheet is exclusively made for industrial/professional use.

\* Has changed compared to previous revision.

- \* Changes : Section 1 , Section 2 , Section 3 , Section 4 , Section 7 , Section 8 , Section 9 , Section 10 , Section 11 , Section 12 , Section 14 , Section 15 , Section 16 .
- Sources of used key data : The information contained herein is based on the present state of our knowledge ( Producer(s) , Chemical cards , ...).  
See also on the webaddress:  
<http://apps.echa.europa.eu/registered/registered-sub.aspx#search>
- R-phrases(s) : R11 - Highly flammable.  
R36 - Irritating to eyes.  
R66 - Repeated exposure may cause skin dryness or cracking.  
R67 - Vapours may cause drowsiness and dizziness.
- (EU)H-statement(s) : H225 - Highly flammable liquid and vapour.  
H319 - Causes serious eye irritation.  
H336 - May cause drowsiness or dizziness.  
EUH066 - Repeated exposure may cause skin dryness or cracking.
- \* List of abbreviations 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  
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 Irrit. 2 : Eye irritation - Category 2  
Flam. Liq. 2 : Flammable liquids - Category 2  
IMDG (International Maritime Dangerous Goods code)  
LC50 : median Lethal Concentration  
LD50 : median Lethal Dose  
NFPA (National Fire Protection Association) or fire diamant  
NOEC (No Observed Effect Concentration)  
NVC1 : 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  
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  
STOT SE 3 : Specific Target Organ Toxicity - Single exposure - Category 3  
STOT RE : Specific Target Organ Toxicity - Repeated exposure  
WGK (Wassergefährdungsklasse) : 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.

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BRENNTAG denies all responsibility for loss or damage resulting from the use of these data.

End of document

*SAFETY DATA SHEET according to Regulation (EC) No. 1907/2006*

**Ethyl acetate**

Version 2.0

Print Date 06.12.2012

Revision Date 06.12.2012

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, 8b	1	NA	ES1389
2	Distribution of substance	3	8, 9	NA	1, 2, 8a, 8b, 9	2	NA	ES1393
3	Formulation & (re)packing of substances and mixtures	3	10	NA	1, 2, 3, 4, 5, 8a, 8b, 9	2	NA	ES1391
4	Uses in coatings	22	NA	NA	1, 2, 8a, 8b, 10, 11, 13, 19	8a, 8d	NA	ES1404
5	Uses in coatings	21	NA	1, 9a	NA	8a	NA	ES1408
6	Application of paints, coatings and other mixtures by way of spraying	3	NA	NA	1, 2, 7, 8a, 8b	4	NA	ES1397
7	Application of paints, coatings and other mixtures by way of non-spraying	3	NA	NA	1, 2, 8a, 8b, 10, 13	4	NA	ES1400
8	Use in agrochemicals	22	NA	NA	2, 4, 8a, 8b, 11, 13	8a, 8c, 8d, 8f	NA	ES8752
9	Use in agrochemicals	21	NA	27	NA	8a, 8d	NA	ES8754
10	Use in laboratories	3	NA	NA	15	4	NA	ES1402
11	Use in laboratories	22	NA	NA	15	8a	NA	ES1406
12	Use as extraction agent and/or processing aid	3	9	NA	1, 2, 3, 4, 8a, 8b	1	NA	ES1395
13	Other consumer uses	21	NA	39	NA	8a	NA	ES1410

**SAFETY DATA SHEET according to Regulation (EC) No. 1907/2006**

**Ethyl acetate**

Version 2.0

Print Date 06.12.2012

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**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 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 percentage substance in the product up to 100 % (unless stated differently).
Amount used	Annual site tonnage (tons/year):	150000 tonnes
	Daily amount per site	500 kg
	Fraction used at the main local source.	1
	Annually total	150000 tonnes
Frequency and duration of use	Continuous exposure	300 days/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)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	2 %
	Emission or Release Factor: Water	10 %
	Emission or Release Factor: Soil	0 %
	Outdoor use.	
	Processing temperature: Ambient temperature	
	Processing pressure: Ambient pressure.	
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	Air	Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation, Use appropriate emission abatement equipment from LEV systems if required by local legislation.

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Organizational measures to prevent/limit release from the site

Air	Apply technical measures aiming at reducing releases to air. (Efficiency: > 70 %)
Water	Onsite wastewater treatment required
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %)
Water	Apply technical measures aiming at reducing and cleaning of wastewater. (Degradation effectiveness: > 87 %)
Soil	Soil emission controls are not applicable as there is no direct release to soil.
Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements.	

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
Percentage removed from waste water	87 %
Sludge Treatment	Disposal or recovery

Conditions and measures related to external treatment of waste for disposal

Waste treatment	Hazardous waste incineration., Dispose for use in recycled fuels.
Disposal methods	Dispose of waste product or used containers according to local regulations.

**2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, 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	98 hPa
Amount used	n.a. in tier 1 TRA MODEL	
Frequency and duration of use	Frequency of use	< 240 days/year
	Frequency of use	> 4 days/week
	Exposure duration per day	> 240 min
	Exposure duration per day	< 240 min(PROC8b)
Human factors not influenced by risk management	Exposed skin areas	Two hands face side only. 480 cm <sup>2</sup>
Other operational conditions affecting workers exposure	Outdoor use.	

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Technical conditions and measures to control dispersion from source towards the worker	General exposures Continuous process	Handle substance within a closed system.(PROC1)
	General exposures Continuous process with sample collection	Handle substance within a closed system.(PROC2)
	Bulk transfers Dedicated facility	Ensure material transfers are under containment or extract ventilation. Provide extraction ventilation at points where emissions occur. Clear transfer lines prior to de-coupling. Retain drain downs in sealed storage pending disposal or for subsequent recycle.(PROC8b)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves (tested to EN374) and eye protection. Butyl rubber gloves offer good protection	

**3. Exposure estimation and reference to its source**

**Environment**

EUSES 2.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC1	---	Fresh water	PEC	0,1001mg/L	0,385
ERC1	---	Fresh water sediment	PEC	0,1329mg/L	0,475
ERC1	---	Marine water	PEC	0,0099mg/kg	0,384
ERC1	---	Marine sediment	PEC	0,0133mg/kg	0,0474
ERC1	---	Soil	PEC	0,0002mg/kg	0,0011
ERC1	---	Sewage treatment plant (STP)	PEC	0,9724mg/L	0,0015
ERC1	---	Total daily intake via local environment	PEC	0,0025mg/kg bw/day	< 0,001

**Workers**

Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC8b	---	Inhalation worker exposure	231,3mg/m <sup>3</sup>	0,317
PROC8b	---	Dermal worker exposure	6,8mg/kg bw/day	0,108
PROC8b	---	Combined worker	39,9mg/kg bw/day	0,633

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| exposure

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

If the local environmental emission conditions deviate significantly from the used default values, please use the below algorithm to estimate the correct local emissions and RCRs:

$PEC_{corrected} = PEC_{calculated} * (\text{local emission fraction}) * (\text{local WWTP flow rate fraction}) * (\text{local river flow rate fraction}) * (\text{local STP efficiency fraction})$

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.

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

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**

Assumes a good basic standard of occupational hygiene is implemented.

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**1. Short title of Exposure Scenario 2: Distribution 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) SU9: Manufacture of fine chemicals
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 PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Environmental Release Categories	ERC2: Formulation of preparations

**2.1 Contributing scenario controlling environmental exposure for: ERC2**

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Amount used	Annual site tonnage (tons/year):	30000 tonnes
	Daily amount per site	500 kg
	Fraction used at the main local source.	1
	Annually total	30000 tonnes
Frequency and duration of use	Continuous exposure	300 days/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)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	2 %
	Emission or Release Factor: Water	10 %
	Emission or Release Factor: Soil	0 %
	Outdoor use.	
	Processing temperature: Ambient temperature	
	Processing pressure: Ambient pressure.	
Technical conditions and measures at process level	Air	Containment should be used to minimize releases to air., Treatment of air emissions is not required for



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(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

	the purposes of REACH compliance but may be needed to comply with other environmental legislation
Water	If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %)
Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements.	

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
Percentage removed from waste water	87 %
Sludge Treatment	Disposal or recovery

Conditions and measures related to external treatment of waste for disposal

Waste treatment	Hazardous waste incineration., Dispose for use in recycled fuels.
Disposal methods	Dispose of waste product or used containers according to local regulations.

**2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC8a, PROC8b, PROC9**

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	98 hPa

Amount used: n.a. in tier 1 TRA MODEL

Frequency and duration of use	Frequency of use	< 240 days/year
	Frequency of use	> 4 days/week
	Exposure duration per day	> 240 min
	Exposure duration per day	60 - 240 min(PROC8a)

Human factors not influenced by risk management: Exposed skin areas: Two hands 960 cm<sup>2</sup>

Other operational conditions affecting workers exposure: Outdoor or in highly ventilated (open) spaces; Indoor use.(PROC8b, PROC9)

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Technical conditions and measures to control dispersion from source towards the worker	General exposures Continuous process	Handle substance within a closed system.(PROC1)
	General exposures Continuous process with sample collection	Handle substance within a closed system.(PROC2)
	Bulk transfers Non-dedicated facility	Use drum pumps or carefully pour from container. Locate bulk storage outdoors.(PROC8a)
	Bulk transfers Dedicated facility	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings. Clear transfer lines prior to de-coupling. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Locate bulk storage outdoors.(PROC8b)
	Drum/batch transfers Filling / preparation of equipment from drums or containers Bulk weighing	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.(PROC9)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves (tested to EN374) and eye protection. Butyl rubber gloves offer good protection	

**3. Exposure estimation and reference to its source**

**Environment**

EUSES 2.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC2	---	Fresh water	PEC	0,179mg/L	0,688
ERC2	---	Marine water	PEC	0,018mg/L	0,688
ERC2	---	Fresh water sediment	PEC	0,239mg/kg	0,854
ERC2	---	Marine sediment	PEC	0,024mg/kg	0,085
ERC2	---	Soil	PEC	0,002mg/kg	0,009
ERC2	---	Sewage treatment plant (STP)	PEC	1,77mg/L	0,003
ERC2	---	Total daily intake via local environment	PEC	0,005mg/kg bw/day	< 0,001

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**Workers**

Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local	0,026mg/m <sup>3</sup>	< 0,001
PROC1	---	Worker - dermal, long-term - systemic	0,34mg/kg bw/day	0,0054
PROC2	---	Worker - inhalative, long-term - local	128,48mg/m <sup>3</sup>	0,18
PROC2	---	Worker - dermal, long-term - systemic	1,37mg/kg bw/day	0,022
PROC8a	---	Worker - inhalative, long-term - local	385,44mg/m <sup>3</sup>	0,53
PROC8a	---	Worker - dermal, long-term - systemic	2,74mg/kg bw/day	0,044
PROC8b	---	Worker - inhalative, long-term - local	9,91mg/m <sup>3</sup>	0,014
PROC8b	---	Worker - dermal, long-term - systemic	0,69mg/kg bw/day	0,011
PROC9	---	Worker - inhalative, long-term - local	73,42mg/m <sup>3</sup>	0,1
PROC9	---	Worker - dermal, long-term - systemic	0,69mg/kg bw/day	0,011

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

If the local environmental emission conditions deviate significantly from the used default values, please use the below algorithm to estimate the correct local emissions and RCRs:

$$PEC_{corrected} = PEC_{calculated} * (\text{local emission fraction}) * (\text{local WWTP flow rate fraction}) * (\text{local river flow rate fraction}) * (\text{local STP efficiency fraction})$$

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.

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

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

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**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
Sectors of end-use	SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)
Process categories	<p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)</p> <p>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p>
Environmental Release Categories	ERC2: Formulation of preparations

**2.1 Contributing scenario controlling environmental exposure for: ERC2**

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Amount used	Annual site tonnage (tons/year):	15000 tonnes
	Daily amount per site	8000 kg
	Fraction used at the main local source.	0,4
	Annually total	60000 tonnes
Frequency and duration of use	Continuous exposure	300 days/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)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0,5 %
	Emission or Release Factor: Water	0,3 %
	Emission or Release Factor: Soil	0,01 %
	Indoor use.	

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<p>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</p>	Air	Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation
	Water	If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.
	Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %)
	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements.	
<p>Conditions and measures related to sewage treatment plant</p>	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2.000 m3/d
	Percentage removed from waste water	87 %
	Sludge Treatment	Disposal or recovery
<p>Conditions and measures related to external treatment of waste for disposal</p>	Waste treatment	Hazardous waste incineration., Dispose for use in recycled fuels., External treatment and disposal of waste should comply with applicable local and/or national regulations.
	Disposal methods	Dispose of waste product or used containers according to local regulations.

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

<p>Product characteristics</p>	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	98 hPa
Amount used	n.a. in tier 1 TRA MODEL	
<p>Frequency and duration of use</p>	Frequency of use	< 240 days/year
	Frequency of use	> 4 days/week
	Exposure duration per day	> 240 min
	Exposure duration per day	< 240 min(PROC8a, PROC8b)
Human factors not influenced by risk management	Exposed skin areas	Two hands 960 cm <sup>2</sup>
Other operational conditions affecting workers exposure	Indoor use.	

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	Outdoor use.(PROC1)	
Technical conditions and measures to control dispersion from source towards the worker	General exposures Continuous process	Handle substance within a closed system.(PROC1)
	General exposures Continuous process with sample collection	Ensure material transfers are under containment or extract ventilation. Provide extraction ventilation at points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).(PROC2)
	Bulk transfers Non-dedicated facility	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). Use drum pumps or carefully pour from container. Locate bulk storage outdoors.(PROC8a)
	Bulk transfers Dedicated facility	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). Clear transfer lines prior to de-coupling. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Locate bulk storage outdoors.(PROC8b)
	Drum/batch transfers Filling / preparation of equipment from drums or containers Bulk weighing	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).(PROC9)
	General exposures Use in contained batch processes	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).(PROC3)
	General exposures Use in contained batch processes with sample collection	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).(PROC4)
	Mixing operations (open	Ensure material transfers are under containment or

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systems) Batch process	extract ventilation. Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).(PROC5)
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Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves (tested to EN374) and eye protection. Butyl rubber gloves offer good protection
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**3. Exposure estimation and reference to its source**

**Environment**

EUSES 2.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC2	---	Fresh water	PEC	0,144mg/L	0,554
ERC2	---	Marine water	PEC	0,0144mg/L	0,554
ERC2	---	Fresh water sediment	PEC	0,192mg/kg	0,686
ERC2	---	Marine sediment	PEC	0,019mg/kg	0,0685
ERC2	---	Soil	PEC	0,0015mg/kg	0,005
ERC2	---	Sewage treatment plant (STP)	PEC	1,416mg/L	0,0022
ERC2	---	Total daily intake via local environment	PEC	0,003mg/kg bw/day	< 0,001

**Workers**

Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local	0,03mg/m <sup>3</sup>	< 0,001
PROC1	---	Worker - dermal, long-term - systemic	0,34mg/kg bw/day	0,0054
PROC2	---	Worker - inhalative, long-term - local	18,35mg/m <sup>3</sup>	0,025
PROC2	---	Worker - dermal, long-term - systemic	0,14mg/kg bw/day	0,0022
PROC3	---	Worker - inhalative, long-term - local	73,42mg/m <sup>3</sup>	0,10
PROC3	---	Worker - dermal, long-term - systemic	0,03mg/kg bw/day	< 0,001

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PROC4	---	Worker - inhalative, long-term - local	73,42mg/m <sup>3</sup>	0,25
PROC4	---	Worker - dermal, long-term - systemic	0,69mg/kg bw/day	0,011
PROC5	---	Worker - inhalative, long-term - local	183,54mg/m <sup>3</sup>	0,301
PROC5	---	Worker - dermal, long-term - systemic	0,07mg/kg bw/day	0,0011
PROC8a	---	Worker - inhalative, long-term - local	55,06mg/m <sup>3</sup>	0,075
PROC8a	---	Worker - dermal, long-term - systemic	0,14mg/kg bw/day	0,0022
PROC8b	---	Worker - inhalative, long-term - local	33,04mg/m <sup>3</sup>	0,075
PROC8b	---	Worker - dermal, long-term - systemic	0,69mg/kg bw/day	0,011
PROC9	---	Worker - inhalative, long-term - local	73,42mg/m <sup>3</sup>	0,10
PROC9	---	Worker - dermal, long-term - systemic	0,69mg/kg bw/day	0,011

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

If the local environmental emission conditions deviate significantly from the used default values, please use the below algorithm to estimate the correct local emissions and RCRs:  
 $PEC_{corrected} = PEC_{calculated} * (\text{local emission fraction}) * (\text{local WWTP flow rate fraction}) * (\text{local river flow rate fraction}) * (\text{local STP efficiency fraction})$   
 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.  
 Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.  
 Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.  
 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**

Assumes a good basic standard of occupational hygiene is implemented.



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**1. Short title of Exposure Scenario 4: Uses in coatings**

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process categories	<p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC10: Roller application or brushing</p> <p>PROC11: Non industrial spraying</p> <p>PROC13: Treatment of articles by dipping and pouring</p> <p>PROC19: Hand-mixing with intimate contact and only PPE available</p>
Environmental Release Categories	<p>ERC8a: Wide dispersive indoor use of processing aids in open systems</p> <p>ERC8d: Wide dispersive outdoor use of processing aids in open systems</p>

**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 100 % (unless stated differently).
Amount used	Daily amount per site	3 kg
	Fraction used at the main local source.	0,002
	Annually total	5000 tonnes
Frequency and duration of use	Continuous exposure	365 days/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)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	90 %
	Emission or Release Factor: Water	90 %
	Emission or Release Factor: Soil	0 %
	Indoor use.	
	Processing temperature: Ambient temperature	
	Processing pressure: Ambient temperature	
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit	Air	Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation

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discharges, air emissions and releases to soil  
Organizational measures to prevent/limit release from the site

Water	If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %)
Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements.	

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
Percentage removed from waste water	87 %
Sludge Treatment	Disposal or recovery

Conditions and measures related to external treatment of waste for disposal

Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
Disposal methods	Dispose of waste product or used containers according to local regulations.

**2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC19**

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
	Physical Form (at time of use)	liquid, spray aerosol
	Vapour pressure	98 hPa

Amount used: n.a. in tier 1 TRA MODEL

Frequency and duration of use	Frequency of use	< 300 days/year
	Frequency of use	> 4 days/week
	Exposure duration per day	> 240 min(PROC1, PROC2)
	Exposure duration per day	60 - 240 min(PROC10, PROC11, PROC13)
	Exposure duration per day	15 - 60 min(PROC8a, PROC8b, PROC19)

Human factors not influenced by risk management: Exposed skin areas: Hands and forearms. 1500 cm<sup>2</sup>

Other operational conditions affecting workers exposure: Indoor use. Outdoor use.(PROC1)

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Technical conditions and measures to control dispersion from source towards the worker	General exposures Continuous process	Clear spills immediately. Ensure operation is undertaken outdoors.(PROC1)
	General exposures Continuous process with sample collection	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Clear spills immediately.(PROC2)
	Bulk transfers Non-dedicated facility	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Use drum pumps or carefully pour from container. Locate bulk storage outdoors. Clear spills immediately.(PROC8a)
	Bulk transfers Dedicated facility	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Clear transfer lines prior to de-coupling. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Locate bulk storage outdoors. Clear spills immediately.(PROC8b)
	Roller, spreader, flow application cleaning Machine Manual	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Clear spills immediately.(PROC10)
	Treatment by dipping and pouring Machine Manual	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Clear spills immediately.(PROC13)
	Spraying/fogging by manual application with potential for aerosol generation	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Ensure that a spraying booth is used Clear spills immediately.(PROC11)
	Transfer from/pouring from containers Mixing operations (closed systems) Manual Without local exhaust ventilation Indoor	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Clear spills immediately.(PROC19)

Conditions and measures related | If above technical/organisational control measures are not feasible, then adopt

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to personal protection, hygiene and health evaluation

following PPE:  
Wear a respirator conforming to EN140 with Type A filter or better.  
Wear suitable gloves (tested to EN374) and eye protection.  
Butyl rubber gloves offer good protection

**3. Exposure estimation and reference to its source**

**Environment**

EUSES 2.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8a, ERC8d	---	Fresh water	PEC	0,139mg/L	0,535
ERC8a, ERC8d	---	Marine water	PEC	0,014mg/L	0,535
ERC8a, ERC8d	---	Fresh water sediment	PEC	0,186mg/kg	0,664
ERC8a, ERC8d	---	Marine sediment	PEC	0,019mg/kg	0,066
ERC8a, ERC8d	---	Soil	PEC	0,0002mg/kg	< 0,001
ERC8a, ERC8d	---	Sewage treatment plant (STP)	PEC	1,369mg/L	0,002
ERC8a, ERC8d	---	Total daily intake via local environment	PEC	0,003mg/kg bw/day	< 0,001

**Workers**

Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local	0,154mg/m <sup>3</sup>	< 0,001
PROC1	---	Worker - dermal, long-term - systemic	0,342mg/kg bw/day	0,0054
PROC2	---	Worker - inhalative, long-term - local	22,03mg/m <sup>3</sup>	0,03
PROC2	---	Worker - dermal, long-term - systemic	0,137mg/kg bw/day	0,0022
PROC8a	---	Worker - inhalative, long-term - local	44,05mg/m <sup>3</sup>	0,06
PROC8a	---	Worker - dermal, long-term - systemic	0,137mg/kg bw/day	0,0022
PROC8b	---	Worker - inhalative, long-term - local	11,01mg/m <sup>3</sup>	0,015
PROC8b	---	Worker - dermal, long-	0,686mg/kg bw/day	0,011

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		term - systemic		
PROC10	---	Worker - inhalative, long-term - local	132,15mg/m <sup>3</sup>	0,18
PROC10	---	Worker - dermal, long-term - systemic	1,37mg/kg bw/day	0,022
PROC11	---	Worker - inhalative, long-term - local	264,3mg/m <sup>3</sup>	0,36
PROC11	---	Worker - dermal, long-term - systemic	2,14mg/kg bw/day	0,034
PROC13	---	Worker - inhalative, long-term - local	66,08mg/m <sup>3</sup>	0,091
PROC13	---	Worker - dermal, long-term - systemic	0,69mg/kg bw/day	0,011
PROC19	---	Worker - inhalative, long-term - local	220,25mg/m <sup>3</sup>	0,30
PROC19	---	Worker - dermal, long-term - systemic	28,28mg/kg bw/day	0,45

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

If the local environmental emission conditions deviate significantly from the used default values, please use the below algorithm to estimate the correct local emissions and RCRs:  
 $PEC_{corrected} = PEC_{calculated} * (\text{local emission fraction}) * (\text{local WWTP flow rate fraction}) * (\text{local river flow rate fraction}) * (\text{local STP efficiency fraction})$   
 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.  
 Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.  
 Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.  
 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**

Assumes a good basic standard of occupational hygiene is implemented.

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**1. Short title of Exposure Scenario 5: Uses in coatings**

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Chemical product category	PC1: Adhesives, sealants PC9a: Coatings and paints, thinners, paint removers
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems

**2.1 Contributing scenario controlling environmental exposure for: ERC8a**

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
Amount used	Daily amount per site	0,3 kg
	Fraction used at the main local source.	0,002
	Annually total	500 tonnes
Frequency and duration of use	Continuous exposure	365 days/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)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	90 %
	Emission or Release Factor: Water	90 %
	Emission or Release Factor: Soil	0 %
	Indoor use.	
	Processing temperature: Ambient temperature	
	Processing pressure: Ambient pressure.	
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
	Degradation efficiency	70 %
	Sludge Treatment	Disposal or recovery
Conditions and measures related to external treatment of waste for disposal	Disposal methods	Dispose of empty containers and wastes safely.

**2.2 Contributing scenario controlling consumer exposure for: PC1: Glues, hobby use**

Activity	spray application
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Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 20 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	98 hPa
Amount used	Amount used per event	150 g
Frequency and duration of use	Frequency of use	0 - 5 events/year
	Exposure duration per event	60 min
Human factors not influenced by risk management	Exposed skin areas	Covers skin contact area up to 35 cm <sup>2</sup>
Other given operational conditions affecting consumers exposure	Room size	20 m <sup>3</sup>

**2.3 Contributing scenario controlling consumer exposure for: PC1: Glues DIY-use (carpet glue, tile glue, wood parquet glue)**

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 20 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	98 hPa
Amount used	Amount used per event	150 g
Frequency and duration of use	Frequency of use	0 - 5 events/year
	Exposure duration per event	60 min
Human factors not influenced by risk management	Exposed skin areas	Covers skin contact area up to 110 cm <sup>2</sup>
Other given operational conditions affecting consumers exposure	Room size	20 m <sup>3</sup>

**2.4 Contributing scenario controlling consumer exposure for: PC9a: Solvent rich, high solid, water borne paint**

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 20 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	98 hPa

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Amount used	Amount used per event	150 g
Frequency and duration of use	Frequency of use	0 - 5 events/year
	Exposure duration per event	60 min
Human factors not influenced by risk management	Exposed skin areas	Covers skin contact area up to 428 cm <sup>2</sup>
Other given operational conditions affecting consumers exposure	Room size	20 m <sup>3</sup>

**2.5 Contributing scenario controlling consumer exposure for: PC9a: Aerosol spray can**

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	98 hPa
Amount used	Amount used per event	150 g
Frequency and duration of use	Frequency of use	0 - 5 events/year
	Exposure duration per event	25 min
Human factors not influenced by risk management	Exposed skin areas	Covers skin contact area up to 428 cm <sup>2</sup>
Other given operational conditions affecting consumers exposure	Room size	20 m <sup>3</sup>

**3. Exposure estimation and reference to its source**

**Environment**

EUSES 2.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8a	---	Fresh water	PEC	0,0044mg/L	0,017
ERC8a	---	Marine water	PEC	0,0004mg/L	0,017
ERC8a	---	Fresh water sediment	PEC	0,0059mg/kg	0,021
ERC8a	---	Marine sediment	PEC	0,0005mg/kg	0,002
ERC8a	---	Soil	PEC	0,0001mg/kg	< 0,001
ERC8a	---	Sewage treatment plant (STP)	PEC	0,0161mg/L	< 0,001
ERC8a	---	Total daily intake via local	PEC	0,0001mg/kg bw/day	< 0,001



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**Consumers**

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Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PC1	---	Consumer inhalation exposure	29,9mg/m <sup>3</sup>	0,245
PC1	---	Consumer dermal exposure	0,04mg/kg bw/day	0,00108
PC9a: Solvent rich, high solid, water borne paint	---	Consumer inhalation exposure	0,03mg/m <sup>3</sup>	0,000246
PC9a: Solvent rich, high solid, water borne paint	---	Consumer dermal exposure	0,02mg/kg bw/day	0,000541
PC9a: Aerosol spray can	---	Consumer inhalation exposure	1,3mg/m <sup>3</sup>	0,0107
PC9a: Aerosol spray can	---	Consumer dermal exposure	0,02mg/kg bw/day	0,000541

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

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.  
 Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.  
 Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.  
 For scaling see: <http://www.ecetoc.org/tra>  
 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

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**1. Short title of Exposure Scenario 6: Application of paints, coatings and other mixtures by way of spraying**

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 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
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 percentage substance in the product up to 25 %.
Amount used	Annual site tonnage (tons/year):	1000 tonnes
	Daily amount per site	333 kg
	Fraction used at the main local source.	0,1
	Annually total	10000 tonnes
Frequency and duration of use	Continuous exposure	300 days/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)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	18 %
	Emission or Release Factor: Water	2 %
	Emission or Release Factor: Soil	0,1 %
	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	Air	Use containment measures to reduce fugitive emissions. (Efficiency: > 80 %)
	Air	Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation, Use appropriate emission abatement

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Organizational measures to prevent/limit release from the site

	equipment from LEV systems if required by local legislation., Use of technical measures such as catalytic or thermal oxidation to reduce emissions to air.
Water	Onsite wastewater treatment required, If discharging to domestic sewage treatment plant, no onsite wastewater treatment required., Do not release wastewater directly into environment.
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %)
Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements.	

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
Percentage removed from waste water	87 %
Sludge Treatment	Disposal or recovery

Conditions and measures related to external treatment of waste for disposal

Waste treatment	Hazardous waste incineration., Dispose for use in recycled fuels.
Disposal methods	Dispose of waste product or used containers according to local regulations.

**2.2 Contributing scenario controlling worker exposure for: PROC1, 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	98 hPa
Amount used	n.a. in tier 1 TRA MODEL	
Frequency and duration of use	Frequency of use	< 240 days/year
	Frequency of use	> 4 days/week
	Exposure duration per day	> 240 min
	Exposure duration per day	60 - 240 min(PROC8a, PROC8b)
Human factors not influenced by risk management	Exposed skin areas	Hands and forearms. 1500 cm <sup>2</sup>
Other operational conditions affecting workers exposure	Indoor use.	
	Outdoor use.(PROC1)	

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Technical conditions and measures to control dispersion from source towards the worker	General exposures Continuous process	Handle substance within a closed system. Ensure operation is undertaken outdoors.(PROC1)
	Bulk transfers Continuous process with sample collection	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide extract ventilation to material transfer points and other openings.(PROC2)
	Bulk transfers Non-dedicated facility	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Use drum pumps or carefully pour from container. Locate bulk storage outdoors.(PROC8a)
	Bulk transfers Dedicated facility	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Clear transfer lines prior to de-coupling. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Locate bulk storage outdoors.(PROC8b)
Organisational measures to prevent /limit releases, dispersion and exposure	Bulk transfers Non-dedicated facility	If technical measures not practical: Avoid carrying out operation for more than 1 hour.(PROC8a)
	Bulk transfers Dedicated facility	If technical measures not practical: Avoid carrying out operation for more than 1 hour.(PROC8b)
Conditions and measures related to personal protection, hygiene and health evaluation	If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A filter or better. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Butyl rubber gloves offer good protection Use suitable eye protection.	
	<b>2.3 Contributing scenario controlling worker exposure for: PROC7</b>	
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	98 hPa
Amount used	n.a. in tier 1 TRA MODEL	
Frequency and duration of use	Frequency of use	< 240 days/year
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	Frequency of use	> 4 days/week
	Exposure duration per day	> 240 min
Human factors not influenced by risk management	Exposed skin areas	Hands and forearms. 1500 cm <sup>2</sup>
Other operational conditions affecting workers exposure	Indoor use.	
Technical conditions and measures to control dispersion from source towards the worker	Spraying/fogging by manual application Spraying/fogging by machine application with potential for aerosol generation	Carry out in a vented booth provided with laminar airflow. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.(PROC7)
Organisational measures to prevent /limit releases, dispersion and exposure	Spraying/fogging by manual application Spraying/fogging by machine application with potential for aerosol generation	If technical measures not practical: Avoid carrying out operation for more than 1 hour.(PROC7)
Conditions and measures related to personal protection, hygiene and health evaluation	Spraying/fogging by manual application Spraying/fogging by machine application with potential for aerosol generation	Use suitable eye protection and gloves.(PROC7)
	If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A filter or better. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Butyl rubber gloves offer good protection	

**3. Exposure estimation and reference to its source**

**Environment**

EUSES 2.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC4	---	Fresh water	PEC	0,042mg/L	0,162
ERC4	---	Marine water	PEC	0,004mg/L	0,162
ERC4	---	Fresh water sediment	PEC	0,056mg/kg	0,200

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ERC4	---	Marine sediment	PEC	0,006mg/kg	0,020
ERC4	---	Soil	PEC	0,010mg/kg	0,005
ERC4	---	Sewage treatment plant (STP)	PEC	0,393mg/L	< 0,001
ERC4	---	Total daily intake via local environment	PEC	0,0015mg/kg bw/day	< 0,001

**Workers**

Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local	0,026mg/m <sup>3</sup>	< 0,001
PROC1	---	Worker - dermal, long-term - systemic	0,343mg/kg bw/day	0,0054
PROC2	---	Worker - inhalative, long-term - local	18,35mg/m <sup>3</sup>	0,025
PROC2	---	Worker - dermal, long-term - systemic	0,137mg/kg bw/day	0,0022
PROC8a	---	Worker - inhalative, long-term - local	55,06mg/m <sup>3</sup>	0,075
PROC8a	---	Worker - dermal, long-term - systemic	0,137mg/kg bw/day	0,0022
PROC8b	---	Worker - inhalative, long-term - local	9,91mg/m <sup>3</sup>	0,014
PROC8b	---	Worker - dermal, long-term - systemic	0,686mg/kg bw/day	0,011
PROC7	---	Worker - inhalative, long-term - local	55,06mg/m <sup>3</sup>	0,075
PROC7	---	Worker - dermal, long-term - systemic	2,14mg/kg bw/day	0,034

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

If the local environmental emission conditions deviate significantly from the used default values, please use the below algorithm to estimate the correct local emissions and RCRs:  
 $PEC_{corrected} = PEC_{calculated} * (\text{local emission fraction}) * (\text{local WWTP flow rate fraction}) * (\text{local river flow rate fraction}) * (\text{local STP efficiency fraction})$   
 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.  
 Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

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Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.  
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

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**1. Short title of Exposure Scenario 7: Application of paints, coatings and other mixtures by way of non-spraying**

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 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 PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring
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 percentage substance in the product up to 25 %.
Amount used	Annual site tonnage (tons/year):	5500 tonnes
	Daily amount per site	1800 kg
	Fraction used at the main local source.	0,1
	Annually total	55000 tonnes
Frequency and duration of use	Continuous exposure	300 days/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)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	9 %
	Emission or Release Factor: Water	2 %
	Emission or Release Factor: Soil	0,1 %
	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	Air	Use containment measures to reduce fugitive emissions. (Efficiency: > 87 %)
	Air	Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental



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releases to soil  
Organizational measures to prevent/limit release from the site

	legislation, Use appropriate emission abatement equipment from LEV systems if required by local legislation., Use of technical measures such as catalytic or thermal oxidation to reduce emissions to air.
Water	If discharging to domestic sewage treatment plant, no onsite wastewater treatment required., Do not release wastewater directly into environment.
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %)
Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements.	

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
Percentage removed from waste water	87 %
Sludge Treatment	Disposal or recovery

Conditions and measures related to external treatment of waste for disposal

Waste treatment	Hazardous waste incineration., Dispose for use in recycled fuels.
Disposal methods	Dispose of waste product or used containers according to local regulations.

**2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC8a, PROC8b, PROC10, PROC13**

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	98 hPa

Amount used n.a. in tier 1 TRA MODEL

Frequency and duration of use	Frequency of use	< 240 days/year
	Frequency of use	> 4 days/week
	Exposure duration per day	> 240 min
	Exposure duration per day	60 - 240 min(PROC8a)

Human factors not influenced by risk management Exposed skin areas Two hands 960 cm<sup>2</sup>

Other operational conditions affecting workers exposure Indoor use.

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		Outdoor use.(PROC1)
Technical conditions and measures to control dispersion from source towards the worker	General exposures Continuous process	Handle substance within a closed system. Clear spills immediately. Ensure operation is undertaken outdoors.(PROC1)
	General exposures Continuous process with sample collection	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). Clear spills immediately.(PROC2)
	Bulk transfers Non-dedicated facility	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). Use drum pumps or carefully pour from container. Locate bulk storage outdoors. Clear spills immediately.(PROC8a)
	Bulk transfers Dedicated facility	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). Clear transfer lines prior to de-coupling. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Locate bulk storage outdoors. Clear spills immediately.(PROC8b)
	Roller, spreader, flow application cleaning Machine Manual	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). Clear spills immediately.(PROC10)
	Treatment by dipping and pouring Machine Manual	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). Clear spills immediately.(PROC13)
	Conditions and measures related to personal protection, hygiene	Use suitable eye protection and gloves. Butyl rubber gloves offer good protection
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**3. Exposure estimation and reference to its source**

**Environment**

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Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC4	---	Fresh water	PEC	0,145mg/L	0,558
ERC4	---	Marine water	PEC	0,015mg/L	0,558
ERC4	---	Fresh water sediment	PEC	0,193mg/kg	0,689
ERC4	---	Marine sediment	PEC	0,019mg/kg	0,069
ERC4	---	Soil	PEC	0,056mg/kg	0,255
ERC4	---	Sewage treatment plant (STP)	PEC	1,426mg/L	0,002
ERC4	---	Total daily intake via local environment	PEC	0,006mg/kg bw/day	< 0,001

**Workers**

Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Worker - inhalative, long-term - local	0,0257mg/m <sup>3</sup>	< 0,001
PROC1	---	Worker - dermal, long-term - systemic	0,3429mg/kg bw/day	0,0054
PROC2	---	Worker - inhalative, long-term - local	18,35mg/m <sup>3</sup>	0,025
PROC2	---	Worker - dermal, long-term - systemic	0,1371mg/kg bw/day	0,0022
PROC8a	---	Worker - inhalative, long-term - local	55,06mg/m <sup>3</sup>	0,075
PROC8a	---	Worker - dermal, long-term - systemic	0,1371mg/kg bw/day	0,0022
PROC8b	---	Worker - inhalative, long-term - local	9,91mg/m <sup>3</sup>	0,014
PROC8b	---	Worker - dermal, long-term - systemic	0,6857mg/kg bw/day	0,011
PROC10	---	Worker - inhalative, long-term - local	55,06mg/m <sup>3</sup>	0,075

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PROC10	---	Worker - dermal, long-term - systemic	1,3714mg/kg bw/day	0,022
PROC13	---	Worker - inhalative, long-term - local	55,06mg/m <sup>3</sup>	0,075
PROC13	---	Worker - dermal, long-term - systemic	0,6857mg/kg bw/day	0,011

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

If the local environmental emission conditions deviate significantly from the used default values, please use the below algorithm to estimate the correct local emissions and RCRs:  
 $PEC_{corrected} = PEC_{calculated} * (\text{local emission fraction}) * (\text{local WWTP flow rate fraction}) * (\text{local river flow rate fraction}) * (\text{local STP efficiency fraction})$   
 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.  
 Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.  
 Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.  
 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**

Assumes a good basic standard of occupational hygiene is implemented.

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**1. Short title of Exposure Scenario 8: Use in agrochemicals**

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process categories	PROC2: Use in closed, continuous process with occasional controlled exposure PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises 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 ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC8d: Wide dispersive outdoor use of processing aids in open systems ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix

**2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8c, ERC8d, ERC8f**

Amount used	Daily amount per site	2,7 kg
Frequency and duration of use	Continuous exposure	365 days/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)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0,9
	Emission or Release Factor: Water	0,01
	Emission or Release Factor: Soil	0,09
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	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements.	
Conditions and measures related to sewage treatment plant	Domestic sewage treatment is not assumed.	
Conditions and measures related to external treatment of waste for disposal	Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.

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**2.2 Contributing scenario controlling worker exposure for: PROC2, PROC4, PROC8a, PROC8b, PROC11, PROC13**

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	98 hPa
Amount used	n.a. in tier 1 TRA MODEL	
Frequency and duration of use	Frequency of use	< 240 days/year
	Frequency of use	> 4 days/week
	Exposure duration per day	> 240 min
	Exposure duration per day	< 60 min(PROC8a, PROC13)
Technical conditions and measures to control dispersion from source towards the worker	Spraying/fogging by manual application Indoor with local exhaust ventilation with potential for aerosol generation	Carry out in a vented booth or extracted enclosure. Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20.(PROC11)
	Equipment cleaning and maintenance	Drain down system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle.(PROC8a)
Conditions and measures related to personal protection, hygiene and health evaluation	Spraying/fogging by manual application Indoor with local exhaust ventilation with potential for aerosol generation	Wear suitable gloves tested to EN374. Wear suitable coveralls to prevent exposure to the skin.(PROC11)
	Spraying/fogging by manual application Outdoor. with potential for aerosol generation	Wear a respirator conforming to EN140 with Type A filter or better. Change filter cartridge on respirator daily. Wear suitable gloves tested to EN374. Wear suitable coveralls to prevent exposure to the skin.(PROC11)
	Wear suitable gloves tested to EN374.	

**3. Exposure estimation and reference to its source**

**Environment**

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Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
---	---	Fresh water	PEC	0,66µg/L	0,00254
---	---	Marine water	PEC	0,117µg/L	0,0045
---	---	Fresh water sediment	PEC	3,97µg/kg dwt	0,00318
---	---	Marine sediment	PEC	0,703µg/kg dwt	0,00562
---	---	Soil	PEC	0,247µg/kg dwt	0,00103
---	---	Sewage treatment plant (STP)	PEC	0,165µg/L	< 0,0001

ESVOC spERC 8.11a.v1 has been used to evaluate the exposure for the environment

**Workers**

Used ECETOC TRA model.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC2	---	Inhalation worker exposure	12ppm	0,06
PROC2	---	Dermal worker exposure	0,822mg/kg/day	0,013
PROC4	---	Inhalation worker exposure	30ppm	0,15
PROC4	---	Dermal worker exposure	4,116mg/kg/day	0,065
PROC8a	---	Inhalation worker exposure	12ppm	0,06
PROC8a	---	Dermal worker exposure	8,226mg/kg/day	0,131
PROC8b	---	Inhalation worker exposure	30ppm	0,15
PROC8b	---	Dermal worker exposure	4,116mg/kg/day	0,065
PROC11	---	Inhalation worker exposure	30ppm	0,15
PROC11	---	Dermal worker exposure	12,857mg/kg/day	0,204
PROC13	---	Inhalation worker exposure	12ppm	0,06
PROC13	---	Dermal worker exposure	8,226mg/kg/day	0,131

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

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.

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Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.  
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.  
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**

Assumes a good basic standard of occupational hygiene is implemented.



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**1. Short title of Exposure Scenario 9: Use in agrochemicals**

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Chemical product category	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**

Frequency and duration of use	Continuous exposure	365 days/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)	100
Conditions and measures related to sewage treatment plant	Domestic sewage treatment is not assumed.	
Conditions and measures related to external treatment of waste for disposal	Waste treatment	This substance is consumed during use and no waste of the substance is generated.
	Disposal methods	Dispose of empty containers and wastes safely.

**2.2 Contributing scenario controlling consumer exposure for: PC27**

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
	Physical Form (at time of use)	liquid
	Vapour pressure	98 hPa
Amount used	Amount used per event	50 g
	Amount used per event (swallowed)	0 g
Frequency and duration of use	Frequency of use	1 Times per day
	Exposure duration per event	30 min
Human factors not influenced by risk management	Exposed skin areas	Covers skin contact area up to 857 cm <sup>2</sup>
Other given operational conditions affecting consumers exposure	Outdoor use.	

**3. Exposure estimation and reference to its source**

**Environment**

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Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
---	---	Fresh water	PEC	0,66µg/L	0,00254
---	---	Marine water	PEC	0,117µg/L	0,0045
---	---	Fresh water sediment	PEC	3,97µg/kg dwt	0,00318
---	---	Marine sediment	PEC	0,703µg/kg dwt	0,00562
---	---	Soil	PEC	0,247µg/kg dwt	0,00103
---	---	Sewage treatment plant (STP)	PEC	0,165µg/L	< 0,0001

ESVOC spERC 8.11b.v1 has been used to evaluate the exposure for the environment

**Consumers**

ConsExpo 4.1

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PC27	---	Consumer inhalation exposure	4,49mg/m <sup>3</sup>	0,0368
PC27	---	Consumer dermal exposure	21,1mg/kg bw/day	0,869

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

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.  
 Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.  
 Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.  
 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

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**1. Short title of Exposure Scenario 10: 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**

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Amount used	Annual site tonnage (tons/year):	30 tonnes
	Daily amount per site	0,16 kg
	Fraction used at the main local source.	0,01
	Annually total	3000 tonnes
Frequency and duration of use	Continuous exposure	300 days/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)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	100 %
	Emission or Release Factor: Water	100 %
	Emission or Release Factor: Soil	0 %
	Indoor use.	
	Processing temperature: Ambient temperature	
	Processing pressure: Ambient pressure.	
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	Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation
	Water	If discharging to domestic sewage treatment plant, no onsite wastewater treatment required., Do not release wastewater directly into environment.
	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements.	

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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
	Percentage removed from waste water	87 %
	Sludge Treatment	Disposal or recovery
Conditions and measures related to external treatment of waste for disposal	Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.

**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	98 hPa
Amount used	n.a. in tier 1 TRA MODEL	
Frequency and duration of use	Frequency of use	< 240 days/year
	Frequency of use	> 4 days/week
	Exposure duration per day	60 - 240 min
Human factors not influenced by risk management	Exposed skin areas	One hand, face side only. 240 cm <sup>2</sup>
Other operational conditions affecting workers exposure	Indoor use.	
Technical conditions and measures to control dispersion from source towards the worker	Laboratory activities	Handle in a fume cupboard or under extract ventilation.
Conditions and measures related to personal protection, hygiene and health evaluation	Laboratory activities	Wear suitable gloves (tested to EN374) and eye protection.

**3. Exposure estimation and reference to its source**

<b>Environment</b>					
EUSES 2.1					
Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC4	---	Fresh water	PEC	0,0839mg/L	0,323
ERC4	---	Marine water	PEC	0,0084mg/L	0,323
ERC4	---	Fresh water sediment	PEC	0,1115mg/kg	0,398

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ERC4	---	Marine sediment	PEC	0,0112mg/kg	0,040
ERC4	---	Soil	PEC	0,0002mg/kg	< 0,001
ERC4	---	Sewage treatment plant (STP)	PEC	0,8219mg/L	0,001
ERC4	---	Total daily intake via local environment	PEC	0,0021mg/kg bw/day	< 0,001

**Workers**

Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC15	---	Worker - inhalative, long-term - local	110,12mg/m <sup>3</sup>	0,151
PROC15	---	Worker - dermal, long-term - systemic	0,343mg/kg bw/day	0,005

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

If the local environmental emission conditions deviate significantly from the used default values, please use the below algorithm to estimate the correct local emissions and RCRs:  
 $PEC_{corrected} = PEC_{calculated} * (\text{local emission fraction}) * (\text{local WWTP flow rate fraction}) * (\text{local river flow rate fraction}) * (\text{local STP efficiency fraction})$   
 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.  
 Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.  
 Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.  
 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**

Assumes a good basic standard of occupational hygiene is implemented.

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**1. Short title of Exposure Scenario 11: 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**

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Amount used	Annual site tonnage (tons/year):	30 tonnes
	Daily amount per site	0,16 kg
	Fraction used at the main local source.	0,01
	Annually total	3000 tonnes
Frequency and duration of use	Continuous exposure	300 days/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)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	100 %
	Emission or Release Factor: Water	100 %
	Emission or Release Factor: Soil	0 %
	Indoor use.	
	Processing temperature: Ambient temperature	
	Processing pressure: Ambient pressure.	
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	Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation
	Water	If discharging to domestic sewage treatment plant, no onsite wastewater treatment required., Do not release wastewater directly into environment.
	Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements.	

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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
	Percentage removed from waste water	87 %
	Sludge Treatment	Disposal or recovery
Conditions and measures related to external treatment of waste for disposal	Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.

**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	98 hPa
Amount used	n.a. in tier 1 TRA MODEL	
Frequency and duration of use	Frequency of use	< 240 days/year
	Frequency of use	> 4 days/week
	Exposure duration per day	60 - 240 min
Human factors not influenced by risk management	Exposed skin areas	One hand, face side only. 240 cm²
Other operational conditions affecting workers exposure	Indoor use.	
Technical conditions and measures to control dispersion from source towards the worker	Laboratory activities	Handle in a fume cupboard or under extract ventilation.
	Conditions and measures related to personal protection, hygiene and health evaluation	Laboratory activities

**3. Exposure estimation and reference to its source**

**Environment**

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Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8a	---	Fresh water	PEC	0,0839mg/L	0,323
ERC8a	---	Marine water	PEC	0,0084mg/L	0,323
ERC8a	---	Fresh water sediment	PEC	0,1115mg/kg	0,398

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ERC8a	---	Marine sediment	PEC	0,0112mg/kg	0,040
ERC8a	---	Soil	PEC	0,0002mg/kg	< 0,001
ERC8a	---	Sewage treatment plant (STP)	PEC	0,8219mg/L	0,001
ERC8a	---	Total daily intake via local environment	PEC	0,0021mg/kg bw/day	< 0,001

**Workers**

Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC15	---	Worker - inhalative, long-term - local	110,12mg/m <sup>3</sup>	0,151
PROC15	---	Worker - dermal, long-term - systemic	0,343mg/kg bw/day	0,005

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

If the local environmental emission conditions deviate significantly from the used default values, please use the below algorithm to estimate the correct local emissions and RCRs:  
 $PEC_{corrected} = PEC_{calculated} * (\text{local emission fraction}) * (\text{local WWTP flow rate fraction}) * (\text{local river flow rate fraction}) * (\text{local STP efficiency fraction})$   
 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.  
 Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.  
 Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.  
 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**

Assumes a good basic standard of occupational hygiene is implemented.



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**1. Short title of Exposure Scenario 12: Use as extraction agent and/or processing aid**

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU9: Manufacture of fine chemicals
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 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	ERC1: Manufacture of substances

**2.1 Contributing scenario controlling environmental exposure for: ERC1**

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Amount used	Annual site tonnage (tons/year):	300 tonnes
	Daily amount per site	100 kg
	Fraction used at the main local source.	0,1
	Annually total	3000 tonnes
Frequency and duration of use	Continuous exposure	300 days/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)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	90 %
	Emission or Release Factor: Water	2 %
	Emission or Release Factor: Soil	0,1 %
	Indoor use.	
	Processing temperature: Ambient temperature	
	Processing pressure: Ambient pressure.	
Technical conditions and measures at process level	Air	Use containment measures to reduce fugitive emissions., Treatment of air emissions is not

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(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

	required for the purposes of REACH compliance but may be needed to comply with other environmental legislation, Use appropriate emission abatement equipment from LEV systems if required by local legislation.
Keep container tightly closed. Store in a bounded area.	
Water	Onsite wastewater treatment required, Do not release wastewater directly into environment.
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %)
Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements.	

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
Percentage removed from waste water	87 %
Sludge Treatment	Disposal or recovery

Conditions and measures related to external treatment of waste for disposal

Waste treatment	Hazardous waste incineration., Dispose for use in recycled fuels.
Disposal methods	Dispose of waste product or used containers according to local regulations.

**2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, 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	98 hPa
Amount used	n.a. in tier 1 TRA MODEL	
Frequency and duration of use	Frequency of use	< 240 days/year
	Frequency of use	> 4 days/week
	Exposure duration per day	> 240 min(PROC3, PROC4)
	Exposure duration per day	60 - 240 min(PROC8a, PROC8b)
Human factors not influenced by risk management	Exposed skin areas	Palms of both hands 480 cm <sup>2</sup> (PROC3, PROC4)
	Exposed skin areas	Two hands 960 cm <sup>2</sup> (PROC8a, PROC8b)

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Other operational conditions affecting workers exposure

Indoor use.

Technical conditions and measures to control dispersion from source towards the worker	General exposures Use in contained batch processes	Handle substance within a predominantly closed system provided with extract ventilation. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).(PROC3)
	General exposures Use in contained batch processes with sample collection	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).(PROC4)
	Bulk transfers Non-dedicated facility	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). Use drum pumps or carefully pour from container. Locate bulk storage outdoors.(PROC8a)
	Bulk transfers Dedicated facility	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour). Clear transfer lines prior to de-coupling. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Locate bulk storage outdoors.(PROC8b)

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

Wear suitable gloves (tested to EN374) and eye protection.  
Butyl rubber gloves offer good protection

**3. Exposure estimation and reference to its source**

**Environment**

EUSES 2.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC1	---	Fresh water	PEC	0,0106mg/L	0,041
ERC1	---	Marine water	PEC	0,0010mg/L	0,041

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ERC1	---	Fresh water sediment	PEC	0,0141mg/kg	0,050
ERC1	---	Marine sediment	PEC	0,0014mg/kg	0,005
ERC1	---	Soil	PEC	0,0031mg/kg	0,014
ERC1	---	Sewage treatment plant (STP)	PEC	0,0778mg/L	< 0,001
ERC1	---	Total daily intake via local environment	PEC	0,0004mg/kg bw/day	< 0,001

**Workers**

Use of ECETOC TRA Version 2 with modifications.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC3	---	Worker - inhalative, long-term - local	36,71mg/m <sup>3</sup>	0,050
PROC3	---	Worker - dermal, long-term - systemic	0,03mg/kg bw/day	< 0,001
PROC4	---	Worker - inhalative, long-term - local	36,71mg/m <sup>3</sup>	0,050
PROC4	---	Worker - dermal, long-term - systemic	0,69mg/kg bw/day	0,011
PROC8a	---	Worker - inhalative, long-term - local	55,06mg/m <sup>3</sup>	0,075
PROC8a	---	Worker - dermal, long-term - systemic	0,14mg/kg bw/day	0,0022
PROC8b	---	Worker - inhalative, long-term - local	9,91mg/m <sup>3</sup>	0,014
PROC8b	---	Worker - dermal, long-term - systemic	0,69mg/kg bw/day	0,011

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

If the local environmental emission conditions deviate significantly from the used default values, please use the below algorithm to estimate the correct local emissions and RCRs:  
 $PEC_{corrected} = PEC_{calculated} * (\text{local emission fraction}) * (\text{local WWTP flow rate fraction}) * (\text{local river flow rate fraction}) * (\text{local STP efficiency fraction})$   
 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.  
 Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.  
 Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

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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**

Assumes a good basic standard of occupational hygiene is implemented.

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**1. Short title of Exposure Scenario 13: Other consumer uses**

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Chemical product category	PC39: Cosmetics, personal care products
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems

**2.1 Contributing scenario controlling environmental exposure for: ERC8a**

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
Amount used	Daily amount per site	0,3 kg
	Fraction used at the main local source.	0,002
	Annually total	500 tonnes
Frequency and duration of use	Continuous exposure	365 days/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)	100
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	90 %
	Emission or Release Factor: Water	90 %
	Emission or Release Factor: Soil	0 %
	Indoor use.	
	Processing temperature: Ambient temperature	
	Processing pressure: Ambient pressure.	
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
	Percentage removed from waste water	90 %
	Sludge Treatment	Disposal or recovery

**2.2 Contributing scenario controlling consumer exposure for: PC39**

Consumer exposure for PC39 (cosmetic products) is regulated by the Cosmetic Directive 76/768/EEC and therefore out of scope for this section.

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**3. Exposure estimation and reference to its source**

**Environment**

EUSES 2.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8a	---	Fresh water	PEC	0,003mg/L	0,012
ERC8a	---	Marine water	PEC	0,0003mg/L	0,012
ERC8a	---	Fresh water sediment	PEC	0,004mg/kg	0,014
ERC8a	---	Marine sediment	PEC	0,0004mg/kg	0,001
ERC8a	---	Soil	PEC	0mg/kg	0,000
ERC8a	---	Sewage treatment plant (STP)	PEC	0,016mg/L	< 0,001
ERC8a	---	Total daily intake via local environment	PEC	0mg/kg bw/day	0,000

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

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.  
 Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.  
 Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

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<b>QUALITY SYSTEMS</b>		
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