Ammonia Solution 25% < Concentration < 35%

SAFETY DATA SHEET

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH) & 1272/2008 (CLP)
Revision 4, Aug 2021 (replaces Revision 3, Nov 2018)

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

1.1 Product identifier

Product Name	Ammonia Solution 25% ≤ concentration < 35%.
Alternative Name(s)	Ammonia liquor, Ammonium hydroxide, Aqueous ammonia, Aqua ammonia.
Chemical Formula	NH_4OH.
CAS No.	1336-21-6.
EINECS No.	215-647-6.
UK REACH Registration No.	UK-01-9638925497-8-0001
EU REACH Registration No.	01-2119488876-14-0024.
Other means of identification:	
Unique Formula Identifier (UFI):	8RW0-V0WG-F00T-NKXE

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

Identified use(s)

Title	Use descriptors
Formulation & (re)packing of substances and mixtures (ES Ref.: 1)	PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC15, ERC2
Use as an intermediate (ES Ref.: 1)	SU1, SU5, SU8, SU9, SU12, SU24, PC19, PROC1, PROC2, PROC3, PROC4, PROC5, PROC8b, PROC9, PROC15, ERC6a
Industrial use of processing aids. (ES Ref.: 1)	SU4, SU5, SU6a, SU6b, SU8, SU9, SU11, SU12, SU13, SU15, SU16, SU23, SU24, PC1, PC9a, PC14, PC16, PC20, PC26, PC29, PC30, PC34, PC35, PC37, PC39, PROC1, PROC2, PROC3, PROC4, PROC5, PROC8b, PROC9, PROC13, ERC4, ERC5, ERC6b, ERC7
Professional use (ES Ref.: 4)	SU1, SU4, SU5, SU6a, SU6b, SU9, SU10, SU11, SU12, SU13, SU15, SU16, SU17, SU23, SU24, PC9a, PC12, PC14, PC15, PC16, PC19, PC20, PC21, PC26, PC29, PC30, PC34, PC35, PC37, PC39, PC40, PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC13, PROC15, PROC20, ERC8b, ERC8e, ERC9a, ERC9b
Consumer use *(ES ref: 5)*	*PC9a, PC35, PC39*

Uses advised against	No additional information available. The use of the substance should be limited to those specified in the CSR.

1.3 Details of the supplier of the Safety Data Sheet

Company Identification	CF Fertilisers UK Limited Ince, Chester CH2 4LB.
Telephone	+44 (0) 151 357 2777
Fax	+44 (0) 151 357 1755
E-mail	info@cffertilisers.co.uk

	Only Representative for EU REACH:	ERM GmbH Siemensstrasse 9 63263 Neu-Isenburg Germany E: REACH-OR.de@erm.com

1.4 Emergency telephone number

Emergency Phone No.	+44 (0)1642 542824 (24hr)
E-mail	Liquids.sds@cffertilisers.co.uk

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

2.1.1 Regulation (EC) No. 1272/2008 (CLP)

Skin Corr./Irrit 1B; Causes severe skin burns and eye damage.
STOT SE 3; May cause respiratory irritation.
Aquatic Acute 1; Very toxic to aquatic life.

2.2 Label elements

2.2.1 Label elements

According to Regulation (EC) No. 1272/2008 (CLP)

Product Name: Aqueous Ammonia.

Hazard Pictogram

GHS05 GHS07 GHS09

Signal word(s): Danger.

Hazard statement(s):
H314: Causes severe skin burns and eye damage.
H335: May cause respiratory irritation.
H400: Very toxic to aquatic life.

Precautionary statement(s):
P260: Do not breathe dust/fume/gas/mist/vapours/spray
P264: Wash hands, forearms and face thoroughly after handling.
P271: Use only outdoors or in a well-ventilated area.
P273: Avoid release to the environment.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P301 + P330 + P331: IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
P304 + P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310: Immediately call a POISON CENTER or doctor/physician
P363: Wash contaminated clothing before reuse.
P391: Collect spillage.
P403 + P233: Store in a well-ventilated place. Keep container tightly closed.
P405: Store locked up.
P501: Dispose of contents/container to a licensed waste contractor.

2.3 Other hazards

Ammonia vapour is flammable in air in the range 16% - 25% v/v.

2.4 Additional Information

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

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Solution of ammonia in water. A clear colourless liquid evolving ammonia vapour.

3.1 Substance

Product is a mixture (see Section 3.2, below)

3.2Mixture

EC Classification No. 1272/2008

Hazardous ingredient(s)	%W/W	CAS No.	EC No.	REACH Registration No.	Hazard pictogram(s) and Hazard statement(s)
Anhydrous Ammonia	25 - 35	7664-41-7	231-635-3	01-2119488876-14-0024	Flam. Gas 2, H221 Compressed Gas, H280 Acute Tox. 3 (inhalation: gas) Skin Corr. 1B; H314 Aquatic Acute 1; H400.

3.2 Additional Information

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

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

Inhalation — IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If breathing is difficult, give oxygen. If not breathing, give artificial resuscitation. Get medical attention immediately.

Skin Contact — IF ON SKIN (or hair): Immediately remove/take off all contaminated clothing and shoes. Flush skin with water for at least 15 minutes. Get medical attention immediately. Wash contaminated clothing and shoes before reuse.

Eye Contact — IF IN EYES: Rinse cautiously with water for several minutes keeping eyelids open. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.

Ingestion — IF SWALLOWED: Rinse mouth. Drink copious quantities of water. Do NOT induce vomiting. Get medical attention immediately.

4.2 Most important symptoms and effects, both acute and delayed

4.2.1 Potential Acute Health Effects

Inhalation — Vapours are irritating to the respiratory system. Corrosive to the respiratory tract. Coughing. Wheezing. May cause allergy or asthma symptoms or breathing difficulties if inhaled. Symptoms may be delayed (pulmonary oedema). Exposure to decomposition products may cause a health hazard.

Skin Contact — May cause severe burns.

Eye Contact — Vapour may be irritating to the eyes. May cause severe burns

Ingestion — May cause burns or irritation of the mouth, throat and gastrointestinal tract.

4.2.2 Over-exposure Signs/Symptoms

Adverse symptoms may include:

Inhalation — Respiratory tract irritation, coughing, wheezing.

Skin Contact — Pain or irritation, redness. Blistering may occur.

Eye Contact — Pain, watering, redness.

Ingestion — Pain, burns to mouth, throat and intestinal tract.

4.3 Indication of immediate medical attention and special treatment needed

Administer oxygen if necessary. In the case of inhalation of decomposition products in a fire, symptoms may be delayed. Treat symptomatically. Treat as thermal burns. Victim should be under medical observation for at least 48 hours after exposure.

SECTION 5: FIRE-FIGHTING MEASURES

Vapour: combustible but not readily ignited

5.1 Extinguishing Media

Suitable Extinguishing Media	As appropriate for surrounding fire.
Unsuitable Extinguishing Media	None known.

5.2 Special hazards arising from the substance or mixture

Combustion or thermal decomposition will evolve toxic and irritant vapours.

Hazards from the substance or mixture.	In a fire or if heated, a pressure increase will occur and the container may burst. This material is harmful to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.
Hazardous thermal decomposition products	Decomposition products may include nitrogen oxides. Avoid breathing dusts, vapours or fumes from burning materials. In case of inhalation of decomposition products in a fire, symptoms may be delayed.

5.3 Advice for fire-fighters

Firefighting Instructions	Evacuate area. Contain fire control water for later disposal. Keep fire exposed containers cool by spraying with water.
Protective Equipment for Firefighters	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	Evacuate surrounding areas. Do not walk through spilled material. Provided it is safe to do so, isolate the source of the leak. Wear appropriate personal protective clothing, gloves and eye/face protection, avoid direct contact with vapour, mist or spilt material. Provide adequate ventilation, and wear appropriate respirator when ventilation is inadequate.
For emergency responders	Wear protective gloves/protective clothing/eye protection/face protection/respiratory protection. Take note of information in section 8. In case of fire: Wear self-contained breathing apparatus. Evacuate area. Isolate the spill and ventilate the spill area. In case of large spillages, alert occupants in downwind areas.

6.2 Environmental precautions

Avoid contact of spilt material and runoff with soil waterways, drains and sewers where possible. Spillages or uncontrolled discharges into watercourses must be alerted to the appropriate regulatory body. Water polluting material. Will be harmful to the environment if released in large quantities.

6.3 Methods and material for containment and cleaning up

Small release	Stop leak if without significant risk. Move containers from spill area. Dilute with water and mop up, or absorb spillages onto sand, earth or any suitable adsorbent material and place in an appropriate waste container. Dispose of via licensed waste contractor.
Large release	Stop leak if without significant risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Use water spray to 'knock down' vapour. Wash spillages into an effluent treatment plant or proceed as follows. Contain or collect spillage with non-combustible, adsorbent material e.g. sand, earth, vermiculite or diatomaceous earth, then place into container for disposal via a licensed waste disposal. Contaminated adsorbent material may pose the same hazard as the spilt product.

6.4 Reference to other sections

See Section: 1 for emergency contact information.
See Section: 13 for waste disposal.
See Also Section 8.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling

Precautions for Safe Handling	Put on appropriate personal protective equipment (see Section 8). Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Keep away from acids. Empty containers may retain product residue and can be hazardous. Do not reuse container.
Hygiene Measures	Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

7.2 Conditions for safe storage, including any incompatibilities

Store locked up. Store in a cool, well-ventilated place protected from direct sunlight. Keep container tightly closed. Keep away from: Acids. Use appropriate containment to avoid environmental contamination. Bund storage facilities to prevent soil and water pollution in the event of spillage.

Storage Temperature	Ambient.
Storage Life	Stable under normal conditions.
Incompatible materials	Copper, Copper alloy, Silver, Mercury, Zinc, Zinc alloy, acids.
Appropriate packaging	Stainless steel, Mild steel, Polyethylene, Polypropylene.

7.3 Specific end use(s) No additional information available

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

8.1.1 Workplace Exposure Limit (UK HSE EH40)

SUBSTANCE.	CAS No.	LTEL (8 hr TWA ppm)	LTEL (8 hr TWA mg/m³)	STEL (ppm)	STEL (mg/m³)	Note:
Anhydrous Ammonia	*7664-41-7*	25	18	35	25	EH40 WEL 10/2007

8.1.2 Biological limit value Not established.

8.1.3 PNECs and DNELs By analogy with similar materials: Anhydrous ammonia.

DNEL	Oral	Inhalation	Dermal
Industry - Long Term – Local effects	-	14.0 mg/m³	-
Industry - Long Term - Systemic effects	-	47.6 mg/m³	6.8 mg/kg bw/day
Industry - Short term - Local effects	-	36.0 mg/m³	-
Industry - Short term - Systemic effects	-	47.6 mg/m³	6.8 mg/kg bw/day
Professional - Long Term - Local effects	-	-	-
Professional - Long Term – Systemic effects	-	-	-
Professional - Short term - Local effects	-	-	-
Professional - Short term - Systemic effects	-	-	-
Consumer - Long Term - Local effects	-	2.8 mg/m³	-
Consumer - Long Term - Systemic effects	6.8 mg/kg bw/day	23.8 mg/m³	6.8 mg/kg bw/day
Consumer - Short term - Local effects	-	7.2 mg/m³	-
Consumer - Short term - Systemic effects	6.8 mg/kg bw/day	23.8 mg/m³	6.8 mg/kg bw/day

	PNEC
Aquatic Compartment (Fresh water)	0.001 mg/l.
Marine Compartment	0.001 mg/l.

Aquatic Compartment (intermittent, fresh water)	0.089 mg/l
Marine Compartment (intermittent)	0.089 mg/l
Terrestrial Compartment	No data.
Atmospheric Compartment	No data.

8.2 Exposure controls

8.2.1 Appropriate engineering controls

Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

8.2.2 Personal protection equipment

Eye/face protection

Goggles giving complete protection to eyes. Recommended – face shield, EN136

Skin protection (Hand protection/ Other)

Impervious gloves and boots: PVC, *Neoprene* / butyl rubber, *Viton, Polytetrafluoroethylene (PTFE).*

Hand protection

Chemical-resistant, impervious gloves tested to EN374 should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
> 8 hours (breakthrough time): Neoprene/butyl rubber, Viton, Polytetrafluoroethylene (PTFE).

Body protection

Personal protective equipment for the body (tested to EN14605) should be selected based on the task being performed and the risks involved.

Other skin protection

Appropriate footwear and any additional skin protection measures *(tested to EN14605)* should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection

A suitable respirator must always be worn. A suitable mask with filter type K (EN141 or EN405) may be appropriate. In confined space use self-contained breathing apparatus.

Thermal hazards

Not applicable.

8.2.3 Environmental Exposure Controls

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation.

In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Physical state	Liquid.
Colour	Clear Colourless. (<5 Hazen Units).
Odour and Odour Threshold (ppm)	Pungent. Detectable to most people at levels as low as 5ppm.
pH (Value)	14.
Freezing Point (°C)	-60°C (25%) to -90°C (35%).
Boiling point/boiling range (°C):	40°C (25%) to 20°C (35%)
Flash Point (°C)	None found.
Evaporation rate	Not available.
Flammability (solid, liquid, gas)	Flammable.
Flammable Limits (v/v)	16% - 25%.
Vapour Pressure (Pascal)	48700 - 100000 @ 20°C.
Relative Vapour Density (Air=1)	Not available.
Density (g/ml)	0.911 (25%) to 0.881 (35%) @ 15.5°C.
Bulk Density (g/ml)	Not applicable.
Solubility (Water)	Miscible.
Solubility (Other)	Not available.
Partition Coefficient (n-Octanol/water)	Log Pow -1.14.

	Auto Ignition Temperature (°C)	651°C (Vapour.)
	Decomposition Temperature (°C)	Not available.
	Viscosity (mPa.s)	1.1 @ 27°C.
	Explosive properties	Not explosive.
	Lower and upper explosion limit	Not explosive
	Oxidising properties	Not oxidising.
	Particle characteristics	Not applicable
9.2	**Other information**	No information available.
9.2.1	**Information with Regard to Physical Hazard Classes**	Product is a flammable liquid. Ammonia vapour is flammable in air in the range 16% - 25% v/v.
9.2.2	**Other Safety Characteristics.**	None to report.

SECTION 10: STABILITY AND REACTIVITY

10.1	**Reactivity**	Stable under normal conditions.
10.2	**Chemical stability**	Stable under recommended storage and handling conditions.
10.3	**Possibility of hazardous reactions**	Under normal conditions of storage and use, hazardous reactions will not occur.
10.4	**Conditions to avoid**	Avoid contamination by any source, including metals, dust and organic materials. Keep away from incompatible materials. Can react violently if in contact with acids, alkalis, halogens, reducing agents and heavy metals.
10.5	**Incompatible materials**	Copper, Copper alloy, Silver, Mercury, Zinc, Zinc alloy, acids, alkalis, halogens, reducing agents and heavy metals.
10.6	**Hazardous Decomposition Product(s)**	Under normal conditions of storage and use, hazardous decomposition products should not be produced. .Nitrogen oxides may be produced if the product is involved in a fire.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1	**Information on toxicological effects**	
11.1.1	**Acute toxicity**	No known significant effects or critical hazards.
	Corrosion/irritation	
	Skin	Corrosive to the skin.
	Eyes	Causes serious eye damage.
	Respiratory	May cause respiratory irritation.
	Sensitization	Not a skin or respiratory sensitiser.
	Mutagenicity	No evidence of mutagenic effect.
	Carcinogenicity	No evidence of carcinogenic effect.
	Reproductive toxicity	No known significant effects or critical hazards.
	Teratogenicity	No known significant effects or critical hazards.
	Specific Target Organ Toxicity	STOT SE 3; May cause respiratory irritation.
	Information on likely routes of exposure	Anticipated – inhalation.
	Potential acute health effects and symptoms	See section 4.2.

11.1.2 Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure — Potential immediate effects – respiratory tract irritation. Potential delayed effects – none identified.

Long term exposure — Potential immediate effects – respiratory tract irritation. Potential delayed effects – none identified.

Potential chronic health effects

Product / ingredient name	Result	Species	Dose	Exposure	References
Anhydrous Ammonia	NOAEL (subacute, oral, male)	Mammal	408 mg/kg bodyweight	28 days	OECD 422

Conclusion/Summary — Irritating to respiratory system.

General — No known significant effects or critical hazards

Mutagenicity — No known significant effects or critical hazards.

Carcinogenicity — No known significant effects or critical hazards.

Teratogenicity — No known significant effects or critical hazards.

Developmental effects — No known significant effects or critical hazards.

Fertility effects — No known significant effects or critical hazards.

11.2 Other information

11.2.1 Endocrine disrupting properties — The product does not have endocrine disrupting properties

11.2.2 Information on other hazards — None to report.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Product / ingredient name	Result	Species	Dose	Exposure	References
Anhydrous Ammonia	Acute LC50	Fish 1	0.89 mg/l	96 h	IUCLID 5
	Acute EC50	Daphnia 1	101 mg/l	48 h	
	Chronic Fish	-	< 0.048 mg/l	31 days	
	Chronic NOEC Crustacea	Daphnia magna	0.79 mg/l	96 h	

Conclusion/summary — Ammonia Solution 25% ≤ Conc < 35% - Very toxic to aquatic life.

12.2 Persistence and degradability — The product is inherently biodegradable.

12.3 Bioaccumulative potential — The product has no potential for bioaccumulation.

12.4 Mobility in soil — No additional information available.

12.5 Results of PBT and vPvB assessment — Not classified as PBT or vPvB.

12.6 Endocrine disrupting properties — The product does not have endocrine disrupting properties.

12.7 Other adverse effects — None anticipated.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods — Re-use/recycling of waste highly recommended. Dispose of contents/container to: Licensed recycler, reclaimer or incinerator. Disposal should be in accordance with local, state or national legislation.

13.2 Additional Information

WGK class 2 (official).

Waste code: 06 02 03 – Ammonium Hydroxide

SECTION 14: TRANSPORT INFORMATION

		ADR / RID	ADN	IMDG	IATA
14.1	**UN number**	2672			
14.2	**Proper shipping name**	AMMONIA SOLUTION			
14.3	**Transport hazard class**	8 			
14.4	**Packing group**	III			
14.5	**Environmental hazards**	No	Yes	Yes	No
14.6	**Additional information**				
	Hazard identification number	80	-	-	-
	Limited quantity	LQ5	-	-	-
	Tunnel Code	(E)	-	-	-
	Danger Code	-	N2	-	-
	IMDG Code Segregation Group	-	-	SG18	-
	Emergency Schedules	-	-	F-A, S-B	-
	Marine pollutant	-	-	Yes	No
	Special precautions for user	-	-	-	-
	Emergency schedules	-	-	-	-
	Passenger & cargo aircraft quantity limitation	-	-	-	-
	Packaging instructions	-	-	-	-
	Cargo aircraft quantity limitation	-	-	-	-

Remark: Re ADN: N2. The product is only regulated as an environmentally hazardous substance when transported in tank vessels.

14.7 Maritime transport in bulk according to IMO instruments

Proper shipping name: Ammonia Solution

Ship type: 2

Pollution category: Y

14.8 IMSBC: Not applicable.

14.9 Additional information: Emergency action code: 2X

SECTION 15: REGULATORY INFORMATION

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

15.1.1 EU regulations

EU Regulation (EC) No. 1907/2006 (REACH) Annex XIV - List of substances subject to authorization: Not listed.

Substances of very high concern: Not listed

15.1.2 National regulations: To our knowledge no other country or state specific regulations are applicable.

15.1.3 Seveso Directive: The product is not controlled under the Seveso Directive.

15.2	**Chemical Safety Assessment**	Complete (Anhydrous Ammonia)

SECTION 16: OTHER INFORMATION

The following sections contain revisions or new statements: 8.1.1, 8.2.2

Additional change information: Changes shown *italics*

LEGEND

LTEL	Long Term Exposure Limit
STEL	Short Term Exposure Limit
STOT	Specific Target Organ Toxicity
DNEL	Derived No Effect Level
PNEC	Predicted No Effect Concentration
PBT	PBT: Persistent, Bioaccumulative and Toxic
vPvB	very Persistent and very Bioaccumulative
CSR	Chemical Safety Report
NOAEL	No Observable Adverse Effect Level
NOEC	No Observable Effect Concentration
Skin Corr. 1B	skin corrosion/irritation Category 1B
STOT SE 3	Specific target organ toxicity — single exposure Category 3
Aquatic Acute 1	Hazardous to the aquatic environment Acute Category 1
C	Corrosive
N	Hazardous to the aquatic environment

Hazard statement(s) and Precautionary statement(s)

H314	Causes severe skin burns and eye damage.
H335	May cause respiratory irritation.
H400	Very toxic to aquatic life.
P260	Do not breathe gas.
P264	Wash hands thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P310	Immediately call a POISON CENTRE or doctor/physician.
P312	Call a POISON CENTRE or doctor if you feel unwell.
P321	Specific treatment (see on this label).
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P301 + P330 + P331	IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P405	Store locked up.
P501	Dispose of contents/container to: Send to a licensed recycler, reclaimer or incinerator.

Hazard pictogram(s) and Hazard Symbol

GHS05

GHS07

GHS09

Information contained in this publication or as otherwise supplied to Users is for the purpose of describing the products but does not constitute a representation or warranty. Users must satisfy themselves of the suitability of the product for their own particular purpose. CF Fertilisers UK Limited gives no warranty as to the fitness of the product for any particular purpose nor any implied warranty or condition (statutory or otherwise) regards the products, except to the extent required by law. Except where exclusion or limitation of liability would be illegal or ineffective, CF Fertilisers UK Limited accepts no liability for loss or damage in relation to the supply of the products (including related information). CF Fertilisers UK Limited assumes all copyright in all materials related to the products.

Annex to the Safety Data Sheet

Product exposure scenario(s)	
ES Type	**ES title**
Worker	Formulation & (re)packing of substances and mixtures
Worker	Use as an intermediate
Worker	Industrial use of reactive processing aids
Worker	Professional use

1. Exposure scenario 1

Formulation & (re)packing of substances and mixtures

ES Ref.: 1 ES Type: Worker	

Use descriptors	PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC15 ERC2
Processes, tasks, activities covered	Formulation [mixing] of preparations and/or re-packaging Distribution of substance Industrial use

2. Operational conditions and risk management measures

2.2 Contributing scenario controlling environmental exposure (ERC2)

ERC2	Formulation of preparations

Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Amounts used	Annual site tonnage (tons/year):	1000000
Frequency and duration of use	Emission days (days/year):	330
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
Environmental factors not influenced by risk management	Local marine water dilution factor:	10
Environmental factors not influenced by risk management	Receiving surface water flow (m³/day):	20000 m³/d
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	2.5 %
Other given operational conditions affecting environmental exposure	Release fraction to wastewater from process (initial release prior to RMM):	2 %
Risk management measures		
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	99.9 %

2.1.1 Contributing scenario controlling worker exposure (PROC1)

PROC1	Use in closed process, no likelihood of exposure

Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Amounts used	Maximum daily site tonnage (kg/day):	3000000 kg
Frequency and duration of use	Avoid carrying out operation for more than 4 hours,Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	

Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	No specific measures identified	

2.1.2 Contributing scenario controlling worker exposure (PROC2)

PROC2	Use in closed, continuous process with occasional controlled exposure	
Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Amounts used	Maximum daily site tonnage (kg/day):	3000000 kg
Frequency and duration of use	Avoid carrying out operation for more than 4 hours,Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]:	90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection	(efficacy 95%)

2.1.3 Contributing scenario controlling worker exposure (PROC3)

PROC3	Use in closed batch process (synthesis or formulation)	
Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Amounts used	Maximum daily site tonnage (kg/day):	3000000 kg
Frequency and duration of use	Avoid carrying out operation for more than 4 hours,Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]:	90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection	(efficacy 95%)

2.1.4 Contributing scenario controlling worker exposure (PROC8b)

PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	
Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Amounts used	Maximum daily site tonnage (kg/day):	3000000 kg
Frequency and duration of use	Avoid carrying out operation for more than 4 hours,Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]:	90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection	(efficacy 95%)

2.1.5 Contributing scenario controlling worker exposure (PROC15)

PROC15	Use as laboratory reagent
Product characteristics	
Concentration of substance in product	<= 100 %

Operational conditions		
Amounts used	Maximum daily site tonnage (kg/day):	3000000 kg
Frequency and duration of use	Avoid carrying out operation for more than 4 hours,Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]:	90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection	(efficacy 95%)

2.1.6 Contributing scenario controlling worker exposure (PROC5)

PROC5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)

Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Amounts used	Maximum daily site tonnage (kg/day):	3000000 kg
Frequency and duration of use	Avoid carrying out operation for more than 4 hours	
Other given operational conditions affecting workers exposure	Indoor	
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]:	90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection	(efficacy 95%)

2.1.7 Contributing scenario controlling worker exposure (PROC8a)

PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities

Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Amounts used	Maximum daily site tonnage (kg/day):	3000000 kg
Frequency and duration of use	Avoid carrying out operation for more than 4 hours,Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]:	90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection	(efficacy 95%)

2.1.8 Contributing scenario controlling worker exposure (PROC9)

PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Amounts used	Maximum daily site tonnage (kg/day):	3000000 kg
Frequency and duration of use	Avoid carrying out operation for more than 4 hours,Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	

Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]:	90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection	(efficacy 95%)

3. Exposure estimation and reference to its source

3.1. Health

Long-term - systemic effects						
DNEL	Inhalation.: 47.6 mg/m³ Dermal: 6.8 mg/kg bodyweight/day					
Contributing scenario	inhalation exposure mg/m³	RCR	Dermal exposure mg/kg bodyweight/day	RCR	Sum RCR	Assessment method
PROC1	0.01	0.000	0.05	0.007	0.007	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC2	0.07	0.001	0.02	0.003	0.004	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC3	0.15	0.003	0.01	0.001	0.004	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC8b	0.07	0.001	0.1	0.015	0.016	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC15	0.04	0.001	0.01	0.001	0.002	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC5	0.22	0.005	0.01	0.001	0.006	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC8a	0.22	0.005	0.02	0.003	0.008	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC9	0.18	0.004	0.1	0.015	0.019	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model

Acute - systemic effects						
DNEL	Inhalation.: 47.6 mg/m³ Dermal: 6.8 mg/kg bodyweight/day					
Contributing scenario	inhalation exposure mg/m³	RCR	Dermal exposure mg/kg bodyweight/day	RCR	Sum RCR	Assessment method
PROC1	0.01	0.000	0.05	0.007	0.007	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC2	0.07	0.001	0.02	0.003	0.004	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC3	0.07	0.001	0.01	0.001	0.002	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC8b	0.07	0.001	0.02	0.003	0.004	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC15	0.04	0.001	0.01	0.001	0.002	Inhalation.: Used ECETOC TRA model

						Dermal: Used ECETOC TRA model
PROC5	0.22	0.005	0.01	0.001	0.006	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC8a	0.22	0.005	0.02	0.003	0.008	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC9	0.18	0.004	0.1	0.015	0.019	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model

Local - Inhalation.					
DNEL	Acute: 36 mg/m³ Long-term: 14 mg/m³				
Contributing scenario	Acute mg/m³	RCR	Long term mg/m³	RCR	Assessment method
PROC1	0.01	0.000	0.01	0.001	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC2	0.1	0.003	0.25	0.018	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC3	0.1	0.003	0.25	0.018	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC8b	0.09	0.003	0.23	0.016	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC15	0.06	0.002	0.15	0.011	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC5	0.3	0.008	0.04	0.003	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC8a	0.3	0.008	0.76	0.054	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC9	0.24	0.007	0.61	0.044	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model

3.2. Environment

environmental exposure	Unit	Exposure Estimation	PNEC	RCR	Assessment method
freshwater	mg/l	0.0013	0.001	1.3	Used EUSES model
marine water	mg/l	0.000314	0.001	0.314	Used EUSES model

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

4.1. Health

Guidance - Health	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Used EUSES model

1. Exposure scenario 2

Use as an intermediate

ES Ref.: 2 ES Type: Worker	

Use descriptors	SU1, SU5, SU8, SU9, SU12, SU24 PROC1, PROC2, PROC3, PROC4, PROC5, PROC8b, PROC9, PROC15 PC19 ERC6a
Processes, tasks, activities covered	Use as an intermediate within closed or contained systems (not related to Strictly Controlled Conditions). Includes incidental exposures during recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (ncluding marine vessel/barge, road/rail car and bulk container) Industrial use

2. Operational conditions and risk management measures

2.2 Contributing scenario controlling environmental exposure (ERC6a)

ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)

Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Amounts used	Annual site tonnage (tons/year):	800000
Frequency and duration of use	Emission days (days/year):	330
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
Environmental factors not influenced by risk management	Local marine water dilution factor:	10
Environmental factors not influenced by risk management	Receiving surface water flow (m³/day):	20000 m³/d
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	5 %
Other given operational conditions affecting environmental exposure	Release fraction to wastewater from process (initial release prior to RMM):	2 %
Risk management measures		
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	99.9 %

2.1.1 Contributing scenario controlling worker exposure (PROC1)

PROC1	Use in closed process, no likelihood of exposure

Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	No specific measures identified	

2.1.2 Contributing scenario controlling worker exposure (PROC2)

PROC2	Use in closed, continuous process with occasional controlled exposure

Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	

Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]:	90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection	(efficacy 95%)

2.1.3 Contributing scenario controlling worker exposure (PROC3)

PROC3	Use in closed batch process (synthesis or formulation)	
Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]:	90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection	(efficacy 95%)

2.1.4 Contributing scenario controlling worker exposure (PROC4)

PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises	
Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]:	90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection	(efficacy 95%)

2.1.5 Contributing scenario controlling worker exposure (PROC8b)

PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	
Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]:	90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection	(efficacy 95%)

2.1.6 Contributing scenario controlling worker exposure (PROC15)

PROC15	Use as laboratory reagent
Product characteristics	
Concentration of substance in product	<= 100 %

Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]:	90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection	(efficacy 95%)

2.1.7 Contributing scenario controlling worker exposure (PROC5)

PROC5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)

Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Frequency and duration of use	Avoid carrying out operation for more than 4 hours	
Other given operational conditions affecting workers exposure	Indoor	
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]:	90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection	(efficacy 95%)

2.1.8 Contributing scenario controlling worker exposure (PROC9)

PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Frequency and duration of use	Avoid carrying out operation for more than 4 hours	
Other given operational conditions affecting workers exposure	Indoor	
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]:	90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection	(efficacy 95%)

3. Exposure estimation and reference to its source

3.1. Health

Long-term - systemic effects						
DNEL	Inhalation.: 47.6 mg/m³ Dermal: 6.8 mg/kg bodyweight/day					
Contributing scenario	inhalation exposure mg/m³	RCR	Dermal exposure mg/kg bodyweight/day	RCR	Sum RCR	Assessment method
PROC1	0.01	0.000	0.05	0.007	0.007	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC2	0.07	0.001	1.37	0.201	0.202	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC3	0.15	0.003	0.01	0.001	0.004	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC4	0.15	0.003	0.1	0.015	0.018	Inhalation.: Used ECETOC TRA model

						Dermal: Used ECETOC TRA model
PROC8b	0.07	0.001	0.1	0.015	0.016	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC15	0.04	0.001	0.01	0.001	0.002	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC5	0.37	0.008	0.01	0.001	0.009	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC9	0.3	0.006	0.1	0.015	0.021	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model

Acute - systemic effects						
DNEL	Inhalation.: 47.6 mg/m³ Dermal: 6.8 mg/kg bodyweight/day					
Contributing scenario	inhalation exposure mg/m³	RCR	Dermal exposure mg/kg bodyweight/day	RCR	Sum RCR	Assessment method
PROC1	0.01	0.000	0.05	0.007	0.007	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC2	0.07	0.001	1.37	0.201	0.202	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC3	0.15	0.003	0.01	0.001	0.004	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC4	0.15	0.003	0.1	0.015	0.018	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC8b	0.07	0.001	0.01	0.001	0.002	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC15	0.04	0.001	0.01	0.001	0.002	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC5	0.37	0.008	0.01	0.001	0.009	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC9	0.3	0.006	0.1	0.015	0.021	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model

Local - Inhalation.					
DNEL	Acute: 36 mg/m³ Long-term: 14 mg/m³				
Contributing scenario	Acute mg/m³	RCR	Long term mg/m³	RCR	Assessment method
PROC1	0.01	0.000	0.01	0.001	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC2	0.1	0.003	0.25	0.018	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC3	0.2	0.006	0.5	0.036	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC4	0.2	0.006	0.5	0.036	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model

PROC8b	0.09	0.003	0.23	0.016	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC15	0.06	0.002	0.1	0.007	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC5	0.49	0.014	0.06	0.004	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC9	0.39	0.011	0.05	0.004	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model

3.2. Environment

environmental exposure	Unit	Exposure Estimation	PNEC	RCR	Assessment method
freshwater	mg/l	0.00219	0.001	2.19	Used EUSES model
marine water	mg/l	0.000537	0.001	0.537	Used EUSES model

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

4.1. Health

Guidance - Health	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Used EUSES model

1. Exposure scenario 3

Industrial use of reactive processing aids

ES Ref.: 3 ES Type: Worker	

Use descriptors	SU4, SU5, SU6a, SU6b, SU8, SU9, SU11, SU12, SU13, SU15, SU16, SU23, SU24 PROC1, PROC2, PROC3, PROC4, PROC5, PROC8b, PROC9, PROC13 PC1, PC9a, PC14, PC16, PC20, PC26, PC29, PC30, PC34, PC35, PC37, PC39 ERC4, ERC5, ERC6b, ERC7
Processes, tasks, activities covered	Use as an intermediate within closed or contained systems (not related to Strictly Controlled Conditions). Includes incidental exposures during recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (ncluding marine vessel/barge, road/rail car and bulk container) Industrial use

2. Operational conditions and risk management measures

2.2.1 Contributing scenario controlling environmental exposure (ERC4)

ERC4	Industrial use of processing aids in processes and products, not becoming part of articles

Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Amounts used	Annual site tonnage (tons/year):	25000
Frequency and duration of use	Emission days (days/year):	330
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
Environmental factors not influenced by risk management	Local marine water dilution factor:	10
Environmental factors not influenced by risk management	Receiving surface water flow (m³/day):	20000 m³/d
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	95 %
Other given operational conditions affecting environmental exposure	Release fraction to wastewater from process (initial release prior to RMM):	100 %
Risk management measures		
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	99.9 %

2.2.2 Contributing scenario controlling environmental exposure (ERC5)

ERC5	Industrial use resulting in inclusion into or onto a matrix

Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Amounts used	Annual site tonnage (tons/year):	25000
Frequency and duration of use	Emission days (days/year):	330
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
Environmental factors not influenced by risk management	Local marine water dilution factor:	10
Environmental factors not influenced by risk management	Receiving surface water flow (m³/day):	20000 m³/d
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	50 %
Other given operational conditions affecting environmental exposure	Release fraction to wastewater from process (initial release prior to RMM):	50 %

Risk management measures		
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	99.9 %

2.2.3 Contributing scenario controlling environmental exposure (ERC6b)

ERC6b	Industrial use of reactive processing aids	
Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Amounts used	Annual site tonnage (tons/year):	25000
Frequency and duration of use	Emission days (days/year):	330
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
Environmental factors not influenced by risk management	Local marine water dilution factor:	10
Environmental factors not influenced by risk management	Receiving surface water flow (m³/day):	20000 m³/d
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	0.1 %
Other given operational conditions affecting environmental exposure	Release fraction to wastewater from process (initial release prior to RMM):	5 %
Risk management measures		
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	99.9 %

2.2.4 Contributing scenario controlling environmental exposure (ERC7)

ERC7	Industrial use of substances in closed systems	
Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Amounts used	Annual site tonnage (tons/year):	25000
Frequency and duration of use	Emission days (days/year):	330
Environmental factors not influenced by risk management	Local freshwater dilution factor:	10
Environmental factors not influenced by risk management	Local marine water dilution factor:	10
Environmental factors not influenced by risk management	Receiving surface water flow (m³/day):	20000 m³/d
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	5 %
Other given operational conditions affecting environmental exposure	Release fraction to wastewater from process (initial release prior to RMM):	5 %
Risk management measures		
Conditions and measures related to municipal sewage treatment plant	Estimated substance removal from wastewater via on-site sewage treatment (%):	99.9 %

2.1.1 Contributing scenario controlling worker exposure (PROC1)

PROC1	Use in closed process, no likelihood of exposure	
Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Amounts used	Annual site tonnage (tons/year):	25000
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	No specific measures identified	

2.1.2 Contributing scenario controlling worker exposure (PROC2)

PROC2	Use in closed, continuous process with occasional controlled exposure	
Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]:	90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection	(efficacy 95%)

2.1.3 Contributing scenario controlling worker exposure (PROC3)

PROC3	Use in closed batch process (synthesis or formulation)	
Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]:	90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection	(efficacy 95%)

2.1.4 Contributing scenario controlling worker exposure (PROC4)

PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises	
Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]:	90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection	(efficacy 95%)

2.1.5 Contributing scenario controlling worker exposure (PROC8b)

PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	
Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]:	90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection	(efficacy 95%)

2.1.6 Contributing scenario controlling worker exposure (PROC5)

PROC5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)

Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Frequency and duration of use	Avoid carrying out operation for more than 4 hours	
Other given operational conditions affecting workers exposure	Indoor	
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]:	90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of possible exposure to degradation products use a suitable respiratory protection	(efficacy 95%)

2.1.7 Contributing scenario controlling worker exposure (PROC9)

PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics		
Concentration of substance in product	<= 100 %	
Operational conditions		
Frequency and duration of use	Avoid carrying out operation for more than 4 hours	
Other given operational conditions affecting workers exposure	Indoor	
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]:	90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection	(efficacy 95%)

3. Exposure estimation and reference to its source

3.1. Health

Long-term - systemic effects						
DNEL	Inhalation.: 47.6 mg/m³ Dermal: 6.8 mg/kg bodyweight/day					
Contributing scenario	inhalation exposure mg/m³	RCR	Dermal exposure mg/kg bodyweight/day	RCR	Sum RCR	Assessment method
PROC1	0.01	0.000	0.05	0.007	0.007	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC2	0.07	0.001	0.2	0.029	0.030	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC3	0.15	0.003	0.01	0.001	0.004	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC4	0.15	0.003	0.1	0.015	0.018	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC8b	0.04	0.001	0.1	0.015	0.016	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC5	0.22	0.005	0.01	0.001	0.006	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC9	0.18	0.004	0.1	0.015	0.019	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model

Acute - systemic effects						
DNEL	Inhalation.: 47.6 mg/m³ Dermal: 6.8 mg/kg bodyweight/day					
Contributing scenario	inhalation exposure mg/m³	RCR	Dermal exposure mg/kg bodyweight/day	RCR	Sum RCR	Assessment method
PROC1	0.01	0.000	0.05	0.007	0.007	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC2	0.07	0.001	0.2	0.029	0.030	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC3	0.15	0.003	0.01	0.001	0.004	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC4	0.15	0.003	0.1	0.015	0.018	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC8b	0.04	0.001	0.1	0.015	0.016	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC5	0.22	0.005	0.01	0.001	0.006	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC9	0.18	0.004	0.1	0.015	0.019	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model

Local - Inhalation.					
DNEL	Acute: 36 mg/m³ Long-term: 14 mg/m³				
Contributing scenario	Acute mg/m³	RCR	Long term mg/m³	RCR	Assessment method
PROC1	0.01	0.000	0.01	0.001	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC2	0.1	0.003	0.25	0.018	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC3	0.2	0.006	0.51	0.036	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC4	0.2	0.006	0.51	0.036	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC8b	0.05	0.001	0.14	0.01	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC5	0.3	0.008	0.76	0.054	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC9	0.24	0.007	0.61	0.044	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model

3.2. Environment

environmental exposure	Unit	Exposure Estimation	PNEC	RCR	Assessment method
freshwater	mg/l	0.00282	0.001	2.82	Used EUSES model
marine water	mg/l	0.000606	0.001	0.606	Used EUSES model

environmental exposure	Unit	Exposure Estimation	PNEC	RCR	Assessment method

freshwater	mg/l	0.00146	0.001	1.46	Used EUSES model
marine water	mg/l	0.00317	0.001	3.17	Used EUSES model

environmental exposure	Unit	Exposure Estimation	PNEC	RCR	Assessment method
freshwater	mg/l	0.000054	0.001	0.054	Used EUSES model
marine water	mg/l	0.0000519	0.001	0.052	Used EUSES model

environmental exposure	Unit	Exposure Estimation	PNEC	RCR	Assessment method
freshwater	mg/l	0.000146	0.001	0.146	Used EUSES model
marine water	mg/l	0.000317	0.001	0.317	Used EUSES model

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

4.1. Health

Guidance - Health	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Used EUSES model

1. Exposure scenario 4

Professional use

ES Ref.: 4 ES Type: Worker	

Use descriptors	SU1, SU4, SU5, SU6a, SU6b, SU9, SU10, SU11, SU12, SU13, SU15, SU16, SU17, SU23, SU24 PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC13, PROC15, PROC20 PC9a, PC12, PC14, PC15, PC16, PC19, PC20, PC21, PC26, PC29, PC30, PC34, PC35, PC37, PC39, PC40 ERC8b, ERC8e, ERC9a, ERC9b
Processes, tasks, activities covered	Use as an intermediate within closed or contained systems (not related to Strictly Controlled Conditions). Includes incidental exposures during recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (ncluding marine vessel/barge, road/rail car and bulk container) Professional use

2. Operational conditions and risk management measures

2.2 Contributing scenario controlling environmental exposure (ERC8b, ERC8e, ERC9a, ERC9b)

ERC8b	Wide dispersive indoor use of reactive substances in open systems
ERC8e	Wide dispersive outdoor use of reactive substances in open systems
ERC9a	Wide dispersive indoor use of substances in closed systems
ERC9b	Wide dispersive outdoor use of substances in closed systems
Assessment method	Not applicable for wide dispersive uses

Product characteristics

Concentration of substance in product	<= 100 %

Operational conditions

Not applicable for wide dispersive uses.

Risk management measures

Not applicable for wide dispersive uses.

2.1.1 Contributing scenario controlling worker exposure (PROC1)

PROC1	Use in closed process, no likelihood of exposure

Product characteristics

Concentration of substance in product	<= 100 %

Operational conditions

Amounts used	Annual site tonnage (tons/year):	25000
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	

Risk management measures

Technical conditions and measures to control dispersion from source towards the worker	No specific measures identified	

2.1.2 Contributing scenario controlling worker exposure (PROC2)

PROC2	Use in closed, continuous process with occasional controlled exposure

Product characteristics

Concentration of substance in product	<= 100 %

Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	

Risk management measures

Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]:	90

Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection	(efficacy 95%)

2.1.3 Contributing scenario controlling worker exposure (PROC3)

PROC3	Use in closed batch process (synthesis or formulation)
Product characteristics	
Concentration of substance in product	<= 100 %
Operational conditions	
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)
Other given operational conditions affecting workers exposure	Indoor
Risk management measures	
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]: 90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection (efficacy 95%)

2.1.4 Contributing scenario controlling worker exposure (PROC4)

PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
Product characteristics	
Concentration of substance in product	<= 100 %
Operational conditions	
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)
Other given operational conditions affecting workers exposure	Indoor
Risk management measures	
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]: 90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection (efficacy 95%)

2.1.5 Contributing scenario controlling worker exposure (PROC8b)

PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Product characteristics	
Concentration of substance in product	<= 100 %
Operational conditions	
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)
Other given operational conditions affecting workers exposure	Indoor
Risk management measures	
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]: 90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection (efficacy 95%)

2.1.6 Contributing scenario controlling worker exposure (PROC15)

PROC15	Use as laboratory reagent
Product characteristics	
Concentration of substance in product	<= 100 %
Operational conditions	
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)
Other given operational conditions affecting workers exposure	Indoor

Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]:	90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection	(efficacy 95%)

2.1.7 Contributing scenario controlling worker exposure (PROC20)

PROC20	Heat and pressure transfer fluids in dispersive use but closed systems
Product characteristics	
Concentration of substance in product	<= 100 %
Operational conditions	
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)
Other given operational conditions affecting workers exposure	Indoor
Risk management measures	
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]: 90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection (efficacy 95%)

2.1.8 Contributing scenario controlling worker exposure (PROC5)

PROC5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
Product characteristics	
Concentration of substance in product	<= 100 %
Operational conditions	
Frequency and duration of use	Avoid carrying out operation for more than 4 hours
Other given operational conditions affecting workers exposure	Indoor
Risk management measures	
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]: 90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of possible exposure to degradation products use a suitable respiratory protection (efficacy 95%)

2.1.9 Contributing scenario controlling worker exposure (PROC9)

PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Product characteristics	
Concentration of substance in product	<= 100 %
Operational conditions	
Frequency and duration of use	Avoid carrying out operation for more than 4 hours
Other given operational conditions affecting workers exposure	Indoor
Risk management measures	
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]: 90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection (efficacy 95%)

2.1.10 Contributing scenario controlling worker exposure (PROC8a)

PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
Product characteristics	
Concentration of substance in product	<= 100 %
Operational conditions	
Frequency and duration of use	Avoid carrying out operation for more than 4 hours
Other given operational conditions affecting workers exposure	Indoor

Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]:	90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection	(efficacy 95%)

2.1.11 Contributing scenario controlling worker exposure (PROC13)

PROC13	Treatment of articles by dipping and pouring

Product characteristics	
Concentration of substance in product	<= 100 %

Operational conditions		
Frequency and duration of use	Avoid carrying out operation for more than 4 hours	
Other given operational conditions affecting workers exposure	Indoor	

Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation - efficiency of at least [%]:	90
Conditions and measures related to personal protection, hygiene and health evaluation	In case of inadequate ventilation wear respiratory protection	(efficacy 95%)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374	(efficacy 90%)

3. Exposure estimation and reference to its source

3.1. Health

Long-term - systemic effects						
DNEL	Inhalation.: 47.6 mg/m³ Dermal: 6.8 mg/kg bodyweight/day					
Contributing scenario	inhalation exposure mg/m³	RCR	Dermal exposure mg/kg bodyweight/day	RCR	Sum RCR	Assessment method
PROC1	0.01	0.000	0.05	0.007	0.007	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC2	0.07	0.001	0.2	0.029	0.030	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC3	0.15	0.003	0.01	0.001	0.004	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC4	0.15	0.003	0.1	0.015	0.018	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC8b	0.07	0.001	0.1	0.015	0.016	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC15	0.04	0.001	0.01	0.001	0.002	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC20	0.15	0.003	0.01	0.001	0.004	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC5	0.22	0.005	0.01	0.001	0.006	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC9	0.18	0.004	0.1	0.015	0.019	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model

PROC8a	0.22	0.005	0.02	0.003	0.008	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC13	0.22	0.005	0.2	0.029	0.034	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model

Acute - systemic effects						
DNEL	Inhalation.: 47.6 mg/m³ Dermal: 6.8 mg/kg bodyweight/day					
Contributing scenario	inhalation exposure mg/m³	RCR	Dermal exposure mg/kg bodyweight/day	RCR	Sum RCR	Assessment method
PROC1	0.01	0.000	0.05	0.007	0.007	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC2	0.07	0.001	0.2	0.029	0.030	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC3	0.15	0.003	0.01	0.001	0.004	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC4	0.15	0.003	0.1	0.015	0.018	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC8b	0.07	0.001	0.1	0.015	0.016	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC15	0.04	0.001	0.01	0.001	0.002	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC20	0.09	0.002	0.01	0.001	0.003	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC5	0.2	0.004	0.01	0.001	0.005	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC9	0.18	0.004	0.1	0.015	0.019	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC8a	0.22	0.005	0.02	0.003	0.008	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC13	0.22	0.005	0.2	0.029	0.034	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model

Local - Inhalation.					
DNEL	Acute: 36 mg/m³ Long-term: 14 mg/m³				
Contributing scenario	Acute mg/m³	RCR	Long term mg/m³	RCR	Assessment method
PROC1	0.01	0.000	0.01	0.001	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC2	0.1	0.003	0.25	0.018	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC3	0.2	0.006	0.51	0.036	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model

PROC4	0.2	0.006	0.51	0.036	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC8b	0.01	0.000	0.01	0.001	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC15	0.06	0.002	0.01	0.001	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC20	0.12	0.003	0.02	0.001	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC5	0.3	0.008	0.76	0.054	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC9	0.24	0.007	0.61	0.044	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC8a	0.3	0.008	0.76	0.054	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC13	0.3	0.008	0.76	0.054	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model

3.2. Environment

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

4.1. Health

Guidance - Health	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

4.2. Environment

Guidance - Environment	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Used EUSES model