

SAFETY DATA SHEET



Triethylenetetramine, TETA

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

1.1 Product identifier

Product name : Triethylenetetramine, TETA
Index number : 612-065-00-8
EC number : 292-588-2
REACH Registration number

Registration number	Legal entity
01-2119487919-13-0000	-

CAS number : 112-24-3 / 90640-67-8
Other means of identification :

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

Product use : Intermediate. Chemical synthesis.

Identified uses
<p>ES 1.1: Use of ethylenamines (EA) in closed system with little opportunity for exposure - Use of EA up to 100% - Industrial: SU03; PROC01, PROC02, PROC03, PROC04, PROC05, PROC08a, PROC08b, PROC09, PROC15; ERC01, ERC02, ERC06a</p> <p>ES 1.2: Use of ethylenamines (EA) in closed system with little opportunity for exposure - Use of preparations containing EA up to 2% - Industrial/Professional: SU03, SU22; PROC05, PROC08a, PROC08b, PROC09; ERC01, ERC02, ERC06a</p> <p>ES 1.3: Use of ethylenamines (EA) in closed system with little opportunity for exposure - Use of preparations containing EA up to 0.5% - Industrial/Professional: SU03, SU22; PROC05, PROC08a, PROC08b, PROC09; ERC01, ERC02, ERC06a</p> <p>ES 2.1: Use of preparations containing ethylenamines (EA) in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial/Professional: SU03, SU22; PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC16; ERC01, ERC02, ERC04, ERC10b</p> <p>ES 2.2: Use of preparations containing ethylenamines (EA) in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial/Professional: SU03, SU22; PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC16; ERC01, ERC02, ERC04, ERC10b</p> <p>ES 3.1: Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 25% - Industrial/Professional: SU03, SU22; PROC05, PROC08a, PROC08b, PROC09; ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC07, ERC08a, ERC08b, ERC08c, ERC08e, ERC08f, ERC11a, ERC12a, ERC12b</p> <p>ES 3.2: Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 15% - Industrial/Professional: SU03, SU22; PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC11, PROC13, PROC14; ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC07, ERC08a, ERC08b, ERC08c, ERC08e, ERC08f, ERC11a, ERC12a, ERC12b</p> <p>ES 3.3: Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 2% - Industrial: SU03, SU22; PROC05, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC11, PROC13, PROC14, PROC19; ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC07, ERC08a, ERC08b, ERC08c, ERC08e, ERC08f, ERC11a, ERC12a, ERC12b</p> <p>ES 3.4: Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 0.5% - Industrial: SU03, SU22; PROC05, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC11, PROC13, PROC14, PROC19; ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC07, ERC08a, ERC08b, ERC08c, ERC08e, ERC08f, ERC11a, ERC12a, ERC12b</p> <p>ES 4.1: Handling of solid products with small amounts of unbound ethylenamines (EA) - Use of preparations containing EA up to 2% - Professional: SU22; PROC21, PROC24; ERC11a</p> <p>ES 4.2: Handling of solid products with small amounts of unbound ethylenamines (EA) - Use of preparations</p>

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containing EA up to 0.5% - Professional: SU22; PROC21, PROC24; ERC11a

ES 5: Consumer uses of ethyleneamines (EA) - Consumer: SU21; PC01, PC09b; ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f

See Annex to the Safety data sheet for additional information in the Exposure Scenario(s).

1.3 Details of the supplier of the safety data sheet

Delamine B.V.

Barchman Wuytierslaan 10

3818 LH Amersfoort

Netherlands

Telephone number: +31-334224600

e-mail address of person responsible for this SDS : sds.delamine@delamine.com

1.4 Emergency telephone number

Supplier

Telephone number : GBK/Infotrac ID 104075 : International (001) 352 323 3500 (24 h)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Product definition : Multi-constituent substance

Classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

Acute Tox. 4, H302

Acute Tox. 4, H312

Skin Corr. 1B, H314

Eye Dam. 1, H318

Skin Sens. 1, H317

Aquatic Chronic 3, H412

The product is classified as hazardous according to Regulation (EC) 1272/2008 as amended.

See Section 16 for the full text of the H statements declared above.

See Section 11 for more detailed information on health effects and symptoms.

2.2 Label elements

Hazard pictograms :



Signal word : Danger

Hazard statements : H302 + H312 - Harmful if swallowed or in contact with skin.
H314 - Causes severe skin burns and eye damage.
H317 - May cause an allergic skin reaction.
H412 - Harmful to aquatic life with long lasting effects.

Precautionary statements

Prevention : P280 - Wear protective gloves. Wear eye or face protection. Wear protective clothing.
P260 - Do not breathe vapour.
P273 - Avoid release to the environment.

Response : P303 + P361 + P353 + P310 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Immediately call a POISON CENTER or physician.
P333 + P313 - If skin irritation or rash occurs: Get medical attention.
P305 + P351 + P338 + P310 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.

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SECTION 2: Hazards identification

- Storage** : Not applicable.
- Disposal** : Not applicable.
- Hazardous ingredients** : Amines, polyethylenepoly-, triethylenetetramine fraction
2-(2-aminoethylamino)ethanol
- Supplemental label elements** : Not applicable.
- Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles** : Not applicable.

2.3 Other hazards

- Substance meets the criteria for PBT according to Regulation (EC) No. 1907/2006, Annex XIII** : No.
P: Yes. B: No. T: No.
- Substance meets the criteria for vPvB according to Regulation (EC) No. 1907/2006, Annex XIII** : No.
vP: No. vB: No.
- Other hazards which do not result in classification** : None known.

SECTION 3: Composition/information on ingredients

3.1 Substances : Multi-constituent substance

Product/ingredient name	Identifiers	%	Regulation (EC) No. 1272/2008 [CLP]	Type
Amines, polyethylenepoly-, triethylenetetramine fraction	REACH #: 01-2119487919-13 EC: 292-588-2 CAS: 90640-67-8 (Other means of identification CAS no. 112-24-3) Index: 612-059-00-5	100	Acute Tox. 4, H302 Acute Tox. 4, H312 Skin Corr. 1B, H314 Eye Dam. 1, H318 Skin Sens. 1, H317 Aquatic Chronic 3, H412	[A]
2-(2-aminoethylamino)ethanol	REACH #: 01-2119456894-24 EC: 203-867-5 CAS: 111-41-1 Index: 603-194-00-0	<0.3	Skin Corr. 1B, H314 Eye Dam. 1, H318 Skin Sens. 1B, H317 Repr. 1B, H360FD (Fertility and Unborn child) Lact., H362 See Section 16 for the full text of the H statements declared above.	[B]

There are no additional ingredients present which, within the current knowledge of the supplier, are classified and contribute to the classification of the substance and hence require reporting in this section.

Type

[A] Constituent

[B] Impurity

[C] Stabilising additive

Occupational exposure limits, if available, are listed in Section 8.

SECTION 4: First aid measures**4.1 Description of first aid measures**

- Eye contact** : Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.
- Inhalation** : Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
- Skin contact** : Get medical attention immediately. Call a poison center or physician. Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Ingestion** : Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

4.2 Most important symptoms and effects, both acute and delayed**Potential acute health effects**

- Eye contact** : Causes serious eye damage.
- Inhalation** : No known significant effects or critical hazards.
- Skin contact** : Causes severe burns. Harmful in contact with skin. May cause an allergic skin reaction.
- Ingestion** : Harmful if swallowed.

Over-exposure signs/symptoms

- Eye contact** : Adverse symptoms may include the following:
pain
watering
redness
- Inhalation** : No specific data.
- Skin contact** : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur
- Ingestion** : Adverse symptoms may include the following:
stomach pains

4.3 Indication of any immediate medical attention and special treatment needed

- Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

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SECTION 4: First aid measures

Specific treatments : No specific treatment.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media : Use dry chemical, CO₂, water spray (fog) or foam. Dry sand or other suitable absorbent. Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : Do not use water jet.

5.2 Special hazards arising from the substance or mixture

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 combustion products : No specific data.

5.3 Advice for firefighters

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters : 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.

Additional information (Explosibility) : Not considered to be a product presenting a risk of explosion.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Do not breathe vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

6.2 Environmental precautions

: Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

6.3 Methods and material for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

SECTION 6: Accidental release measures

Large spill : Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations. Dispose of via a licensed waste disposal contractor. Contaminated absorbent 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 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

SECTION 7: Handling and storage**7.1 Precautions for safe handling**

Protective measures : Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not breathe vapour or mist. Do not ingest. Avoid release to the environment. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. 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 retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : 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 in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Separate from acids. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination.

7.3 Specific end use(s)

Section 7. Handling and storage: The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

SECTION 8: Exposure controls/personal protection

The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

8.1 Control parameters**Occupational exposure limits**

No exposure limit value known.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to monitoring standards, such as the following: European Standard EN 689 (Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy) European Standard EN 14042 (Workplace atmospheres - Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents) European Standard EN 482 (Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents) Reference to national guidance

SECTION 8: Exposure controls/personal protection

documents for methods for the determination of hazardous substances will also be required.

DNELs/DMELs

Product/ingredient name	Type	Exposure	Value	Population	Effects
Amines, polyethylenepoly-, triethylenetetramine fraction	DNEL	Long term Inhalation	1 mg/m ³	Workers	Systemic
	DNEL	Short term Inhalation	5380 mg/m ³	Workers	Systemic
	DNEL	Long term Dermal	0.57 mg/kg bw/day	Workers	Systemic
	DNEL	Long term Dermal	0.028 mg/cm ²	Workers	Local
	DNEL	Long term Inhalation	0.29 mg/m ³	Consumers	Systemic
	DNEL	Short term Inhalation	1600 mg/m ³	Consumers	Systemic
	DNEL	Long term Dermal	0.25 mg/kg bw/day	Consumers	Systemic
	DNEL	Short term Dermal	8 mg/kg bw/day	Consumers	Systemic
	DNEL	Long term Dermal	0.43 mg/cm ²	Consumers	Local
	DNEL	Short term Dermal	1 mg/cm ²	Consumers	Local
	DNEL	Long term Oral	0.41 mg/kg bw/day	Consumers	Systemic
	DNEL	Short term Oral	20 mg/kg bw/day	Consumers	Systemic

PNECs

Product/ingredient name	Compartment Detail	Value	Method Detail
Amines, polyethylenepoly-, triethylenetetramine fraction	Fresh water	190 µg/l	Assessment Factors
	Marine water	38 µg/l	Assessment Factors
	Intermittent release	200 µg/l	Assessment Factors
	Fresh water sediment	95.9 mg/kg dwt	-
	Marine water sediment	19.2 mg/kg dwt	-
	Sewage Treatment Plant	4.25 mg/l	Assessment Factors
	Soil	19.1 mg/kg dwt	-
	Secondary Poisoning	0.18 mg/kg	Assessment Factors

8.2 Exposure controls

Appropriate engineering controls

: If user operations generate dust, fumes, gas, vapour 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.

SECTION 8: Exposure controls/personal protection**Individual protection measures**

- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Eye/face protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.
- Skin protection**
- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Recommended: Wear suitable gloves tested to EN374.
> 8 hours (breakthrough time): butyl rubber (thickness ≥ 0.3 mm), nitrile rubber (thickness ≥ 0.4 mm), Chloroprene (thickness ≥ 0.65 mm).
- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Other skin protection** : Appropriate footwear and any additional skin protection measures 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** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Recommended: Combination filtering device (DIN EN 14387), Filter type: A-P2.
- 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****Appearance**

- Physical state** : Liquid.
- Colour** : Off-white. Clear.
- Odour** : Faint odour.
- Odour threshold** : Not available.
- pH** : 13.2
- Melting point/freezing point** : -71°C
- Initial boiling point and boiling range** : 274.6°C
- Flash point** : Closed cup: 118°C
- Evaporation rate** : Not available.
- Flammability (solid, gas)** : Not applicable.

SECTION 9: Physical and chemical properties

Upper/lower flammability or explosive limits	: Not available.
Vapour pressure	: 0.00035 kPa [room temperature]
Vapour density	: Not available.
Relative density	: Not available.
Density	: 0.971 g/cm ³
Solubility(ies)	: Not available.
Solubility in water	: >1000 g/l
Partition coefficient: n-octanol/ water	: -2.65
Auto-ignition temperature	: 325°C
Decomposition temperature	: Not available.
Viscosity	: Kinematic (room temperature): 0.286 cm ² /s
Explosive properties	: Not considered to be a product presenting a risk of explosion.
Oxidising properties	: None.

9.2 Other information

No additional information.

SECTION 10: Stability and reactivity

10.1 Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
10.2 Chemical stability	: The product is stable.
10.3 Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous polymerisation will not occur.
10.4 Conditions to avoid	: aerosol or mist formation. Keep away from heat, sparks and flame. Do not smoke.
10.5 Incompatible materials	: Reactive or incompatible with the following materials: oxidizing materials, metals, acids. Chlorinated hydrocarbon.
10.6 Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information**11.1 Information on toxicological effects****Acute toxicity**

Product/ingredient name	Result	Species	Dose	Exposure	Remarks
Amines, polyethylenepoly-, triethylenetetramine fraction	LD50 Dermal [OECD 402]	Rabbit - Male, Female	1465.4 mg/kg	-	-
	LD50 Oral [OECD 401]	Rat - Male, Female	1716.2 mg/kg	-	-
2-(2-aminoethylamino) ethanol	LD50 Dermal [OECD 402]	Rat - Male, Female	>2000 mg/kg	-	-
	LD50 Oral [OECD 401]	Rat - Male, Female	2150 mg/kg	-	-

SECTION 11: Toxicological information

Conclusion/Summary : Harmful if swallowed or in contact with skin.

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation	Remarks
Amines, polyethylenepoly-, triethylenetetramine fraction	Skin - Visible necrosis [OECD 404]	Rabbit	-	4 hours	14 days	-
	Eyes - Severe irritant [OECD 405]	Rabbit	-	1 hours	-	-
2-(2-aminoethylamino) ethanol	Skin - Visible necrosis [OECD 404]	Rabbit	-	4 hours	14 days	-
	Eyes - Oedema of the conjunctivae [OECD 405]	Rabbit	3	24 hours	8 days	-

Conclusion/Summary

Skin : Causes severe burns.

Eyes : Causes serious eye damage.

Sensitisation

Product/ingredient name	Route of exposure	Species	Result	Remarks
Amines, polyethylenepoly-, triethylenetetramine fraction	skin	Guinea pig	Sensitising [OECD 406]	-
2-(2-aminoethylamino) ethanol	skin	Mouse	Sensitising [OECD 429]	-

Conclusion/Summary

Skin : May cause an allergic skin reaction.

Mutagenicity

Product/ingredient name	Test	Experiment	Result	Remarks
Amines, polyethylenepoly-, triethylenetetramine fraction	OECD 477	Experiment: In vivo Subject: Insect	Negative	-
	OECD 474	Experiment: In vivo Subject: Mammalian-Animal	Negative	-
2-(2-aminoethylamino) ethanol	OECD 477	Experiment: In vivo Subject: Insect Cell: Germ	Negative	-

Conclusion/Summary : Based on available data, the classification criteria are not met.

Carcinogenicity

Conclusion/Summary : No known significant effects or critical hazards.

Reproductive toxicity

SECTION 11: Toxicological information

Product/ingredient name	Maternal toxicity	Fertility	Developmental toxin	Species	Dose	Exposure	Remarks
Amines, polyethylenepoly-, triethylenetetramine fraction	Positive	-	Negative	Rabbit	Dermal: >125 mg/kg NOAEL	-	OECD 414
	Negative	-	Negative	Rat	Oral: >750 mg/kg NOAEL	-	OECD 414
2-(2-aminoethylamino) ethanol	Negative	Positive	Positive	Rat - Male, Female	Oral	-	OECD 421

Conclusion/Summary : Based on available data, the classification criteria are not met.

Teratogenicity

Conclusion/Summary : No known significant effects or critical hazards.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Causes serious eye damage.

Inhalation : No known significant effects or critical hazards.

Skin contact : Causes severe burns. Harmful in contact with skin. May cause an allergic skin reaction.

Ingestion : Harmful if swallowed.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:
pain
watering
redness

Inhalation : No specific data.

Skin contact : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur

Ingestion : Adverse symptoms may include the following:
stomach pains

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

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Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Product/ingredient name	Result	Species	Dose	Exposure	Remarks
Amines, polyethylenepoly-, triethylenetetramine fraction	Sub-chronic NOAEL Oral [OECD 408]	Rat - Female	50 mg/kg	-	test substance: CAS no.38260-01-4 (read-across). Based on available data, the classification criteria are not met.
2-(2-aminoethylamino) ethanol	Sub-acute NOEL Oral [OECD 407]	Rat - Male, Female	60 mg/kg	28 days	Based on available data, the classification criteria are not met.
	Sub-acute NOAEL Dermal [OECD 410]	Rat - Male, Female	1000 mg/kg	4 weeks; 5 days per week	Based on available data, the classification criteria are not met.

Conclusion/Summary : Based on available data, the classification criteria are not met.

General : Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : 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.

Other information : Not available.

SECTION 12: Ecological information

12.1 Toxicity

Product/ingredient name	Result	Species	Exposure	Remarks
Amines, polyethylenepoly-, triethylenetetramine fraction	Acute EC50 20 mg/l Fresh water [OECD 201]	Algae - Pseudokirchneriella subcapitata	72 hours	-
	Acute EC50 31.1 mg/l [EU C. 2]	Daphnia - Daphnia magna	48 hours	-
	Acute LC50 330 mg/l [EU C. 1]	Fish - Pimephales promelas	96 hours	-
	Chronic EC10 1.9 mg/l Fresh water [OECD 202]	Daphnia - Daphnia magna	21 days	-
	Chronic NOEC 1.34 mg/l Fresh water [OECD 201]	Algae - Pseudokirchneriella subcapitata	72 hours	-
2-(2-aminoethylamino) ethanol	Acute EC50 920 mg/l Marine water [ISO 10253]	Algae	72 hours	-
	Acute EC50 190 mg/l Fresh water [OECD 202]	Daphnia	48 hours	-
	Acute LC50 640 mg/l Fresh water	Fish	96 hours	-

SECTION 12: Ecological information

Conclusion/Summary : Harmful to aquatic life with long lasting effects.

12.2 Persistence and degradability

Product/ingredient name	Test	Result	Dose	Inoculum
Amines, polyethylenepoly-, triethylenetetramine fraction	OECD 301D	0 % - Not readily - 162 days	-	-
2-(2-aminoethylamino) ethanol	OECD 301F	>60 % - Readily - 28 days	-	-

Conclusion/Summary : Not readily biodegradable.

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
Amines, polyethylenepoly-, triethylenetetramine fraction	-	-	Not readily
2-(2-aminoethylamino) ethanol	-	-	Readily

12.3 Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
Amines, polyethylenepoly-, triethylenetetramine fraction	-2.65	-	low
2-(2-aminoethylamino) ethanol	-1.46	2.1	low

12.4 Mobility in soil

Soil/water partition coefficient (K_{oc}) : 4000

Mobility : Low mobility in soil predicted, based on the log K_{oc} value.

12.5 Results of PBT and vPvB assessment

PBT : No.
P: Yes. B: No. T: No.

vPvB : No.
vP: No. vB: No.

12.6 Other adverse effects : No known significant effects or critical hazards.

SECTION 13: Disposal considerations

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

13.1 Waste treatment methods

Product

Methods of disposal : The generation of waste should be avoided or minimised wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction.

Hazardous waste : The classification of the product may meet the criteria for a hazardous waste. The allocation of waste identity numbers/waste descriptions must be carried out according to the EEC, specific to the industry and process.

Triethylenetetramine, TETA





SECTION 13: Disposal considerations

Packaging

Methods of disposal : The generation of waste should be avoided or minimised wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

Special precautions : This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

SECTION 14: Transport information

	ADR/RID	ADN	IMDG	IATA
14.1 UN number	UN2259	UN2259	UN2259	UN2259
14.2 UN proper shipping name	TRIETHYLENETETRAMINE	TRIETHYLENETETRAMINE	TRIETHYLENETETRAMINE	Triethylenetetramine
14.3 Transport hazard class(es)	8	8	8	8
Label				
14.4 Packing group	II	II	II	II
14.5 Environmental hazards	No.	Yes.	Marine Pollutant: No	No.
Additional information	<p>Hazard identification number 80</p> <p>Limited quantity 1 L</p> <p>Tunnel code (E)</p>	The product is only regulated as an environmentally hazardous substance when transported in tank vessels.	<p>Emergency schedules (EmS) F-A, S-B</p>	<p>Passenger and Cargo Aircraft Quantity limitation: 1 L Packaging instructions: 851</p> <p>Cargo Aircraft Only Quantity limitation: 30 L Packaging instructions: 855</p> <p>Limited Quantities - Passenger Aircraft Quantity limitation: 0.5 L Packaging instructions: Y840</p>

14.6 Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

14.7 Transport in bulk according to Annex II of Marpol and the IBC Code : Not available.

SECTION 15: Regulatory information

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

EU Regulation (EC) No. 1907/2006 (REACH)

Annex XIV - List of substances subject to authorisation

Annex XIV

None of the components are listed.

Substances of very high concern

None of the components are listed.

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles : Not applicable.

Other EU regulations

Europe inventory : All components are listed or exempted.

Ozone depleting substances (1005/2009/EU)

Not listed.

Prior Informed Consent (PIC) (649/2012/EU)

Not listed.

Seveso Directive

This product is not controlled under the Seveso Directive.

National regulations

Hazchem code : 2X

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

International lists

National inventory

Australia : All components are listed or exempted.

Canada : All components are listed or exempted.

China : All components are listed or exempted.

Japan : **Japan inventory (ENCS):**
All components are listed or exempted.

Malaysia : All components are listed or exempted.

New Zealand : All components are listed or exempted.

Philippines : All components are listed or exempted.

Republic of Korea : All components are listed or exempted.

Taiwan : All components are listed or exempted.

Turkey : All components are listed or exempted.

United States : All components are listed or exempted.

Triethylenetetramine, TETA

SECTION 15: Regulatory information

15.2 Chemical safety assessment : Complete.

SECTION 16: Other information

✔ Indicates information that has changed from previously issued version.

Abbreviations and acronyms : ATE = Acute Toxicity Estimate
 CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]
 DMEL = Derived Minimal Effect Level
 DNEL = Derived No Effect Level
 EUH statement = CLP-specific Hazard statement
 PBT = Persistent, Bioaccumulative and Toxic
 PNEC = Predicted No Effect Concentration
 RRN = REACH Registration Number
 vPvB = Very Persistent and Very Bioaccumulative

Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

Classification	Justification
Acute Tox. 4, H302	Calculation method
Acute Tox. 4, H312	Calculation method
Skin Corr. 1B, H314	Expert judgment
Eye Dam. 1, H318	On basis of test data
Skin Sens. 1, H317	Calculation method
Aquatic Chronic 3, H412	Calculation method

Full text of abbreviated H statements

H302	Harmful if swallowed.
H312	Harmful in contact with skin.
H314	Causes severe skin burns and eye damage.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H360FD	May damage fertility. May damage the unborn child.
H362	May cause harm to breast-fed children.
H412	Harmful to aquatic life with long lasting effects.

Full text of classifications [CLP/GHS]

Acute Tox. 4, H302	ACUTE TOXICITY (oral) - Category 4
Acute Tox. 4, H312	ACUTE TOXICITY (dermal) - Category 4
Aquatic Chronic 3, H412	LONG-TERM AQUATIC HAZARD - Category 3
Eye Dam. 1, H318	SERIOUS EYE DAMAGE/EYE IRRITATION - Category 1
Lact., H362	REPRODUCTIVE TOXICITY - Effects on or via lactation
Repr. 1B, H360FD	REPRODUCTIVE TOXICITY (Fertility and Unborn child) - Category 1B
Skin Corr. 1B, H314	SKIN CORROSION/IRRITATION - Category 1B
Skin Sens. 1, H317	SKIN SENSITISATION - Category 1
Skin Sens. 1B, H317	SKIN SENSITISATION - Category 1B

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Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Annex to the extended Safety Data Sheet (eSDS)

Industrial

Identification of the substance or mixture

Product definition : Multi-constituent substance
Product name : Triethylenetetramine, TETA

Section 1 - Title

Short title of the exposure scenario : Use of ethylenamines (EA) in closed system with little opportunity for exposure - Use of EA up to 100% - Industrial.

List of use descriptors : **Identified use name: ES 1.1:** Use of ethylenamines (EA) in closed system with little opportunity for exposure - Use of EA up to 100% - Industrial: SU03; PROC01, PROC02, PROC03, PROC04, PROC05, PROC08a, PROC08b, PROC09, PROC15; ERC01, ERC02, ERC06a
Process Category: PROC01, PROC02, PROC03, PROC04, PROC05, PROC08a, PROC08b, PROC09, PROC15
Substance supplied to that use in form of: As such
Subsequent service life relevant for that use: No.
Environmental Release Category: ERC01, ERC02, ERC06a

Environmental contributing scenarios : **Manufacturing/Use as an intermediate** - ERC01
Formulation - ERC02
Industrial manufacture of coatings and inks - ERC06a

Health Contributing scenarios : **Use in closed process, no likelihood of exposure** - PROC01
Use in closed, continuous process with occasional controlled exposure - PROC02
Use in closed batch process (synthesis or formulation) - PROC03
Use in batch and other process (synthesis) where opportunity for exposure arises - PROC04
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - PROC05
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities - PROC08a
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities - PROC08b
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - PROC09
Use as laboratory reagent - PROC15

Number of the ES	: 1.1
Additional information	: Sector of uses [SU]: SU06b, SU08, SU09, SU10 Product categories [PC]: PC02, PC03, PC10, PC19, PC21, PC22, PC24, PC26, PC32 Free short title of the generic exposure scenario: Handling the EA and chemical preparations containing the substance up to 100%, upon manufacturing the EA, chemicals for which the EA is an intermediate and chemical preparations containing the substance.

Section 2 - Exposure controls

Contributing scenario controlling environmental exposure for 1: Manufacturing/Use as an intermediate	
Amounts used	: Regional use tonnage: 4650 tonnes/year. Fraction of Regional tonnage used locally: 1. Daily amount per site: 15500 kg/day. Annual site tonnage: 4650 tonnes/year.
Frequency and duration of use	: Continuous. Emission days: 300 days per year.
Environment factors not influenced by risk management	: Local freshwater dilution factor: 1000. Local marine water dilution factor: Not applicable.

Triethylenetetramine, TETA	Exposure Scenario: 1.1	Use of ethylenamines (EA) in closed system with little opportunity for exposure - Use of EA up to 100% - Industrial.
Other conditions affecting environmental exposure	: Release to waste water from process: 0.00403 % (Industry Specific Data) Release to air from process: 0.11 % (Industry Specific Data) Release to soil from process: 0.01 % (A&B table approach)	
Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil	: No air emission controls required; required removal efficiency is 0%. Treat on-site wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ 37.4 %. Soil emission controls are not applicable as there is no direct release to soil.	
Organisational measures to prevent/limit release from site	: Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Conditions and measures related to sewage treatment plant	: Assumed domestic sewage treatment plant flow 2000 m ³ /d.	
Contributing scenario controlling environmental exposure for 2: Formulation		
Amounts used	: Regional use tonnage: 604 tonnes/year. Fraction of Regional tonnage used locally: 1. Daily amount per site: 2684 kg/day. Annual site tonnage: 604 tonnes/year.	
Frequency and duration of use	: Continuous. Emission days: 225 days per year.	
Environment factors not influenced by risk management	: Local freshwater dilution factor: 10. Local marine water dilution factor: 100.	
Other conditions affecting environmental exposure	: Release to waste water from process: 0 % (Industry Specific Data) Release to air from process: 0.11 % (Industry Specific Data) Release to soil from process: 0 % (Industry Specific Data)	
Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil	: No air emission controls required; required removal efficiency is 0%. No wastewater treatment required. Soil emission controls are not applicable as there is no direct release to soil.	
Contributing scenario controlling environmental exposure for 3: Industrial manufacture of coatings and inks		
Amounts used	: Regional use tonnage: 2560 tonnes/year. Fraction of Regional tonnage used locally: 1. Daily amount per site: 11378 kg/day. Annual site tonnage: 2560 tonnes/year.	
Frequency and duration of use	: Continuous. Emission days: 225 days per year.	
Environment factors not influenced by risk management	: Local freshwater dilution factor: 10. Local marine water dilution factor: 100.	
Other conditions affecting environmental exposure	: Release to waste water from process: 0.005 % (CEPE 3) Release to air from process: 0.11 % (Industry Specific Data) Release to soil from process: 0 % (CEPE 3)	
Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil	: No air emission controls required; required removal efficiency is 0%. Treat on-site wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ 37.4 %. Soil emission controls are not applicable as there is no direct release to soil.	
Organisational measures to prevent/limit release from site	: Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Conditions and measures related to sewage treatment plant	: Assumed domestic sewage treatment plant flow 2000 m ³ /d.	

Contributing scenario controlling worker exposure for 4: Use in closed process, no likelihood of exposure

Product characteristics	: Liquid.
Concentration of substance in mixture or article	: Covers concentrations up to 100 %.
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.
Other conditions affecting workers exposure	: Indoor use. Industrial.
Organisational measures to prevent/limit releases, dispersion and exposure	: Avoid contact with eyes. Avoid contact with skin.

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

Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear suitable protective clothing and gloves. Wash off any skin contamination immediately.
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Contributing scenario controlling worker exposure for 5: Use in closed, continuous process with occasional controlled exposure

Product characteristics	: Liquid.
Concentration of substance in mixture or article	: Covers concentrations up to 100 %.
Frequency and duration of use/exposure	: Avoid carrying out activities involving exposure for more than 4 hours.
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.
Other conditions affecting workers exposure	: Indoor use. Industrial.
Technical conditions and measures to control dispersion from source towards the worker	: Local exhaust ventilation - Efficiency of at least 90 %.
Organisational measures to prevent/limit releases, dispersion and exposure	: Avoid contact with eyes. Avoid contact with skin.

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

Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear suitable protective clothing and gloves. Wash off any skin contamination immediately.
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Contributing scenario controlling worker exposure for 6: Use in closed batch process (synthesis or formulation)**Product characteristics** : Liquid.**Concentration of substance in mixture or article** : Covers concentrations up to 100 %.**Frequency and duration of use/exposure** : Covers exposure up to 8 h (full shift).**Human factors not influenced by risk management** : Breathing volume: 10 m³/day.
Body weight: 70 kg.**Other conditions affecting workers exposure** : Indoor use.
Industrial.**Technical conditions and measures to control dispersion from source towards the worker** : Local exhaust ventilation - Efficiency of at least 90 %.**Organisational measures to prevent/limit releases, dispersion and exposure** : Avoid contact with eyes.
Avoid contact with skin.**Conditions and measures related to personal protection, hygiene and health evaluation****Personal protection** : Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls.
Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training.
Wear suitable protective clothing and gloves.
Wash off any skin contamination immediately.**Respiratory protection** : Wear appropriate respiratory protection. Efficiency of at least 90 %.**Contributing scenario controlling worker exposure for 7: Use in batch and other process (synthesis) where opportunity for exposure arises****Product characteristics** : Liquid.**Concentration of substance in mixture or article** : Covers concentrations up to 100 %.**Frequency and duration of use/exposure** : Covers exposure up to 8 h (full shift).**Human factors not influenced by risk management** : Breathing volume: 10 m³/day.
Body weight: 70 kg.**Other conditions affecting workers exposure** : Indoor use.
Industrial.**Technical conditions and measures to control dispersion from source towards the worker** : Local exhaust ventilation - Efficiency of at least 90 %.**Organisational measures to prevent/limit releases, dispersion and exposure** : Avoid contact with eyes.
Avoid contact with skin.**Conditions and measures related to personal protection, hygiene and health evaluation****Personal protection** : Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls.
Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training.
Wear suitable protective clothing and gloves.
Wash off any skin contamination immediately.**Respiratory protection** : Wear appropriate respiratory protection. Efficiency of at least 90 %.

Contributing scenario controlling worker exposure for 8: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)**Product characteristics** : Liquid.**Concentration of substance in mixture or article** : Covers concentrations up to 100 %.**Frequency and duration of use/exposure** : Covers exposure up to 8 h (full shift).**Human factors not influenced by risk management** : Breathing volume: 10 m³/day.
Body weight: 70 kg.**Other conditions affecting workers exposure** : Indoor use.
Industrial.**Technical conditions and measures to control dispersion from source towards the worker** : Local exhaust ventilation - Efficiency of at least 90 %.**Organisational measures to prevent/limit releases, dispersion and exposure** : Avoid contact with eyes.
Avoid contact with skin.**Conditions and measures related to personal protection, hygiene and health evaluation****Personal protection** : Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls.
Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training.
Wear suitable protective clothing and gloves.
Wash off any skin contamination immediately.**Respiratory protection** : Wear appropriate respiratory protection. Efficiency of at least 90 %.**Contributing scenario controlling worker exposure for 9: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities****Product characteristics** : Liquid.**Concentration of substance in mixture or article** : Covers concentrations up to 100 %.**Frequency and duration of use/exposure** : Avoid carrying out activities involving exposure for more than 1 hour.**Human factors not influenced by risk management** : Breathing volume: 10 m³/day.
Body weight: 70 kg.**Other conditions affecting workers exposure** : Indoor use.
Industrial.**Technical conditions and measures to control dispersion from source towards the worker** : Local exhaust ventilation - Efficiency of at least 90 %.**Organisational measures to prevent/limit releases, dispersion and exposure** : Avoid contact with eyes.
Avoid contact with skin.**Conditions and measures related to personal protection, hygiene and health evaluation****Personal protection** : Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls.
Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training.
Wear suitable protective clothing and gloves.
Wash off any skin contamination immediately.**Respiratory protection** : Wear appropriate respiratory protection. Efficiency of at least 95 %.

Contributing scenario controlling worker exposure for 10: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities

Product characteristics	: Liquid.
Concentration of substance in mixture or article	: Covers concentrations up to 100 %.
Frequency and duration of use/exposure	: Avoid carrying out activities involving exposure for more than 4 hours.
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.
Other conditions affecting workers exposure	: Indoor use. Industrial.
Technical conditions and measures to control dispersion from source towards the worker	: Local exhaust ventilation - Efficiency of at least 90 %.
Organisational measures to prevent/limit releases, dispersion and exposure	: Avoid contact with eyes. Avoid contact with skin.
Conditions and measures related to personal protection, hygiene and health evaluation	
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear suitable protective clothing and gloves. Wash off any skin contamination immediately.

Contributing scenario controlling worker exposure for 11: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics	: Liquid.
Concentration of substance in mixture or article	: Covers concentrations up to 100 %.
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.
Other conditions affecting workers exposure	: Indoor use. Industrial.
Technical conditions and measures to control dispersion from source towards the worker	: Local exhaust ventilation - Efficiency of at least 90 %.
Organisational measures to prevent/limit releases, dispersion and exposure	: Avoid contact with eyes. Avoid contact with skin.
Conditions and measures related to personal protection, hygiene and health evaluation	
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear suitable protective clothing and gloves. Wash off any skin contamination immediately.
Respiratory protection	: Wear appropriate respiratory protection. Efficiency of at least 90 %.

Contributing scenario controlling worker exposure for 12: Use as laboratory reagent

Product characteristics	: Liquid.
Concentration of substance in mixture or article	: Covers concentrations up to 100 %.
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.
Other conditions affecting workers exposure	: Indoor use. Industrial.
Technical conditions and measures to control dispersion from source towards the worker	: Local exhaust ventilation - Efficiency of at least 90 %.
Organisational measures to prevent/limit releases, dispersion and exposure	: Avoid contact with eyes. Avoid contact with skin.
Conditions and measures related to personal protection, hygiene and health evaluation	
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear suitable protective clothing and gloves. Wash off any skin contamination immediately.
Respiratory protection	: Wear appropriate respiratory protection. Efficiency of at least 90 %.

Section 3 - Exposure estimation and reference to its source**Exposure estimation and reference to its source - Environment: 1: Manufacturing/Use as an intermediate**

Exposure assessment (environment):	: EUSES v2.1
Exposure estimation	: Freshwater: 0.00163 mg/l. Risk characterisation ratio (PEC/PNEC): 0.00855. Freshwater sediment: 0.82 mg/kg dwt. Risk characterisation ratio (PEC/PNEC): 0.00855. Marine water: 0.00208 mg/l. Risk characterisation ratio (PEC/PNEC): 0.055. Marine water sediment: 1.05 mg/kg dwt. Risk characterisation ratio (PEC/PNEC): 0.055. Sewage Treatment Plant: 0.196 mg/l. Risk characterisation ratio (PEC/PNEC): 0.046. Soil: 0.197 mg/kg dwt. Risk characterisation ratio (PEC/PNEC): 0.010. Air: 0.0039 mg/m ³ . Risk characterisation ratio (PEC/PNEC): Not applicable.
Remark	: Based on the applied RMMs the risk towards environment is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Environment: 2: Formulation

Exposure assessment (environment): : EUSES v2.1

Exposure estimation : Freshwater: 0.00143 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.00753.

Freshwater sediment: 0.722 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.00753.

Marine water: 0.000143 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.00373.

Marine water sediment: 0.072 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.00373.

Sewage Treatment Plant: 0 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.

Soil: 0.125 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.00653.

Air: 0.00051 mg/m³.
Risk characterisation ratio (PEC/PNEC): Not applicable.

Remark : Based on the applied RMMs the risk towards environment is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Environment: 3: Industrial manufacture of coatings and inks

Exposure assessment (environment): : EUSES v2.1

Exposure estimation : Freshwater: 0.0191 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.101.

Freshwater sediment: 9.64 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.101.

Marine water: 0.00191 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.050.

Marine water sediment: 0.96 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.050.

Sewage Treatment Plant: 0.178 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.042.

Soil: 0.160 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.00837.

Air: 0.00051 mg/m³.
Risk characterisation ratio (PEC/PNEC): Not applicable.

Remark : Based on the applied RMMs the risk towards environment is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Workers: 4: Use in closed process, no likelihood of exposure

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Triethylenetetramine, TETA	Exposure Scenario: 1.1	Use of ethylenamines (EA) in closed system with little opportunity for exposure - Use of EA up to 100% - Industrial.
Exposure estimation	<p>Worker - inhalative, long-term - systemic: 0.06 mg/m³. Risk characterisation ratio: 0.0609.</p> <p>Worker - dermal, long-term - systemic: 0.007 mg/kg bw/day. Risk characterisation ratio: 0.0120.</p> <p>Worker - combined, long-term - systemic: 0.073.</p> <p>Worker - inhalative, short-term - local: 0.12 mg/m³. Risk characterisation ratio: 0.000023.</p>	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	
Exposure estimation and reference to its source - Workers: 5: Use in closed, continuous process with occasional controlled exposure		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC08b.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	
Exposure estimation and reference to its source - Workers: 6: Use in closed batch process (synthesis or formulation)		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC04, PROC09.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	
Exposure estimation and reference to its source - Workers: 7: Use in batch and other process (synthesis) where opportunity for exposure arises		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	<p>Worker - inhalative, long-term - systemic: 0.3 mg/m³. Risk characterisation ratio: 0.3046.</p> <p>Worker - dermal, long-term - systemic: 0.14 mg/kg bw/day. Risk characterisation ratio: 0.2406.</p> <p>Worker - combined, long-term - systemic: 0.545.</p> <p>Worker - inhalative, short-term - local: 0.62 mg/m³. Risk characterisation ratio: 0.000113.</p>	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	
Exposure estimation and reference to its source - Workers: 8: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	<p>Worker - inhalative, long-term - systemic: 0.3 mg/m³. Risk characterisation ratio: 0.3046.</p> <p>Worker - dermal, long-term - systemic: 0.27 mg/kg bw/day. Risk characterisation ratio: 0.4812.</p> <p>Worker - combined, long-term - systemic: 0.786.</p>	
Date of issue/Date of revision	: 05/10/2017	Version : 12 / en 25/99

Triethylenetetramine, TETA Exposure Scenario: 1.1 **Use of ethylenamines (EA) in closed system with little opportunity for exposure - Use of EA up to 100% - Industrial.**

Worker - inhalative, short-term - local: 0.60 mg/m³.
Risk characterisation ratio: 0.000113.

Remark : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Workers: 9: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Exposure estimation : **Worker - inhalative, long-term - systemic:** 0.37 mg/m³.
Risk characterisation ratio: 0.3656.

Worker - dermal, long-term - systemic: 0.27 mg/kg bw/day.
Risk characterisation ratio: 0.4812.

Worker - combined, long-term - systemic: 0.847.

Worker - inhalative, short-term - local: 0.74 mg/m³.
Risk characterisation ratio: 0.000136.

Remark : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Workers: 10: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Exposure estimation : **Worker - inhalative, long-term - systemic:** 0.548 mg/m³.
Risk characterisation ratio: 0.5484.

Worker - dermal, long-term - systemic: 0.14 mg/kg bw/day.
Risk characterisation ratio: 0.2406.

Worker - combined, long-term - systemic: 0.789.

Worker - inhalative, short-term - local: 0.55 mg/m³.
Risk characterisation ratio: 0.000204.

Remark : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Workers: 11: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Exposure estimation : **Worker - inhalative, long-term - systemic:** 0.3 mg/m³.
Risk characterisation ratio: 0.3046.

Worker - dermal, long-term - systemic: 0.14 mg/kg bw/day.
Risk characterisation ratio: 0.2406.

Worker - combined, long-term - systemic: 0.545.

Worker - inhalative, short-term - local: 0.62 mg/m³.
Risk characterisation ratio: 0.000113.

Remark : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Triethylenetetramine, TETA Exposure Scenario: 1.1 **Use of ethylenamines (EA) in closed system with little opportunity for exposure - Use of EA up to 100% - Industrial.**

Exposure estimation and reference to its source - Workers: 12: Use as laboratory reagent

- Exposure assessment (human):** : ECETOC TRA, Version 2 (Modified version).
- Exposure estimation** : Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC04, PROC09.
- Remark** : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Section 4 - Guidance to DU to evaluate whether he works inside the boundaries set by the ES

- General** : The immediate downstream user is required to evaluate whether the operational conditions and risk management measures described in the exposure scenario fit to his use. If other OC/RMM are adopted, the user has to ensure that risks are managed to at least equivalent levels. The risk assessment methods/tools given in section 3 may be used for this evaluation.
- 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. Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).
- Health** : ECETOC TRA, Version 2 (Modified version):
- adjusted efficacy values for gloves as adopted by CEFIC
- use of factor 2 to calculate peak exposure from long term exposure
- use of exact percentage (2%, 0.5%) in product instead of broad TRA categories

Annex to the extended Safety Data Sheet (eSDS)

Industrial

Identification of the substance or mixture

Product definition : Multi-constituent substance
Product name : Triethylenetetramine, TETA

Section 1 - Title

Short title of the exposure scenario : Use of ethylenamines (EA) in closed system with little opportunity for exposure - Use of preparations containing EA up to 2% - Industrial/Professional.

List of use descriptors : **Identified use name: ES 1.2:** Use of ethylenamines (EA) in closed system with little opportunity for exposure - Use of preparations containing EA up to 2% - Industrial/Professional: SU03, SU22; PROC05, PROC08a, PROC08b, PROC09; ERC01, ERC02, ERC06a
Process Category: PROC05, PROC08a, PROC08b, PROC09
Substance supplied to that use in form of: As such
Subsequent service life relevant for that use: No.
Environmental Release Category: ERC01, ERC02, ERC06a

Environmental contributing scenarios : **All ERCs (see above)**

Health Contributing scenarios : **Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - PROC05**
Transfer of substance or preparation (charging/discharging) from/to vessels/ large containers at non-dedicated facilities - PROC08a
Transfer of substance or preparation (charging/discharging) from/to vessels/ large containers at dedicated facilities - PROC08b
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - PROC09

Number of the ES	: 1.2
Additional information	: Sector of uses [SU]: SU06b, SU08, SU09, SU10 Product categories [PC]: PC02, PC03, PC10, PC19, PC21, PC22, PC24, PC26, PC32 Free short title of the generic exposure scenario: Use of the diluted product (up to 2% content) upon manufacturing of chemicals for which the EA is an intermediate and chemical preparations containing the substance.

Section 2 - Exposure controls

Contributing scenario controlling environmental exposure for 1: All ERCs (see above)
 see ES 1.1.

Contributing scenario controlling worker exposure for 2: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)

Product characteristics : Liquid.
Concentration of substance in mixture or article : Covers concentrations up to 2 %.
Frequency and duration of use/exposure : Covers exposure up to 8 h (full shift).
Human factors not influenced by risk management : Breathing volume: 10 m³/day.
 Body weight: 70 kg.
Other conditions affecting workers exposure : Indoor use.
 Industrial.

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

Triethylenetetramine, TETA	Exposure Scenario: 1.2	Use of ethylenamines (EA) in closed system with little opportunity for exposure - Use of preparations containing EA up to 2% - Industrial/ Professional.
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 3: Transfer of substance or preparation (charging/ discharging) from/to vessels/large containers at non-dedicated facilities		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 2 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial. Professional.	
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		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 4: Transfer of substance or preparation (charging/ discharging) from/to vessels/large containers at dedicated facilities		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 2 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 5: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 2 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Date of issue/Date of revision : 05/10/2017		
Version : 12 / en 29/99		

Triethylenetetramine, TETA	Exposure Scenario: 1.2	Use of ethylenamines (EA) in closed system with little opportunity for exposure - Use of preparations containing EA up to 2% - Industrial/ Professional.
Other conditions affecting workers exposure	: Indoor use. Industrial.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	

Section 3 - Exposure estimation and reference to its source

Exposure estimation and reference to its source - Environment: 1: All ERCs (see above)		
Exposure assessment (environment):	: see ES 1.1.	
Exposure estimation	: see ES 1.1.	

Exposure estimation and reference to its source - Workers: 2: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Worker - inhalative, long-term - systemic: 0.61 mg/m ³ . Risk characterisation ratio: 0.6093.	
	Worker - dermal, long-term - systemic: 0.005 mg/kg bw/day. Risk characterisation ratio: 0.0481.	
	Worker - combined, long-term - systemic: 0.657.	
	Worker - inhalative, short-term - local: 1.22 mg/m ³ . Risk characterisation ratio: 0.00023.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	

Exposure estimation and reference to its source - Workers: 3: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Worker - inhalative, long-term - systemic: 0.31 mg/m ³ . Risk characterisation ratio: 0.3046.	
	Worker - dermal, long-term - systemic: 0.005 mg/kg bw/day. Risk characterisation ratio: 0.0962.	
	Worker - combined, long-term - systemic: 0.401.	
	Worker - inhalative, short-term - local: 0.61 mg/m ³ . Risk characterisation ratio: 0.00011.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	

Exposure estimation and reference to its source - Workers: 4: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC05.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	

Triethylenetetramine, TETA	Exposure Scenario: 1.2	Use of ethylenamines (EA) in closed system with little opportunity for exposure - Use of preparations containing EA up to 2% - Industrial/ Professional.
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Exposure estimation and reference to its source - Workers: 5: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).
Exposure estimation	: Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC05.
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Section 4 - Guidance to DU to evaluate whether he works inside the boundaries set by the ES

General	: The immediate downstream user is required to evaluate whether the operational conditions and risk management measures described in the exposure scenario fit to his use. If other OC/RMM are adopted, the user has to ensure that risks are managed to at least equivalent levels. The risk assessment methods/tools given in section 3 may be used for this evaluation.
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. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health	: ECETOC TRA, Version 2 (Modified version): <ul style="list-style-type: none">- adjusted efficacy values for gloves as adopted by CEFIC- use of factor 2 to calculate peak exposure from long term exposure- use of exact percentage (2%, 0.5%) in product instead of broad TRA categories

Annex to the extended Safety Data Sheet (eSDS)

Industrial

Identification of the substance or mixture

Product definition : Multi-constituent substance
Product name : Triethylenetetramine, TETA

Section 1 - Title

Short title of the exposure scenario : Use of ethylenamines (EA) in closed system with little opportunity for exposure - Use of preparations containing EA up to 0.5% - Industrial/Professional.

List of use descriptors : **Identified use name: ES 1.3:** Use of ethylenamines (EA) in closed system with little opportunity for exposure - Use of preparations containing EA up to 0.5% - Industrial/Professional: SU03, SU22; PROC05, PROC08a, PROC08b, PROC09; ERC01, ERC02, ERC06a
Process Category: PROC05, PROC08a, PROC08b, PROC09
Substance supplied to that use in form of: As such
Subsequent service life relevant for that use: No.
Environmental Release Category: ERC01, ERC02, ERC06a

Environmental contributing scenarios : **All ERCs (see above)**

Health Contributing scenarios : **Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - PROC05**
Transfer of substance or preparation (charging/discharging) from/to vessels/ large containers at non-dedicated facilities - PROC08a
Transfer of substance or preparation (charging/discharging) from/to vessels/ large containers at dedicated facilities - PROC08b
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - PROC09

Number of the ES	: 1.3
Additional information	: Sector of uses [SU]: SU06b, SU08, SU09, SU10 Product categories [PC]: PC02, PC03, PC10, PC19, PC21, PC22, PC24, PC26, PC32 Free short title of the generic exposure scenario: Use of diluted product (up to 0.5% content) upon manufacturing of chemicals for which the EA is an intermediate and chemical preparations containing the substance.

Section 2 - Exposure controls

Contributing scenario controlling environmental exposure for 1: All ERCs (see above)
 see ES 1.1.

Contributing scenario controlling worker exposure for 2: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)

Product characteristics : Liquid.
Concentration of substance in mixture or article : Covers concentrations up to 0.5 %.
Frequency and duration of use/exposure : Covers exposure up to 8 h (full shift).
Human factors not influenced by risk management : Breathing volume: 10 m³/day.
 Body weight: 70 kg.
Other conditions affecting workers exposure : Indoor use.
 Industrial.

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

Triethylenetetramine, TETA	Exposure Scenario: 1.3	Use of ethylenamines (EA) in closed system with little opportunity for exposure - Use of preparations containing EA up to 0.5% - Industrial/ Professional.
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 3: Transfer of substance or preparation (charging/ discharging) from/to vessels/large containers at non-dedicated facilities		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 0.5 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial. Professional.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 4: Transfer of substance or preparation (charging/ discharging) from/to vessels/large containers at dedicated facilities		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 0.5 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 5: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 0.5 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
Conditions and measures related to personal protection, hygiene and health evaluation		

Triethylenetetramine, TETA	Exposure Scenario: 1.3	Use of ethylenamines (EA) in closed system with little opportunity for exposure - Use of preparations containing EA up to 0.5% - Industrial/ Professional.
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	

Section 3 - Exposure estimation and reference to its source

Exposure estimation and reference to its source - Environment: 1: All ERCs (see above)		
Exposure assessment (environment):	: see ES 1.1.	
Exposure estimation	: see ES 1.1.	

Exposure estimation and reference to its source - Workers: 2: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC08a.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	

Exposure estimation and reference to its source - Workers: 3: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Worker - inhalative, long-term - systemic: 0.76 mg/m ³ . Risk characterisation ratio: 0.7616.	
	: Worker - dermal, long-term - systemic: 0.001 mg/kg bw/day. Risk characterisation ratio: 0.0241.	
	: Worker - combined, long-term - systemic: 0.786.	
	: Worker - inhalative, short-term - local: 1.52 mg/m ³ . Risk characterisation ratio: 0.00028.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	

Exposure estimation and reference to its source - Workers: 4: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC08a.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	

Exposure estimation and reference to its source - Workers: 5: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC08a.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	

Section 4 - Guidance to DU to evaluate whether he works inside the boundaries set by the ES**General**

: The immediate downstream user is required to evaluate whether the operational conditions and risk management measures described in the exposure scenario fit to his use. If other OC/RMM are adopted, the user has to ensure that risks are managed to at least equivalent levels. The risk assessment methods/tools given in section 3 may be used for this evaluation.

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. Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

: ECETOC TRA, Version 2 (Modified version):
- adjusted efficacy values for gloves as adopted by CEFIC
- use of factor 2 to calculate peak exposure from long term exposure
- use of exact percentage (2%, 0.5%) in product instead of broad TRA categories

Annex to the extended Safety Data Sheet (eSDS)

Industrial

Identification of the substance or mixture

Product definition : Multi-constituent substance
Product name : Triethylenetetramine, TETA

Section 1 - Title

Short title of the exposure scenario : Use of preparations containing ethylenamines (EA) in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial/Professional.

List of use descriptors : **Identified use name: ES 2.1:** Use of preparations containing ethylenamines (EA) in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial/Professional: SU03, SU22; PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC16; ERC01, ERC02, ERC04, ERC10b
Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC16
Substance supplied to that use in form of: In a mixture
Subsequent service life relevant for that use: No.
Environmental Release Category: ERC01, ERC02, ERC04, ERC10b

Environmental contributing scenarios : **Fuel additive.**
Wood preservative.

Health Contributing scenarios : **Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - PROC05**
Calendering operations - PROC06
Transfer of substance or preparation (charging/discharging) from/to vessels/ large containers at non-dedicated facilities - PROC08a
Transfer of substance or preparation (charging/discharging) from/to vessels/ large containers at dedicated facilities - PROC08b
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - PROC09
Roller application or brushing of adhesive and other coating - PROC10
Treatment of articles by dipping and pouring - PROC13
Using material as fuel sources, limited exposure to unburned product to be expected - PROC16

Number of the ES	: 2.1
Additional information	: Product categories [PC]: PC08, PC23
	Free short title of the generic exposure scenario: Use of the diluted product (up to 2% content) upon manufacturing of chemicals for which the EA is an intermediate and chemical preparations containing the substance.

Section 2 - Exposure controls

Contributing scenario controlling environmental exposure for 1: Fuel additive.	
Amounts used	: Annual amount used in the EU: 1160 tonnes/year. Fraction of EU tonnage used in region: 0.0005. Daily amount per site: 1.59 kg/day. Annual site tonnage: 0.58 tonnes/year.
Frequency and duration of use	: Continuous. Emission days: 365 days per year.
Environment factors not influenced by risk management	: Local freshwater dilution factor: 10. Local marine water dilution factor: 100.
Other conditions affecting environmental exposure	: Release to waste water from process: 0 % Release to air from process: 0.1 % Release to soil from process: 0 %

Triethylenetetramine, TETA	Exposure Scenario: 2.1	Use of preparations containing ethylenamines (EA) in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial/Professional.
Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil	: No air emission controls required; required removal efficiency is 0%. No wastewater treatment required. Soil emission controls are not applicable as there is no direct release to soil.	
Contributing scenario controlling environmental exposure for 2: Wood preservative.		
Amounts used	: Annual amount used in the EU: 604 tonnes/year. Fraction of EU tonnage used in region: 0.045. Daily amount per site: 123 kg/day. Annual site tonnage: 27.2 tonnes/year.	
Frequency and duration of use	: Continuous. Emission days: 220 days per year.	
Environment factors not influenced by risk management	: Local freshwater dilution factor: 10. Local marine water dilution factor: 100.	
Other conditions affecting environmental exposure	: Release to waste water from process: 2 % Release to air from process: 0.0011 % Release to soil from process: 0 %	
Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil	: No air emission controls required; required removal efficiency is 0%. Treat on-site wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ 37.4 %. Soil emission controls are not applicable as there is no direct release to soil.	
Contributing scenario controlling worker exposure for 3: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 2 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 4: Calendering operations		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 2 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Date of issue/Date of revision	: 05/10/2017	Version : 12 / en 37/99

Triethylenetetramine, TETA	Exposure Scenario: 2.1	Use of preparations containing ethylenamines (EA) in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial/Professional.
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 5: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 2 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial. Professional.	
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		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 6: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 2 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 7: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 2 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
<p>Date of issue/Date of revision : 05/10/2017</p> <p style="text-align: right;">Version : 12 / en 38/99</p>		

Triethylenetetramine, TETA	Exposure Scenario: 2.1	Use of preparations containing ethylenamines (EA) in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial/Professional.
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 8: Roller application or brushing of adhesive and other coating		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 2 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Professional.	
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		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 9: Treatment of articles by dipping and pouring		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 2 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
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		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	

Triethylenetetramine, TETA	Exposure Scenario: 2.1	Use of preparations containing ethylenamines (EA) in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial/Professional.
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Contributing scenario controlling worker exposure for 10: Using material as fuel sources, limited exposure to unburned product to be expected

Product characteristics	: Liquid.
Concentration of substance in mixture or article	: Covers concentrations up to 2 %.
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.
Other conditions affecting workers exposure	: Indoor use. Industrial.
Conditions and measures related to personal protection, hygiene and health evaluation	
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).

Section 3 - Exposure estimation and reference to its source

Exposure estimation and reference to its source - Environment: 1: Fuel additive.

Exposure assessment (environment):	: EUSES v2.1
Exposure estimation	: Freshwater: 0.00143 mg/l. Risk characterisation ratio (PEC/PNEC): 0.00753. Freshwater sediment: 0.722 mg/kg dwt. Risk characterisation ratio (PEC/PNEC): 0.00753. Marine water: 0.000142 mg/l. Risk characterisation ratio (PEC/PNEC): 0.00373. Marine water sediment: 0.072 mg/kg dwt. Risk characterisation ratio (PEC/PNEC): 0.00373. Sewage Treatment Plant: 0 mg/l. Risk characterisation ratio (PEC/PNEC): 0. Soil: 0.114 mg/kg dwt. Risk characterisation ratio (PEC/PNEC): 0.00597. Air: 0.000000516 mg/m ³ . Risk characterisation ratio (PEC/PNEC): Not applicable.
Remark	: Based on the applied RMMs the risk towards environment is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Environment: 2: Wood preservative.

Exposure assessment (environment):	: EUSES v2.1
Exposure estimation	: Freshwater: 0.078 mg/l. Risk characterisation ratio (PEC/PNEC): 0.412. Freshwater sediment: 39.5 mg/kg dwt. Risk characterisation ratio (PEC/PNEC): 0.412. Marine water: 0.00783 mg/l. Risk characterisation ratio (PEC/PNEC): 0.206.

Marine water sediment: 3.95 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.206.

Sewage Treatment Plant: 0.775 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.182.

Soil: 0.114 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.00597.

Air: 0.000000236 mg/m³.
Risk characterisation ratio (PEC/PNEC): Not applicable.

Remark : Based on the applied RMMs the risk towards environment is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Workers: 3: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Exposure estimation : **Worker - inhalative, long-term - systemic:** 0.61 mg/m³.
Risk characterisation ratio: 0.6093.

Worker - dermal, long-term - systemic: 0.055 mg/kg bw/day.
Risk characterisation ratio: 0.0962.

Worker - combined, long-term - systemic: 0.70553.

Worker - inhalative, short-term - local: 1.22 mg/m³.
Risk characterisation ratio: 0.00023.

Remark : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Workers: 4: Calendering operations

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Exposure estimation : **Worker - inhalative, long-term - systemic:** 0.61 mg/m³.
Risk characterisation ratio: 0.6093.

Worker - dermal, long-term - systemic: 0.055 mg/kg bw/day.
Risk characterisation ratio: 0.0962.

Worker - combined, long-term - systemic: 0.70553.

Worker - inhalative, short-term - local: 1.22 mg/m³.
Risk characterisation ratio: 0.00023.

Remark : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Workers: 5: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Triethylenetetramine, TETA	Exposure Scenario: 2.1	Use of preparations containing ethylenamines (EA) in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial/Professional.
Exposure estimation	<p>Worker - inhalative, long-term - systemic: 0.305 mg/m³. Risk characterisation ratio: 0.3046.</p> <p>Worker - dermal, long-term - systemic: 0.110 mg/kg bw/day. Risk characterisation ratio: 0.1925.</p> <p>Worker - combined, long-term - systemic: 0.49713.</p> <p>Worker - inhalative, short-term - local: 0.61 mg/m³. Risk characterisation ratio: 0.00011.</p>	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	
Exposure estimation and reference to its source - Workers: 6: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	<p>Worker - inhalative, long-term - systemic: 0.61 mg/m³. Risk characterisation ratio: 0.6093.</p> <p>Worker - dermal, long-term - systemic: 0.055 mg/kg bw/day. Risk characterisation ratio: 0.0962.</p> <p>Worker - combined, long-term - systemic: 0.70553.</p> <p>Worker - inhalative, short-term - local: 1.22 mg/m³. Risk characterisation ratio: 0.00023.</p>	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	
Exposure estimation and reference to its source - Workers: 7: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	<p>Worker - inhalative, long-term - systemic: 0.61 mg/m³. Risk characterisation ratio: 0.6093.</p> <p>Worker - dermal, long-term - systemic: 0.055 mg/kg bw/day. Risk characterisation ratio: 0.0962.</p> <p>Worker - combined, long-term - systemic: 0.70553.</p> <p>Worker - inhalative, short-term - local: 1.22 mg/m³. Risk characterisation ratio: 0.00023.</p>	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	
Exposure estimation and reference to its source - Workers: 8: Roller application or brushing of adhesive and other coating		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	<p>Worker - inhalative, long-term - systemic: 0.305 mg/m³. Risk characterisation ratio: 0.3046.</p> <p>Worker - dermal, long-term - systemic: 0.110 mg/kg bw/day. Risk characterisation ratio: 0.1925.</p> <p>Worker - combined, long-term - systemic: 0.49713.</p>	
Date of issue/Date of revision	: 05/10/2017	Version : 12 / en 42/99

Triethylenetetramine, TETA	Exposure Scenario: 2.1	Use of preparations containing ethylenamines (EA) in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial/Professional.
	Worker - inhalative, short-term - local: 0.61 mg/m ³ . Risk characterisation ratio: 0.00011.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	
Exposure estimation and reference to its source - Workers: 9: Treatment of articles by dipping and pouring		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Worker - inhalative, long-term - systemic: 0.305 mg/m ³ . Risk characterisation ratio: 0.3046.	
	Worker - dermal, long-term - systemic: 0.110 mg/kg bw/day. Risk characterisation ratio: 0.1925.	
	Worker - combined, long-term - systemic: 0.49713.	
	Worker - inhalative, short-term - local: 0.61 mg/m ³ . Risk characterisation ratio: 0.00011.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	
Exposure estimation and reference to its source - Workers: 10: Using material as fuel sources, limited exposure to unburned product to be expected		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC005/PROC06/PROC08b/PROC09/PROC16.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	

Section 4 - Guidance to DU to evaluate whether he works inside the boundaries set by the ES

General	: The immediate downstream user is required to evaluate whether the operational conditions and risk management measures described in the exposure scenario fit to his use. If other OC/RMM are adopted, the user has to ensure that risks are managed to at least equivalent levels. The risk assessment methods/tools given in section 3 may be used for this evaluation.
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. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health	: ECETOC TRA, Version 2 (Modified version): - adjusted efficacy values for gloves as adopted by CEFIC - use of factor 2 to calculate peak exposure from long term exposure - use of exact percentage (2%, 0.5%) in product instead of broad TRA categories

Annex to the extended Safety Data Sheet (eSDS)

Industrial

Identification of the substance or mixture

Product definition : Multi-constituent substance
Product name : Triethylenetetramine, TETA

Section 1 - Title

Short title of the exposure scenario : Use of preparations containing ethylenamines (EA) in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial/Professional.

List of use descriptors : **Identified use name: ES 2.2:** Use of preparations containing ethylenamines (EA) in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial/Professional: SU03, SU22; PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC16; ERC01, ERC02, ERC04, ERC10b
Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC16
Substance supplied to that use in form of: In a mixture
Subsequent service life relevant for that use: No.
Environmental Release Category: ERC01, ERC02, ERC04, ERC10b

Environmental contributing scenarios : **All ERCs (see above)**

Health Contributing scenarios : **Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - PROC05**
Calendering operations - PROC06
Transfer of substance or preparation (charging/discharging) from/to vessels/ large containers at non-dedicated facilities - PROC08a
Transfer of substance or preparation (charging/discharging) from/to vessels/ large containers at dedicated facilities - PROC08b
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - PROC09
Roller application or brushing of adhesive and other coating - PROC10
Treatment of articles by dipping and pouring - PROC13
Using material as fuel sources, limited exposure to unburned product to be expected - PROC16

Number of the ES	: 2.2
Additional information	: Product categories [PC]: PC08, PC23
	Free short title of the generic exposure scenario: Use of diluted product (up to 0.5% content) upon manufacturing of chemicals for which the EA is an intermediate and chemical preparations containing the substance.

Section 2 - Exposure controls

Contributing scenario controlling environmental exposure for 1: All ERCs (see above) see ES 2.1.	
Contributing scenario controlling worker exposure for 2: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	
Product characteristics	: Liquid.
Concentration of substance in mixture or article	: Covers concentrations up to 0.5 %.
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).

Triethylenetetramine, TETA	Exposure Scenario: 2.2	Use of preparations containing ethylenamines (EA) in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial/Professional.
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 3: Calendering operations		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 0.5 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 4: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 0.5 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial. Professional.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 5: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 0.5 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
<p><i>Date of issue/Date of revision</i> : 05/10/2017</p> <p style="text-align: right;"><i>Version</i> : 12 / en 45/99</p>		

Triethylenetetramine, TETA	Exposure Scenario: 2.2	Use of preparations containing ethylenamines (EA) in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial/Professional.
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 6: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 0.5 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 7: Roller application or brushing of adhesive and other coating		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 0.5 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Professional.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 8: Treatment of articles by dipping and pouring		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 0.5 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	

Triethylenetetramine, TETA	Exposure Scenario: 2.2	Use of preparations containing ethylenamines (EA) in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial/Professional.
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 9: Using material as fuel sources, limited exposure to unburned product to be expected		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 0.5 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	

Section 3 - Exposure estimation and reference to its source

Exposure estimation and reference to its source - Environment: 1: All ERCs (see above)		
Exposure assessment (environment):	: see ES 2.1.	
Exposure estimation	: see ES 2.1.	
Exposure estimation and reference to its source - Workers: 2: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC08a/PROC10.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	
Exposure estimation and reference to its source - Workers: 3: Calendering operations		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC08a/PROC10.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	

<p>Triethylenetetramine, TETA</p>	<p>Exposure Scenario: 2.2</p>	<p>Use of preparations containing ethylenamines (EA) in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial/Professional.</p>
<p>Exposure estimation and reference to its source - Workers: 4: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p>		
<p>Exposure assessment (human):</p> <p>Exposure estimation</p> <p>Remark</p>	<p>: ECETOC TRA, Version 2 (Modified version).</p> <p>: Worker - inhalative, long-term - systemic: 0.76 mg/m³. Risk characterisation ratio: 0.7616.</p> <p>Worker - dermal, long-term - systemic: 0.027 mg/kg bw/day. Risk characterisation ratio: 0.0241.</p> <p>Worker - combined, long-term - systemic: 0.786.</p> <p>Worker - inhalative, short-term - local: 1.52 mg/m³. Risk characterisation ratio: 0.0003.</p> <p>: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).</p>	
<p>Exposure estimation and reference to its source - Workers: 5: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p>		
<p>Exposure assessment (human):</p> <p>Exposure estimation</p> <p>Remark</p>	<p>: ECETOC TRA, Version 2 (Modified version).</p> <p>: Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC08a/PROC10.</p> <p>: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).</p>	
<p>Exposure estimation and reference to its source - Workers: 6: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p>		
<p>Exposure assessment (human):</p> <p>Exposure estimation</p> <p>Remark</p>	<p>: ECETOC TRA, Version 2 (Modified version).</p> <p>: Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC08a/PROC10.</p> <p>: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).</p>	
<p>Exposure estimation and reference to its source - Workers: 7: Roller application or brushing of adhesive and other coating</p>		
<p>Exposure assessment (human):</p> <p>Exposure estimation</p> <p>Remark</p>	<p>: ECETOC TRA, Version 2 (Modified version).</p> <p>: Worker - inhalative, long-term - systemic: 0.76 mg/m³. Risk characterisation ratio: 0.7616.</p> <p>Worker - dermal, long-term - systemic: 0.027 mg/kg bw/day. Risk characterisation ratio: 0.0241.</p> <p>Worker - combined, long-term - systemic: 0.786.</p> <p>Worker - inhalative, short-term - local: 1.52 mg/m³. Risk characterisation ratio: 0.0003.</p> <p>: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).</p>	

Triethylenetetramine, TETA	Exposure Scenario: 2.2	<i>Use of preparations containing ethylenamines (EA) in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial/Professional.</i>
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Exposure estimation and reference to its source - Workers: 8: Treatment of articles by dipping and pouring		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC08a/PROC10.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	

Exposure estimation and reference to its source - Workers: 9: Using material as fuel sources, limited exposure to unburned product to be expected		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC08a/PROC10.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	

Section 4 - Guidance to DU to evaluate whether he works inside the boundaries set by the ES

General	: The immediate downstream user is required to evaluate whether the operational conditions and risk management measures described in the exposure scenario fit to his use. If other OC/RMM are adopted, the user has to ensure that risks are managed to at least equivalent levels. The risk assessment methods/tools given in section 3 may be used for this evaluation.
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. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health	: ECETOC TRA, Version 2 (Modified version): - adjusted efficacy values for gloves as adopted by CEFIC - use of factor 2 to calculate peak exposure from long term exposure - use of exact percentage (2%, 0.5%) in product instead of broad TRA categories

Annex to the extended Safety Data Sheet (eSDS)

Industrial

Identification of the substance or mixture

Product definition : Multi-constituent substance
Product name : Triethylenetetramine, TETA

Section 1 - Title

Short title of the exposure scenario : Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 25% - Industrial/Professional.

List of use descriptors : **Identified use name: ES 3.1:** Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 25% - Industrial/Professional: SU03, SU22; PROC05, PROC08a, PROC08b, PROC09; ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC07, ERC08a, ERC08b, ERC08c, ERC08e, ERC08f, ERC11a, ERC12a, ERC12b
Process Category: PROC05, PROC08a, PROC08b, PROC09
Substance supplied to that use in form of: In a mixture
Subsequent service life relevant for that use: No.
Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC07, ERC08a, ERC08b, ERC08c, ERC08e, ERC08f, ERC11a, ERC12a, ERC12b

Environmental contributing scenarios : **Ashless dispersant**
Epoxy curing agent
Epoxy curing agent in paint
Use in laboratories
Industrial use of reactive processing aids
Use in coatings; adhesive - Industrial
Use in coatings; adhesive - Professional

Health Contributing scenarios : **Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - PROC05**
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - PROC05
Transfer of substance or preparation (charging/discharging) from/to vessels/ large containers at non-dedicated facilities - PROC08a
Transfer of substance or preparation (charging/discharging) from/to vessels/ large containers at non-dedicated facilities - PROC08a
Transfer of substance or preparation (charging/discharging) from/to vessels/ large containers at dedicated facilities - PROC08b
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - PROC09

Number of the ES	: 3.1
Additional information	: Sector of uses [SU]: SU01, SU06a, SU06b, SU08, SU09, SU10, SU11, SU12, SU13, SU14, SU16, SU17, SU19, SU23 Product categories [PC]: PC01, PC02, PC03, PC05, PC08, PC09a, PC09b, PC09, PC14, PC15, PC18, PC19, PC20, PC21, PC23, PC26, PC27, PC28, PC31, PC32, PC33, PC35, PC39 Free short title of the generic exposure scenario: Mixing or blending in batch processes for formulation of preparations and articles; Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities; Transfer of substance or preparation into small containers (dedicated filling line, including weighing); Industrial; Professional

Section 2 - Exposure controls**Contributing scenario controlling environmental exposure for 1: Ashless dispersant**

Amounts used	: Regional use tonnage: 1160 tonnes/year. Fraction of Regional tonnage used locally: 1. Daily amount per site: 3867 kg/day. Annual site tonnage: 1160 tonnes/year.
Frequency and duration of use	: Continuous. Emission days: 300 days per year.
Environment factors not influenced by risk management	: Local freshwater dilution factor: 10. Local marine water dilution factor: 100.
Other conditions affecting environmental exposure	: Release to waste water from process: 0 % Release to air from process: 0.11 % Release to soil from process: 0 %
Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil	: No air emission controls required; required removal efficiency is 0%. No wastewater treatment required. Soil emission controls are not applicable as there is no direct release to soil.

Contributing scenario controlling environmental exposure for 2: Epoxy curing agent

Amounts used	: Regional use tonnage: 2560 tonnes/year. Fraction of Regional tonnage used locally: 0.038. Daily amount per site: 442 kg/day. Annual site tonnage: 97.3 tonnes/year.
Frequency and duration of use	: Continuous. Emission days: 220 days per year.
Environment factors not influenced by risk management	: Local freshwater dilution factor: 10. Local marine water dilution factor: 100.
Other conditions affecting environmental exposure	: Release to waste water from process: 0 % Release to air from process: 0.11 % Release to soil from process: 0 %
Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil	: No air emission controls required; required removal efficiency is 0%. No wastewater treatment required. Soil emission controls are not applicable as there is no direct release to soil.

Contributing scenario controlling environmental exposure for 3: Epoxy curing agent in paint

Amounts used	: Regional use tonnage: 2560 tonnes/year. Fraction of Regional tonnage used locally: 0.095. Daily amount per site: 1105 kg/day. Annual site tonnage: 243 tonnes/year.
Frequency and duration of use	: Continuous. Emission days: 220 days per year.
Environment factors not influenced by risk management	: Local freshwater dilution factor: 10. Local marine water dilution factor: 100.
Other conditions affecting environmental exposure	: Release to waste water from process: 0 % Release to air from process: 0.11 % Release to soil from process: 0 %

Triethylenetetramine, TETA	Exposure Scenario: 3.1	Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 25% - Industrial/Professional.
Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil	: No air emission controls required; required removal efficiency is 0%. No wastewater treatment required. Soil emission controls are not applicable as there is no direct release to soil.	
Contributing scenario controlling environmental exposure for 4: Use in laboratories		
Amounts used	: Regional use tonnage: 25.1 tonnes/year. Fraction of Regional tonnage used locally: 0.02. Daily amount per site: 25.1 kg/day. Annual site tonnage: 0.50 tonnes/year.	
Frequency and duration of use	: Continuous. Emission days: 20 days per year.	
Environment factors not influenced by risk management	: Local freshwater dilution factor: 10. Local marine water dilution factor: 100.	
Other conditions affecting environmental exposure	: Release to waste water from process: not available. Release to air from process: 0.0688 % Release to soil from process: 0.688 %	
Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil	: No air emission controls required; required removal efficiency is 0%. Treat on-site wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ 37.4 %. Soil emission controls are not applicable as there is no direct release to soil.	
Contributing scenario controlling environmental exposure for 5: Industrial use of reactive processing aids		
Amounts used	: Regional use tonnage: 604 tonnes/year. Fraction of Regional tonnage used locally: 0.00394. Daily amount per site: 10.8 kg/day. Annual site tonnage: 2.38 tonnes/year.	
Frequency and duration of use	: Continuous. Emission days: 220 days per year.	
Environment factors not influenced by risk management	: Local freshwater dilution factor: 10. Local marine water dilution factor: 100.	
Other conditions affecting environmental exposure	: Release to waste water from process: 0 % Release to air from process: 0.11 % Release to soil from process: 0 %	
Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil	: No air emission controls required; required removal efficiency is 0%. No wastewater treatment required. Soil emission controls are not applicable as there is no direct release to soil.	
Contributing scenario controlling environmental exposure for 6: Use in coatings; adhesive - Industrial		
Amounts used	: Regional use tonnage: 2560 tonnes/year. Fraction of Regional tonnage used locally: 1. Daily amount per site: 7014 kg/day. Annual site tonnage: 2560 tonnes/year.	
Frequency and duration of use	: Continuous. Emission days: 365 days per year.	
Environment factors not influenced by risk management	: Local freshwater dilution factor: 10. Local marine water dilution factor: 100.	
Other conditions affecting environmental exposure	: Release to waste water from process: 1 % Release to air from process: 0 % Release to soil from process: 0.5 %	
Date of issue/Date of revision	: 05/10/2017	Version : 12 / en 52/99

Triethylenetetramine, TETA	Exposure Scenario: 3.1	Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 25% - Industrial/Professional.
Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil	: No air emission controls required; required removal efficiency is 0%. Treat on-site wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ 37.4 %. Soil emission controls are not applicable as there is no direct release to soil.	
Contributing scenario controlling environmental exposure for 7: Use in coatings; adhesive - Professional		
Amounts used	: Daily amount per site: 14.0 kg/day.	
Frequency and duration of use	: Continuous. Emission days: 365 days per year.	
Environment factors not influenced by risk management	: Local freshwater dilution factor: 10. Local marine water dilution factor: 100.	
Other conditions affecting environmental exposure	: Release to waste water from process: 1 % Release to air from process: 0 % Release to soil from process: 0.5 %	
Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil	: Estimated substance removal from wastewater via municipal sewage treatment ≥ 37.4 %.	
Contributing scenario controlling worker exposure for 8: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 25 %.	
Frequency and duration of use/exposure	: Avoid carrying out activities involving exposure for more than 1 hour.	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
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		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 9: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 25 %.	
Frequency and duration of use/exposure	: Avoid carrying out activities involving exposure for more than 1 hour.	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Professional.	
Date of issue/Date of revision	: 05/10/2017	Version : 12 / en 53/99

Triethylenetetramine, TETA	Exposure Scenario: 3.1	Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 25% - Industrial/Professional.
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Respiratory protection	: Wear appropriate respiratory protection. Efficiency of at least 95 %.	
Contributing scenario controlling worker exposure for 10: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 25 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
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		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 11: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 25 %.	
Frequency and duration of use/exposure	: Avoid carrying out activities involving exposure for more than 15 minutes.	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Professional.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Respiratory protection	: Wear appropriate respiratory protection. Efficiency of at least 95 %.	

Triethylenetetramine, TETA	Exposure Scenario: 3.1	Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 25% - Industrial/Professional.
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Contributing scenario controlling worker exposure for 12: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities

Product characteristics	: Liquid.
Concentration of substance in mixture or article	: Covers concentrations up to 25 %.
Frequency and duration of use/exposure	: Avoid carrying out activities involving exposure for more than 1 hour.
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.
Other conditions affecting workers exposure	: Indoor use. Industrial.
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	
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).

Contributing scenario controlling worker exposure for 13: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics	: Liquid.
Concentration of substance in mixture or article	: Covers concentrations up to 25 %.
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.
Other conditions affecting workers exposure	: Indoor use. Industrial.
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	
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).

Section 3 - Exposure estimation and reference to its source

Exposure estimation and reference to its source - Environment: 1: Ashless dispersant

Exposure assessment (environment): : EUSES v2.1

Exposure estimation : Freshwater: 0.00143 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.00753.

Freshwater sediment: 0.722 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.00753.

Marine water: 0.000142 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.00373.

Marine water sediment: 0.072 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.00373.

Sewage Treatment Plant: 0 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.

Soil: 0.135 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.00706.

Air: 0.000974 mg/m³.
Risk characterisation ratio (PEC/PNEC): Not applicable.

Remark : Based on the applied RMMs the risk towards environment is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Environment: 2: Epoxy curing agent

Exposure assessment (environment): : EUSES v2.1

Exposure estimation : Freshwater: 0.00143 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.00753.

Freshwater sediment: 0.722 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.00753.

Marine water: 0.000142 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.00373.

Marine water sediment: 0.072 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.00373.

Sewage Treatment Plant: 0 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.

Soil: 0.114 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.00597.

Air: 0.000000293 mg/m³.
Risk characterisation ratio (PEC/PNEC): Not applicable.

Remark : Based on the applied RMMs the risk towards environment is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Environment: 3: Epoxy curing agent in paint

Exposure assessment (environment): : EUSES v2.1

Exposure estimation : Freshwater: 0.00143 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.00753.

Freshwater sediment: 0.722 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.00753.

Marine water: 0.000142 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.00373.

Marine water sediment: 0.072 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.00373.

Sewage Treatment Plant: 0 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.

Soil: 0.114 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.00597.

Air: 0.0000000293 mg/m³.
Risk characterisation ratio (PEC/PNEC): Not applicable.

Remark : Based on the applied RMMs the risk towards environment is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Environment: 4: Use in laboratories

Exposure assessment (environment): : EUSES v2.1

Exposure estimation : Freshwater: 0.017 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.090.

Freshwater sediment: 8.60 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.090.

Marine water: 0.00170 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.045.

Marine water sediment: 0.860 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.045.

Sewage Treatment Plant: 0.157 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.037.

Soil: 0.114 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.00597.

Air: 0.0000000331 mg/m³.
Risk characterisation ratio (PEC/PNEC): Not applicable.

Remark : Based on the applied RMMs the risk towards environment is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Environment: 5: Industrial use of reactive processing aids**Exposure assessment (environment):** : EUSES v2.1

Exposure estimation : Freshwater: 0.00143 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.00753.

Freshwater sediment: 0.722 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.00753.

Marine water: 0.000142 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.00373.

Marine water sediment: 0.072 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.00373.

Sewage Treatment Plant: 0 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.

Soil: 0.114 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.00597.

Air: 0.00000202 mg/m³.
Risk characterisation ratio (PEC/PNEC): Not applicable.

Remark : Based on the applied RMMs the risk towards environment is sufficiently controlled (RCR < 1).**Exposure estimation and reference to its source - Environment: 6: Use in coatings; adhesive - Industrial****Exposure assessment (environment):** : EUSES v2.1

Exposure estimation : Freshwater: 0.00143 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.00753.

Freshwater sediment: 0.722 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.00753.

Marine water: 0.000142 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.00373.

Marine water sediment: 0.072 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.00373.

Sewage Treatment Plant: 0 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.

Soil: 0.160 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.00837.

Air: 0.00214 mg/m³.
Risk characterisation ratio (PEC/PNEC): Not applicable.

Remark : Based on the applied RMMs the risk towards environment is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Environment: 7: Use in coatings; adhesive - Professional

Exposure assessment (environment): : EUSES v2.1

Exposure estimation : Freshwater: 0.00317 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.017.

Freshwater sediment: 1.60 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.017.

Marine water: 0.00042 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.00831.

Marine water sediment: 0.212 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.00831.

Sewage Treatment Plant: 0.018 mg/l.
Risk characterisation ratio (PEC/PNEC): 0.00413.

Soil: 0.114 mg/kg dwt.
Risk characterisation ratio (PEC/PNEC): 0.00597.

Air: 0.0000000293 mg/m³.
Risk characterisation ratio (PEC/PNEC): Not applicable.

Remark : Based on the applied RMMs the risk towards environment is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Workers: 8: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Exposure estimation : **Worker - inhalative, long-term - systemic:** 0.366 mg/m³.
Risk characterisation ratio: 0.3656.

Worker - dermal, long-term - systemic: 0.069 mg/kg bw/day.
Risk characterisation ratio: 0.1203.

Worker - combined, long-term - systemic: 0.485876.

Worker - inhalative, short-term - local: 0.731 mg/m³.
Risk characterisation ratio: 0.000136.

Remark : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Workers: 9: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Exposure estimation : **Worker - inhalative, long-term - systemic:** 0.366 mg/m³.
Risk characterisation ratio: 0.3656.

Worker - dermal, long-term - systemic: 0.069 mg/kg bw/day.
Risk characterisation ratio: 0.1203.

Worker - combined, long-term - systemic: 0.485876.

Worker - inhalative, short-term - local: 0.731 mg/m³.
Risk characterisation ratio: 0.000136.

Triethylenetetramine, TETA	Exposure Scenario: 3.1	Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 25% - Industrial/Professional.
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	
Exposure estimation and reference to its source - Workers: 10: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Worker - inhalative, long-term - systemic: 0.366 mg/m ³ . Risk characterisation ratio: 0.3656.	
	Worker - dermal, long-term - systemic: 0.069 mg/kg bw/day. Risk characterisation ratio: 0.1203.	
	Worker - combined, long-term - systemic: 0.485876.	
	Worker - inhalative, short-term - local: 0.731 mg/m ³ . Risk characterisation ratio: 0.000136.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	
Exposure estimation and reference to its source - Workers: 11: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Worker - inhalative, long-term - systemic: 0.457 mg/m ³ . Risk characterisation ratio: 0.4570.	
	Worker - dermal, long-term - systemic: 0.069 mg/kg bw/day. Risk characterisation ratio: 0.1203.	
	Worker - combined, long-term - systemic: 0.577270.	
	Worker - inhalative, short-term - local: 0.914 mg/m ³ . Risk characterisation ratio: 0.000170.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	
Exposure estimation and reference to its source - Workers: 12: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Worker - inhalative, long-term - systemic: 0.545 mg/m ³ . Risk characterisation ratio: 0.5484.	
	Worker - dermal, long-term - systemic: 0.034 mg/kg bw/day. Risk characterisation ratio: 0.0602.	
	Worker - combined, long-term - systemic: 0.608513.	
	Worker - inhalative, short-term - local: 1.098 mg/m ³ . Risk characterisation ratio: 0.000203.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	

Triethylenetetramine, TETA	Exposure Scenario: 3.1	Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 25% - Industrial/Professional.
Exposure estimation and reference to its source - Workers: 13: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Worker - inhalative, long-term - systemic: 0.366 mg/m ³ . Risk characterisation ratio: 0.3656.	
	: Worker - dermal, long-term - systemic: 0.069 mg/kg bw/day. Risk characterisation ratio: 0.1203.	
	: Worker - combined, long-term - systemic: 0.485876.	
	: Worker - inhalative, short-term - local: 0.731 mg/m ³ . Risk characterisation ratio: 0.000136.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	

Section 4 - Guidance to DU to evaluate whether he works inside the boundaries set by the ES

General	: The immediate downstream user is required to evaluate whether the operational conditions and risk management measures described in the exposure scenario fit to his use. If other OC/RMM are adopted, the user has to ensure that risks are managed to at least equivalent levels. The risk assessment methods/tools given in section 3 may be used for this evaluation.
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. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health	: ECETOC TRA, Version 2 (Modified version): - adjusted efficacy values for gloves as adopted by CEFIC - use of factor 2 to calculate peak exposure from long term exposure - use of exact percentage (2%, 0.5%) in product instead of broad TRA categories

Annex to the extended Safety Data Sheet (eSDS)

Industrial

Identification of the substance or mixture

Product definition : Multi-constituent substance
Product name : Triethylenetetramine, TETA

Section 1 - Title

Short title of the exposure scenario : Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 15% - Industrial/Professional.

List of use descriptors : **Identified use name: ES 3.2:** Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 15% - Industrial/Professional: SU03, SU22; PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC11, PROC13, PROC14; ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC07, ERC08a, ERC08b, ERC08c, ERC08e, ERC08f, ERC11a, ERC12a, ERC12b
Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC11, PROC13, PROC14
Substance supplied to that use in form of: In a mixture
Subsequent service life relevant for that use: No.
Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC07, ERC08a, ERC08b, ERC08c, ERC08e, ERC08f, ERC11a, ERC12a, ERC12b

Environmental contributing scenarios : **All ERCs (see above)**

Health Contributing scenarios : **Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - PROC05**
Calendering operations - PROC06
Spraying in industrial settings and applications - PROC07
Transfer of substance or preparation (charging/discharging) from/to vessels/ large containers at non-dedicated facilities - PROC08a
Transfer of substance or preparation (charging/discharging) from/to vessels/ large containers at non-dedicated facilities - PROC08a
Transfer of substance or preparation (charging/discharging) from/to vessels/ large containers at dedicated facilities - PROC08b
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - PROC09
Roller application or brushing of adhesive and other coating - PROC10
Spraying outside industrial settings and/or applications - PROC11
Treatment of articles by dipping and pouring - PROC13
Production of preparations or articles by tableting, compression, extrusion, pelletisation - PROC14

Number of the ES : 3.2
Additional information : Sector of uses [SU]: SU01, SU06, SU08, SU09, SU10, SU11, SU12, SU13, SU14, SU16, SU17, SU19, SU23
Product categories [PC]: PC01, PC02, PC03, PC05, PC08, PC09a, PC09b, PC09, PC14, PC15, PC18, PC19, PC20, PC21, PC23, PC26, PC27, PC28, PC31, PC32, PC33, PC35, PC39
Free short title of the generic exposure scenario: Mixing, blending, transfer and use of liquid substance containing up to 15% EA.

Section 2 - Exposure controls

Contributing scenario controlling environmental exposure for 1: All ERCs (see above)

see ES 3.1.

Contributing scenario controlling worker exposure for 2: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)

Product characteristics : Liquid.

Concentration of substance in mixture or article : Covers concentrations up to 15 %.

Frequency and duration of use/exposure : Covers exposure up to 8 h (full shift).

Human factors not influenced by risk management : Breathing volume: 10 m³/day.
Body weight: 70 kg.

Other conditions affecting workers exposure : Indoor use.
Industrial.

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

Personal protection : Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls.
Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).

Contributing scenario controlling worker exposure for 3: Calendering operations

Product characteristics : Liquid.

Concentration of substance in mixture or article : Covers concentrations up to 15 %.

Frequency and duration of use/exposure : Covers exposure up to 8 h (full shift).

Human factors not influenced by risk management : Breathing volume: 10 m³/day.
Body weight: 70 kg.

Other conditions affecting workers exposure : Indoor use.
Industrial.

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

Personal protection : Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls.
Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).

Contributing scenario controlling worker exposure for 4: Spraying in industrial settings and applications**Product characteristics** : Liquid.**Concentration of substance in mixture or article** : Covers concentrations up to 15 %.**Frequency and duration of use/exposure** : Covers exposure up to 8 h (full shift).**Human factors not influenced by risk management** : Breathing volume: 10 m³/day.
Body weight: 70 kg.**Other conditions affecting workers exposure** : Indoor use.
Industrial.**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****Personal protection** : Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls.
Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).**Respiratory protection** : Wear appropriate respiratory protection. Efficiency of at least 90 %.**Contributing scenario controlling worker exposure for 5: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities****Product characteristics** : Liquid.**Concentration of substance in mixture or article** : Covers concentrations up to 15 %.**Frequency and duration of use/exposure** : Covers exposure up to 8 h (full shift).**Human factors not influenced by risk management** : Breathing volume: 10 m³/day.
Body weight: 70 kg.**Other conditions affecting workers exposure** : Indoor use.
Industrial.**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****Personal protection** : Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls.
Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).**Contributing scenario controlling worker exposure for 6: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities****Product characteristics** : Liquid.**Concentration of substance in mixture or article** : Covers concentrations up to 15 %.**Frequency and duration of use/exposure** : Avoid carrying out activities involving exposure for more than 1 hour.**Human factors not influenced by risk management** : Breathing volume: 10 m³/day.
Body weight: 70 kg.

Triethylenetetramine, TETA	Exposure Scenario: 3.2	Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 15% - Industrial/Professional.
Other conditions affecting workers exposure	: Indoor use. Professional.	
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		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 7: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 15 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
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		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 8: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 15 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
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		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
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Contributing scenario controlling worker exposure for 9: Roller application or brushing of adhesive and other coating

Product characteristics	: Liquid.
Concentration of substance in mixture or article	: Covers concentrations up to 15 %.
Frequency and duration of use/exposure	: Avoid carrying out activities involving exposure for more than 1 hour.
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.
Other conditions affecting workers exposure	: Indoor use. Professional.

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

Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).
Respiratory protection	: Wear appropriate respiratory protection. Efficiency of at least 95 %.

Contributing scenario controlling worker exposure for 10: Spraying outside industrial settings and/or applications

Product characteristics	: Liquid.
Concentration of substance in mixture or article	: Covers concentrations up to 10 %.
Frequency and duration of use/exposure	: Avoid carrying out activities involving exposure for more than 1 hour.
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.
Other conditions affecting workers exposure	: Indoor use. Professional.

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

Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).
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Contributing scenario controlling worker exposure for 11: Treatment of articles by dipping and pouring

Product characteristics	: Liquid.
Concentration of substance in mixture or article	: Covers concentrations up to 15 %.
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.
Other conditions affecting workers exposure	: Indoor use. Industrial.

Triethylenetetramine, TETA	Exposure Scenario: 3.2	Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 15% - Industrial/Professional.
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		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 12: Production of preparations or articles by tableting, compression, extrusion, pelletisation		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 15 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
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		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	

Section 3 - Exposure estimation and reference to its source

Exposure estimation and reference to its source - Environment: 1: All ERCs (see above)		
Exposure assessment (environment):	: see ES 3.1.	
Exposure estimation	: see ES 3.1.	
Exposure estimation and reference to its source - Workers: 2: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Worker - inhalative, long-term - systemic: 0.457 mg/m ³ . Risk characterisation ratio: 0.4570.	
	: Worker - dermal, long-term - systemic: 0.082 mg/kg bw/day. Risk characterisation ratio: 0.1444.	
	: Worker - combined, long-term - systemic: 0.601330.	
	: Worker - inhalative, short-term - local: 0.914 mg/m ³ . Risk characterisation ratio: 0.000170.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	

Exposure estimation and reference to its source - Workers: 3: Calendering operations

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Exposure estimation : **Worker - inhalative, long-term - systemic:** 0.457 mg/m³.
Risk characterisation ratio: 0.4570.

Worker - dermal, long-term - systemic: 0.082 mg/kg bw/day.
Risk characterisation ratio: 0.1444.

Worker - combined, long-term - systemic: 0.601330.

Worker - inhalative, short-term - local: 0.914 mg/m³.
Risk characterisation ratio: 0.000170.

Remark : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Workers: 4: Spraying in industrial settings and applications

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Exposure estimation : **Worker - inhalative, long-term - systemic:** 0.457 mg/m³.
Risk characterisation ratio: 0.4570.

Worker - dermal, long-term - systemic: 0.129 mg/kg bw/day.
Risk characterisation ratio: 0.2256.

Worker - combined, long-term - systemic: 0.682533.

Worker - inhalative, short-term - local: 0.914 mg/m³.
Risk characterisation ratio: 0.000170.

Remark : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Workers: 5: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Exposure estimation : **Worker - inhalative, long-term - systemic:** 0.548 mg/m³.
Risk characterisation ratio: 0.5484.

Worker - dermal, long-term - systemic: 0.041 mg/kg bw/day.
Risk characterisation ratio: 0.0722.

Worker - combined, long-term - systemic: 0.620543.

Worker - inhalative, short-term - local: 1.097 mg/m³.
Risk characterisation ratio: 0.000203.

Remark : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Workers: 6: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Triethylenetetramine, TETA	Exposure Scenario: 3.2	Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 15% - Industrial/Professional.
Exposure estimation	<p>Worker - inhalative, long-term - systemic: 0.457 mg/m³. Risk characterisation ratio: 0.4570.</p> <p>Worker - dermal, long-term - systemic: 0.041 mg/kg bw/day. Risk characterisation ratio: 0.0722.</p> <p>Worker - combined, long-term - systemic: 0.529149.</p> <p>Worker - inhalative, short-term - local: 0.914 mg/m³. Risk characterisation ratio: 0.000170.</p>	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	
Exposure estimation and reference to its source - Workers: 7: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	<p>Worker - inhalative, long-term - systemic: 0.457 mg/m³. Risk characterisation ratio: 0.4570.</p> <p>Worker - dermal, long-term - systemic: 0.082 mg/kg bw/day. Risk characterisation ratio: 0.1444.</p> <p>Worker - combined, long-term - systemic: 0.601330.</p> <p>Worker - inhalative, short-term - local: 0.914 mg/m³. Risk characterisation ratio: 0.000170.</p>	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	
Exposure estimation and reference to its source - Workers: 8: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	<p>Worker - inhalative, long-term - systemic: 0.457 mg/m³. Risk characterisation ratio: 0.4570.</p> <p>Worker - dermal, long-term - systemic: 0.082 mg/kg bw/day. Risk characterisation ratio: 0.1444.</p> <p>Worker - combined, long-term - systemic: 0.601330.</p> <p>Worker - inhalative, short-term - local: 0.914 mg/m³. Risk characterisation ratio: 0.000170.</p>	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	
Exposure estimation and reference to its source - Workers: 9: Roller application or brushing of adhesive and other coating		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	<p>Worker - inhalative, long-term - systemic: 0.457 mg/m³. Risk characterisation ratio: 0.2285.</p> <p>Worker - dermal, long-term - systemic: 0.082 mg/kg bw/day. Risk characterisation ratio: 0.1444.</p> <p>Worker - combined, long-term - systemic: 0.372845.</p>	
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Triethylenetetramine, TETA	Exposure Scenario: 3.2	Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 15% - Industrial/Professional.
Remark	<p>Worker - inhalative, short-term - local: 0.914 mg/m³. Risk characterisation ratio: 0.000085.</p> <p>: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).</p>	
Exposure estimation and reference to its source - Workers: 10: Spraying outside industrial settings and/or applications		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	<p>Worker - inhalative, long-term - systemic: 0.121 mg/m³. Risk characterisation ratio: 0.1219.</p>	
	<p>Worker - dermal, long-term - systemic: 0.214 mg/kg bw/day. Risk characterisation ratio: 0.3759.</p>	
	<p>Worker - combined, long-term - systemic: 0.497798.</p>	
	<p>Worker - inhalative, short-term - local: 0.243 mg/m³. Risk characterisation ratio: 0.000045.</p>	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	
Exposure estimation and reference to its source - Workers: 11: Treatment of articles by dipping and pouring		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	<p>Worker - inhalative, long-term - systemic: 0.548 mg/m³. Risk characterisation ratio: 0.5484.</p>	
	<p>Worker - dermal, long-term - systemic: 0.041 mg/kg bw/day. Risk characterisation ratio: 0.0722.</p>	
	<p>Worker - combined, long-term - systemic: 0.620543.</p>	
	<p>Worker - inhalative, short-term - local: 1.097 mg/m³. Risk characterisation ratio: 0.000203.</p>	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	
Exposure estimation and reference to its source - Workers: 12: Production of preparations or articles by tableting, compression, extrusion, pelletisation		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	<p>Worker - inhalative, long-term - systemic: 0.457 mg/m³. Risk characterisation ratio: 0.4570.</p>	
	<p>Worker - dermal, long-term - systemic: 0.082 mg/kg bw/day. Risk characterisation ratio: 0.1444.</p>	
	<p>Worker - combined, long-term - systemic: 0.601330.</p>	
	<p>Worker - inhalative, short-term - local: 0.914 mg/m³. Risk characterisation ratio: 0.000170.</p>	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	

Section 4 - Guidance to DU to evaluate whether he works inside the boundaries set by the ES**General**

: The immediate downstream user is required to evaluate whether the operational conditions and risk management measures described in the exposure scenario fit to his use. If other OC/RMM are adopted, the user has to ensure that risks are managed to at least equivalent levels. The risk assessment methods/tools given in section 3 may be used for this evaluation.

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. Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

: ECETOC TRA, Version 2 (Modified version):
- adjusted efficacy values for gloves as adopted by CEFIC
- use of factor 2 to calculate peak exposure from long term exposure
- use of exact percentage (2%, 0.5%) in product instead of broad TRA categories

Annex to the extended Safety Data Sheet (eSDS)

Industrial

Identification of the substance or mixture

Product definition : Multi-constituent substance
Product name : Triethylenetetramine, TETA

Section 1 - Title

Short title of the exposure scenario : Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 2% - Industrial/Professional.

List of use descriptors : **Identified use name: ES 3.3:** Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 2% - Industrial: SU03, SU22; PROC05, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC11, PROC13, PROC14, PROC19; ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC07, ERC08a, ERC08b, ERC08c, ERC08e, ERC08f, ERC11a, ERC12a, ERC12b
Process Category: PROC05, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC11, PROC13, PROC14, PROC19
Substance supplied to that use in form of: In a mixture
Subsequent service life relevant for that use: No.
Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC07, ERC08a, ERC08b, ERC08c, ERC08e, ERC08f, ERC11a, ERC12a, ERC12b

Environmental contributing scenarios : **All ERCs (see above)**

Health Contributing scenarios : **Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - PROC05**
Spraying in industrial settings and applications - PROC07
Transfer of substance or preparation (charging/discharging) from/to vessels/ large containers at non-dedicated facilities - PROC08a
Transfer of substance or preparation (charging/discharging) from/to vessels/ large containers at dedicated facilities - PROC08b
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - PROC09
Roller application or brushing of adhesive and other coating - PROC10
Spraying outside industrial settings and/or applications - PROC11
Treatment of articles by dipping and pouring - PROC13
Production of preparations or articles by tableting, compression, extrusion, pelletisation - PROC14
Hand-mixing with intimate contact and only PPE available - PROC19

Number of the ES	: 3.3
Additional information	: Sector of uses [SU]: SU01, SU06, SU08, SU09, SU10, SU11, SU12, SU13, SU14, SU16, SU17, SU19, SU23 Product categories [PC]: PC01, PC02, PC03, PC05, PC08, PC09a, PC09b, PC09, PC14, PC15, PC18, PC19, PC20, PC21, PC23, PC26, PC27, PC28, PC31, PC32, PC33, PC35, PC39 Free short title of the generic exposure scenario: Use of the diluted product (up to 2% content) upon manufacturing of chemicals for which the EA is an intermediate and chemical preparations containing the substance.

Section 2 - Exposure controls**Contributing scenario controlling environmental exposure for 1: All ERCs (see above)**

see ES 3.1.

Contributing scenario controlling worker exposure for 2: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)

Product characteristics	: Liquid.
Concentration of substance in mixture or article	: Covers concentrations up to 2 %.
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.
Other conditions affecting workers exposure	: Indoor use. Industrial.

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

Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).
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Contributing scenario controlling worker exposure for 3: Spraying in industrial settings and applications

Product characteristics	: Liquid.
Concentration of substance in mixture or article	: Covers concentrations up to 2 %.
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.
Other conditions affecting workers exposure	: Indoor use. Industrial.
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

Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).
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Contributing scenario controlling worker exposure for 4: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

Product characteristics	: Liquid.
Concentration of substance in mixture or article	: Covers concentrations up to 2 %.
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).

Triethylenetetramine, TETA	Exposure Scenario: 3.3	Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 2% - Industrial/Professional.
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial. Professional.	
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		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 5: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 2 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 6: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 2 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	

Contributing scenario controlling worker exposure for 7: Roller application or brushing of adhesive and other coating**Product characteristics** : Liquid.**Concentration of substance in mixture or article** : Covers concentrations up to 2 %.**Frequency and duration of use/exposure** : Covers exposure up to 8 h (full shift).**Human factors not influenced by risk management** : Breathing volume: 10 m³/day.
Body weight: 70 kg.**Other conditions affecting workers exposure** : Indoor use.
Industrial.**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****Personal protection** : Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls.
Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).**Contributing scenario controlling worker exposure for 8: Spraying outside industrial settings and/or applications****Product characteristics** : Liquid.**Concentration of substance in mixture or article** : Covers concentrations up to 2 %.**Frequency and duration of use/exposure** : Avoid carrying out activities involving exposure for more than 4 hours.**Human factors not influenced by risk management** : Breathing volume: 10 m³/day.
Body weight: 70 kg.**Other conditions affecting workers exposure** : Indoor use.
Professional.**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****Personal protection** : Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls.
Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).**Respiratory protection** : Wear appropriate respiratory protection. Efficiency of at least 90 %.**Contributing scenario controlling worker exposure for 9: Treatment of articles by dipping and pouring****Product characteristics** : Liquid.**Concentration of substance in mixture or article** : Covers concentrations up to 2 %.**Frequency and duration of use/exposure** : Covers exposure up to 8 h (full shift).**Human factors not influenced by risk management** : Breathing volume: 10 m³/day.
Body weight: 70 kg.

Triethylenetetramine, TETA	Exposure Scenario: 3.3	Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 2% - Industrial/Professional.
Other conditions affecting workers exposure	: Indoor use. Industrial.	
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		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 10: Production of preparations or articles by tableting, compression, extrusion, pelletisation		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 2 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 11: Hand-mixing with intimate contact and only PPE available		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 2 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
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		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	

Section 3 - Exposure estimation and reference to its source**Exposure estimation and reference to its source - Environment: 1: All ERCs (see above)**

Exposure assessment (environment): : see ES 3.1.

Exposure estimation: : see ES 3.1.

Exposure estimation and reference to its source - Workers: 2: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Exposure estimation: : **Worker - inhalative, long-term - systemic:** 0.61 mg/m³.
Risk characterisation ratio: 0.6093.

Worker - dermal, long-term - systemic: 0.05 mg/kg bw/day.
Risk characterisation ratio: 0.0962.

Worker - combined, long-term - systemic: 0.7055.

Worker - inhalative, short-term - local: 1.22 mg/m³.
Risk characterisation ratio: 0.00023.

Remark: : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Workers: 3: Spraying in industrial settings and applications

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Exposure estimation: : **Worker - inhalative, long-term - systemic:** 0.61 mg/m³.
Risk characterisation ratio: 0.6093.

Worker - dermal, long-term - systemic: 0.09 mg/kg bw/day.
Risk characterisation ratio: 0.1504.

Worker - combined, long-term - systemic: 0.7597.

Worker - inhalative, short-term - local: 1.22 mg/m³.
Risk characterisation ratio: 0.00023.

Remark: : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Workers: 4: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Exposure estimation: : Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption)
see PROC07, PROC10.

Remark: : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Workers: 5: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Exposure estimation : **Worker - inhalative, long-term - systemic:** 0.61 mg/m³.
Risk characterisation ratio: 0.6093.

Worker - dermal, long-term - systemic: 0.05 mg/kg bw/day.
Risk characterisation ratio: 0.0962.

Worker - combined, long-term - systemic: 0.7055.

Worker - inhalative, short-term - local: 1.22 mg/m³.
Risk characterisation ratio: 0.00023.

Remark : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Workers: 6: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Exposure estimation : **Worker - inhalative, long-term - systemic:** 0.61 mg/m³.
Risk characterisation ratio: 0.6093.

Worker - dermal, long-term - systemic: 0.05 mg/kg bw/day.
Risk characterisation ratio: 0.0962.

Worker - combined, long-term - systemic: 0.7055.

Worker - inhalative, short-term - local: 1.22 mg/m³.
Risk characterisation ratio: 0.00023.

Remark : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Workers: 7: Roller application or brushing of adhesive and other coating

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Exposure estimation : **Worker - inhalative, long-term - systemic:** 0.61 mg/m³.
Risk characterisation ratio: 0.6093.

Worker - dermal, long-term - systemic: 0.09 mg/kg bw/day.
Risk characterisation ratio: 0.1504.

Worker - combined, long-term - systemic: 0.7597.

Worker - inhalative, short-term - local: 1.22 mg/m³.
Risk characterisation ratio: 0.00023.

Remark : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Triethylenetetramine, TETA	Exposure Scenario: 3.3	Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 2% - Industrial/Professional.
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Exposure estimation and reference to its source - Workers: 8: Spraying outside industrial settings and/or applications		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Worker - inhalative, long-term - systemic: 0.15 mg/m ³ . Risk characterisation ratio: 0.1219.	
	: Worker - dermal, long-term - systemic: 0.21 mg/kg bw/day. Risk characterisation ratio: 0.3759.	
	: Worker - combined, long-term - systemic: 0.4978.	
	: Worker - inhalative, short-term - local: 0.3 mg/m ³ . Risk characterisation ratio: 0.0000452.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	

Exposure estimation and reference to its source - Workers: 9: Treatment of articles by dipping and pouring		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC07, PROC10.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	

Exposure estimation and reference to its source - Workers: 10: Production of preparations or articles by tableting, compression, extrusion, pelletisation		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC05, PROC08b, PROC09.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	

Exposure estimation and reference to its source - Workers: 11: Hand-mixing with intimate contact and only PPE available		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC07, PROC10.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	

Section 4 - Guidance to DU to evaluate whether he works inside the boundaries set by the ES

General	: The immediate downstream user is required to evaluate whether the operational conditions and risk management measures described in the exposure scenario fit to his use. If other OC/RMM are adopted, the user has to ensure that risks are managed to at least equivalent levels. The risk assessment methods/tools given in section 3 may be used for this evaluation.
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. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

Triethylenetetramine, TETA

Exposure Scenario: 3.3

Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 2% - Industrial/Professional.

Health

- : ECETOC TRA, Version 2 (Modified version):
 - adjusted efficacy values for gloves as adopted by CEFIC
 - use of factor 2 to calculate peak exposure from long term exposure
 - use of exact percentage (2%, 0.5%) in product instead of broad TRA categories

Annex to the extended Safety Data Sheet (eSDS)

Industrial

Identification of the substance or mixture

Product definition : Multi-constituent substance
Product name : Triethylenetetramine, TETA

Section 1 - Title

Short title of the exposure scenario : Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 0.5% - Industrial/Professional.

List of use descriptors : **Identified use name: ES 3.4:** Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 0.5% - Industrial: SU03, SU22; PROC05, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC11, PROC13, PROC14, PROC19; ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC07, ERC08a, ERC08b, ERC08c, ERC08e, ERC08f, ERC11a, ERC12a, ERC12b
Process Category: PROC05, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC11, PROC13, PROC14, PROC19
Substance supplied to that use in form of: In a mixture
Subsequent service life relevant for that use: No.
Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC07, ERC08a, ERC08b, ERC08c, ERC08e, ERC08f, ERC11a, ERC12a, ERC12b

Environmental contributing scenarios : **All ERCs (see above)**

Health Contributing scenarios : **Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) - PROC05**
Spraying in industrial settings and applications - PROC07
Transfer of substance or preparation (charging/discharging) from/to vessels/ large containers at non-dedicated facilities - PROC08a
Transfer of substance or preparation (charging/discharging) from/to vessels/ large containers at dedicated facilities - PROC08b
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - PROC09
Roller application or brushing of adhesive and other coating - PROC10
Spraying outside industrial settings and/or applications - PROC11
Treatment of articles by dipping and pouring - PROC13
Production of preparations or articles by tableting, compression, extrusion, pelletisation - PROC14
Hand-mixing with intimate contact and only PPE available - PROC19

Number of the ES : 3.4
Additional information : Sector of uses [SU]: SU01, SU06, SU08, SU09, SU10, SU11, SU12, SU13, SU14, SU16, SU17, SU19, SU23
Product categories [PC]: PC01, PC02, PC03, PC05, PC08, PC09a, PC09b, PC09, PC14, PC15, PC18, PC19, PC20, PC21, PC23, PC26, PC27, PC28, PC31, PC32, PC33, PC35, PC39

Free short title of the generic exposure scenario: Use of diluted product (up to 0.5% content) upon manufacturing of chemicals for which the EA is an intermediate and chemical preparations containing the substance.

Section 2 - Exposure controls**Contributing scenario controlling environmental exposure for 1: All ERCs (see above)**

see ES 3.1.

Contributing scenario controlling worker exposure for 2: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)**Product characteristics** : Liquid.**Concentration of substance in mixture or article** : Covers concentrations up to 0.5 %.**Frequency and duration of use/exposure** : Covers exposure up to 8 h (full shift).**Human factors not influenced by risk management** : Breathing volume: 10 m³/day.
Body weight: 70 kg.**Other conditions affecting workers exposure** : Indoor use.
Industrial.**Conditions and measures related to personal protection, hygiene and health evaluation****Personal protection** : Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls.
Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).**Contributing scenario controlling worker exposure for 3: Spraying in industrial settings and applications****Product characteristics** : Liquid.**Concentration of substance in mixture or article** : Covers concentrations up to 0.5 %.**Frequency and duration of use/exposure** : Covers exposure up to 8 h (full shift).**Human factors not influenced by risk management** : Breathing volume: 10 m³/day.
Body weight: 70 kg.**Other conditions affecting workers exposure** : Indoor use.
Industrial.**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****Personal protection** : Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls.
Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).**Contributing scenario controlling worker exposure for 4: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities****Product characteristics** : Liquid.**Concentration of substance in mixture or article** : Covers concentrations up to 0.5 %.**Frequency and duration of use/exposure** : Covers exposure up to 8 h (full shift).

Triethylenetetramine, TETA	Exposure Scenario: 3.4	Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 0.5% - Industrial/Professional.
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 5: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 0.5 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 6: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 0.5 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 7: Roller application or brushing of adhesive and other coating		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 0.5 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
<p><i>Date of issue/Date of revision</i> : 05/10/2017</p> <p style="text-align: right;"><i>Version</i> : 12 / en 83/99</p>		

Triethylenetetramine, TETA	Exposure Scenario: 3.4	Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 0.5% - Industrial/Professional.
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 8: Spraying outside industrial settings and/or applications		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 0.5 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Professional.	
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		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	
Contributing scenario controlling worker exposure for 9: Treatment of articles by dipping and pouring		
Product characteristics	: Liquid.	
Concentration of substance in mixture or article	: Covers concentrations up to 0.5 %.	
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).	
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.	
Other conditions affecting workers exposure	: Indoor use. Industrial.	
Conditions and measures related to personal protection, hygiene and health evaluation		
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).	

Triethylenetetramine, TETA	Exposure Scenario: 3.4	Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 0.5% - Industrial/Professional.
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Contributing scenario controlling worker exposure for 10: Production of preparations or articles by tableting, compression, extrusion, pelletisation

Product characteristics	: Liquid.
Concentration of substance in mixture or article	: Covers concentrations up to 0.5 %.
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.
Other conditions affecting workers exposure	: Indoor use. Industrial.
Conditions and measures related to personal protection, hygiene and health evaluation	
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).

Contributing scenario controlling worker exposure for 11: Hand-mixing with intimate contact and only PPE available

Product characteristics	: Liquid.
Concentration of substance in mixture or article	: Covers concentrations up to 0.5 %.
Frequency and duration of use/exposure	: Covers exposure up to 8 h (full shift).
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.
Other conditions affecting workers exposure	: Indoor use. Industrial.
Conditions and measures related to personal protection, hygiene and health evaluation	
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).

Section 3 - Exposure estimation and reference to its source

Exposure estimation and reference to its source - Environment: 1: All ERCs (see above)

Exposure assessment (environment):	: see ES 3.1.
Exposure estimation	: see ES 3.1.

Exposure estimation and reference to its source - Workers: 2: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)

Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).
Exposure estimation	: Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC19.
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Triethylenetetramine, TETA	Exposure Scenario: 3.4	Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 0.5% - Industrial/Professional.
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Exposure estimation and reference to its source - Workers: 3: Spraying in industrial settings and applications

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Exposure estimation : Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC11.

Remark : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Workers: 4: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Exposure estimation : Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC19.

Remark : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Workers: 5: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Exposure estimation : Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC19.

Remark : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Workers: 6: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Exposure estimation : Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC19.

Remark : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Workers: 7: Roller application or brushing of adhesive and other coating

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Exposure estimation : Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC19.

Remark : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Workers: 8: Spraying outside industrial settings and/or applications

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).

Exposure estimation : **Worker - inhalative, long-term - systemic:** 0.30 mg/m³.
Risk characterisation ratio: 0.3046.

Worker - dermal, long-term - systemic: 0.11 mg/kg bw/day.
Risk characterisation ratio: 0.1880.

Worker - combined, long-term - systemic: 0.4926.

Triethylenetetramine, TETA	Exposure Scenario: 3.4	Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 0.5% - Industrial/Professional.
Remark	Worker - inhalative, short-term - local: 1.22 mg/m ³ . Risk characterisation ratio: 0.000113. : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	
Exposure estimation and reference to its source - Workers: 9: Treatment of articles by dipping and pouring		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC19.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	
Exposure estimation and reference to its source - Workers: 10: Production of preparations or articles by tableting, compression, extrusion, pelletisation		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Risk characterisations have only been calculated for the highest exposure level. (Worst case assumption) see PROC19.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	
Exposure estimation and reference to its source - Workers: 11: Hand-mixing with intimate contact and only PPE available		
Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).	
Exposure estimation	: Worker - inhalative, long-term - systemic: 0.76 mg/m ³ . Risk characterisation ratio: 0.0762.	
	Worker - dermal, long-term - systemic: 0.14 mg/kg bw/day. Risk characterisation ratio: 0.2481.	
	Worker - combined, long-term - systemic: 0.3243.	
	Worker - inhalative, short-term - local: 1.52 mg/m ³ . Risk characterisation ratio: 0.000028.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	

Section 4 - Guidance to DU to evaluate whether he works inside the boundaries set by the ES

General	: The immediate downstream user is required to evaluate whether the operational conditions and risk management measures described in the exposure scenario fit to his use. If other OC/RMM are adopted, the user has to ensure that risks are managed to at least equivalent levels. The risk assessment methods/tools given in section 3 may be used for this evaluation.
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. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health	: ECETOC TRA, Version 2 (Modified version): - adjusted efficacy values for gloves as adopted by CEFIC - use of factor 2 to calculate peak exposure from long term exposure - use of exact percentage (2%, 0.5%) in product instead of broad TRA categories

Triethylenetetramine, TETA

Exposure Scenario: 3.4

Use of ethylenamines (EA) in open processes with high exposure potential and evaporation and aerosol formation as possible exposure forms - Use of preparations containing EA up to 0.5% - Industrial/Professional.

Annex to the extended Safety Data Sheet (eSDS)

Industrial

Identification of the substance or mixture

Product definition : Multi-constituent substance
Product name : Triethylenetetramine, TETA

Section 1 - Title

Short title of the exposure scenario : Handling of solid products with small amounts of unbound ethylenamines (EA) - Use of preparations containing EA up to 2% - Professional.

List of use descriptors : **Identified use name: ES 4.1:** Handling of solid products with small amounts of unbound ethylenamines (EA) - Use of preparations containing EA up to 2% - Professional: SU22; PROC21, PROC24; ERC11a
Process Category: PROC21, PROC24
Subsequent service life relevant for that use: No.
Environmental Release Category: ERC11a

Environmental contributing scenarios : **All ERCs (see above)**

Health Contributing scenarios : **Low energy manipulation of substances bound in materials and/or articles - PROC21**
High (mechanical) energy work-up of substances bound in materials and/or articles - PROC24

Number of the ES	: 4.1
Additional information	: Product categories [PC]: PC14, PC23, PC26, PC31
Free short title of the generic exposure scenario: Manipulation and high energy workup of solid product containing up to 2% of EA.	

Section 2 - Exposure controls

Contributing scenario controlling environmental exposure for 1: All ERCs (see above) see ES 3.1. The emission assessments for professional use are covered under the risk characterisation for wide-dispersive use.
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Contributing scenario controlling worker exposure for 2: Low energy manipulation of substances bound in materials and/or articles	
Product characteristics	: Solid.
Concentration of substance in mixture or article	: Covers concentrations up to 2 %.
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.
Other conditions affecting workers exposure	: Indoor use. Professional.
Conditions and measures related to personal protection, hygiene and health evaluation	
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).

Triethylenetetramine, TETA Exposure Scenario: 4.1 **Handling of solid products with small amounts of unbound ethylenamines (EA) - Use of preparations containing EA up to 2% - Professional.**

Contributing scenario controlling worker exposure for 3: High (mechanical) energy work-up of substances bound in materials and/or articles

Product characteristics : Solid.
Concentration of substance in mixture or article : Covers concentrations up to 2 %.
Human factors not influenced by risk management : Breathing volume: 10 m³/day.
Body weight: 70 kg.
Other conditions affecting workers exposure : Indoor use.
Professional.
Conditions and measures related to personal protection, hygiene and health evaluation
Personal protection : Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls.
Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).

Section 3 - Exposure estimation and reference to its source

Exposure estimation and reference to its source - Environment: 1: All ERCs (see above)

Exposure assessment (environment): : see ES 3.1.
Exposure estimation : see ES 3.1.

Exposure estimation and reference to its source - Workers: 2: Low energy manipulation of substances bound in materials and/or articles

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).
Exposure estimation : **Worker - inhalative, long-term - systemic:** 0.06 mg/m³.
Risk characterisation ratio: 0.06.
Worker - dermal, long-term - systemic: 0.0566 mg/kg bw/day.
Risk characterisation ratio: 0.0992.
Worker - combined, long-term - systemic: 0.1593.
Worker - inhalative, short-term - local: 0.12 mg/m³.
Risk characterisation ratio: 0.0000223.
Remark : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Workers: 3: High (mechanical) energy work-up of substances bound in materials and/or articles

Exposure assessment (human): : ECETOC TRA, Version 2 (Modified version).
Exposure estimation : **Worker - inhalative, long-term - systemic:** 0.06 mg/m³.
Risk characterisation ratio: 0.06.
Worker - dermal, long-term - systemic: 0.0566 mg/kg bw/day.
Risk characterisation ratio: 0.0992.
Worker - combined, long-term - systemic: 0.1593.
Worker - inhalative, short-term - local: 0.12 mg/m³.
Risk characterisation ratio: 0.0000223.
Remark : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Section 4 - Guidance to DU to evaluate whether he works inside the boundaries set by the ES

General	: The immediate downstream user is required to evaluate whether the operational conditions and risk management measures described in the exposure scenario fit to his use. If other OC/RMM are adopted, the user has to ensure that risks are managed to at least equivalent levels. The risk assessment methods/tools given in section 3 may be used for this evaluation.
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. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health	: ECETOC TRA, Version 2 (Modified version): <ul style="list-style-type: none">- adjusted efficacy values for gloves as adopted by CEFIC- use of factor 2 to calculate peak exposure from long term exposure- use of exact percentage (2%, 0.5%) in product instead of broad TRA categories

Annex to the extended Safety Data Sheet (eSDS)

Industrial

Identification of the substance or mixture

Product definition : Multi-constituent substance
Product name : Triethylenetetramine, TETA

Section 1 - Title

Short title of the exposure scenario : Handling of solid products with small amounts of unbound ethylenamines (EA) - Use of preparations containing EA up to 0.5% - Professional.

List of use descriptors : **Identified use name: ES 4.2:** Handling of solid products with small amounts of unbound ethylenamines (EA) - Use of preparations containing EA up to 0.5% - Professional: SU22; PROC21, PROC24; ERC11a
Process Category: PROC21, PROC24
Subsequent service life relevant for that use: No.
Environmental Release Category: ERC11a

Environmental contributing scenarios : **All ERCs (see above)**

Health Contributing scenarios : **Low energy manipulation of substances bound in materials and/or articles - PROC21**
High (mechanical) energy work-up of substances bound in materials and/or articles - PROC24

Number of the ES	: 4.2
Additional information	: Product categories [PC]: PC14, PC23, PC26, PC31
Free short title of the generic exposure scenario: Manipulation and high energy workup of solid product containing up to 0.5% of EA.	

Section 2 - Exposure controls

Contributing scenario controlling environmental exposure for 1: All ERCs (see above) see ES 3.1. The emission assessments for professional use are covered under the risk characterisation for wide-dispersive use.
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Contributing scenario controlling worker exposure for 2: Low energy manipulation of substances bound in materials and/or articles	
Product characteristics	: Solid.
Concentration of substance in mixture or article	: Covers concentrations up to 0.5 %.
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.
Other conditions affecting workers exposure	: Indoor use. Professional.
Conditions and measures related to personal protection, hygiene and health evaluation	
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).

Triethylenetetramine, TETA	Exposure Scenario: 4.2	Handling of solid products with small amounts of unbound ethylenamines (EA) - Use of preparations containing EA up to 0.5% - Professional.
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Contributing scenario controlling worker exposure for 3: High (mechanical) energy work-up of substances bound in materials and/or articles

Product characteristics	: Solid.
Concentration of substance in mixture or article	: Covers concentrations up to 0.5 %.
Human factors not influenced by risk management	: Breathing volume: 10 m ³ /day. Body weight: 70 kg.
Other conditions affecting workers exposure	: Indoor use. Professional.
Conditions and measures related to personal protection, hygiene and health evaluation	
Personal protection	: Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 98%).

Section 3 - Exposure estimation and reference to its source

Exposure estimation and reference to its source - Environment: 1: All ERCs (see above)

Exposure assessment (environment):	: see ES 3.1.
Exposure estimation	: see ES 3.1.

Exposure estimation and reference to its source - Workers: 2: Low energy manipulation of substances bound in materials and/or articles

Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).
Exposure estimation	: Worker - inhalative, long-term - systemic: 0.02 mg/m ³ . Risk characterisation ratio: 0.015.
	Worker - dermal, long-term - systemic: 0.0141 mg/kg bw/day. Risk characterisation ratio: 0.0248.
	Worker - combined, long-term - systemic: 0.0398.
	Worker - inhalative, short-term - local: 0.03 mg/m ³ . Risk characterisation ratio: 0.00000557.
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Workers: 3: High (mechanical) energy work-up of substances bound in materials and/or articles

Exposure assessment (human):	: ECETOC TRA, Version 2 (Modified version).
Exposure estimation	: Worker - inhalative, long-term - systemic: 0.02 mg/m ³ . Risk characterisation ratio: 0.015.
	Worker - dermal, long-term - systemic: 0.0141 mg/kg bw/day. Risk characterisation ratio: 0.0248.
	Worker - combined, long-term - systemic: 0.0398.
	Worker - inhalative, short-term - local: 0.03 mg/m ³ . Risk characterisation ratio: 0.00000557.
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Section 4 - Guidance to DU to evaluate whether he works inside the boundaries set by the ES

General	: The immediate downstream user is required to evaluate whether the operational conditions and risk management measures described in the exposure scenario fit to his use. If other OC/RMM are adopted, the user has to ensure that risks are managed to at least equivalent levels. The risk assessment methods/tools given in section 3 may be used for this evaluation.
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. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
Health	: ECETOC TRA, Version 2 (Modified version): <ul style="list-style-type: none">- adjusted efficacy values for gloves as adopted by CEFIC- use of factor 2 to calculate peak exposure from long term exposure- use of exact percentage (2%, 0.5%) in product instead of broad TRA categories

Annex to the extended Safety Data Sheet (eSDS)

Consumer

Identification of the substance or mixture

Product definition : Multi-constituent substance
Product name : Triethylenetetramine, TETA

Section 1 - Title

Short title of the exposure scenario : Consumer uses of ethyleneamines (EA) - Consumer

List of use descriptors : **Identified use name: ES 5:** Consumer uses of ethyleneamines (EA) - Consumer: SU21; PC01, PC09b; ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f
Substance supplied to that use in form of: In a mixture
Subsequent service life relevant for that use: No.
Environmental Release Category: ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f
Market sector by type of chemical product: PC01, PC09b

Environmental contributing scenarios : **Use in coatings; adhesive** - ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f

Health Contributing scenarios : **Adhesives, sealants; Mixing and loading** - PC01
Adhesives, sealants; Application - PC01
Fillers, putties, plasters, modelling clay - PC09b
Fillers, putties, plasters, modelling clay; Application - PC09b

Number of the ES	: 5
Additional information	: Exposure Scenarios: <ul style="list-style-type: none"> • two component epoxy glue • two component wood repair filler. For each situation two scenarios are applicable; <ul style="list-style-type: none"> • Mixing of the epoxy curing agent with the epoxy polymer • Application of the mixture

Section 2 - Exposure controls

Contributing scenario controlling environmental exposure for 1: Use in coatings; adhesive	
Amounts used	: Daily amount per site: 14.0 kg/day.
Frequency and duration of use	: Continuous. Emission days: 220 days per year.
Environment factors not influenced by risk management	: Local freshwater dilution factor: 10. Local marine water dilution factor: 100.
Other conditions affecting environmental exposure	: Release to waste water from process: 1 % Release to air from process: 0 % Release to soil from process: 0.5 %
Conditions and measures related to sewage treatment plant	: Estimated substance removal from wastewater via municipal sewage treatment \geq 37.4 %.

Contributing scenario controlling consumer exposure for 2: Adhesives, sealants; Mixing and loading	
Product characteristics	: Physical state: Liquid. Molecular weight: 146.23 g/mol. Vapour pressure: 0.346 Pa (25 °C).
Amounts used	: Covers use up to 25 %. For each use event, covers use amounts up to 20 g.
Frequency and duration of use/exposure	: Covers use up to 3 days per year. Covers exposure up to 5 min/event.

Triethylenetetramine, TETA	Exposure Scenario: 5	Consumer uses of ethyleneamines (EA) - Consumer
Human factors not influenced by risk management	: Breathing volume: 32.9 m ³ /day. Body weight: 60 kg.	
Other given operational conditions affecting consumers exposure	: Inhalation exposure: Inhalation model: exposure to vapour - evaporation. Application duration: 5 min. Room volume: 1 m ³ . Ventilation rate: 0.6 L/h. Release area: 20 cm ² . Temperature: 20 °C. Mass transfer rate: 3090 m/min. Mol. Weight Matrix: 550 g/mol. Uptake fraction (uptake model): 1. Dermal exposure: Dermal model: instant application. Exposed skin surface assumed: 2 cm ² . Amount/concentration applied: 0.05 g. Uptake fraction (uptake model): 1.	
Conditions and measures related to information and behavioural advice to consumers	: Avoid using at a product concentration greater than 25 %. Avoid contact with eyes. Ensure spraying away from persons.	
Conditions and measures related to personal protection and hygiene		
Personal protection	: Wear suitable gloves. Efficiency of at least 90 %.	
Contributing scenario controlling consumer exposure for 3: Adhesives, sealants; Application		
Product characteristics	: Physical state: Liquid. Molecular weight: 146.23 g/mol. Vapour pressure: 0.346 Pa (25 °C).	
Amounts used	: Covers use up to 5 %. For each use event, covers use amounts up to 20 g.	
Frequency and duration of use/exposure	: Covers use up to 3 days per year. Covers exposure up to 90 min/event.	
Human factors not influenced by risk management	: Breathing volume: 32.9 m ³ /day. Body weight: 60 kg.	
Other given operational conditions affecting consumers exposure	: Covers use in room size of 20 m ³ . Inhalation exposure: Inhalation model: exposure to vapour - evaporation. Application duration: 30 min. Room volume: 20 m ³ . Ventilation rate: 0.6 L/h. Release area: 500 cm ² . Temperature: 20 °C. Mass transfer rate: 3090 m/min. Mol. Weight Matrix: 550 g/mol. Uptake fraction (uptake model): 1. Dermal exposure: Dermal model: instant application. Exposed skin surface assumed: 43 cm ² . Amount/concentration applied: 0.1 g. Uptake fraction (uptake model): 1.	
Conditions and measures related to information and behavioural advice to consumers	: Avoid using at a product concentration greater than 5 %. Avoid contact with eyes. Ensure spraying away from persons.	
Conditions and measures related to personal protection and hygiene		
Personal protection	: Wear suitable gloves. Efficiency of at least 90 %.	

Contributing scenario controlling consumer exposure for 4: Fillers, putties, plasters, modelling clay

Product characteristics	: Physical state: Liquid. Molecular weight: 146.23 g/mol. Vapour pressure: 0.346 Pa (25 °C).
Amounts used	: Covers use up to 25 %. For each use event, covers use amounts up to 200 g.
Frequency and duration of use/exposure	: Covers use up to 2 days per year. Covers exposure up to 5 min/event.
Human factors not influenced by risk management	: Breathing volume: 32.9 m ³ /day. Body weight: 60 kg.
Other given operational conditions affecting consumers exposure	: Inhalation exposure: Inhalation model: exposure to vapour - evaporation. Application duration: 5 min. Room volume: 1 m ³ . Ventilation rate: 0.6 L/h. Release area: 100 cm ² . Temperature: 20 °C. Mass transfer rate: 3090 m/min. Mol. Weight Matrix: 550 g/mol. Uptake fraction (uptake model): 1. Dermal exposure: Dermal model: instant application. Exposed skin surface assumed: 2 cm ² . Amount/concentration applied: 0.02 g. Uptake fraction (uptake model): 1.
Conditions and measures related to information and behavioural advice to consumers	: Avoid using at a product concentration greater than 25 %. Avoid contact with eyes. Ensure spraying away from persons.
Conditions and measures related to personal protection and hygiene	
Personal protection	: Wear suitable gloves. Efficiency of at least 90 %.

Contributing scenario controlling consumer exposure for 5: Fillers, putties, plasters, modelling clay; Application

Product characteristics	: Physical state: Liquid. Molecular weight: 146.23 g/mol. Vapour pressure: 0.346 Pa (25 °C).
Amounts used	: Covers use up to 5 %. For each use event, covers use amounts up to 200 g.
Frequency and duration of use/exposure	: Covers use up to 2 days per year. Covers exposure up to 90 min/event.
Human factors not influenced by risk management	: Breathing volume: 32.9 m ³ /day. Body weight: 60 kg.
Other given operational conditions affecting consumers exposure	: Covers use in room size of 20 m ³ . Inhalation exposure: Inhalation model: exposure to vapour - evaporation. Application duration: 30 min. Room volume: 20 m ³ . Ventilation rate: 0.6 L/h. Release area: 50 cm ² . Temperature: 20 °C. Mass transfer rate: 3090 m/min. Mol. Weight Matrix: 550 g/mol. Uptake fraction (uptake model): 1. Dermal exposure: Dermal model: instant application. Exposed skin surface assumed: 22 cm ² .

Triethylenetetramine, TETA	Exposure Scenario: 5	Consumer uses of ethyleneamines (EA) - Consumer
Conditions and measures related to information and behavioural advice to consumers	Amount/concentration applied: 1 g. Uptake fraction (uptake model): 1. : Avoid using at a product concentration greater than 5 %. Avoid contact with eyes. Ensure spraying away from persons.	
Conditions and measures related to personal protection and hygiene		
Personal protection	: Wear suitable gloves. Efficiency of at least 90 %.	

Section 3 - Exposure estimation and reference to its source

Exposure estimation and reference to its source - Environment: 1: Use in coatings; adhesive		
Exposure assessment (environment):	: EUSES v2.1	
Exposure estimation	: Freshwater: 0.00317 mg/l. Risk characterisation ratio (PEC/PNEC): 0.017. Freshwater sediment: 1.60 mg/kg dwt. Risk characterisation ratio (PEC/PNEC): 0.017. Marine water: 0.00042 mg/l. Risk characterisation ratio (PEC/PNEC): 0.00831. Marine water sediment: 0.212 mg/kg dwt. Risk characterisation ratio (PEC/PNEC): 0.00831. Sewage Treatment Plant: 0.018 mg/l. Risk characterisation ratio (PEC/PNEC): 0.00413. Soil: 0.114 mg/kg dwt. Risk characterisation ratio (PEC/PNEC): 0.00597. Air: 0.000000293 mg/m ³ . Risk characterisation ratio (PEC/PNEC): Not applicable.	
Remark	: Based on the applied RMMs the risk towards environment is sufficiently controlled (RCR < 1).	

Exposure estimation and reference to its source - Consumers: 2: Adhesives, sealants; Mixing and loading		
Exposure assessment (human):	: Consexpo V4.1	
Exposure estimation	: Consumer - inhalative, long-term - systemic: 0.039 mg/m ³ . Risk characterisation ratio: 0.17. Consumer - dermal, long-term - systemic: 0.0002 mg/kg bw/day. Risk characterisation ratio: <0.001. Consumer - combined, long-term - systemic: 0.17. Consumer - inhalative, short-term - systemic: 11.2 mg/m ³ . Risk characterisation ratio: 0.11.	
Remark	: Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).	

Exposure estimation and reference to its source - Consumers: 3: Adhesives, sealants; Application

Exposure assessment (human): : Consexpo V4.1

Exposure estimation : **Consumer - inhalative, long-term - systemic:** 0.188 mg/m³.
Risk characterisation ratio: 0.82.

Consumer - dermal, long-term - systemic: 0.0001 mg/kg bw/day.
Risk characterisation ratio: <0.001.

Consumer - combined, long-term - systemic: 0.82.

Consumer - inhalative, short-term - systemic: 3.0 mg/m³.
Risk characterisation ratio: 0.03.

Remark : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Consumers: 4: Fillers, putties, plasters, modelling clay

Exposure assessment (human): : Consexpo V4.1

Exposure estimation : **Consumer - inhalative, long-term - systemic:** 0.040 mg/m³.
Risk characterisation ratio: 0.17.

Consumer - dermal, long-term - systemic: 0.00005 mg/kg bw/day.
Risk characterisation ratio: <0.001.

Consumer - combined, long-term - systemic: 0.17.

Consumer - inhalative, short-term - systemic: 11.5 mg/m³.
Risk characterisation ratio: 0.11.

Remark : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Exposure estimation and reference to its source - Consumers: 5: Fillers, putties, plasters, modelling clay; Application

Exposure assessment (human): : Consexpo V4.1

Exposure estimation : **Consumer - inhalative, long-term - systemic:** 0.191 mg/m³.
Risk characterisation ratio: 0.83.

Consumer - dermal, long-term - systemic: 0.0001 mg/kg bw/day.
Risk characterisation ratio: <0.001.

Consumer - combined, long-term - systemic: 0.83.

Consumer - inhalative, short-term - systemic: 3.1 mg/m³.
Risk characterisation ratio: 0.03.

Remark : Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR < 1).

Section 4 - Guidance to DU to evaluate whether he works inside the boundaries set by the ES

General	: Not applicable.
Environment	: Not applicable.