SAFETY DATA SHEET



Pentaethylenehexamine, PEHA

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

1.1 Product identifier

Product name : Pentaethylenehexamine, PEHA

 Index number
 : 612-064-00-2

 EC number
 : 223-775-9

REACH Registration number

Registration number	Legal entity
01-219485826-22-0000	Delamine BV

CAS number : 4067-16-7

Product description : Not applicable

Product type : Liquid.

Other means of : 3,6,9,12-tetraazatetradecamethylenediamine; Pentaethylenehexamine; 3,6,9,12-

identification Tetraazatetradecane-1,14-diamine; pentacthylenehexamine

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

Product use : Adhesives, binding agents Dye. Pigments. Complexing agents Fuel. Fuel additive.

Impregnation agents Intermediate. Lubricants and additives Laboratory activities

Pharmaceuticals. Surface-active agents

Area of application: Consumer applications.

Identified uses

Consumer uses of ethyleneamines

Handling of solid products with small amounts of unbound ethylenamines - Use of preparations containing EA up to 0.5% - Professional

Handling of solid products with small amounts of unbound ethylenamines - Use of preparations containing EA up to 2% - Professional

Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 100% - Industrial

Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 2% - Industrial

Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 0.5% - Industrial

Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 2% - Professional

Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 0.5% - Professional

Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 25% - Industrial

Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Industrial

Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial

Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial

Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 25% - Professional

Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Professional

Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Professional

Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Professional

Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial

Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as

Pentaethylenehexamine, PEHA

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

most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial

Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Professional

Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Professional

1.3 Details of the supplier of the safety data sheet

DELAMINE B.V. Barchman Wuytierslaan 10 3818 LH Amersfoort The Netherlands Tel.:31-334676897

e-mail address of person responsible for this SDS

: SDS.Delamine@delamine.com

1.4 Emergency telephone number

Supplier

Telephone number : AkzoNobel Chemicals-Deventer-NLT +31 570 679211 (24hours/7days)

F +31 570 679801

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Product definition : UVCB

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

Acute Tox. 4, H302 Acute Tox. 4, H312 Skin Corr. 1A, H314 Eye Dam. 1, H318 Skin Sens. 1, H317 Aquatic Acute 1, H400 Aquatic Chronic 1, H410

Classification according to Directive 67/548/EEC [DSD]

Xn; R21/22 C; R34 R43 N; R50/53

See Section 16 for the full text of the R phrases or 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: Harmful if swallowed.

Harmful in contact with skin.

Causes severe skin burns and eye damage.

May cause an allergic skin reaction.

Very toxic to aquatic life with long lasting effects.

Precautionary statements

Date of issue/Date of revision : 25 February 2011

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Pentaethylenehexamine, PEHA

SECTION 2: Hazards identification

Prevention

: Wear protective gloves: >8 hours (breakthrough time): neoprene. Wear eye or face protection. Wear protective clothing. Avoid release to the environment.

Response

: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or physician. IF SWALLOWED: Immediately call a POISON CENTER or physician. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Immediately call a POISON CENTER or physician. IF IN EYES: Immediately call a POISON CENTER or physician.

Storage

: Store locked up.

Disposal

 Dispose of contents and container in accordance with all local, regional, national and international regulations.

Supplemental label elements

: Not applicable.

Special packaging requirements

Containers to be fitted : Y

with child-resistant

: Yes, applicable.

fastenings

Tactile warning of danger : Yes, applicable.

2.3 Other hazards

Substance meets the criteria for PBT according to Regulation (EC) No. 1907/2006, Annex XIII

: No.

Substance meets the criteria for vPvB according to Regulation (EC) No.

: No.

1907/2006, Annex XIII
Other hazards which do

Other hazards which do not result in classification

: Not applicable.

SECTION 3: Composition/information on ingredients

Substance/mixture : UVCB

			<u>Classification</u>		
Product/ingredient name	Identifiers	%	67/548/EEC	Regulation (EC) No. 1272/2008 [CLP]	Туре
3,6,9,12-tetra-azatetradecamethylenediamine	REACH #: 01- 219485826-22-0 EC: 223-775-9 CAS: 4067-16-7 Index: 612-064-00-2	100	Xn; R21/22 C; R34 R43 N; R50/53 See section 16 for the full text of the R-phrases declared above	Acute Tox. 4, H302 Acute Tox. 4, H312 Skin Corr. 1A, H314 Eye Dam. 1, H318 Skin Sens. 1, H317 Aquatic Acute 1, H400 Aquatic Chronic 1, H410 See Section 16 for the full text of the H statements declared above.	[*]

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

Pentaethylenehexamine, PEHA

SECTION 3: Composition/information on ingredients

- [*] Substance
- [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. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

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 : May give off gas, vapor or dust that is very irritating or corrosive to the respiratory

system. Exposure to decomposition products may cause a health hazard. Serious

effects may be delayed following exposure.

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

reaction.

Ingestion: Harmful if swallowed. May cause burns to mouth, throat and stomach.

Over-exposure signs/symptoms

Eye contact: Adverse symptoms may include the following:

pain watering redness

Date of issue/Date of revision : 25 February 2011

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Pentaethylenehexamine, PEHA

SECTION 4: First aid measures

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

: In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Specific treatments

: No specific treatment.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing

media

: Use an extinguishing agent suitable for the surrounding fire.Dry sand or other

suitable absorbent. Use dry chemical, CO₂, water spray (fog) or foam.

Unsuitable extinguishing

media

: Halones

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 very toxic 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

: Decomposition products may include the following materials:

carbon dioxide carbon monoxide nitrogen oxides

5.3 Advice for firefighters

Special precautions 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.

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. Collect spillage.

Pentaethylenehexamine, PEHA

SECTION 6: Accidental release measures

6.3 Methods and materials 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.

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 (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

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

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).

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)

Recommendations : No specific data.

Industrial sector specific : No specific data.

solutions

SECTION 8: Exposure controls/personal protection

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).

8.1 Control parameters

Occupational exposure limits

No exposure limit value known.

Pentaethylenehexamine, PEHA

SECTION 8: Exposure controls/personal protection

procedures

Recommended monitoring: 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 European Standard EN 689 for methods for the assessment of exposure by inhalation to chemical agents and national guidance documents for methods for the determination of hazardous substances.

Derived effect levels

Product/ingredient name	Type	Exposure	Value	Population	Effects
3,6,9,12-tetra- azatetradecamethylenediamine	DNEL	Short term Inhalation	8550 mg/m³	Workers	Systemic
	DNEL	Long term Dermal	0.91 mg/kg bw/day	Workers	Systemic
	DNEL	Long term Inhalation	1.59 mg/m³	Workers	Systemic
	DNEL	Long term Dermal	0.044 mg/cm²	Workers	Local
	DNEL	Short term Dermal	13 mg/kg bw/day	Consumers	Systemic
	DNEL	Short term Inhalation	2542 mg/m³	Consumers	Systemic
	DNEL	Short term Oral	32 mg/kg bw/day	Consumers	Systemic
	DNEL	Short term Dermal	1.59 mg/cm²	Consumers	Local
	DNEL	Long term Dermal	0.4 mg/kg bw/day	Consumers	Systemic
	DNEL	Long term Inhalation	0.46 mg/m³	Consumers	Systemic
	DNEL	Long term Oral	0.65 mg/kg bw/day	Consumers	Systemic
	DNEL	Long term Dermal	0.68 mg/cm ²	Consumers	Local

Predicted effect concentrations

Product/ingredient name	Type	Compartment Detail	Value	Method Detail
3,6,9,12-tetra- azatetradecamethylenediamine	PNEC	Secondary Poisoning	0.29 mg/kg	Assessment Factors
•	PNEC	Fresh water	2.5 μg/l	Assessment Factors
	PNEC	Marine	2.5 µg/l	Assessment Factors
	PNEC	Fresh water sediment	0.22 mg/kg dwt	-
	PNEC	Marine water sediment	0.14 mg/kg dwt	-
	PNEC	Soil	0.18 mg/kg dwt	-
	PNEC	Sewage Treatment Plant	1.64 mg/l	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.

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.

Pentaethylenehexamine, PEHA

SECTION 8: Exposure controls/personal protection

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. >8 hours (breakthrough time): neoprene

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. Recommended: neoprene

Boots.

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: ammonia filter

(Type K) ammonia (Type K) and particulate filter

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. [Clear.]
Colour : Yellow. [Light]
Odour : Odourless.
Odour threshold : Not available.

pH : 12.6

Melting point/freezing point : <-70°C Pour point < - 20 C

Initial boiling point and boiling : 426°C

range

Flash point : Closed cup: 183°C

Evaporation rate : Not available.

Flammability (solid, gas) : Not applicable

Burning time : Not applicable.

Burning rate : Not applicable.

Upper/lower flammability or

explosive limits

: Not available.

Vapour pressure : 0.0000017 kPa [20°C]

Vapour density : Not available.

Relative density : 1.003

Solubility(ies) :

>500 g/l

Partition coefficient: n-

octanol/water

: -3.67

Auto-ignition temperature : 335°C

Decomposition temperature : Not

Not available.

Viscosity : Not available.

Explosive properties : Not applicable.

9.2 Other information

Pentaethylenehexamine, PEHA

SECTION 9: Physical and chemical properties

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.

10.4 Conditions to avoid

: Keep away from sources of ignition - No smoking. aerosol or mist formation

10.5 Incompatible materials

: Reactive or incompatible with the following materials: oxidizing materials, metals and

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
3,6,9,12-tetra- azatetradecamethylenediamine	LD50 Oral	Rat	1600 mg/kg	-

Conclusion/Summary

: Oral Harmful if swallowed.

Dermal Harmful in contact with skin.

Inhalation No applicable toxicity data Not classified as dangerous

Irritation/Corrosion

Conclusion/Summary

Skin : Corrosive to the skin.

Eyes : Corrosive to eyes.

Respiratory : No data available for this end-point, hence this classification is not considered to be

applicable.

Sensitiser

Product/ingredient name	Route of exposure	Species	Result
3,6,9,12-tetra- azatetradecamethylenediamine	skin	Guinea pig	Sensitising

Conclusion/Summary

Skin

: May cause skin sensitisation.

Respiratory

: No data available for this end-point, hence this classification is not considered to be applicable.

Mutagenicity

Product/ingredient name	Test	Experiment	Result
3,6,9,12-tetra- azatetradecamethylenediamine	-	Experiment: In vivo Subject: Mammalian-Animal Cell: Germ	Negative

Conclusion/Summary

Carcinogenicity

: No mutagenic effect.

Conclusion/Summary: skin No carcinogenic effect.

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SECTION 11: Toxicological information

Reproductive toxicity

Conclusion/Summary : Fertility : No data available for this end-point, hence this classification is not

considered to be applicable.

Developmental Toxicity: No data available for this end-point, hence this classification

is not considered to be applicable.

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 the likely

routes of exposure

: Routes of entry anticipated:Oral.

Potential acute health effects

Inhalation : May give off gas, vapor or dust that is very irritating or corrosive to the respiratory

system. Exposure to decomposition products may cause a health hazard. Serious

effects may be delayed following exposure.

Ingestion: Harmful if swallowed. May cause burns to mouth, throat and stomach.

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

reaction.

Eye contact : Causes serious eye damage.

Symptoms related to the physical, chemical and toxicological characteristics

Inhalation : No specific data.

Ingestion : Adverse symptoms may include the following:

stomach pains

Skin contact: Adverse symptoms may include the following:

pain or irritation

redness

blistering may occur

Eye contact: Adverse symptoms may include the following:

pain watering redness

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

Short term exposure

Potential immediate : No specific data.

effects

Potential delayed effects: No specific data.

Long term exposure

Potential immediate : No specific data.

effects

Potential delayed effects: No specific data.

Potential chronic health effects

Product/ingredient name	Result	Species	Dose	Exposure
3,6,9,12-tetra- azatetradecamethylenediamine	Sub-chronic LOAEL Oral	Rat	52 mg/kg	-

Conclusion/Summary : Not classified as dangerous

General : Once sensitized, a severe allergic reaction may occur when subsequently exposed

to very low levels.

Carcinogenicity : No known significant effects or critical hazards.

Pentaethylenehexamine, PEHA

SECTION 11: Toxicological information

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.

Absorption: Slowly absorbed.Metabolism: Rapidly metabolised.Elimination: Rapidly excreted.Other information: No specific data.

SECTION 12: Ecological information

12.1 Toxicity

Product/ingredient name	Result	Species	Exposure
3,6,9,12-tetra- azatetradecamethylenediamine	EC50 164 mg/l	Micro-organism	2 hours
, and the second	Acute EC50 0.7 mg/l Fresh water Acute EC50 17.5 mg/l Fresh water Acute LC50 180 mg/l Fresh water Chronic NOEC 0.8 mg/l Fresh water	Algae Daphnia Fish Daphnia	72 hours 48 hours 96 hours 14 days

Conclusion/Summary

: Dangerous for the environment. PNEC Intermittent release.= 0.025 mg/l

12.2 Persistence and degradability

Conclusion/Summary

: Not readily biodegradable. This substance is not expected to bioaccumulate through food chains in the environment.

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
3,6,9,12-tetra- azatetradecamethylenediamine	-	-	Not readily

12.3 Bioaccumulative potential

Product/ingredient name	LogPow	BCF	Potential
3,6,9,12-tetra-	-3.67	-	low
azatetradecamethylenediamine			

12.4 Mobility in soil

Soil/water partition : >3000 coefficient (Koc)

Mobility : No specific data.

12.5 Results of PBT and vPvB assessment

PBT : No.

vPvB : No.

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

Pentaethylenehexamine, PEHA

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. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. 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.

Hazardous waste Packaging

Methods of disposal

: The classification of the product may meet the criteria for a hazardous waste.

: 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 spilt material and runoff and contact with soil, waterways, drains and sewers.

SECTION 14: Transport information

	ADR/RID	ADN/ADNR	IMDG	IATA
14.1 UN number	UN2735	UN2735	UN2735	UN2735
14.2 UN proper shipping name	POLYAMINES, LIQUID, CORROSIVE, N.O.S.	POLYAMINES, LIQUID, CORROSIVE, N.O.S.	POLYAMINES, LIQUID, CORROSIVE, N.O.S Marine pollutant (Amines, polyethylenepoly-)	Polyamines, liquid, corrosive, n.o.s.
14.3 Transport hazard class(es)	8	8	8	8
14.4 Packing group	III	III	III	III
14.5 Environmental hazards	Yes.	Yes.	Yes.	Yes.
14.6 Special precautions for user	Not available.	Not available.	Not available.	Not available.
Additional information	Hazard identification number 80 Limited quantity 5 L Special provisions 274 Tunnel code (E)	-	Emergency schedules (EmS) F-A, S-B	Passenger and Cargo Aircraft Quantity limitation: 5 Packaging instructions: 852 Cargo Aircraft Only Quantity limitation: 60 L Packaging instructions: 856 Limited Quantities Passenger Aircraft Quantity limitation: 1

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SECTION 14: Transport information

Packaging instructions: Y841

14.7 Transport in bulk according to Annex II of MARPOL 73/78 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

Substances of very high concern

None of the components are listed.

Annex XVII - Restrictions : Not applicable.

on the manufacture, placing on the market and

use of certain dangerous substances, mixtures and

articles

Other EU regulations

Europe inventory : All components are listed or exempted.

Black List Chemicals : Not listed **Priority List Chemicals** : Not listed Integrated pollution : Not listed

prevention and control

list (IPPC) - Air

Integrated pollution : Not listed

prevention and control list (IPPC) - Water

International regulations

Chemical Weapons Convention List Schedule I

Chemicals

: Not listed

Chemical Weapons Convention List Schedule II

Chemicals

: Not listed

Chemical Weapons

Convention List Schedule III

Chemicals

Not listed

15.2 Chemical Safety

Assessment

: Complete.

15.3 Registration status : Applicable.

SECTION 16: Other information

Indicates information that has changed from previously issued version.

Abbreviations and

: ATE = Acute Toxicity Estimate

acronyms

CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No.

1272/2008]

DNEL = Derived No Effect Level

EUH statement = CLP-specific Hazard statement PNEC = Predicted No Effect Concentration RRN = REACH Registration Number

Date of issue/Date of revision : 25 February 2011

13/200

Pentaethylenehexamine, PEHA

SECTION 16: Other information

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

Classification	Justification
Acute Tox. 4, H302	Expert judgment
Acute Tox. 4, H312	Expert judgment
Skin Corr. 1A, H314	Expert judgment
Eye Dam. 1, H318	Expert judgment
Skin Sens. 1, H317	Expert judgment
Aquatic Acute 1, H400	Expert judgment
Aquatic Chronic 1, H410	Expert judgment

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.
H400 Very toxic to aquatic life.

H410 Very toxic 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: SKIN - Category 4
Aquatic Acute 1, H400 AQUATIC TOXICITY (ACUTE) - Category 1
Aquatic Chronic 1, H410 AQUATIC TOXICITY (CHRONIC) - Category 1

Eye Dam. 1, H318 SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1

Skin Corr. 1A, H314 SKIN CORROSION/IRRITATION - Category 1A

Skin Sens. 1, H317 SKIN SENSITIZATION - Category 1

Full text of abbreviated R

phrases

: R21/22- Harmful in contact with skin and if swallowed.

R34- Causes burns.

R43- May cause sensitisation by skin contact.

R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the

aquatic environment.

Full text of classifications

[DSD/DPD]

: C - Corrosive Xn - Harmful

N - Dangerous for the environment

Date of issue/ Date of

revision

: 25 February 2011

,

Date of previous issue : 09/11/2010

Version : 4

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 quarantee that these are the only hazards that exist.

Annex to the extended Safety Data Sheet (eSDS)

Consumer

Identification of the substance or mixture

Product definition UVCB

Product name Pentaethylenehexamine, PEHA

Section 1: Title

Short title of the exposure scenario Identified use name: Consumer uses of ethyleneamines

Sector of end use: SU21

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 Article category related to subsequent service life: Not applicable.

List of use descriptors Identified use name: Consumer uses of ethyleneamines

Sector of end use: SU21

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 Article category related to subsequent service life: Not applicable.

Processes and activities covered

by the exposure scenario

Not applicable.

Assessment Method See Section 3

Section 2: Operational conditions and risk management measures

Section 2.1: Control of consumer exposure

Physical state: Physical state: liquid

Molecular weight: 146.23 g/mole Vapour pressure: 0.346 Pa*s at 25°C

Contributing scenarios: Operational conditions and risk management measures

Product Categories 1: Adhesives, sealants Mixing and loading

Operations Conditions (consumer):

- Covers use up to 3 days/Year
- Covers use up to 25%
- For each use event, covers use amounts up to 20 g
- Covers exposure up to 5 minutes/event

Risk Management Measures (consumer): No specific risk management measure identified beyond those operational conditions stated. Avoid using at a product concentration greater than 25%

Product Categories 1: Adhesives, sealants Application:

Operations Conditions (consumer):

- Covers use up to 3 days/Year
- Covers use up to 5%
- For each use event, covers use amounts up to 20 g
- Covers use in room size of 20 m³
- Covers exposure up to 90 minutes/event

Risk Management Measures (consumer): No specific risk management measure identified beyond those operational conditions stated. Avoid using at a product concentration greater than 5%

Product Categories 9b: Fillers, putties, plasters, modelling clay

Operations Conditions (consumer):

- Covers use up to 2 days/Year
- Covers use up to 25%
- For each use event, covers use amounts up to 200 g
- Covers exposure up to 5 minutes/event

Risk Management Measures (consumer): No specific risk management measure identified beyond those operational conditions stated. Avoid using at a product concentration greater than 25%

Product Categories 9b: Fillers, putties, plasters, modelling clay Application:

Operations Conditions (consumer):

- Covers use up to 2 days/Year
- Covers use up to 5%
- For each use event, covers use amounts up to 200 g
- Covers use in room size of 20 m³
- Covers exposure up to 90 minutes/event

Risk Management Measures (consumer): No specific risk management measure identified beyond those operational conditions stated. Avoid using at a product concentration greater than 5%

Pentaethylenehexamine, PEHA

Identified use name: Consumer uses of ethyleneamines

Sector of end use: SU21

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
Article category related to subsequent service life: Not applicable.

5/200

Section 2.1: Control of consumer exposure

Physical state: Physical state: liquid

Molecular weight: 146.23 g/mole Vapour pressure: 0.346 Pa*s at 25°C

Contributing scenarios: Operational conditions and risk management measures

Product Categories 1: Adhesives, sealants Mixing and loading

Operations Conditions (consumer):

- Covers use up to 3 days/Year

- Covers use up to 25%
- For each use event, covers use amounts up to 20 g
- Covers exposure up to 5 minutes/event

Risk Management Measures (consumer): No specific risk management measure identified beyond those operational conditions stated. Avoid using at a product concentration greater than 25%

Product Categories 1: Adhesives, sealants Application:

Operations Conditions (consumer):

- Covers use up to 3 days/Year
- Covers use up to 5%
- For each use event, covers use amounts up to 20 g
- Covers use in room size of 20 m³
- Covers exposure up to 90 minutes/event

Risk Management Measures (consumer): No specific risk management measure identified beyond those operational conditions stated. Avoid using at a product concentration greater than 5%

Product Categories 9b: Fillers, putties, plasters, modelling clay

Operations Conditions (consumer):

- Covers use up to 2 days/Year
- Covers use up to 25%
- For each use event, covers use amounts up to 200 g
- Covers exposure up to 5 minutes/event

Risk Management Measures (consumer): No specific risk management measure identified beyond those operational conditions stated. Avoid using at a product concentration greater than 25%

Product Categories 9b: Fillers, putties, plasters, modelling clay Application:

Operations Conditions (consumer):

- Covers use up to 2 days/Year
- Covers use up to 5%
- For each use event, covers use amounts up to 200 g
- Covers use in room size of 20 m³
- Covers exposure up to 90 minutes/event

Risk Management Measures (consumer): No specific risk management measure identified beyond those operational conditions stated. Avoid using at a product concentration greater than 5%

Section 2.1: Control of consumer exposure

Physical state:

Physical state: liquid

Molecular weight: 146.23 g/mole Vapour pressure: 0.346 Pa*s at 25°C

Contributing scenarios: Operational conditions and risk management measures

Product Categories 1: Adhesives, sealants Mixing and loading

Operations Conditions (consumer):

- Covers use up to 3 days/Year
- Covers use up to 25%
- For each use event, covers use amounts up to 20 g
- Covers exposure up to 5 minutes/event

Risk Management Measures (consumer): No specific risk management measure identified beyond those operational conditions stated. Avoid using at a product concentration greater than 25%

Product Categories 1: Adhesives, sealants Application:

Operations Conditions (consumer):

- Covers use up to 3 days/Year
- Covers use up to 5%
- For each use event, covers use amounts up to 20 g
- Covers use in room size of 20 m³
- Covers exposure up to 90 minutes/event

Risk Management Measures (consumer): No specific risk management measure identified beyond those operational conditions stated. Avoid using at a product concentration greater than 5%

Product Categories 9b: Fillers, putties, plasters, modelling clay

Operations Conditions (consumer):

- Covers use up to 2 days/Year
- Covers use up to 25%
- For each use event, covers use amounts up to 200 g
- Covers exposure up to 5 minutes/event

Risk Management Measures (consumer): No specific risk management measure identified beyond those operational conditions stated. Avoid using at a product concentration greater than 25%

Product Categories 9b: Fillers, putties, plasters, modelling clay Application:

Operations Conditions (consumer):

- Covers use up to 2 days/Year
- Covers use up to 5%
- For each use event, covers use amounts up to 200 g

Pentaethylenehexamine, PEHA

Identified use name: Consumer uses of ethyleneamines

Sector of end use: SU21

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

Article category related to subsequent service life: Not applicable.

Covers use in room size of 20 m³

Covers exposure up to 90 minutes/event

Risk Management Measures (consumer): No specific risk management measure identified beyond those operational conditions stated. Avoid using at a product concentration greater than 5%

Section 2.2: Control of environmental exposure

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Regional use tonnage (tonnes/year): 1860 Fraction of Regional tonnage used locally: 20% 1019 Average Local Daily Tonnage (kg/day)

Frequency and duration of use: Continuous release.

Section 2.2: Control of environmental exposure

Operational conditions: Not determined

Product Characteristics: Indoor/Outdoor use.

Regional use tonnage (tonnes/year): 1860 20% Fraction of Regional tonnage used locally: Average Local Daily Tonnage (kg/day) 1019

Frequency and duration of use: Continuous release

Section 2.2: Control of environmental exposure

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Regional use tonnage (tonnes/year): 372 Fraction of Regional tonnage used locally: 20% Average Local Daily Tonnage (kg/day) 204

Frequency and duration of use: Continuous release.

Section 3: Exposure estimation and reference to its source

Section 3.1: Exposure estimation - Consumers

Contributing Frequency (1/Year): Weight fraction of **Body weight:** Calculation method: Scenario: substance in the

25%; 5%; 25%; 5%

60 kg

article::

3; 3; 2; 2

Exposure estimation and

Adhesives, sealants -Mixing and loading; reference to its source -

Adhesives, sealants -Consumers: 0: Application(s); Fillers, putties, plasters, modelling clay -

Mixing and loading; Fillers, putties, plasters, modelling clay - Application(s)

Inhalation:

evaporation Mode of release:

Exposure estimation and reference to its source -

Consumers: 1:

Exposure (minutes): Application duration: Amount/concentration Room volume (m3): Room volume x applied (g): ventilation rate: (I/h):

5; 90; 5; 90 5; 30; 5; 30 20; 20; 200; 200 1; 20; 1; 20

Contributing **Uptake fraction** Inhalation rate: Release area (cm2): Temperature (°C): Mass transfer rate:

Scenario Molecular (Update model):

weight (g/mole):

32.9 20; 500; 100; 50 20 3.09E+03 550 1

Application methods: instant

Surface area (Skin contact Product amount (g): **Uptake fraction (Update** Inhalation event (mg/m³): model):

area) cm2:

2; 43; 2; 22 0.05; 0.1; 0.02; 1 11.2; 3.0; 11.5; 3.1

Inhalation mg/m³

Pentaethylenehexamine, PEHA

(Concentration on day of

exposure):

Dermal (Internal dose) mg/kg Dermal load (mg/cm2): Dermal External dose (mg/kg

bw/day:

0.039; 0.188; 0.040; 0.191 6.25; 0.12; 2.5; 0.46 0.208; 0.08; 0.08; 1.67 0.002; 0.001; 5E-4; 0.001

> Identified use name: Consumer uses of ethyleneamines Sector of end use: SU21

ConsExpo 4.1

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 Article category related to subsequent service life: Not applicable.

0.6

Dermal (External dose) mg/kg Inhalation event/Exposure **Dermal systemic exposure** Inhalation (mg/kg/day) Long bw/day: mg/m³ (Short term exposure): (external dose) with gloves term exposure:

(90% efficiency) mg/kg bw/day (Long term exposure):

0.002; 0.001; 5E-4; 0.001 0.0002; 0.0001; 5E-5; 0.0001 0.039; 0.188; 0.040; 0.191 11.2: 3.0: 11.5: 3.1

Section 3.2 Exposure estimation-Consumers Contributing exposure scenario controlling worker exposure for 0: **Route of exposure Contributing scenarios Dose/Concentration Justification** Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Dermal Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Inhalable Not applicable. Not applicable. Long term exposure, Systemic, Not applicable. Combined Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Long term exposure, Local, Not applicable. Not applicable. Not applicable. Inhalable Long term exposure, Systemic, Oral Not applicable. Not applicable. Not applicable. Short term exposure, Systemic, Not applicable. Not applicable. Not applicable. Dermal Short term exposure, Systemic, Not applicable. Not applicable. Inhalable Short term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined Short term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Short term exposure, Local, Not applicable. Not applicable. Not applicable.

Not applicable.

Total release for regional

Section 3.3 Environment Exposure estimation

Short term exposure, Systemic,

Contributing exposure scenario controlling environmental exposure for 1:

Not applicable.

Release from point source

(local exposure estimation) exposure estimation kg/day kg/day

0.382 737 **FUSES** calculation Waste water Not evaluated O **EUSES** calculation **Surface water** air (direct + STP) 0.231; Regional PEC: 6.87x10-13 EUSES calculation

Not evaluated 6.94; Regional PEC natural soil: Not applicable. Soil (direct releases only)

3.75x10-4

Justification Value Concentration in sewage (PECstp) 0.138 **EUSES** calculation

mg/l

mg/kg dwt

Inhalable

Oral

Concentration in sewage sludge **EUSES** calculation

Local concentration PEC aquatic (local+regional) **Justification**

8.25x10-3; Regional PEC: Fresh water mg/l 1.06x10-4 **EUSES** calculation

8 19x10-3

Marine water mg/l 9.39x10-4; Regional PEC: 1.38x10-4 **EUSES** calculation 8.03x10-4

Not applicable. Not applicable. Intermittent release. mg/l Not applicable. Local concentration PEC sediment (local+regional) **Justification**

Fresh water sediment mg/kg dwt Not evaluated. 2.64; Regional PEC: 4.43 **EUSES** calculation Marine water sediment mg/kg dwt Not evaluated. 0.300; Regional PEC: 0.371 **EUSES** calculation

Local concentration PEC soil (local+regional) **Justification**

3.75x10-4; Regional PEC: Agricultural soil averaged mg/kg 4.33x10-11 **EUSES** calculation 3.71x10-4

Grassland averaged mg/kg dwt 8.43x10-11 **EUSES** calculation 3.75x10-4 Groundwater mg/l **EUSES** calculation Not evaluated. 5.91x10-6

Local concentration PEC air (local+regional) Justification During emission mg/m³ 7.32x10-13 Not evaluated. **EUSES** calculation Annual average mg/m³ 7.32x10-13 1 42x10-12 **EUSES** calculation

EUSES calculation Annual deposition mg/m2/d 3.71x10-12 Not evaluated. Local concentration PEC aquatic (local+regional) **Justification**

Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Consumer uses of ethyleneamines

Not applicable.

Justification

Sector of end use: SU21

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 Article category related to subsequent service life: Not applicable.

Section 4: Guidance to Downstream User to evaluate if he works inside the boundaries set by the ES

Environment	Not available.
Health	Not available.

Section 5. Remarks: Additional good practice advice beyond the REACH CSA

Environment	Not applicable.	
Health	Not applicable.	
Additional guidance	Not applicable.	

Pentaethylenehexamine, PEHA

Identified use name: Consumer uses of ethyleneamines

Sector of end use: SU21

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 Article category related to subsequent service life: Not applicable.

Annex to the extended Safety Data Sheet (eSDS)

Professional

Identification of the substance or mixture

Product definition UVCB

Product name Pentaethylenehexamine, PEHA

Section 1: Title

Short title of the exposure scenario Identified use name: Handling of solid products with small amounts of unbound ethylenamines - Use of

preparations containing EA up to 0.5% - Professional

Process Category: PROC21, PROC24

Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC06d

List of use descriptors Identified use name: Handling of solid products with small amounts of unbound ethylenamines - Use of

preparations containing EA up to 0.5% - Professional

Process Category: PROC21, PROC24

Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC06d

Section 2: Operational conditions and risk management measures

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 0: Low energy manipulation of substances bound in materials and/or

articles

Product Characteristics: Solid. Covers concentrations up to 0.5%

Amounts used:

Frequency and duration of use:

Not applicable.

Not applicable.

Human factors not influenced by risk management: Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor. professional setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

from source towards the worker:

Not applicable.

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 1: High (mechanical) energy work-up of substances bound in materials

and/or articles

Product Characteristics: Solid. Covers concentrations up to 0.5%

Amounts used: Not applicable.

Frequency and duration of use: Not applicable.

Human factors not influenced by risk management: Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor. professional setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

Not applicable.

from source towards the worker:

Organisational measures to prevent/limit releases,

Not applicable.

dispersion and exposure: Personal protection:

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Pentaethylenehexamine, PEHA

Identified use name: Handling of solid products with small amounts of unbound ethylenamines - Use of preparations containing EA up to

0.5% - Professional Process Category: PROC21, PROC24

Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC06d

2/200

Contributing exposure scenario controlling environmental exposure for 0: Ashless dispersant

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

4840 Regional use tonnage (tonnes/year): Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 967 Average Local Daily Tonnage (kg/day): 2649

Frequency and duration of use: Continuous release.

365 Emission Days (days/year):

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None

Release fraction to air from process (initial release prior to 1.00x10-5

RMM):

RMM):

Release fraction to wastewater from process (initial release

Release fraction to soil from process (initial release prior to

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

(%):

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required.

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

plant:

Contributing exposure scenario controlling environmental exposure for 1: Use as an epoxy curing agent

Not applicable

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1860 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1240

Frequency and duration of use: Continuous release.

Emission Days (days/year): 300

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None

exposure:

Release fraction to air from process (initial release prior to

Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to Not applicable.

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

No air emission controls required; required removal efficiency is 0%.

1.00x10-5

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required. to provide the required removal efficiency of 3 (%):

Pentaethylenehexamine, PEHA

Identified use name: Handling of solid products with small amounts of unbound ethylenamines - Use of preparations containing EA up to

Soil emission controls are not applicable as there is no direct release to soil.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

0.5% - Professional Process Category: PROC21, PROC24

Sector of end use: SU22

Organisational measures to prevent/limit release from site: Conditions and measures related to municipal sewage treatment plant:

Contributing exposure scenario controlling environmental exposure for 2: Epoxy curing agent in paint

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

1860 Regional use tonnage (tonnes/year): Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1240

Frequency and duration of use: Continuous release.

Emission Days (days/year): 300

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 None

Other operational conditions of use affecting environmental exposure:

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to

RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required.

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Contributing exposure scenario controlling environmental exposure for 3: Laboratory chemicals

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 100 Fraction of Regional tonnage used locally: 20% 20.1 Annual site tonnage (tonnes/year): Average Local Daily Tonnage (kg/day): 55 1

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 None. Other operational conditions of use affecting environmental

exposure:

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to

RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

Pentaethylenehexamine, PEHA

Technical conditions and measures at process level (source) to prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

1.00x10-5

1.00x10-5

Not applicable.

1.00x10-4

0.02

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Identified use name: Handling of solid products with small amounts of unbound ethylenamines - Use of preparations containing EA up to

0.5% - Professional Process Category: PROC21, PROC24

Sector of end use: SU22

Treat air emission to provide a typical removal efficiency of No air emission controls required; required removal efficiency is 0%. (%):

Treat on-site wastewater (prior to receiving water discharge) =>27.7

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

plant:

Contributing exposure scenario controlling environmental exposure for 4: Use of coatings and adhesives

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 1019 Average Local Daily Tonnage (kg/day):

Frequency and duration of use: Continuous release.

Emission Days (days/year):

Environmental factors not influenced by risk management:

Local marine water dilution factor:

Other operational conditions of use affecting environmental exposure:

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1860

365

1000

None

5 00x10-3

0.01

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Treat on-site wastewater (prior to receiving water discharge) =>27.7

Section 3: Exposure estimation

Section 3.1Workers Exposure estimation

Contributing exposure scenario controlling worker exposure for 0: Low energy manipulation of substances bound in materials and/or

articles

Route of exposure **Contributing scenarios Dose/Concentration Justification** Long term exposure, Systemic, 0.001 The ECETOC TRA tool has been used to Not applicable.

Dermal

estimate workplace exposures unless otherwise indicated. The PROC with the

Long term exposure, Systemic,

Inhalable

Not applicable.

0.06

highest exposure level is given since the exposure estimates for other PROC are below this value The ECETOC TRA tool has been used to

estimate workplace exposures unless otherwise indicated. The PROC with the

highest exposure level is given since the exposure estimates for other PROC are

below this value

Long term exposure, Systemic,

Inhalable

Not applicable.

Not applicable.

Not applicable.

Long term exposure, Local, Dermal Not applicable.

Long term exposure, Local, Not applicable Not applicable. Not applicable. Not applicable. Since the substance is not classified for

acute effects and therefore, no acute DNEL

has been derived.

Pentaethylenehexamine, PEHA

Identified use name: Handling of solid products with small amounts of unbound ethylenamines - Use of preparations containing EA up to

0.5% - Professional Process Category: PROC21, PROC24

Sector of end use: SU22 Subsequent service life relevant for that use: No.

Environmental Release Category: ERC06d

Short term exposure, Systemic, Not applicable. Not applicable Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived. Since the substance is not classified for Short term exposure, Systemic, Not applicable Not applicable. acute effects and therefore, no acute DNEL Combined has been derived. Not applicable. Since the substance is not classified for Short term exposure, Local, Dermal Not applicable. acute effects and therefore, no acute DNEL has been derived The ECETOC TRA tool has been used to 0.12 Short term exposure, Local, Not applicable. estimate workplace exposures unless Inhalable otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value

Section 3.1Workers Exposure estimation

Contributing exposure scenario controlling worker exposure for 1: High (mechanical) energy work-up of substances bound in materials

and/or articles

Route of exposure **Contributing scenarios Dose/Concentration** Justification

Long term exposure, Systemic,

Dermal

Not applicable.

0.001

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value

Long term exposure, Systemic, Inhalable

Not applicable.

0.06

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value

Long term exposure, Systemic, Combined

Long term exposure, Local, Dermal Not applicable.

Long term exposure, Local, Inhalable

Not applicable.

Not applicable

Not applicable.

Not applicable.

Not applicable.

Not applicable. Not applicable.

> Since the substance is not classified for acute effects and therefore, no acute DNEL

has been derived.

Short term exposure, Systemic, **Dermal**

Short term exposure, Systemic,

Inhalable

Not applicable

Not applicable.

Not applicable.

Since the substance is not classified for acute effects and therefore, no acute DNEL

has been derived.

Since the substance is not classified for acute effects and therefore, no acute DNEL

has been derived.

Short term exposure, Systemic,

Combined

Not applicable

Not applicable

Not applicable.

Since the substance is not classified for acute effects and therefore, no acute DNEL

has been derived

Short term exposure, Local, Dermal Not applicable.

Not applicable.

Since the substance is not classified for acute effects and therefore, no acute DNEL

has been derived.

Short term exposure, Local,

Inhalable

Not applicable.

0.12

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the

exposure estimates for other PROC are below this value

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 0: Ashless dispersant

Release from point source (local exposure estimation)

kg/day

Value

Total release for regional exposure estimation kg/day **Justification**

Waste water Surface water air (direct + STP) Soil (direct releases only) n Not evaluated. 0.027 Not evaluated.

737 0.231 6.94 **Justification** **EUSES** calculation **EUSES** calculation **EUSES** calculation Not applicable.

Concentration in sewage (PECstp)

mg/l Concentration in sewage sludge

mg/kg dwt

Not applicable as there is no release to wastewater.

Not applicable as there is no release to wastewater.

EUSES calculation

EUSES calculation

Pentaethylenehexamine, PEHA

Identified use name: Handling of solid products with small amounts of unbound ethylenamines - Use of preparations containing EA up to 0.5% - Professional

Process Category: PROC21, PROC24 Sector of end use: SU22

	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	4.35x10-4	8.10x10-4	EUSES calculation
Grassland averaged mg/kg dwt	8.48x10-4	1.22x10-3	EUSES calculation
Groundwater mg/l	Not evaluated.	1.29x10-5	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	7.37x10-6	Not evaluated.	EUSES calculation
Annual average mg/m³	7.37x10-6	7.37x10-6	EUSES calculation
Annual deposition mg/m2/d	3.74x10-5	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 1: Use as an epoxy curing agent

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	0	Not evaluated.	EUSES calculation
Annual average mg/m³	0	6.87x10-13	EUSES calculation
Annual deposition mg/m2/d	0	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 2: Epoxy curing agent in paint

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated	6 94	Not applicable

Pentaethylenehexamine, PEHA

Identified use name: Handling of solid products with small amounts of unbound ethylenamines - Use of preparations containing EA up to 0.5% - Professional

Process Category: PROC21, PROC24 Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC06d

5/200

Justification Concentration in sewage (PECstp) Not applicable as there is no **EUSES** calculation release to wastewater. Not applicable as there is no Concentration in sewage sludge **EUSES** calculation mg/kg dwt release to wastewater. Local concentration PEC aquatic (local+regional) **Justification** Fresh water mg/l 8.15x10-3 **EUSES** calculation Marine water mg/l 8.02x10-4 **EUSES** calculation Intermittent release. mg/l Not applicable. Not applicable. Not applicable. **Local concentration** PEC sediment (local+regional) **Justification** Fresh water sediment mg/kg dwt Not evaluated. 2.61 **EUSES** calculation Marine water sediment mg/kg dwt Not evaluated. **EUSES** calculation **Local concentration** PEC soil (local+regional) **Justification** Agricultural soil averaged mg/kg 3.75x10-4 **EUSES** calculation Grassland averaged mg/kg dwt 3.75x10-4 **EUSES** calculation Not evaluated. Groundwater mg/l **EUSES** calculation 5.91x10-6 **Local concentration** PEC air (local+regional) **Justification** During emission mg/m³ Not evaluated. **EUSES** calculation Annual average mg/m³ 6.87x10-13 **EUSES** calculation Annual deposition mg/m2/d Not evaluated. **EUSES** calculation PEC aquatic (local+regional) **Local concentration Justification** Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 3: Laboratory chemicals

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0.022	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	1.10x10-5	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	7.96x10-3	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	6.09x10-6	8.15x10-3	EUSES calculation
Marine water mg/l	7.92x10-6	8.10x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.259	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	1.81x10-7	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	3.52x10-7	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	3.06x10-9	Not evaluated.	EUSES calculation
Annual average mg/m³	3.06x10-9	3.06x10-9	EUSES calculation
Annual deposition mg/m2/d	1.55x10-8	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 4: Use of coatings and adhesives

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0.010	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	3.68x10-3	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	2.82x10-6	8.15x10-3	EUSES calculation
Marine water mg/l	3.67x10-6	8.06x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.258	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	1.15x10-12	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	2.25x10-12	3.75x10-4	EUSES calculation

Section 4: Guidance to check compliance with the exposure scenario

Groundwater mg/l

During emission mg/m³

Annual average mg/m³

Micro-organism mg/l

Annual deposition mg/m2/d

Environment	Not available.
Health	Not available.

5.91x10-6

Not evaluated.

Not evaluated.

Not applicable.

7.07x10-13

PEC air (local+regional)

PEC aquatic (local+regional)

Section 5. Remarks: Additional good practice advice beyond the REACH CSA

Not evaluated.

Local concentration

1.95x10-14

1.95x10-14

Not applicable.

Local concentration

9.90

Environment	Not applicable.
Health	Not applicable.
Additional good practices	Not applicable.

EUSES calculation

EUSES calculation

EUSES calculation

Justification

Justification

Not applicable.

EUSES calculation

Annex to the extended Safety Data Sheet (eSDS)

Identification of the substance or mixture

Product definition UVCB

Product name Pentaethylenehexamine, PEHA

Section 1: Title

Short title of the exposure scenario Identified use name: Handling of solid products with small amounts of unbound ethylenamines - Use of

preparations containing EA up to 2% - Professional

Process Category: PROC21, PROC24

Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC06d

Identified use name: Handling of solid products with small amounts of unbound ethylenamines - Use of List of use descriptors

preparations containing EA up to 2% - Professional

Process Category: PROC21, PROC24

Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC06d

Section 2: Operational conditions and risk management measures

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 0: Low energy manipulation of substances bound in materials and/or

articles

Product Characteristics: Solid. Covers concentrations up to 2%

Amounts used: Not applicable. Frequency and duration of use: Not applicable.

Human factors not influenced by risk management: Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg

Not applicable.

Other operational conditions affecting worker exposure: Indoor, professional setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Not applicable.

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 1: High (mechanical) energy work-up of substances bound in materials

and/or articles

Product Characteristics: Solid. Covers concentrations up to 2%

Amounts used: Not applicable. Frequency and duration of use: Not applicable.

Human factors not influenced by risk management: Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, professional setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

Not applicable.

from source towards the worker: Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Pentaethylenehexamine, PEHA

Identified use name: Handling of solid products with small amounts of unbound ethylenamines - Use of preparations containing EA up to 2% -

Professional

Professional

Process Category: PROC21, PROC24 Sector of end use: SU22

Contributing exposure scenario controlling environmental exposure for 0: Ashless dispersant

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

4840 Regional use tonnage (tonnes/year): Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 967 Average Local Daily Tonnage (kg/day): 2649

Frequency and duration of use: Continuous release.

365 Emission Days (days/year):

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None

Release fraction to air from process (initial release prior to 1.00x10-5

RMM):

Release fraction to soil from process (initial release prior to

RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required.

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Not applicable

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Contributing exposure scenario controlling environmental exposure for 1: Use as an epoxy curing agent

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1860 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1240

Frequency and duration of use: Continuous release.

Emission Days (days/year): 300

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None

exposure:

Release fraction to air from process (initial release prior to

Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required. to provide the required removal efficiency of 3 (%):

1.00x10-5

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Pentaethylenehexamine, PEHA

Identified use name: Handling of solid products with small amounts of unbound ethylenamines - Use of preparations containing EA up to 2% -

Professional Process Category: PROC21, PROC24

Sector of end use: SU22

Organisational measures to prevent/limit release from site: Conditions and measures related to municipal sewage treatment plant:

Contributing exposure scenario controlling environmental exposure for 2: Epoxy curing agent in paint

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

1860 Regional use tonnage (tonnes/year): Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1240

Frequency and duration of use: Continuous release.

Emission Days (days/year): 300

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None

exposure:

Release fraction to air from process (initial release prior to 1.00x10-5

RMM):

Release fraction to soil from process (initial release prior to RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required.

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Contributing exposure scenario controlling environmental exposure for 3: Laboratory chemicals

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 100 Fraction of Regional tonnage used locally: 20% 20.1 Annual site tonnage (tonnes/year): Average Local Daily Tonnage (kg/day): 55 1

Frequency and duration of use:

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 None. Other operational conditions of use affecting environmental

exposure:

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to

RMM): Release fraction to wastewater from process (initial release

prior to RMM):

Pentaethylenehexamine, PEHA

Technical conditions and measures at process level (source) to prevent release:

discharges, air emissions and releases to soil:

Technical on-site conditions and measures to reduce or limit

Continuous release.

1.00x10-5

1.00x10-4

0.02

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

Identified use name: Handling of solid products with small amounts of unbound ethylenamines - Use of preparations containing EA up to 2% -

Professional

Process Category: PROC21, PROC24 Sector of end use: SU22

Treat air emission to provide a typical removal efficiency of No air emission controls required; required removal efficiency is 0%. (%):

Treat on-site wastewater (prior to receiving water discharge) =>27.7

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

plant:

Contributing exposure scenario controlling environmental exposure for 4: Use of coatings and adhesives

Concentration of substance in mixture or article:

Amounts used:

Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 1019 Average Local Daily Tonnage (kg/day):

Frequency and duration of use: Continuous release.

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to

RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Treat on-site wastewater (prior to receiving water discharge) =>27.7

to provide the required removal efficiency of 3 (%):

plant:

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Regional use tonnage (tonnes/year): 1860

Emission Days (days/year): 365

Other operational conditions of use affecting environmental

None

5 00x10-3

0.01

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

Section 3: Exposure estimation

Section 3.1Workers Exposure estimation

Contributing exposure scenario controlling worker exposure for 0: Low energy manipulation of substances bound in materials and/or

articles

Route of exposure **Contributing scenarios Dose/Concentration Justification** Long term exposure, Systemic, 0.0003 The ECETOC TRA tool has been used to Not applicable.

Dermal

estimate workplace exposures unless

otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value

Long term exposure, Systemic,

Inhalable

Not applicable.

0.02

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

highest exposure level is given since the

exposure estimates for other PROC are below this value

Long term exposure, Systemic,

Not applicable.

Not applicable.

Not applicable.

Long term exposure, Local, Dermal Not applicable.

Long term exposure, Local, Not applicable Inhalable

Not applicable. Not applicable. Not applicable. Since the substance is not classified for

acute effects and therefore, no acute DNEL

has been derived.

Pentaethylenehexamine, PEHA

Identified use name: Handling of solid products with small amounts of unbound ethylenamines - Use of preparations containing EA up to 2% -

Professional Process Category: PROC21, PROC24

Sector of end use: SU22 Subsequent service life relevant for that use: No.

Environmental Release Category: ERC06d

Short term exposure, Systemic, Not applicable. Not applicable Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived. Since the substance is not classified for Short term exposure, Systemic, Not applicable Not applicable.

has been derived. Since the substance is not classified for Short term exposure, Local, Dermal Not applicable Not applicable. acute effects and therefore, no acute DNEL

has been derived

0.03 Short term exposure, Local, Not applicable. Inhalable

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value

acute effects and therefore, no acute DNEL

Section 3.1Workers Exposure estimation

Contributing exposure scenario controlling worker exposure for 1: High (mechanical) energy work-up of substances bound in materials

and/or articles

Combined

Route of exposure **Contributing scenarios Dose/Concentration Justification**

Long term exposure, Systemic, Not applicable. Not applicable. **Dermal**

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

highest exposure level is given since the exposure estimates for other PROC are below this value

Long term exposure, Systemic, Inhalable

Not applicable.

Not applicable.

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value Not applicable.

Long term exposure, Systemic, Combined

Not applicable.

Not applicable.

Not applicable.

Long term exposure, Local, Dermal Not applicable.

Long term exposure, Local, Inhalable

Not applicable

Not applicable. Not applicable.

Since the substance is not classified for acute effects and therefore, no acute DNEL

has been derived.

Short term exposure, Systemic, **Dermal**

Not applicable

Not applicable.

Since the substance is not classified for acute effects and therefore, no acute DNEL

has been derived.

Short term exposure, Systemic, Inhalable

Not applicable

Not applicable.

Since the substance is not classified for acute effects and therefore, no acute DNEL

has been derived.

Short term exposure, Systemic,

Combined

Not applicable

Not applicable.

Since the substance is not classified for acute effects and therefore, no acute DNEL

has been derived

Short term exposure, Local, Dermal Not applicable

Not applicable.

Since the substance is not classified for acute effects and therefore, no acute DNEL

has been derived.

Short term exposure, Local,

Inhalable

Not applicable.

Not applicable.

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 0: Ashless dispersant

Release from point source (local exposure estimation)

Total release for regional exposure estimation kg/day **Justification**

Waste water Surface water air (direct + STP) Soil (direct releases only) kg/day n Not evaluated.

0.027

Value

Not evaluated.

737 0.231 6.94 **Justification**

EUSES calculation **EUSES** calculation **EUSES** calculation Not applicable.

Concentration in sewage (PECstp)

mg/l

Not applicable as there is no release to wastewater.

EUSES calculation

Concentration in sewage sludge mg/kg dwt

Not applicable as there is no release to wastewater.

FUSES calculation

Pentaethylenehexamine, PEHA

Identified use name: Handling of solid products with small amounts of unbound ethylenamines - Use of preparations containing EA up to 2% -Professional

Process Category: PROC21, PROC24 Sector of end use: SU22

	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	4.35x10-4	8.10x10-4	EUSES calculation
Grassland averaged mg/kg dwt	8.48x10-4	1.22x10-3	EUSES calculation
Groundwater mg/l	Not evaluated.	1.29x10-5	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	7.37x10-6	Not evaluated.	EUSES calculation
Annual average mg/m³	7.37x10-6	7.37x10-6	EUSES calculation
Annual deposition mg/m2/d	3.74x10-5	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 1: Use as an epoxy curing agent

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	0	Not evaluated.	EUSES calculation
Annual average mg/m³	0	6.87x10-13	EUSES calculation
Annual deposition mg/m2/d	0	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 2: Epoxy curing agent in paint

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Handling of solid products with small amounts of unbound ethylenamines - Use of preparations containing EA up to 2% -Professional

Process Category: PROC21, PROC24 Sector of end use: SU22

2/200

Justification Concentration in sewage (PECstp) Not applicable as there is no **EUSES** calculation release to wastewater. Not applicable as there is no Concentration in sewage sludge **EUSES** calculation mg/kg dwt release to wastewater. Local concentration PEC aquatic (local+regional) **Justification** Fresh water mg/l 8.15x10-3 **EUSES** calculation Marine water mg/l 8.02x10-4 **EUSES** calculation Intermittent release. mg/l Not applicable. Not applicable. Not applicable. **Local concentration** PEC sediment (local+regional) **Justification** Fresh water sediment mg/kg dwt Not evaluated. 2.61 **EUSES** calculation Marine water sediment mg/kg dwt Not evaluated. **EUSES** calculation **Local concentration** PEC soil (local+regional) **Justification** Agricultural soil averaged mg/kg 3.75x10-4 **EUSES** calculation Grassland averaged mg/kg dwt 3.75x10-4 **EUSES** calculation Groundwater mg/l Not evaluated **EUSES** calculation 5.91x10-6 **Local concentration** PEC air (local+regional) **Justification** During emission mg/m³ Not evaluated. **EUSES** calculation Annual average mg/m³ 6.87x10-13 **EUSES** calculation Annual deposition mg/m2/d Not evaluated. **EUSES** calculation PEC aquatic (local+regional) **Local concentration Justification** Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 3: Laboratory chemicals

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0.022	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	1.10x10-5	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	7.96x10-3	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	6.09x10-6	8.15x10-3	EUSES calculation
Marine water mg/l	7.92x10-6	8.10x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.259	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	1.81x10-7	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	3.52x10-7	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	3.06x10-9	Not evaluated.	EUSES calculation
Annual average mg/m³	3.06x10-9	3.06x10-9	EUSES calculation
Annual deposition mg/m2/d	1.55x10-8	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 4: Use of coatings and adhesives

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0.010	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	3.68x10-3	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	2.82x10-6	8.15x10-3	EUSES calculation
Marine water mg/l	3.67x10-6	8.06x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.258	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	1.15x10-12	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	2.25x10-12	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	1.95x10-14	Not evaluated.	EUSES calculation

Section 4: Guidance to check compliance with the exposure scenario

Annual average mg/m³

Micro-organism mg/l

Annual deposition mg/m2/d

Environment	Not available.
Health	Not available.

7.07x10-13

Not evaluated.

Not applicable.

PEC aquatic (local+regional)

Section 5. Remarks: Additional good practice advice beyond the REACH CSA

1.95x10-14

9.90x10-14

Not applicable.

Local concentration

Environment	Not applicable.
Health	Not applicable.
Additional good practices	Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Handling of solid products with small amounts of unbound ethylenamines - Use of preparations containing EA up to 2% -

EUSES calculation

EUSES calculation

Justification

Not applicable.

Professional Process Category: PROC21, PROC24

Sector of end use: SU22 Subsequent service life relevant for that use: No.

Annex to the extended Safety Data Sheet (eSDS)

Identification of the substance or mixture

Product definition UVCB

Product name Pentaethylenehexamine, PEHA

Section 1: Title

Short title of the exposure scenario Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of

preparations containing EA up to 100% - Industrial

Process Category: PROC01, PROC02, PROC03, PROC04, PROC05, PROC08a, PROC08b, PROC09,

PROC15

Substance supplied to that use in form of: As such

Sector of end use: SU03

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC06a

List of use descriptors Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of

preparations containing EA up to 100% - Industrial

Process Category: PROC01, PROC02, PROC03, PROC04, PROC05, PROC08a, PROC08b, PROC09,

PROC15

Substance supplied to that use in form of: As such

Sector of end use: SU03

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC06a

Section 2: Operational conditions and risk management measures

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 0: Use in closed process, no likelihood of exposure

Product Characteristics: Liquid. Covers percentage substance in the product up to 100%

Amounts used: Not applicable

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor. industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 1: Use in closed, continuous process with occasional controlled exposure

Product Characteristics: Liquid. Covers percentage substance in the product up to 100%

Amounts used: Not applicable

Frequency and duration of use: Avoid carrying out operation for more than 4 hours.

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor. industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

from source towards the worker:

Use the following local exhaust ventilation types: Treat air emission to provide a typical

removal efficiency of (%): 90%

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 100% - Industrial

Process Category: PROC01, PROC02, PROC03, PROC04, PROC05,

PROC08a, PROC08b, PROC09, PROC15 Substance supplied to that use in form of: As such

Sector of end use: SU03 Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC06a

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Industrial

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 2: Use in closed batch process (synthesis or formulation)

Product Characteristics: Liquid. Covers percentage substance in the product up to 100%

Amounts used:

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Not applicable.

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Personal protection:

Use the following local exhaust ventilation types: Treat air emission to provide a typical

removal efficiency of (%): 90%

Not applicable.

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear appropriate respiratory protection. with a

minimum efficacy of 90%

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 3: Use in batch and other process (synthesis) where opportunity for

exposure arises

Product Characteristics: Liquid. Covers percentage substance in the product up to 100%

Amounts used:

Not applicable. Frequency and duration of use:

Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Not applicable.

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Use the following local exhaust ventilation types: Treat air emission to provide a typical

removal efficiency of (%): 90%

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear appropriate respiratory protection, with a

minimum efficacy of 90%

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 4: Mixing or blending in batch processes for formulation of preparations*

and articles (multistage and/or significant contact)

Product Characteristics: Liquid. Covers percentage substance in the product up to 100%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, industrial setting Not applicable.

Technical conditions and measures at process level (source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Use the following local exhaust ventilation types: Treat air emission to provide a typical

removal efficiency of (%): 90%

Not applicable.

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity Personal protection:

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear appropriate respiratory protection. with a

minimum efficacy of 90%

Section 2.1 Control of worker exposure

Contributing exposure 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. Covers percentage substance in the product up to 100%

Amounts used: Not applicable.

Frequency and duration of use:

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Not applicable.

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Avoid carrying out operation for more than 1 hour.

Indoor. industrial setting

Use the following local exhaust ventilation types: Treat air emission to provide a typical

removal efficiency of (%): 90%

Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 100% - Industrial

Process Category: PROC01, PROC02, PROC03, PROC04, PROC05, PROC08a, PROC08b, PROC09, PROC15

Substance supplied to that use in form of: As such Sector of end use: SU03

Personal protection:

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear appropriate respiratory protection. with a minimum efficacy of 95%

Use the following local exhaust ventilation types: Treat air emission to provide a typical

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 6: Transfer of substance or preparation (charging/discharging) from/to

vessels/large containers at dedicated facilities

Product Characteristics: Liquid. Covers percentage substance in the product up to 100%

Not applicable. Amounts used:

Frequency and duration of use: Avoid carrying out operation for more than 4 hours.

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, industrial setting Not applicable.

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

Not applicable.

management supervision controls.

removal efficiency of (%): 90%

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 7: Transfer of substance or preparation into small containers (dedicated

filling line, including weighing)

Product Characteristics: Liquid. Covers percentage substance in the product up to 100%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Not applicable.

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Use the following local exhaust ventilation types: Treat air emission to provide a typical removal efficiency of (%): 90%

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear appropriate respiratory protection. with a

minimum efficacy of 90%

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 8: Use as laboratory reagent

Product Characteristics: Liquid. Covers percentage substance in the product up to 100%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level Not applicable.

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Pentaethylenehexamine, PEHA

Organisational measures to prevent/limit releases,

dispersion and exposure:

Personal protection:

Use the following local exhaust ventilation types: Treat air emission to provide a typical

removal efficiency of (%): 90%

Not applicable.

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls. Wear appropriate respiratory protection, with a minimum efficacy of 90%

Section 2.2: Control of environmental exposure

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 100% - Industrial

Process Category: PROC01, PROC02, PROC03, PROC04, PROC05, PROC08a, PROC08b, PROC09, PROC15

Substance supplied to that use in form of: As such Sector of end use: SU03

Contributing exposure scenario controlling environmental exposure for 0: Manufacture of substances

Operational conditions: Indoor use.

Product Characteristics: Not applicable

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1.86x10-4 Fraction of Regional tonnage used locally: 3 72x10-3 Annual site tonnage (tonnes/year): 3.72x10-3 Average Local Daily Tonnage (kg/day): 10192

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000

Indoor, industrial setting Other operational conditions of use affecting environmental

1x10-5

1 61x10-8

=>27 7

wastewater.

Not applicable.

exposure:

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to 1x10-4

RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Treat on-site wastewater (prior to receiving water discharge) to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

plant:

Assumed domestic sewage treatment plant flow (m3/d): 2000

Contributing exposure scenario controlling environmental exposure for 1: Use as an intermediate

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1 86x10-4 Fraction of Regional tonnage used locally: 3.72x10-3 Annual site tonnage (tonnes/year): 3 72x10-3 Average Local Daily Tonnage (kg/day): 10192

Frequency and duration of use: Continuous release.

365 Emission Days (days/year):

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000

Other operational conditions of use affecting environmental

exposure:

Release fraction to air from process (initial release prior to

Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release

prior to RMM):

Pentaethylenehexamine, PEHA

Technical conditions and measures at process level (source) to prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Not applicable.

1x10-5

1x10-4

1.61x10-8

Indoor. industrial setting

Soil emission controls are not applicable as there is no direct release to soil.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Prevent discharge of undissolved substance to or recover from onsite

No air emission controls required: required removal efficiency is 0%.

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to

100% - Industrial Process Category: PROC01, PROC02, PROC03, PROC04, PROC05,

PROC08a, PROC08b, PROC09, PROC15 Substance supplied to that use in form of: As such

Sector of end use: SU03

Treat on-site wastewater (prior to receiving water discharge) =>27.7

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site: Prevent discharge of undissolved substance to or recover from onsite

wastewater.

Conditions and measures related to municipal sewage treatment

plant:

Assumed domestic sewage treatment plant flow (m3/d): 2000

Contributing exposure scenario controlling environmental exposure for 2: Formulation of preparations*

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 3720 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 744 Average Local Daily Tonnage (kg/day): 2000

Frequency and duration of use:

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000

Other operational conditions of use affecting environmental

exposure:

Release fraction to air from process (initial release prior to

Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

(%):

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required.

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Continuous release.

Indoor, industrial setting

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Contributing exposure scenario controlling environmental exposure for 3: Manufacture of coatings, adhesives and inks (and powder products)

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 3720 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 744 Average Local Daily Tonnage (kg/day): 2038

Frequency and duration of use: Continuous release.

365 Emission Days (days/year):

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000

Other operational conditions of use affecting environmental

exposure:

Indoor, industrial setting

Release fraction to air from process (initial release prior to

RMM):

1.1x10-3

Release fraction to soil from process (initial release prior to

RMM):

Pentaethylenehexamine, PEHA Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to

100% - Industrial

Process Category: PROC01, PROC02, PROC03, PROC04, PROC05, PROC08a, PROC08b, PROC09, PROC15 Substance supplied to that use in form of: As such

Sector of end use: SU03

Release fraction to wastewater from process (initial release 5.0x10-5 prior to RMM):

Technical conditions and measures at process level (source) to prevent release:

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Treat on-site wastewater (prior to receiving water discharge) =>27.7 to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Prevent discharge of undissolved substance to or recover from onsite

wastewater. Conditions and measures related to municipal sewage treatment

plant:

2000 Assumed domestic sewage treatment plant flow (m3/d):

Section 3: Exposure estimation

Section 3.1Workers Exposure estimates Contributing exposure scenario con		0: Use in closed process, no lik	relihood of exposure
Route of exposure	Contributing scenarios	Dose/Concentration	Justification
Long term exposure, Systemic, Dermal	1.1	0.007	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Inhalable	1.1	0.06	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Dermal	Not applicable.	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Inhalable	1.1	0.12	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value

Section 3.1Workers Exposure estimation

Contributing exposure scenario controlling worker exposure for 1: Use in closed, continuous process with occasional controlled exposure

Route of exposure	Contributing scenarios	Dose/Concentration	Justification
Long term exposure, Systemic, Dermal	Not applicable.	Not applicable.	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Inhalable	Not applicable.	Not applicable.	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 100% - Industrial

Process Category: PROC01, PROC02, PROC03, PROC04, PROC05, PROC08a, PROC08b, PROC09, PROC15

Substance supplied to that use in form of: As such Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC06a

has been derived.

Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Dermal	Not applicable.	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Inhalable	Not applicable.	Not applicable.	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Section 3.1Workers Exposure estima		O. Handin alasad hatab massass	(complete or formulation)
Contributing exposure scenario con Route of exposure		2: Use in closed patch process Dose/Concentration	(synthesis or formulation) Justification
Long term exposure, Systemic,	Contributing scenarios Not applicable.		The PROC with the highest exposure level
Dermal		Not applicable.	is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Inhalable	Not applicable.	Not applicable.	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Dermal		Not applicable.	Not applicable.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Dermal	Not applicable.	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Inhalable	Not applicable.	Not applicable.	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Section 3.1Workers Exposure estimate	ation		
Contributing exposure scenario con exposure arises	trolling worker exposure for	3: Use in batch and other proce	ss (synthesis) where opportunity for
Route of exposure	Contributing scenarios	Dose/Concentration	Justification
Long term exposure, Systemic, Dermal	1.3	0.14	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Inhalable	1.3	0.30	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Dermal	• • • • • • • • • • • • • • • • • • • •	Not applicable.	Not applicable.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Dermal	Not applicable.	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Inhalable	1.3	0.62	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Pentaethylenehexamine, PEHA			of ethylenamines in closed system with little ire - Use of preparations containing EA up to 100% - Industrial

Process Category: PROC01, PROC02, PROC03, PROC04, PROC05, PROC08a, PROC08b, PROC09, PROC15
Substance supplied to that use in form of: As such Sector of end use: SU03

Section 3.1Workers Exposure estimate	ation		
	trolling worker exposure for	4: Mixing or blending in batch p	rocesses for formulation of preparations*
Route of exposure	Contributing scenarios	Dose/Concentration	Justification
Long term exposure, Systemic, Dermal	1.4	0.27	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Inhalable	1.4	0.30	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Dermal	Not applicable.	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
	1.4	0.60	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Short term exposure, Local, Inhalable Section 3.1Workers Exposure estima Contributing exposure scenario convessels/large containers at non-dedi	ation trolling worker exposure for		is given since the exposure estimates for
Inhalable Section 3.1Workers Exposure estimate Contributing exposure scenario contributing exposure estimates and exposure exposure exposure estimates and exposure exposure estimates and exposure exposure estimates and exposure ex	ation trolling worker exposure for		is given since the exposure estimates for other PROC are below this value
Section 3.1Workers Exposure estimate Contributing exposure scenario convessels/large containers at non-dedi	ation trolling worker exposure for icated facilities	5: Transfer of substance or pre	is given since the exposure estimates for other PROC are below this value paration (charging/discharging) from/to
Inhalable Section 3.1Workers Exposure estimate Contributing exposure scenario convessels/large containers at non-dediffection Route of exposure Long term exposure, Systemic, Dermal Long term exposure, Systemic,	ation trolling worker exposure for icated facilities Contributing scenarios	5: Transfer of substance or pre Dose/Concentration	is given since the exposure estimates for other PROC are below this value paration (charging/discharging) from/to Justification The PROC with the highest exposure level is given since the exposure estimates for
Inhalable Section 3.1Workers Exposure estimate Contributing exposure scenario convessels/large containers at non-dediffection Route of exposure Long term exposure, Systemic, Dermal Long term exposure, Systemic,	ation trolling worker exposure for cated facilities Contributing scenarios 1.5	5: Transfer of substance or pre Dose/Concentration 0.27	is given since the exposure estimates for other PROC are below this value paration (charging/discharging) from/to Justification The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value The PROC with the highest exposure level is given since the exposure estimates for
Inhalable Section 3.1Workers Exposure estimate Contributing exposure scenario convessels/large containers at non-dediffection Route of exposure Long term exposure, Systemic, Dermal Long term exposure, Systemic, Inhalable Long term exposure, Systemic,	ation trolling worker exposure for icated facilities Contributing scenarios 1.5 1.5 Not applicable.	5: Transfer of substance or pre Dose/Concentration 0.27 0.37	is given since the exposure estimates for other PROC are below this value paration (charging/discharging) from/to Justification The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Inhalable Section 3.1Workers Exposure estimate Contributing exposure scenario convessels/large containers at non-dediffection Route of exposure Long term exposure, Systemic, Dermal Long term exposure, Systemic, Inhalable Long term exposure, Systemic, Combined	ation trolling worker exposure for icated facilities Contributing scenarios 1.5 1.5 Not applicable.	5: Transfer of substance or pre Dose/Concentration 0.27 0.37 Not applicable.	is given since the exposure estimates for other PROC are below this value paration (charging/discharging) from/to Justification The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Not applicable.
Inhalable Section 3.1Workers Exposure estimate Contributing exposure scenario convessels/large containers at non-dedict Route of exposure Long term exposure, Systemic, Dermal Long term exposure, Systemic, Inhalable Long term exposure, Systemic, Combined Long term exposure, Local, Dermal Long term exposure, Local, Dermal	ation trolling worker exposure for icated facilities Contributing scenarios 1.5 1.5 Not applicable. Not applicable.	5: Transfer of substance or pre Dose/Concentration 0.27 0.37 Not applicable. Not applicable.	is given since the exposure estimates for other PROC are below this value paration (charging/discharging) from/to Justification The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Not applicable. Not applicable. Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL
Inhalable Section 3.1Workers Exposure estimate Contributing exposure scenario convessels/large containers at non-dedict Route of exposure Long term exposure, Systemic, Dermal Long term exposure, Systemic, Inhalable Long term exposure, Systemic, Combined Long term exposure, Local, Dermal Long term exposure, Local, Inhalable Short term exposure, Systemic,	ation trolling worker exposure for icated facilities Contributing scenarios 1.5 1.5 Not applicable. Not applicable. Not applicable	5: Transfer of substance or pre Dose/Concentration 0.27 0.37 Not applicable. Not applicable. Not applicable.	is given since the exposure estimates for other PROC are below this value paration (charging/discharging) from/to Justification The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Not applicable. Not applicable. Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Since the substance is not classified for acute effects and therefore, no acute DNEL
Inhalable Section 3.1Workers Exposure estimate Contributing exposure scenario convessels/large containers at non-dedifference Route of exposure Long term exposure, Systemic, Dermal Long term exposure, Systemic, Inhalable Long term exposure, Systemic, Combined Long term exposure, Local, Dermal Long term exposure, Local, Inhalable Short term exposure, Systemic, Dermal Short term exposure, Systemic,	ation trolling worker exposure for icated facilities Contributing scenarios 1.5 1.5 Not applicable. Not applicable. Not applicable Not applicable	5: Transfer of substance or pre Dose/Concentration 0.27 0.37 Not applicable. Not applicable. Not applicable. Not applicable.	is given since the exposure estimates for other PROC are below this value paration (charging/discharging) from/to Justification The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Not applicable. Not applicable. Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.

0.74

Short term exposure, Local,

Inhalable

1.5

acute effects and therefore, no acute DNEL

The PROC with the highest exposure level

is given since the exposure estimates for other PROC are below this value

has been derived.

Section 3.1Workers Exposure estima	ation		
Contributing exposure scenario con vessels/large containers at dedicate		6: Transfer of substance or pre	paration (charging/discharging) from/to
Route of exposure	Contributing scenarios	Dose/Concentration	Justification
Long term exposure, Systemic, Dermal	1.2	0.14	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Inhalable	1.2	0.548	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Dermal	Not applicable.	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Inhalable	1.2	0.55	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Section 3.1Workers Exposure estimate Contributing exposure scenario confilling line, including weighing)		7: Transfer of substance or pre	paration into small containers (dedicated
Route of exposure	Contributing scenarios	Dose/Concentration	Justification
Long term exposure, Systemic, Dermal	1.3	0.14	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Inhalable	1.3	0.30	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Dermal	Not applicable.	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL

0.62

Short term exposure, Local,

Inhalable

1.3

has been derived.

The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value

Section 3.1Workers Exposure estimation Contributing exposure scenario controlling worker exposure for 8: Use as laboratory reagent				
Route of exposure	Contributing scenarios	Dose/Concentration	Justification	
Long term exposure, Systemic, Dermal	Not applicable.	Not applicable.	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value	
Long term exposure, Systemic, Inhalable	Not applicable.	Not applicable.	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value	
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.	
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.	
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.	
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.	
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.	
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.	
Short term exposure, Local, Dermal	Not applicable.	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.	
Short term exposure, Local, Inhalable	Not applicable.	Not applicable.	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value	

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 0: Manufacture of substances

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	1.64x10-4	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0.102	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	EUSES calculation
	Value	Justification	
Concentration in sewage (PECstp) mg/l	5.93x10-5	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	5.9x10-8	8.15x10-3	EUSES calculation
Marine water mg/l	5.9x10-8	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable	Not applicable	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	1.67x10-3	2.05x10-3	EUSES calculation
Grassland averaged mg/kg dwt	3.26x10-3	3.64x10-3	EUSES calculation
Groundwater mg/l	Not evaluated.	3.28x10-5	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	2.83x10-5	Not evaluated.	EUSES calculation
Annual average mg/m³	2.83x10-5	2.83x10-5	EUSES calculation
Annual deposition mg/m2/d	1.44x10-4	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 100% - Industrial

Process Category: PROC01, PROC02, PROC03, PROC04, PROC05, PROC08a, PROC08b, PROC09, PROC15

Substance supplied to that use in form of: As such Sector of end use: SU03

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 1: Use as an intermediate

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	1064x10-4	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0.102	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	EUSES calculation
	Value	Justification	
Concentration in sewage (PECstp) mg/l	5.93x10-5	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	5.9x10-8	8.15x10-3	EUSES calculation
Marine water mg/l	5.9x10-8	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable	Not applicable	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	1.67x10-3	2.05x10-3	EUSES calculation
Grassland averaged mg/kg dwt	3.26x10-3	3.64x10-3	EUSES calculation
Groundwater mg/l	Not evaluated.	3.28x10-5	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	2.83x10-5	Not evaluated.	EUSES calculation
Annual average mg/m³	2.83x10-5	2.83x10-5	EUSES calculation
Annual deposition mg/m2/d	1.44x10-4	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 2: Formulation of preparations*

Total release for regional

Release from point source

	(local exposure estimation) kg/day	exposure estimation kg/day	
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0.020	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	EUSES calculation
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable	Not applicable	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	3.35x10-4	7.10x10-4	EUSES calculation
Grassland averaged mg/kg dwt	6.52x10-4	1.03x10-3	EUSES calculation
Groundwater mg/l	Not evaluated.	1.13x10-5	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 100% - Industrial

Process Category: PROC01, PROC02, PROC03, PROC04, PROC05, PROC08a, PROC08b, PROC09, PROC15 Substance supplied to that use in form of: As such

Justification

Sector of end use: SU03

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC06a

During emission mg/m³ 5.67x10-6 Not evaluated. **EUSES** calculation Annual average mg/m³ 5.67x10-6 5.67x10-6 **EUSES** calculation Annual deposition mg/m2/d 2.87x10-5 Not evaluated. **EUSES** calculation **Local concentration** PEC aquatic (local+regional) **Justification**

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 3: Manufacture of coatings, adhesives and inks (and powder products)

> Release from point source Total release for regional Justification (local exposure estimation) exposure estimation kg/day

Not applicable.

Not applicable.

kg/day

Not applicable.

0.102 Waste water 737 **FUSES** calculation Surface water Not evaluated. **EUSES** calculation 0 air (direct + STP) 0.0204 0.231 **EUSES** calculation Soil (direct releases only) Not evaluated. 6 94 **EUSES** calculation

> **Value Justification**

Concentration in sewage (PECstp) 0.037 **EUSES** calculation

mg/kg dwt

Micro-organism mg/l

Concentration in sewage sludge **EUSES** calculation

Local concentration PEC aquatic (local+regional) **Justification** 2 82x10-5 8.17x10-3 Fresh water mg/l **EUSES** calculation Marine water mg/l 3.76x10-5 8.39x10-4 **EUSES** calculation Intermittent release, mg/l Not applicable Not applicable Not applicable. **Local concentration** PEC sediment (local+regional) **Justification**

Fresh water sediment mg/kg dwt Not evaluated. 2.61 **EUSES** calculation Marine water sediment mg/kg dwt Not evaluated. **EUSES** calculation Local concentration PEC soil (local+regional) Justification

3.35x10-4 7.10x10-4 **EUSES** calculation Agricultural soil averaged mg/kg

Grassland averaged mg/kg dwt 6.52x10-4 1.03x10-3 **EUSES** calculation Groundwater mg/l Not evaluated 1 13x10-5 **EUSES** calculation

PEC air (local+regional) **Justification** Local concentration During emission mg/m³ Not evaluated. **EUSES** calculation 5.67x10-6 Annual average mg/m³ 5.67x10-6 5.67x10-6 **EUSES** calculation Annual deposition mg/m2/d 2.87x10-5 Not evaluated. **EUSES** calculation **Local concentration** PEC aquatic (local+regional) **Justification**

Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 4: Guidance to check compliance with the exposure scenario

Environment Not available. Health Not available.

Section 5. Remarks: Additional good practice advice beyond the REACH CSA

Environment Not applicable. Health Not applicable. Not applicable. **Additional good practices**

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 100% - Industrial

Process Category: PROC01, PROC02, PROC03, PROC04, PROC05, PROC08a, PROC08b, PROC09, PROC15 Substance supplied to that use in form of: As such

Sector of end use: SU03 Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC06a

Annex to the extended Safety Data Sheet (eSDS)

Identification of the substance or mixture

Product definition UVCB

Product name Pentaethylenehexamine, PEHA

Section 1: Title

Short title of the exposure scenario Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of

preparations containing EA up to 2% - Industrial Process Category: PROC05, PROC08a, PROC08b, PROC09

Substance supplied to that use in form of: As such

Sector of end use: SU03

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC06a

List of use descriptors Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of

preparations containing EA up to 2% - Industrial

Process Category: PROC05, PROC08a, PROC08b, PROC09

Substance supplied to that use in form of: As such

Sector of end use: SU03

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC06a

Section 2: Operational conditions and risk management measures

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 0: Mixing or blending in batch processes for formulation of preparations*

and articles (multistage and/or significant contact)

Product Characteristics: Liquid. Covers concentrations up to 2%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg Human factors not influenced by risk management:

Not applicable.

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable. Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 1: Transfer of substance or preparation (charging/discharging) from/to

vessels/large containers at non-dedicated facilities

Product Characteristics: Liquid. Covers concentrations up to 2%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

from source towards the worker:

Use the following local exhaust ventilation types: Treat air emission to provide a typical

removal efficiency of (%): 90%

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity Personal protection:

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 2% - Industrial

Process Category: PROC05, PROC08a, PROC08b, PROC09 Substance supplied to that use in form of: As such

Sector of end use: SU03 Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC06a

Industrial

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 2: Transfer of substance or preparation (charging/discharging) from/to

vessels/large containers at dedicated facilities

Product Characteristics: Liquid. Covers concentrations up to 2%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, industrial setting Not applicable.

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases, dispersion and exposure:

Personal protection:

Not applicable.

Not applicable.

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 3: Transfer of substance or preparation into small containers (dedicated

filling line, including weighing)

Product Characteristics: Liquid. Covers concentrations up to 2%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Personal protection:

Not applicable.

Not applicable.

Not applicable.

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.2: Control of environmental exposure

Contributing exposure scenario controlling environmental exposure for 0: Manufacture of substances

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1 86x10-4 Fraction of Regional tonnage used locally: 3.72x10-3 Annual site tonnage (tonnes/year): 3 72x10-3 Average Local Daily Tonnage (kg/day): 10192

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000

Other operational conditions of use affecting environmental Indoor, industrial setting

exposure:

Release fraction to air from process (initial release prior to

RMM):

1x10-5

Release fraction to soil from process (initial release prior to

1x10-4

Release fraction to wastewater from process (initial release

prior to RMM):

1.61x10-8

Technical conditions and measures at process level (source) to

prevent release:

Not applicable.

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Soil emission controls are not applicable as there is no direct release to soil.

Treat air emission to provide a typical removal efficiency of

No air emission controls required; required removal efficiency is 0%.

Treat on-site wastewater (prior to receiving water discharge) =>27.7

to provide the required removal efficiency of 3 (%):

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 2% - Industrial

Process Category: PROC05, PROC08a, PROC08b, PROC09 Substance supplied to that use in form of: As such

Sector of end use: SU03

Prevent discharge of undissolved substance to or recover from onsite Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

2000 Assumed domestic sewage treatment plant flow (m3/d):

Contributing exposure scenario controlling environmental exposure for 1: Use as an intermediate

Operational conditions: Indoor use.

Product Characteristics:

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1.86x10-4 Fraction of Regional tonnage used locally: 3.72x10-3 Annual site tonnage (tonnes/year): 3.72x10-3 Average Local Daily Tonnage (kg/day): 10192

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000

Other operational conditions of use affecting environmental Indoor, industrial setting

exposure:

Release fraction to air from process (initial release prior to 1x10-5

Release fraction to soil from process (initial release prior to

1.61x10-8 Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

(%):

Treat on-site wastewater (prior to receiving water discharge)

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

plant:

Assumed domestic sewage treatment plant flow (m3/d):

Not applicable.

1x10-4

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

=>27.7

Prevent discharge of undissolved substance to or recover from onsite wastewater.

2000

Contributing exposure scenario controlling environmental exposure for 2: Formulation of preparations*

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 3720 20% Fraction of Regional tonnage used locally: Annual site tonnage (tonnes/year): 744 Average Local Daily Tonnage (kg/day): 2000

Frequency and duration of use: Continuous release.

365 Emission Days (days/year):

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000

Other operational conditions of use affecting environmental Indoor, industrial setting

exposure:

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release 0

prior to RMM):

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to

2% - Industrial Process Category: PROC05, PROC08a, PROC08b, PROC09

Substance supplied to that use in form of: As such Sector of end use: SU03

Technical conditions and measures at process level (source) to prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Soil emission controls are not applicable as there is no direct release to soil.

Treat air emission to provide a typical removal efficiency of

No air emission controls required; required removal efficiency is 0%.

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required.

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

Contributing exposure scenario controlling environmental exposure for 3: Manufacture of coatings, adhesives and inks (and powder products)

Indoor, industrial setting

5 0x10-5

=>27.7

wastewater.

Not applicable.

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 3720 20% Fraction of Regional tonnage used locally: Annual site tonnage (tonnes/year): 744 Average Local Daily Tonnage (kg/day): 2038

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000

Other operational conditions of use affecting environmental exposure:

Release fraction to air from process (initial release prior to 1.1x10-3

RMM):

Release fraction to soil from process (initial release prior to RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

Not applicable. Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

(%):

Treat on-site wastewater (prior to receiving water discharge)

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

Assumed domestic sewage treatment plant flow (m3/d): 2000

Section 3: Exposure estimation

Section 3.1Workers Exposure estimation

Contributing exposure scenario controlling worker exposure for 0: Mixing or blending in batch processes for formulation of preparations*

and articles (multistage and/or significant contact)

Route of exposure **Contributing scenarios Dose/Concentration Justification** 0.005 The PROC with the highest exposure level

Long term exposure, Systemic, 21

Long term exposure, Systemic,

2 1

0.61

is given since the exposure estimates for other PROC are below this value

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Prevent discharge of undissolved substance to or recover from onsite

The PROC with the highest exposure level

is given since the exposure estimates for other PROC are below this value

Long term exposure, Systemic, Not applicable.

Combined

Dermal

Inhalable

Long term exposure, Local, Dermal Not applicable.

Not applicable.

Not applicable.

Not applicable. Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 2% - Industrial

Process Category: PROC05, PROC08a, PROC08b, PROC09 Substance supplied to that use in form of: As such

Sector of end use: SU03

Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Inhalable	2.1	1.22	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Section 3.1Workers Exposure estim	ation		
vessels/large containers at non-ded	icated facilities		paration (charging/discharging) from/to
Route of exposure	Contributing scenarios	Dose/Concentration	Justification
Long term exposure, Systemic, Dermal	2.2	0.005	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Inhalable	2.2	0.31	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Dermal	• • • • • • • • • • • • • • • • • • • •	Not applicable.	Not applicable.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Inhalable	2.2	0.61	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Section 3.1Workers Exposure estim	ation		
	trolling worker exposure for	2: Transfer of substance or pre	paration (charging/discharging) from/to
Route of exposure	Contributing scenarios	Dose/Concentration	Justification
Long term exposure, Systemic, Dermal	Not applicable.	Not applicable.	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure Systemic	Not applicable	Not applicable	The PROC with the highest exposure level

Long term exposure, Systemic, Dermal	Not applicable.	Not applicable.	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Inhalable	Not applicable.	Not applicable.	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 2% - Industrial Process Category: PROC05, PROC08a, PROC08b, PROC09

Substance supplied to that use in form of: As such Sector of end use: SU03

Short term exposure, Local, Dermal Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Short term exposure, Local, Not applicable. Not applicable. The PROC with the highest exposure level Inhalable is given since the exposure estimates for other PROC are below this value Section 3.1Workers Exposure estimation Contributing exposure scenario controlling worker exposure for 3: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) Route of exposure **Contributing scenarios Dose/Concentration** Long term exposure, Systemic, The PROC with the highest exposure level Not applicable. Not applicable. **Dermal** is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. The PROC with the highest exposure level Inhalable is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for Inhalable acute effects and therefore, no acute DNEL has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL **Dermal** has been derived Since the substance is not classified for Short term exposure, Systemic, Not applicable Not applicable. acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable. Since the substance is not classified for

Not applicable.

Not applicable.

Section 3.2 Environment Exposure estimation

Not applicable.

Short term exposure, Local, Dermal Not applicable

Combined

Inhalable

Short term exposure, Local,

Contributing exposure scenario controlling environmental exposure for 0: Manufacture of substances

Release from point source Total release for regional **Justification** (local exposure estimation) exposure estimation kg/day kg/day Waste water 1.64x10-4 737 **EUSES** calculation Surface water Not evaluated. **EUSES** calculation air (direct + STP) 0.102 0.231 **EUSES** calculation Soil (direct releases only) Not evaluated. 6 94 **EUSES** calculation **Value Justification** Concentration in sewage (PECstp) 5.93x10-5 **EUSES** calculation Concentration in sewage sludge **EUSES** calculation mg/kg dwt PEC aquatic (local+regional) **Local concentration Justification** 5.9x10-8 8.15x10-3 **EUSES** calculation Fresh water mg/l Marine water mg/l 5.9x10-8 8.02x10-4 **EUSES** calculation Intermittent release. mg/l Not applicable Not applicable Not applicable. **Local concentration** PEC sediment (local+regional) **Justification** Fresh water sediment mg/kg dwt Not evaluated. 2.61 **EUSES** calculation Marine water sediment mg/kg dwt Not evaluated. 0.256 **EUSES** calculation **Local concentration** PEC soil (local+regional) **Justification** Agricultural soil averaged mg/kg 1.67x10-3 2.05x10-3 **EUSES** calculation Grassland averaged mg/kg dwt 3 26x10-3 **EUSES** calculation 3.64x10-3 **EUSES** calculation Groundwater mg/l Not evaluated. 3.28x10-5 Local concentration PEC air (local+regional) **Justification** During emission mg/m³ 2.83x10-5 Not evaluated. EUSES calculation Annual average mg/m³ 2.83x10-5 2.83x10-5 **EUSES** calculation Annual deposition mg/m2/d 1.44x10-4 Not evaluated. **EUSES** calculation

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 2% - Industrial

Process Category: PROC05, PROC08a, PROC08b, PROC09
Substance supplied to that use in form of: As such
Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC06a

RCUI, ERCUZ, ERCUGA

acute effects and therefore, no acute DNEL

The PROC with the highest exposure level

is given since the exposure estimates for other PROC are below this value

Since the substance is not classified for acute effects and therefore, no acute DNEL

has been derived.

has been derived.

Local concentration PEC aquatic (local+regional) Justification

Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 1: Use as an intermediate

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	1.64x10-4	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0.102	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	EUSES calculation
	Value	Justification	
Concentration in sewage (PECstp) mg/l	5.93x105	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	5.9x10-8	8.15x10-3	EUSES calculation
Marine water mg/l	5.9x10-8	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable	Not applicable	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	1.67x10-3	2.05x10-3	EUSES calculation
Grassland averaged mg/kg dwt	3.26x10-3	3.64x10-3	EUSES calculation
Groundwater mg/l	Not evaluated.	3.28x10-5	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	2.83x10-5	Not evaluated.	EUSES calculation
Annual average mg/m³	2.83x10-5	2.83x10-5	EUSES calculation
Annual deposition mg/m2/d	1.44x10-4	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 2: Formulation of preparations*

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0.020	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	EUSES calculation
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable	Not applicable	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	3.35x10-4	7.10x10-4	EUSES calculation
Grassland averaged mg/kg dwt	6.52x10-4	1.03x10-3	EUSES calculation
Groundwater mg/l	Not evaluated.	1.13x10-5	EUSES calculation

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 2% - Industrial

Process Category: PROC05, PROC08a, PROC08b, PROC09 Substance supplied to that use in form of: As such Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC06a

Local concentration PEC air (local+regional) Justification During emission mg/m³ 5.67x10-6 Not evaluated. **EUSES** calculation Annual average mg/m³ 5.67x10-6 5.67x10-6 **EUSES** calculation Annual deposition mg/m2/d 2.87x10-5 Not evaluated. **EUSES** calculation Local concentration PEC aquatic (local+regional) Justification Not applicable. Micro-organism mg/l Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 3: Manufacture of coatings, adhesives and inks (and powder products)

> **Justification** Release from point source Total release for regional

(local exposure estimation) exposure estimation kg/day kg/day

737 **EUSES** calculation Waste water 0 102 Surface water Not evaluated. **EUSES** calculation 0 0.0204

air (direct + STP) 0.231 **EUSES** calculation Soil (direct releases only) Not evaluated. 6 94 **EUSES** calculation

Value Justification EUSES calculation

Concentration in sewage (PECstp) 0.037

mg/l

Concentration in sewage sludge **EUSES** calculation 0 mg/kg dwt

Local concentration PEC aquatic (local+regional) **Justification** Fresh water mg/l 8.17x10-3 2.82x10-5 **EUSES** calculation Marine water mg/l 3.76x10-5 8.39x10-4 **EUSES** calculation Intermittent release, mg/l Not applicable Not applicable Not applicable. **Local concentration** PEC sediment (local+regional) **Justification**

Fresh water sediment mg/kg dwt Not evaluated. 2.61 **EUSES** calculation Marine water sediment mg/kg dwt Not evaluated. 0.268 **EUSES** calculation

Local concentration PEC soil (local+regional) **Justification**

3.35x10-4 7.10x10-4 **EUSES** calculation Agricultural soil averaged mg/kg

Grassland averaged mg/kg dwt 6.52x10-4 1.03x10-3

Groundwater mg/l Not evaluated 1 13x10-5 **EUSES** calculation PEC air (local+regional) **Justification Local concentration**

During emission mg/m³ 5.67x10-6 Not evaluated. **FUSES** calculation Annual average mg/m³ 5 67x10-6 5 67x10-6 **EUSES** calculation Annual deposition mg/m2/d **EUSES** calculation 287x10-5 Not evaluated. **Local concentration** PEC aquatic (local+regional) **Justification**

Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 4: Guidance to check compliance with the exposure scenario

Environment Not available. Health Not available.

Section 5. Remarks: Additional good practice advice beyond the REACH CSA

Environment Not applicable. Health Not applicable. Not applicable. **Additional good practices**

EUSES calculation

Annex to the extended Safety Data Sheet (eSDS)

Identification of the substance or mixture

Product definition UVCB

Product name Pentaethylenehexamine, PEHA

Section 1: Title

Short title of the exposure scenario Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of

preparations containing EA up to 0.5% - Industrial Process Category: PROC05, PROC08a, PROC08b, PROC09

Substance supplied to that use in form of: As such Sector of end use: SU03

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC06a

List of use descriptors Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of

preparations containing EA up to 0.5% - Industrial

Process Category: PROC05, PROC08a, PROC08b, PROC09 Substance supplied to that use in form of: As such

Sector of end use: SU03

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC06a

Section 2: Operational conditions and risk management measures

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 0: Mixing or blending in batch processes for formulation of preparations*

and articles (multistage and/or significant contact)

Product Characteristics: Liquid. Covers concentrations up to 0.5%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg Human factors not influenced by risk management:

Not applicable.

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable. Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 1: Transfer of substance or preparation (charging/discharging) from/to

vessels/large containers at non-dedicated facilities

Product Characteristics: Liquid. Covers concentrations up to 0.5%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

from source towards the worker:

Not applicable.

Organisational measures to prevent/limit releases,

dispersion and exposure:

Personal protection:

Not applicable.

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to

0.5% - Industrial

Industrial

Process Category: PROC05, PROC08a, PROC08b, PROC09 Substance supplied to that use in form of: As such Sector of end use: SU03

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC06a

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 2: Transfer of substance or preparation (charging/discharging) from/to

vessels/large containers at dedicated facilities

Product Characteristics: Liquid. Covers concentrations up to 0.5%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Not applicable.

Other operational conditions affecting worker exposure: Indoor, industrial setting Not applicable.

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

dispersion and exposure:

Organisational measures to prevent/limit releases,

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 3: Transfer of substance or preparation into small containers (dedicated

filling line, including weighing)

Product Characteristics: Liquid. Covers concentrations up to 0.5%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Not applicable.

Not applicable.

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Personal protection:

Not applicable.

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

1x10-4

1.61x10-8

Not applicable.

Section 2.2: Control of environmental exposure

Contributing exposure scenario controlling environmental exposure for 0: Manufacture of substances

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1 86x10-4 Fraction of Regional tonnage used locally: 3.72x10-3 Annual site tonnage (tonnes/year): 3 72x10-3 Average Local Daily Tonnage (kg/day): 10192

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000

Other operational conditions of use affecting environmental Indoor, industrial setting

exposure:

Release fraction to air from process (initial release prior to 1x10-5

RMM):

Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release

prior to RMM):

Pentaethylenehexamine, PEHA

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Treat on-site wastewater (prior to receiving water discharge) =>27.7

to provide the required removal efficiency of 3 (%):

Identified use name: Use of ethylenamines in closed system with little

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

opportunity for exposure - Use of preparations containing EA up to 0.5% - Industrial Process Category: PROC05, PROC08a, PROC08b, PROC09

Substance supplied to that use in form of: As such Sector of end use: SU03

Prevent discharge of undissolved substance to or recover from onsite Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

2000 Assumed domestic sewage treatment plant flow (m3/d):

Contributing exposure scenario controlling environmental exposure for 1: Use as an intermediate

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1.86x10-4 Fraction of Regional tonnage used locally: 3.72x10-3 Annual site tonnage (tonnes/year): 3.72x10-3 Average Local Daily Tonnage (kg/day): 10192

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000

Other operational conditions of use affecting environmental Indoor, industrial setting

exposure:

Release fraction to air from process (initial release prior to 1x10-5

Release fraction to soil from process (initial release prior to 1x10-4

1.61x10-8 Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

(%):

Treat on-site wastewater (prior to receiving water discharge)

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

plant:

Assumed domestic sewage treatment plant flow (m3/d): 2000

Contributing exposure scenario controlling environmental exposure for 2: Formulation of preparations*

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 3720 20% Fraction of Regional tonnage used locally: Annual site tonnage (tonnes/year): 744 Average Local Daily Tonnage (kg/day): 2000

Frequency and duration of use: Continuous release.

365 Emission Days (days/year):

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000

Other operational conditions of use affecting environmental Indoor, industrial setting

exposure:

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release 0

prior to RMM):

Pentaethylenehexamine, PEHA Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to

Not applicable.

=>27.7

wastewater.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Prevent discharge of undissolved substance to or recover from onsite

0.5% - Industrial

Process Category: PROC05, PROC08a, PROC08b, PROC09 Substance supplied to that use in form of: As such Sector of end use: SU03

Technical conditions and measures at process level (source) to prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Soil emission controls are not applicable as there is no direct release to soil.

Treat air emission to provide a typical removal efficiency of

No air emission controls required; required removal efficiency is 0%.

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site: Conditions and measures related to municipal sewage treatment

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required.

Not applicable.

Contributing exposure scenario controlling environmental exposure for 3: Manufacture of coatings, adhesives and inks (and powder products)

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 3720 20% Fraction of Regional tonnage used locally: Annual site tonnage (tonnes/year): 744 Average Local Daily Tonnage (kg/day): 2038

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000

Other operational conditions of use affecting environmental

exposure:

1.1x10-3

Release fraction to air from process (initial release prior to RMM):

Release fraction to soil from process (initial release prior to

RMM):

5 0x10-5 Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Not applicable.

Indoor, industrial setting

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

(%):

Soil emission controls are not applicable as there is no direct release to soil.

=>27.7

Treat on-site wastewater (prior to receiving water discharge) to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Prevent discharge of undissolved substance to or recover from onsite

No air emission controls required; required removal efficiency is 0%.

wastewater.

Conditions and measures related to municipal sewage treatment

Assumed domestic sewage treatment plant flow (m3/d): 2000

Section 3: Exposure estimation

Section 3.1Workers Exposure estimation

Contributing exposure scenario controlling worker exposure for 0: Mixing or blending in batch processes for formulation of preparations* and articles (multistage and/or significant contact)

Route of exposure **Contributing scenarios Dose/Concentration Justification**

Long term exposure, Systemic, Not applicable. The PROC with the highest exposure level Not applicable.

is given since the exposure estimates for **Dermal** other PROC are below this value

Long term exposure, Systemic, Not applicable. Not applicable. The PROC with the highest exposure level Inhalable

is given since the exposure estimates for

other PROC are below this value Long term exposure, Systemic, Not applicable.

Not applicable. Not applicable.

Not applicable. Not applicable.

Combined

Pentaethylenehexamine, PEHA

Long term exposure, Local, Dermal Not applicable.

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 0.5% - Industrial

> Process Category: PROC05, PROC08a, PROC08b, PROC09 Substance supplied to that use in form of: As such Sector of end use: SU03

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC06a

Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Inhalable	Not applicable.	Not applicable.	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Section 3.1Workers Exposure estim			
Contributing exposure scenario con vessels/large containers at non-ded		1: Transfer of substance or pre	paration (charging/discharging) from/to
Route of exposure	Contributing scenarios	Dose/Concentration	Justification
Long term exposure, Systemic, Dermal	3.1	0.001	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Inhalable	3.1	0.76	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Inhalable	3.1	1.52	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Section 3.1Workers Exposure estim Contributing exposure scenario con vessels/large containers at dedicate	trolling worker exposure for	2: Transfer of substance or pre	paration (charging/discharging) from/to
Route of exposure	Contributing scenarios	Dose/Concentration	Justification
Long term exposure, Systemic, Dermal	Not applicable.	Not applicable.	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure. Systemic.	Not applicable.	Not applicable.	The PROC with the highest exposure level

Contributing scenarios	Dose/Concentration	Justification
Not applicable.	Not applicable.	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Not applicable.	Not applicable.	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Not applicable.	Not applicable.	Not applicable.
Not applicable.	Not applicable.	Not applicable.
Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
	Contributing scenarios Not applicable. Not applicable. Not applicable. Not applicable. Not applicable Not applicable Not applicable Not applicable	Contributing scenariosDose/ConcentrationNot applicable.Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 0.5% - Industrial Process Category: PROC05, PROC08a, PROC08b, PROC09

Substance supplied to that use in form of: As such
Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC06a

Short term exposure, Local, Dermal Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Short term exposure, Local, Not applicable. Not applicable. The PROC with the highest exposure level Inhalable is given since the exposure estimates for other PROC are below this value Section 3.1Workers Exposure estimation Contributing exposure scenario controlling worker exposure for 3: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) Route of exposure **Contributing scenarios Dose/Concentration Justification** Long term exposure, Systemic, The PROC with the highest exposure level Not applicable. Not applicable. **Dermal** is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. The PROC with the highest exposure level Inhalable is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for Inhalable acute effects and therefore, no acute DNEL has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL **Dermal** has been derived. Not applicable. Since the substance is not classified for Short term exposure, Systemic, Not applicable acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for

Not applicable.

Not applicable.

Section 3.2 Environment Exposure estimation

Not applicable.

Short term exposure, Local, Dermal Not applicable

Combined

Inhalable

Short term exposure, Local,

Contributing exposure scenario controlling environmental exposure for 0: Manufacture of substances

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	1.64x10-4	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0.102	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	EUSES calculation
	Value	Justification	
Concentration in sewage (PECstp) mg/l	5.93x10-5	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	5.9x10-8	8.15x10-3	EUSES calculation
Marine water mg/l	5.9x10-8	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable	Not applicable	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	1.67x10-3	2.05x10-3	EUSES calculation
Grassland averaged mg/kg dwt	3.26x10-3	3.64x10-3	EUSES calculation
Groundwater mg/l	Not evaluated.	3.28x10-5	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	2.83x10-5	Not evaluated.	EUSES calculation
Annual average mg/m³	2.83x10-5	2.83x10-5	EUSES calculation
Annual deposition mg/m2/d	1.44x10-4	Not evaluated.	EUSES calculation

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 0.5% - Industrial

Process Category: PROC05, PROC08a, PROC08b, PROC09
Substance supplied to that use in form of: As such
Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC06a

acute effects and therefore, no acute DNEL

Since the substance is not classified for acute effects and therefore, no acute DNEL

The PROC with the highest exposure level

is given since the exposure estimates for other PROC are below this value

has been derived.

has been derived.

Local concentration PEC aquatic (local+regional) Justification

Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 1: Use as an intermediate

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	1.64x10-4	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0.102	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	EUSES calculation
	Value	Justification	
Concentration in sewage (PECstp) mg/l	5.93x10-5	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	5.9x10-8	8.15x10-3	EUSES calculation
Marine water mg/l	5.9x10-8	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable	Not applicable	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	1.67x10-3	2.05x10-3	EUSES calculation
Grassland averaged mg/kg dwt	3.26x10-3	3.64x10-3	EUSES calculation
Groundwater mg/l	Not evaluated.	3.28x10-5	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	2.83x10-5	Not evaluated.	EUSES calculation
Annual average mg/m³	2.83x10-5	2.83x10-5	EUSES calculation
Annual deposition mg/m2/d	1.44x10-4	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification

Section 3.2 Environment Exposure estimation

Not applicable.

Contributing exposure scenario controlling environmental exposure for 2: Formulation of preparations*

Not applicable.

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0.020	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	EUSES calculation
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable	Not applicable	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	3.35x10-4	7.10x10-4	EUSES calculation
Grassland averaged mg/kg dwt	6.52x10-4	1.03x10-3	EUSES calculation
Groundwater mg/l	Not evaluated.	1.13x10-5	EUSES calculation

Pentaethylenehexamine, PEHA

Micro-organism mg/l

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to

0.5% - Industrial
Process Category: PROC05, PROC08a, PROC08b, PROC09
Substance supplied to that use in form of: As such
Sector of end use: SU03

Not applicable.

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC06a

Local concentration PEC air (local+regional) Justification During emission mg/m³ 5.67x10-6 Not evaluated. **EUSES** calculation Annual average mg/m³ 5.67x10-6 5.67x10-6 **EUSES** calculation Annual deposition mg/m2/d 2.87x10-5 Not evaluated. **EUSES** calculation Local concentration PEC aquatic (local+regional) Justification Not applicable. Micro-organism mg/l Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 3: Manufacture of coatings, adhesives and inks (and powder products)

> **Justification** Release from point source Total release for regional

(local exposure estimation) exposure estimation kg/day

kg/day 737 Waste water 0 102

EUSES calculation Surface water Not evaluated. **EUSES** calculation 0 air (direct + STP) 0.0204 0.231 **EUSES** calculation Soil (direct releases only) Not evaluated. 6 94 **EUSES** calculation

Value Justification EUSES calculation

Concentration in sewage (PECstp) 0.037

mg/l

Concentration in sewage sludge

EUSES calculation 0 mg/kg dwt

Local concentration PEC aquatic (local+regional) **Justification** Fresh water mg/l 8.17x10-3 2.82x10-5 **EUSES** calculation Marine water mg/l 3.76x10-5 8.39x10-4 **EUSES** calculation Intermittent release, mg/l Not applicable Not applicable Not applicable.

Local concentration PEC sediment (local+regional) **Justification** Fresh water sediment mg/kg dwt Not evaluated. 2.61 **EUSES** calculation Marine water sediment mg/kg dwt Not evaluated. 0.268 **EUSES** calculation

Local concentration PEC soil (local+regional) **Justification** 3.35x10-4 7.10x10-4 **EUSES** calculation

Agricultural soil averaged mg/kg

Grassland averaged mg/kg dwt 6.52x10-4 1.03x10-3 **EUSES** calculation Groundwater mg/l Not evaluated 1 13x10-5 **EUSES** calculation

PEC air (local+regional) **Justification Local concentration** During emission mg/m³ 5.67x10-6 Not evaluated. **FUSES** calculation Annual average mg/m³ 5 67x10-6 5 67x10-6 **EUSES** calculation Annual deposition mg/m2/d **EUSES** calculation 287x10-5 Not evaluated.

Local concentration PEC aquatic (local+regional) **Justification** Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 4: Guidance to check compliance with the exposure scenario

Environment Not available. Health Not available.

Section 5. Remarks: Additional good practice advice beyond the REACH CSA

Environment Not applicable. Health Not applicable. Not applicable. **Additional good practices**

Annex to the extended Safety Data Sheet (eSDS)

Professional

Identification of the substance or mixture

Product definition UVCB

Product name Pentaethylenehexamine, PEHA

Section 1: Title

Short title of the exposure scenario Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of

preparations containing EA up to 2% - Professional

Process Category: PROC08a, PROC05

Substance supplied to that use in form of: As such

Sector of end use: SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC06a

List of use descriptors Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of

> preparations containing EA up to 2% - Professional Process Category: PROC08a, PROC05

Substance supplied to that use in form of: As such

Sector of end use: SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC06a

Section 2: Operational conditions and risk management measures

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 0: Transfer of substance or preparation (charging/discharging) from/to

vessels/large containers at non-dedicated facilities

Product Characteristics: Liquid. Covers concentrations up to 2%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg Human factors not influenced by risk management:

Not applicable.

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

dispersion and exposure:

Use the following local exhaust ventilation types: Treat air emission to provide a typical

removal efficiency of (%): 90%

Organisational measures to prevent/limit releases, Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 1: Mixing or blending in batch processes for formulation of preparations*

and articles (multistage and/or significant contact)

Product Characteristics: Liquid. Covers concentrations up to 2%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg

Not applicable.

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

from source towards the worker:

Technical conditions and measures to control dispersion

Organisational measures to prevent/limit releases,

dispersion and exposure: Personal protection:

Use the following local exhaust ventilation types: Treat air emission to provide a typical removal efficiency of (%): 90%

Not applicable.

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 2% - Professional

Process Category: PROC08a, PROC05 Substance supplied to that use in form of: As such

Sector of end use: SU22

Contributing exposure scenario controlling environmental exposure for 0: Manufacture of substances

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1.86x10-4 Fraction of Regional tonnage used locally: 3.72x10-3 Annual site tonnage (tonnes/year): 3.72x10-3 Average Local Daily Tonnage (kg/day): 10192

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000

Other operational conditions of use affecting environmental

Indoor, industrial setting

Release fraction to air from process (initial release prior to RMM):

1x10-5

Release fraction to soil from process (initial release prior to

RMM):

1x10-4

Release fraction to wastewater from process (initial release prior to RMM):

Technical conditions and measures at process level (source) to

1.61x10-8

prevent release: Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Not applicable.

Treat air emission to provide a typical removal efficiency of

Soil emission controls are not applicable as there is no direct release to soil.

(%):

No air emission controls required; required removal efficiency is 0%.

Treat on-site wastewater (prior to receiving water discharge) =>27.7

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Prevent discharge of undissolved substance to or recover from onsite

wastewater.

Conditions and measures related to municipal sewage treatment

plant:

2000 Assumed domestic sewage treatment plant flow (m3/d):

Contributing exposure scenario controlling environmental exposure for 1: Use as an intermediate

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1.86x10-4 3.72x10-3 Fraction of Regional tonnage used locally: Annual site tonnage (tonnes/year): 3 72x10-3 10192 Average Local Daily Tonnage (kg/day):

Frequency and duration of use: Continuous release

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000

Other operational conditions of use affecting environmental

exposure:

Indoor. industrial setting

Release fraction to air from process (initial release prior to

1x10-5

Release fraction to soil from process (initial release prior to

RMM):

1x10-4

Release fraction to wastewater from process (initial release

prior to RMM):

1.61x10-8

Technical conditions and measures at process level (source) to

prevent release:

Not applicable.

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Soil emission controls are not applicable as there is no direct release to soil.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to

2% - Professional

Process Category: PROC08a, PROC05 Substance supplied to that use in form of: As such Sector of end use: SU22

Treat air emission to provide a typical removal efficiency of No air emission controls required; required removal efficiency is 0%. (%):

Treat on-site wastewater (prior to receiving water discharge) =>27.7

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site: Prevent discharge of undissolved substance to or recover from onsite

wastewater.

Conditions and measures related to municipal sewage treatment

plant:

2000 Assumed domestic sewage treatment plant flow (m3/d):

Contributing exposure scenario controlling environmental exposure for 2: Formulation of preparations*

Operational conditions: Indoor use.

Product Characteristics:

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 3720 20% Fraction of Regional tonnage used locally: Annual site tonnage (tonnes/year): 744 Average Local Daily Tonnage (kg/day): 2000

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000

Other operational conditions of use affecting environmental

exposure:

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to

RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of (%):

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site: Conditions and measures related to municipal sewage treatment

plant:

Not applicable.

Indoor, industrial setting

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required.

Contributing exposure scenario controlling environmental exposure for 3: Manufacture of coatings, adhesives and inks (and powder products)

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

3720 Regional use tonnage (tonnes/year): 20% Fraction of Regional tonnage used locally: Annual site tonnage (tonnes/year): 744 Average Local Daily Tonnage (kg/day): 2038

Frequency and duration of use: Continuous release.

225 Emission Days (days/year):

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000

Other operational conditions of use affecting environmental

exposure:

Release fraction to air from process (initial release prior to

RMM):

Indoor, industrial setting

1.1x10-3

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 2% - Professional

Process Category: PROC08a, PROC05 Substance supplied to that use in form of: As such

Sector of end use: SU22

Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release

Technical conditions and measures at process level (source) to Not applicable. prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Soil emission controls are not applicable as there is no direct release to soil.

Treat air emission to provide a typical removal efficiency of

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 3 (%):

=>27.7

Organisational measures to prevent/limit release from site:

Prevent discharge of undissolved substance to or recover from onsite wastewater.

Conditions and measures related to municipal sewage treatment

plant:

2000 Assumed domestic sewage treatment plant flow (m3/d):

Section 3: Exposure estimation

Section 3.1Workers Exposure estimation

Contributing exposure scenario con vessels/large containers at non-ded		0: Transfer of substance or pre	paration (charging/discharging) from/to
Route of exposure	Contributing scenarios	Dose/Concentration	Justification
Long term exposure, Systemic, Dermal	2.2	0.005	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Inhalable	2.2	0.31	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Inhalable	2.2	0.61	The PROC with the highest exposure level is given since the exposure estimates for

5.0x10-5

Section 3.1Workers Exposure estimation

Contributing exposure scenario controlling worker exposure for 1: Mixing or blending in batch processes for formulation of preparations* and articles (multistage and/or significant contact)

	•		
Route of exposure	Contributing scenarios	Dose/Concentration	Justification
Long term exposure, Systemic, Dermal	2.1	0.005	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Inhalable	2.1	0.61	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Dermal		Not applicable.	

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 2% - Professional

Process Category: PROC08a, PROC05 Substance supplied to that use in form of: As such Sector of end use: SU22

Subsequent service life relevant for that use: No.

other PROC are below this value

Environmental Release Category: ERC01, ERC02, ERC06a

Not applicable Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Combined has been derived. Short term exposure, Local, Dermal Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Short term exposure, Local, 2.1 1.22 The PROC with the highest exposure level is given since the exposure estimates for Inhalable other PROC are below this value

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 0: Manufacture of substances

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	1.64x10-4	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0.102	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	EUSES calculation
	Value	Justification	
Concentration in sewage (PECstp) mg/l	5.93x10-5	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	5.9x10-8	8.15x10-3	EUSES calculation
Marine water mg/l	5.9x10-8	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable	Not applicable	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	1.67x10-3	2.05X10-3	EUSES calculation
Grassland averaged mg/kg dwt	3.26x10-3	3.64x10-3	EUSES calculation
Groundwater mg/l	Not evaluated.	3.28x10-5	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	2.83x10-5	Not evaluated.	EUSES calculation
Annual average mg/m³	2.83x10-5	2.83x10-5	EUSES calculation
Annual deposition mg/m2/d	1.44x10-4	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 1: Use as an intermediate

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	1.64x10-4	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0.102	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	EUSES calculation
	Value	Justification	
Concentration in sewage (PECstp) mg/l	5.93x10-5	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	5.9x10-8	8.15x0-3	EUSES calculation

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 2% - Professional

Process Category: PROC08a, PROC05 Substance supplied to that use in form of: As such Sector of end use: SU22

Marine water mg/l	5.9x10-8	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable	Not applicable	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	1.67x10-3	2.05X10-3	EUSES calculation
Grassland averaged mg/kg dwt	3.26x10-3	3.64x10-3	EUSES calculation
Groundwater mg/l	Not evaluated.	3.28x10-5	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	2.83x10-5	Not evaluated.	EUSES calculation
Annual average mg/m³	2.83x10-5	2.83x10-5	EUSES calculation
Annual deposition mg/m2/d	1.44x10-4	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 2: Formulation of preparations*

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0.020	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	EUSES calculation
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable	Not applicable	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	3.35x10-4	7.10x10-4	EUSES calculation
Grassland averaged mg/kg dwt	6.52x10-4	1.03x10-3	EUSES calculation
Groundwater mg/l	Not evaluated.	1.13x10-5	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	5.67x10-6	Not evaluated.	EUSES calculation
Annual average mg/m³	5.67x10-6	5.67x10-6	EUSES calculation
Annual deposition mg/m2/d	2.87x10-5	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 3: Manufacture of coatings, adhesives and inks (and powder products)

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0.102	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0.0204	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	EUSES calculation
	Value	Justification	

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 2% - Professional Process Category: PROC08a, PROC05

Process Category: PROC08a, PROC05
Substance supplied to that use in form of: As such
Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC06a

Concentration in sewage (PECstp) 0.037 EUSES calculation

Concentration in sewage sludge 0 EUSES calculation

mg/kg dwt

Local concentration PEC aquatic (local+regional) **Justification** Fresh water mg/l 2.82x10-5 8.17x10-3 **EUSES** calculation Marine water mg/l 3.76x10-5 8.39x10-4 **EUSES** calculation Intermittent release. mg/l Not applicable Not applicable Not applicable. **Local concentration** PEC sediment (local+regional) **Justification**

Fresh water sediment mg/kg dwt Not evaluated. 2.61 EUSES calculation

Marine water sediment mg/kg dwt Not evaluated. 0.268 EUSES calculation

Local concentration PEC soil (local+regional) Justification

Agricultural soil averaged mg/kg 3.35x10-4 7.10x10-4 EUSES calculation

dwt

Grassland averaged mg/kg dwt 6.52x10-4 1.03x10-3 EUSES calculation
Groundwater mg/l Not evaluated. 1.13x10-5 EUSES calculation

Local concentrationPEC air (local+regional)JustificationDuring emission mg/m³5.67x10-6Not evaluated.EUSES calculationAnnual average mg/m³5.67x10-65.67x10-6EUSES calculationAnnual deposition mg/m²/d2.87x10-5Not evaluated.EUSES calculation

Local concentration PEC aquatic (local+regional) Justification

Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 4: Guidance to check compliance with the exposure scenario

EnvironmentNot available.HealthNot available.

Section 5. Remarks: Additional good practice advice beyond the REACH CSA

EnvironmentNot applicable.HealthNot applicable.Additional good practicesNot applicable.

Annex to the extended Safety Data Sheet (eSDS)

Professional

Identification of the substance or mixture

Product definition UVCB

Product name Pentaethylenehexamine, PEHA

Section 1: Title

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of Short title of the exposure scenario

preparations containing EA up to 0.5% - Professional

Process Category: PROC08a

Substance supplied to that use in form of: As such

Sector of end use: SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC06a

List of use descriptors Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of

preparations containing EA up to 0.5% - Professional

Process Category: PROC08a

Substance supplied to that use in form of: As such

Sector of end use: SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC06a

Section 2: Operational conditions and risk management measures

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 0: Transfer of substance or preparation (charging/discharging) from/to

vessels/large containers at non-dedicated facilities

Product Characteristics: Liquid. Covers concentrations up to 0.5%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg Human factors not influenced by risk management:

Not applicable.

Other operational conditions affecting worker exposure: Indoor, professional setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable. Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.2: Control of environmental exposure

Contributing exposure scenario controlling environmental exposure for 0: Manufacture of substances

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 186x10-4 Fraction of Regional tonnage used locally: 3.72x10-3 Annual site tonnage (tonnes/year): 3.72x10-3 Average Local Daily Tonnage (kg/day): 10192

Frequency and duration of use: Continuous release.

365 Emission Days (days/year):

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000

Indoor. industrial setting Other operational conditions of use affecting environmental

exposure:

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 0.5% - Professional

Process Category: PROC08a

Substance supplied to that use in form of: As such

Sector of end use: SU22

Release fraction to air from process (initial release prior to

Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release 1.61x10-8

prior to RMM): Technical conditions and measures at process level (source) to

Not applicable. prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Treat on-site wastewater (prior to receiving water discharge) to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Prevent discharge of undissolved substance to or recover from onsite

No air emission controls required; required removal efficiency is 0%.

Soil emission controls are not applicable as there is no direct release to soil.

wastewater.

1x10-5

1x10-4

Conditions and measures related to municipal sewage treatment plant:

Assumed domestic sewage treatment plant flow (m3/d):

2000

Contributing exposure scenario controlling environmental exposure for 1: Use as an intermediate

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1.86x10-4 Fraction of Regional tonnage used locally: 3 72x10-3 Annual site tonnage (tonnes/year): 3.72x10-3 10192 Average Local Daily Tonnage (kg/day):

Frequency and duration of use: Continuous release.

365 Emission Days (days/year):

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000

Indoor, industrial setting Other operational conditions of use affecting environmental exposure:

Release fraction to air from process (initial release prior to

Release fraction to soil from process (initial release prior to 1x10-4

RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

(%):

Treat on-site wastewater (prior to receiving water discharge)

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

Assumed domestic sewage treatment plant flow (m3/d):

1.61x10-8

1x10-5

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

=>27.7

Prevent discharge of undissolved substance to or recover from onsite

2000

wastewater

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 0.5% - Professional

Process Category: PROC08a Substance supplied to that use in form of: As such

Sector of end use: SU22 Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC06a

Contributing exposure scenario controlling environmental exposure for 2: Formulation of preparations* Operational conditions: Indoor use. **Product Characteristics:** Not applicable. Concentration of substance in mixture or article: Amounts used: Regional use tonnage (tonnes/year): 3720 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 744 Average Local Daily Tonnage (kg/day): 2000 Frequency and duration of use: Continuous release. 365 **Emission Days (days/year):** Environmental factors not influenced by risk management: Local marine water dilution factor: 1000 Indoor, industrial setting Other operational conditions of use affecting environmental exposure: Release fraction to air from process (initial release prior to Release fraction to soil from process (initial release prior to RMM): Release fraction to wastewater from process (initial release prior to RMM): Technical conditions and measures at process level (source) to Not applicable. prevent release: Technical on-site conditions and measures to reduce or limit Soil emission controls are not applicable as there is no direct release to soil. discharges, air emissions and releases to soil: No air emission controls required; required removal efficiency is 0%. Treat air emission to provide a typical removal efficiency of (%): Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required. to provide the required removal efficiency of 3 (%): Organisational measures to prevent/limit release from site: Conditions and measures related to municipal sewage treatment plant: Contributing exposure scenario controlling environmental exposure for 3: Manufacture of coatings, adhesives and inks (and powder products) Operational conditions: Indoor use. Product Characteristics: Not applicable. Concentration of substance in mixture or article: Amounts used: 3720 Regional use tonnage (tonnes/year): Fraction of Regional tonnage used locally: 20% 744 Annual site tonnage (tonnes/year): Average Local Daily Tonnage (kg/day): 2038 Frequency and duration of use: Continuous release. Emission Days (days/year): 225 Environmental factors not influenced by risk management: Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental Indoor, industrial setting exposure: Release fraction to air from process (initial release prior to 1.1x10-3 RMM): Release fraction to soil from process (initial release prior to RMM):

5 0x10-5

Not applicable.

Pentaethylenehexamine, PEHA

prior to RMM):

prevent release:

(%):

Release fraction to wastewater from process (initial release

Treat air emission to provide a typical removal efficiency of

Technical conditions and measures at process level (source) to

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 0.5% - Professional

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Process Category: PROC08a Substance supplied to that use in form of: As such

Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC06a

Treat on-site wastewater (prior to receiving water discharge) =>27.7 to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site: Prevent discharge of undissolved substance to or recover from onsite

wastewater.

Conditions and measures related to municipal sewage treatment

Assumed domestic sewage treatment plant flow (m3/d): 2000

Section 3: Exposure estimation

Section 3.1Workers Exposure estim	ation	Section 3.1Workers Exposure estimation				
Contributing exposure scenario cor	Contributing exposure scenario controlling worker exposure for 0: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities					
Route of exposure	Contributing scenarios	Dose/Concentration	Justification			
Long term exposure, Systemic, Dermal	Not applicable.	0.001	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value			
Long term exposure, Systemic, Inhalable	Not applicable.	0.76	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value			
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.			
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.			
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.			
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.			
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.			
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.			
Short term exposure, Local, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.			
Short term exposure, Local, Inhalable	Not applicable.	1.52	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value			

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 0: Manufacture of substances

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	1.64x10-4	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0.102	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	EUSES calculation
	Value	Justification	
Concentration in sewage (PECstp) mg/l	5.93x10-5	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	5.9x10-8	8.15x10-3	EUSES calculation
Marine water mg/l	5.9x10-8	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable	Not applicable	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	1.67x10-3	2.05x10-3	EUSES calculation

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 0.5% - Professional

Process Category: PROC08a Substance supplied to that use in form of: As such

Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC06a

Grassland averaged mg/kg dwt 3.26x10-3 3.64x10-3 **EUSES** calculation Groundwater mg/l Not evaluated. 3.28x10-5 **EUSES** calculation PEC air (local+regional) **Justification Local concentration** During emission mg/m³ Not evaluated. **EUSES** calculation 2.83x10-5 Annual average mg/m³ 2.83x10-5 2.83x10-5 **EUSES** calculation Annual deposition mg/m2/d 1.44x10-4 Not evaluated. **EUSES** calculation PEC aquatic (local+regional) **Local concentration Justification** Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 1: Use as an intermediate

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	1.64x10-4	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0.102	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	EUSES calculation
	Value	Justification	
Concentration in sewage (PECstp) mg/l	5.93x10-5	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	5.9x10-8	8.15x10-3	EUSES calculation
Marine water mg/l	5.9x10-8	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable	Not applicable	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	1.67x10-3	2.05x10-3	EUSES calculation
Grassland averaged mg/kg dwt	3.26x10-3	3.64x10-3	EUSES calculation
Groundwater mg/l	Not evaluated.	3.28x10-5	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	2.83x10-5	Not evaluated.	EUSES calculation
Annual average mg/m³	2.83x10-5	2.83x10-5	EUSES calculation
Annual deposition mg/m2/d	1.44x10-4	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 2: Formulation of preparations*

Total release for regional

Release from point source

	(local exposure estimation) kg/day	exposure estimation kg/day	
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0.020	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	EUSES calculation
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable	Not applicable	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
· · · · · · · · · · · · · · · · · · ·			

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 0.5% - Professional

Justification

Process Category: PROC08a Substance supplied to that use in form of: As such

Sector of end use: SU22 life relevant for that use: No.

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC06a

0.256 **EUSES** calculation Marine water sediment mg/kg dwt Not evaluated. Local concentration PEC soil (local+regional) **Justification** Agricultural soil averaged mg/kg 3.35x10-4 7.10x10-4 **EUSES** calculation dwt Grassland averaged mg/kg dwt 6.52x10-4 1 03x10-3 **EUSES** calculation Groundwater mg/l Not evaluated. 1.13x10-5 **EUSES** calculation **Local concentration** PEC air (local+regional) **Justification** During emission mg/m³ 5.67x10-6 Not evaluated. **EUSES** calculation Annual average mg/m³ 5.67x10-6 5.67x10-6 **EUSES** calculation Annual deposition mg/m2/d **EUSES** calculation 2 87x10-5 Not evaluated.

PEC aquatic (local+regional)

Not applicable.

Justification

Not applicable.

Section 3.2 Environment Exposure estimation

Micro-organism mg/l

Local concentration

Not applicable.

Contributing exposure scenario controlling environmental exposure for 3: Manufacture of coatings, adhesives and inks (and powder products)

Justification Release from point source Total release for regional (local exposure estimation) exposure estimation kg/day kg/day Waste water 0.102 737 **EUSES** calculation Not evaluated. Surface water n **EUSES** calculation 0.0204 0 231 **EUSES** calculation air (direct + STP) Soil (direct releases only) Not evaluated 6 94 **FUSES** calculation **Value** Justification Concentration in sewage (PECstp) 0.037 **EUSES** calculation Concentration in sewage sludge **EUSES** calculation mg/kg dwt **Local concentration** PEC aquatic (local+regional) **Justification** Fresh water mg/l 2.82x10-5 8.17x10-3 **EUSES** calculation Marine water mg/l 3.76x10-5 **EUSES** calculation 8.39x10-4 Intermittent release. mg/l Not applicable Not applicable Not applicable. **Local concentration** PEC sediment (local+regional) **Justification** Fresh water sediment mg/kg dwt Not evaluated. 2.61 **EUSES** calculation Marine water sediment mg/kg dwt Not evaluated. 0.268 **EUSES** calculation **Local concentration** PEC soil (local+regional) **Justification** Agricultural soil averaged mg/kg 3.35x10-4 7.10x10-4 **EUSES** calculation dwt 6.52x10-4 1.03x10-3 **EUSES** calculation Grassland averaged mg/kg dwt Groundwater mg/l Not evaluated 1 13x10-5 **FUSES** calculation Local concentration PEC air (local+regional) **Justification** During emission mg/m³ 5.67x10-6 Not evaluated. EUSES calculation Annual average mg/m³ 5.67x10-6 5.67x10-6 **EUSES** calculation Annual deposition mg/m2/d 2.87x10-5 Not evaluated. **EUSES** calculation **Local concentration** PEC aquatic (local+regional) **Justification** Not applicable. Micro-organism mg/l Not applicable. Not applicable.

Section 4: Guidance to check compliance with the exposure scenario

Environment Not available.

Health Not available.

Section 5. Remarks: Additional good practice advice beyond the REACH CSA

EnvironmentNot applicable.HealthNot applicable.Additional good practicesNot applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in closed system with little opportunity for exposure - Use of preparations containing EA up to 0.5% - Professional

Process Category: PROC08a Substance supplied to that use in form of: As such

Sector of end use: SU22 fe relevant for that use: No.

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC06a

Annex to the extended Safety Data Sheet (eSDS)

Identification of the substance or mixture

Product definition UVCB

Product name Pentaethylenehexamine, PEHA

Section 1: Title

Short title of the exposure scenario Identified use name: Use of ethylenamines in open processes with high exposure potential and

evaporation as most likely exposure form - Use of preparations containing EA up to 25% - Industrial

Process Category: PROC05, PROC08a, PROC08b, PROC09 Substance supplied to that use in form of: In a mixture

Sector of end use: SU03

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c,

ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

List of use descriptors Identified use name: Use of ethylenamines in open processes with high exposure potential and

evaporation as most likely exposure form - Use of preparations containing EA up to 25% - Industrial

Process Category: PROC05, PROC08a, PROC08b, PROC09 Substance supplied to that use in form of: In a mixture

Sector of end use: SU03

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c,

ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Section 2: Operational conditions and risk management measures

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 0: Mixing or blending in batch processes for formulation of preparations*

and articles (multistage and/or significant contact)

Product Characteristics: Liquid. Covers percentage substance in the product up to 25%.

Not applicable. Amounts used:

Frequency and duration of use: Exposure duration per day: 15 min to <1 hour(s)

Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg Human factors not influenced by risk management:

Not applicable.

Not applicable.

Indoor. industrial setting Other operational conditions affecting worker exposure:

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Personal protection:

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

Use the following local exhaust ventilation types: Treat air emission to provide a typical

management supervision controls.

removal efficiency of (%): 90%

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 1: Transfer of substance or preparation (charging/discharging) from/to

vessels/large containers at non-dedicated facilities

Product Characteristics: Liquid. Covers percentage substance in the product up to 25%.

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Not applicable.

Not applicable.

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Personal protection:

Use the following local exhaust ventilation types: Treat air emission to provide a typical

removal efficiency of (%): 90%

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 25% - Industrial Process Category: PROC05, PROC08a, PROC08b, PROC09 Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Industrial

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 2: Transfer of substance or preparation (charging/discharging) from/to

vessels/large containers at dedicated facilities

Product Characteristics: Liquid. Covers percentage substance in the product up to 25%.

Amounts used: Not applicable.

Frequency and duration of use: Avoid carrying out operation for more than 1 hour.

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Not applicable.

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases, dispersion and exposure:

Personal protection:

Use the following local exhaust ventilation types: Treat air emission to provide a typical

removal efficiency of (%): 90%

Not applicable.

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 3: Transfer of substance or preparation into small containers (dedicated

filling line, including weighing)

Product Characteristics: Liquid. Covers percentage substance in the product up to 25%.

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Not applicable.

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Personal protection:

Use the following local exhaust ventilation types: Treat air emission to provide a typical removal efficiency of (%): 90%

Not applicable.

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.2: Control of environmental exposure

Contributing exposure scenario controlling environmental exposure for 0: Ashless dispersant

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 4840 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 967 Average Local Daily Tonnage (kg/day): 2649

Frequency and duration of use: Continuous release

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None.

exposure:

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to RMM):

Release fraction to wastewater from process (initial release prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

1.00x10-5

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Pentaethylenehexamine. PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 25% - Industrial Process Category: PROC05, PROC08a, PROC08b, PROC09 Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required. to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

plant:

Contributing exposure scenario controlling environmental exposure for 1: Use as an epoxy curing agent

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1860 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1240

Frequency and duration of use: Continuous release.

Emission Days (days/year): 300

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None.

Release fraction to air from process (initial release prior to

RMM):

exposure:

Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required. to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

1 00x10-5

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Contributing exposure scenario controlling environmental exposure for 2: Epoxy curing agent in paint

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1860 Fraction of Regional tonnage used locally: 20% 372 Annual site tonnage (tonnes/year): Average Local Daily Tonnage (kg/day): 1240

Frequency and duration of use: Continuous release

300 Emission Days (days/year):

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None.

exposure:

Release fraction to air from process (initial release prior to

1.00x10-5

Release fraction to soil from process (initial release prior to

RMM):

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 25% - Industrial Process Category: PROC05, PROC08a, PROC08b, PROC09 Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Release fraction to wastewater from process (initial release prior to RMM):

Technical conditions and measures at process level (source) to prevent release:

Not applicable.

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Soil emission controls are not applicable as there is no direct release to soil.

Treat air emission to provide a typical removal efficiency of

No air emission controls required; required removal efficiency is 0%.

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required. to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Contributing exposure scenario controlling environmental exposure for 3: Lube oil use

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1300 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 260 1182 Average Local Daily Tonnage (kg/day):

Frequency and duration of use: Continuous release

220 Emission Days (days/year):

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 None. Other operational conditions of use affecting environmental exposure:

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to Not applicable.

1.00x10-5

1.00x10-3

1.00x10-3

prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

(%):

Soil emission controls are not applicable as there is no direct release to soil.

Treat air emission to provide a typical removal efficiency of No air emission controls required; required removal efficiency is 0%.

Treat on-site wastewater (prior to receiving water discharge) =>27.7 to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Contributing exposure scenario controlling environmental exposure for 4: Laboratory chemicals

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 100 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 20 1 55.1 Average Local Daily Tonnage (kg/day):

Frequency and duration of use: Continuous release.

365 Emission Days (days/year):

Environmental factors not influenced by risk management:

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 25% - Industrial Process Category: PROC05, PROC08a, PROC08b, PROC09 Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Local marine water dilution factor: Other operational conditions of use affecting environmental exposure:

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release prior to RMM):

Technical conditions and measures at process level (source) to prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Treat on-site wastewater (prior to receiving water discharge) =>27.7 to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

1000

None.

1.00x10-5

1.00x10-4

Not applicable.

0.02

Contributing exposure scenario controlling environmental exposure for 5: Use of coatings and adhesives

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1860 20% Fraction of Regional tonnage used locally: Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1019

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None. exposure:

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to RMM):

Release fraction to wastewater from process (initial release prior to RMM):

Technical conditions and measures at process level (source) to prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

(%):

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required. to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

1x10-5

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

No air emission controls required; required removal efficiency is 0%.

Identified use name: Use of ethylenamines in open processes with high Pentaethylenehexamine, PEHA exposure potential and evaporation as most likely exposure form - Use

of preparations containing EA up to 25% - Industrial Process Category: PROC05, PROC08a, PROC08b, PROC09 Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05,

ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

and articles (multistage and/or signi	•	D10	Local Manager
Route of exposure Long term exposure, Systemic, Dermal	Contributing scenarios Not applicable.	Dose/Concentration 0.0685714	Justification The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Inhalable	Not applicable.	0.3656 0.365575	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEI has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEI has been derived.
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEI has been derived.
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEI has been derived.
Short term exposure, Local, Dermal	Not applicable.	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEI has been derived.
Short term exposure, Local, Inhalable	Not applicable.	0.73115	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Section 3.1Workers Exposure estimate	ation		
Contributing exposure scenario con vessels/large containers at non-ded		1: Transfer of substance or pre	paration (charging/discharging) from/to
Route of exposure	Contributing scenarios	Dose/Concentration	Justification
Long term exposure, Systemic, Dermal	Not applicable.	0.0685714	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Inhalable	Not applicable.	0.365575 0.45697	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEI has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEI has been derived.
Short term exposure, Systemic,	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEI

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 25% - Industrial Process Category: PROC05, PROC08a, PROC08b, PROC09 Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Short term exposure, Systemic, Not applicable. Since the substance is not classified for Not applicable acute effects and therefore, no acute DNEL has been derived. Short term exposure, Local, Dermal Not applicable. Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL

> The ECETOC TRA tool has been used to 0.73115 estimate workplace exposures unless 0.91393 otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value

has been derived

Section 3.1Workers Exposure estimation

Section 3.1Workers Exposure estimation

Short term exposure, Local,

Inhalable

Inhalable

Contributing exposure scenario controlling worker exposure for 2: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities

Route of exposure **Contributing scenarios Dose/Concentration Justification**

Long term exposure, Systemic, Not applicable. 0.034286

Not applicable.

The ECETOC TRA tool has been used to **Dermal** estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value The ECETOC TRA tool has been used to 0.548325 Long term exposure, Systemic, Not applicable. estimate workplace exposures unless

otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value

Not applicable. Long term exposure, Systemic, Not applicable. Not applicable.

Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable.

Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for

acute effects and therefore, no acute DNEL Inhalable has been derived.

Not applicable. Short term exposure, Systemic, Not applicable Since the substance is not classified for **Dermal** acute effects and therefore, no acute DNEL

has been derived.

Since the substance is not classified for Short term exposure, Systemic, Not applicable Not applicable. acute effects and therefore, no acute DNEL Inhalable

has been derived.

Since the substance is not classified for Short term exposure, Systemic, Not applicable Not applicable. acute effects and therefore, no acute DNEL Combined

has been derived.

Short term exposure, Local, Dermal Not applicable. Not applicable. Since the substance is not classified for

acute effects and therefore, no acute DNEL

has been derived.

Short term exposure, Local, Not applicable. 1 096725 The ECETOC TRA tool has been used to Inhalable

estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value

Contributing exposure scenario controlling worker exposure for 3: Transfer of substance or preparation into small containers (dedicated

filling line, including weighing) **Contributing scenarios Dose/Concentration Justification**

0.0685714 The ECETOC TRA tool has been used to

Long term exposure, Systemic, Not applicable. Dermal estimate workplace exposures unless

otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value

Long term exposure, Systemic, Not applicable. 0.365575 The ECETOC TRA tool has been used to Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the

highest exposure level is given since the exposure estimates for other PROC are below this value

Not applicable. Not applicable. Not applicable. Long term exposure, Systemic,

Combined

Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable.

Pentaethylenehexamine, PEHA Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 25% - Industrial 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, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

> > 83/200

Sector of end use: SU03

Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Not applicable. Short term exposure, Systemic, Not applicable Since the substance is not classified for acute effects and therefore, no acute DNEL Dermal has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Combined has been derived. Short term exposure, Local, Dermal Not applicable. Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Short term exposure, Local, Not applicable. 0.73115 The ECETOC TRA tool has been used to Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 0: Ashless dispersant

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0.027	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	4.35x10-4	8.10x10-4	EUSES calculation
Grassland averaged mg/kg dwt	8.48x10-4	1.22x10-3	EUSES calculation
Groundwater mg/l	Not evaluated.	1.29x10-5	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	7.37x10-6	Not evaluated.	EUSES calculation
Annual average mg/m³	7.37x10-6	7.37x10-6	EUSES calculation
Annual deposition mg/m2/d	3.74x10-5	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 1: Use as an epoxy curing agent

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 25% - Industrial Process Category: PROC05, PROC08a, PROC08b, PROC09 Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Justification Concentration in sewage (PECstp) Not applicable as there is no **EUSES** calculation release to wastewater. Concentration in sewage sludge Not applicable as there is no **EUSES** calculation mg/kg dwt release to wastewater. **Local concentration** PEC aquatic (local+regional) **Justification** Fresh water mg/l 0 8.15x10-3 **EUSES** calculation Marine water mg/l n 8 02x10-4 **EUSES** calculation Intermittent release. mg/l Not applicable. Not applicable. Not applicable. **Local concentration** PEC sediment (local+regional) **Justification** Fresh water sediment mg/kg dwt Not evaluated. 2.61 **EUSES** calculation Marine water sediment mg/kg dwt Not evaluated 0.256 **EUSES** calculation **Local concentration** PEC soil (local+regional) **Justification** Agricultural soil averaged mg/kg 3.75x10-4 **EUSES** calculation dwt Grassland averaged mg/kg dwt 3.75x10-4 **EUSES** calculation Not evaluated. Groundwater mg/l 5.91x10-6 **EUSES** calculation PEC air (local+regional) **Local concentration Justification** During emission mg/m³ Not evaluated. **EUSES** calculation Annual average mg/m³ 0 6.87x10-13 **EUSES** calculation Annual deposition mg/m2/d 0 Not evaluated. **EUSES** calculation PEC aquatic (local+regional) **Local concentration Justification** Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 2: Epoxy curing agent in paint

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	0	Not evaluated.	EUSES calculation
Annual average mg/m³	0	6.87x10-13	EUSES calculation
Annual deposition mg/m2/d	0	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 25% - Industrial Process Category: PROC05, PROC08a, PROC08b, PROC09 Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 3: Lube oil use

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	8.49x10-4	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	8.49x10-6	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	3.07x10-4	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	2.35x10-7	8.15x10-3	EUSES calculation
Marine water mg/l	3.05x10-7	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.257	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	8.40x10-8	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	1.64x10-7	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	2.36x10-9	Not evaluated.	EUSES calculation
Annual average mg/m³	1.42x10-9	1.42x10-9	EUSES calculation
Annual deposition mg/m2/d	7.21x10-9	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 4: Laboratory chemicals

Total release for regional

Release from point source

(local exposure estimation)	exposure estimation kg/day	
0.022	737	EUSES calculation
Not evaluated.	0	EUSES calculation
1.10x10-5	0.231	EUSES calculation
Not evaluated.	6.94	Not applicable.
Value	Justification	
7.96x10-3	EUSES calculation	
0	EUSES calculation	
Local concentration	PEC aquatic (local+regional)	Justification
6.09x10-6	8.15x10-3	EUSES calculation
7.92x10-6	8.02x10-4	EUSES calculation
Not applicable.	Not applicable.	Not applicable.
Local concentration	PEC sediment (local+regional)	Justification
Not evaluated.	2.61	EUSES calculation
Not evaluated.	0.259	EUSES calculation
Local concentration	PEC soil (local+regional)	Justification
1.81x10-7	3.75x10-4	EUSES calculation
3.52x10-7	3.75x10-4	EUSES calculation
Not evaluated.	5.91x10-6	EUSES calculation
Local concentration	PEC air (local+regional)	Justification
	Not evaluated. 1.10x10-5 Not evaluated. Value 7.96x10-3 0 Local concentration 6.09x10-6 7.92x10-6 Not applicable. Local concentration Not evaluated. Not evaluated. Local concentration 1.81x10-7 3.52x10-7 Not evaluated.	0.022 737 Not evaluated. 0 1.10x10-5 0.231 Not evaluated. 6.94 Value Justification 7.96x10-3 EUSES calculation 0 EUSES calculation Local concentration PEC aquatic (local+regional) 6.09x10-6 8.15x10-3 7.92x10-6 8.02x10-4 Not applicable. Not applicable. Local concentration PEC sediment (local+regional) Not evaluated. 0.259 Local concentration PEC soil (local+regional) 1.81x10-7 3.75x10-4 3.52x10-7 3.75x10-4 Not evaluated. 5.91x10-6

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 25% - Industrial Process Category: PROC05, PROC08a, PROC08b, PROC09 Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Justification

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

During emission mg/m³ 3.06x10-9 Not evaluated. **EUSES** calculation Annual average mg/m³ 3.06x10-9 3.06x10-9 **EUSES** calculation Annual deposition mg/m2/d 1.55x10-8 Not evaluated. **EUSES** calculation PEC aquatic (local+regional) **Local concentration Justification** Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 5: Use of coatings and adhesives

Total release for regional Justification Release from point source (local exposure estimation) exposure estimation kg/day

kg/day

737 Waste water **EUSES** calculation Surface water Not evaluated O **FUSES** calculation air (direct + STP) 0.012 0.231 **EUSES** calculation

Soil (direct releases only) Not evaluated. 6.94 Not applicable.

Justification

Concentration in sewage (PECstp) Not applicable as there is no **EUSES** calculation

release to wastewater.

Concentration in sewage sludge Not applicable as there is no **EUSES** calculation mg/kg dwt release to wastewater.

Local concentration PEC aquatic (local+regional) **Justification** Fresh water mg/l 8.15x10-3 **EUSES** calculation Marine water mg/l 8.02x10-4 **EUSES** calculation Not applicable. Intermittent release. mg/l Not applicable. Not applicable.

Local concentration PEC sediment (local+regional) **Justification** Fresh water sediment mg/kg dwt Not evaluated. **EUSES** calculation 2.61

Marine water sediment mg/kg dwt Not evaluated. 0.256 **EUSES** calculation Local concentration Justification

PEC soil (local+regional) 5.42x10-4 **EUSES** calculation

Agricultural soil averaged mg/kg 1.67x10-4

Grassland averaged mg/kg dwt 3.26x10-4 7.01x10-4 **EUSES** calculation Groundwater mg/l Not evaluated. 8.61x10-6 **EUSES** calculation

Justification PEC air (local+regional) **Local concentration** During emission mg/m³ 3.45x10-6 Not evaluated. **EUSES** calculation Annual average mg/m³ 2.83x10-6 2.83x10-6 **EUSES** calculation

Annual deposition mg/m2/d 1.44x10-5 Not evaluated. **EUSES** calculation **Local concentration** PEC aquatic (local+regional) **Justification**

Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 4: Guidance to check compliance with the exposure scenario

Environment Not available. Health Not available.

Section 5. Remarks: Additional good practice advice beyond the REACH CSA

Environment Not applicable. Health Not applicable. **Additional good practices** Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 25% - Industrial Process Category: PROC05, PROC08a, PROC08b, PROC09 Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Annex to the extended Safety Data Sheet (eSDS)

Industrial

Identification of the substance or mixture

Product definition UVCB

Product name Pentaethylenehexamine, PEHA

Section 1: Title

Short title of the exposure scenario Identified use name: Use of ethylenamines in open processes with high exposure potential and

> evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC13, PROC14

Substance supplied to that use in form of: In a mixture

Sector of end use: SU03

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c,

ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

List of use descriptors Identified use name: Use of ethylenamines in open processes with high exposure potential and

evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC13, PROC14

Substance supplied to that use in form of: In a mixture

Sector of end use: SU03

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c,

ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Section 2: Operational conditions and risk management measures

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 0: Mixing or blending in batch processes for formulation of preparations*

and articles (multistage and/or significant contact)

Product Characteristics: Liquid. Covers concentrations up to 15%

Not applicable. Amounts used:

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg Human factors not influenced by risk management:

Not applicable.

Not applicable.

Indoor. industrial setting Other operational conditions affecting worker exposure:

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Personal protection:

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

Use the following local exhaust ventilation types: Treat air emission to provide a typical

management supervision controls.

removal efficiency of (%): 90%

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 1: Calendering operations

Product Characteristics: Liquid. Covers concentrations up to 15%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level Not applicable.

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Personal protection:

Use the following local exhaust ventilation types: Treat air emission to provide a typical removal efficiency of (%): 90%

Not applicable.

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC13, PROC14

Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 2: Industrial spraying

Product Characteristics: Liquid. Covers concentrations up to 15%

Amounts used: Not applicable

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

from source towards the worker:

Use the following local exhaust ventilation types: Treat air emission to provide a typical

removal efficiency of (%): 90%

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection:

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear appropriate respiratory protection. with a minimum efficacy of 90%

Section 2.1 Control of worker exposure

Contributing exposure 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. Covers concentrations up to 15%

Amounts used: Not applicable.

Frequency and duration of use: Exposure duration per day: 1-4 hour(s)

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

from source towards the worker:

Use the following local exhaust ventilation types: Treat air emission to provide a typical

removal efficiency of (%): 90%

Organisational measures to prevent/limit releases, dispersion and exposure:

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 4: Transfer of substance or preparation (charging/discharging) from/to

vessels/large containers at dedicated facilities

Product Characteristics: Liquid. Covers concentrations up to 15%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Not applicable.

Other operational conditions affecting worker exposure: Indoor. industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Use the following local exhaust ventilation types: Treat air emission to provide a typical

Technical conditions and measures to control dispersion

from source towards the worker:

removal efficiency of (%): 90%

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 5: Transfer of substance or preparation into small containers (dedicated

filling line, including weighing)

Product Characteristics: Liquid. Covers concentrations up to 15%

Amounts used: Not applicable

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

from source towards the worker:

Use the following local exhaust ventilation types: Treat air emission to provide a typical removal efficiency of (%): 90%

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC13, PROC14

Substance supplied to that use in form of: In a mixture

Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity Personal protection:

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 6: Treatment of articles by dipping and pouring

Product Characteristics: Liquid. Covers concentrations up to 15%

Amounts used: Not applicable

Frequency and duration of use: Exposure duration per day: 1-4 hour(s)

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Not applicable.

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases, dispersion and exposure:

Use the following local exhaust ventilation types: Treat air emission to provide a typical

removal efficiency of (%): 90%

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 7: Production of preparations* or articles by tabletting, compression,

Not applicable.

extrusion, pelletisation

Product Characteristics: Liquid. Covers concentrations up to 15%

Amounts used:

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management:

Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure:

Indoor, industrial setting Technical conditions and measures at process level Not applicable.

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Use the following local exhaust ventilation types: Treat air emission to provide a typical

removal efficiency of (%): 90%

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.2: Control of environmental exposure

Contributing exposure scenario controlling environmental exposure for 0: Ashless dispersant

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 4840 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 967 Average Local Daily Tonnage (kg/day): 2649

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None. exposure:

Release fraction to air from process (initial release prior to

Release fraction to soil from process (initial release prior to

RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to prevent release:

Not applicable.

1.00x10-5

Technical on-site conditions and measures to reduce or limit

Soil emission controls are not applicable as there is no direct release to soil.

discharges, air emissions and releases to soil:

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC13, PROC14

Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Treat air emission to provide a typical removal efficiency of No air emission controls required; required removal efficiency is 0%. (%):

1.00x10-5

Not applicable.

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required. to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Contributing exposure scenario controlling environmental exposure for 1: Use as an epoxy curing agent

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

1860 Regional use tonnage (tonnes/year): Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1240

Frequency and duration of use: Continuous release.

Emission Days (days/year): 300

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None.

Release fraction to air from process (initial release prior to

RMM):

exposure:

Release fraction to soil from process (initial release prior to

RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required. to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Contributing exposure scenario controlling environmental exposure for 2: Epoxy curing agent in paint

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1860 20% Fraction of Regional tonnage used locally: Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1240

Frequency and duration of use: Continuous release.

Emission Days (days/year): 300

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 None. Other operational conditions of use affecting environmental

exposure:

Release fraction to air from process (initial release prior to 1.00x10-5

RMM):

Identified use name: Use of ethylenamines in open processes with high

exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b,

PROC09, PROC13, PROC14 Substance supplied to that use in form of: In a mixture

Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05,

ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Pentaethylenehexamine, PEHA

Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release

Technical conditions and measures at process level (source) to

Not applicable. prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of No air emission controls required; required removal efficiency is 0%. (%):

1 00x10-5

1.00x10-3

1.00x10-3

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required.

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Contributing exposure scenario controlling environmental exposure for 3: Lube oil use

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1300 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 260 Average Local Daily Tonnage (kg/day): 1182

Frequency and duration of use: Continuous release

Emission Days (days/year): 220

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 None Other operational conditions of use affecting environmental

exposure:

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Treat on-site wastewater (prior to receiving water discharge) =>27.7 to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Contributing exposure scenario controlling environmental exposure for 4: Laboratory chemicals

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 100 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 20.1 55.1 Average Local Daily Tonnage (kg/day):

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b,

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

PROC09, PROC13, PROC14 Substance supplied to that use in form of: In a mixture

Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Frequency and duration of use: Continuous release. 365 Emission Days (days/year): Environmental factors not influenced by risk management:

Local marine water dilution factor:

1000 Other operational conditions of use affecting environmental None exposure:

Release fraction to air from process (initial release prior to

Release fraction to soil from process (initial release prior to RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Treat on-site wastewater (prior to receiving water discharge) =>27.7 to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

1 00x10-5

1 00x10-4

0.02

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Contributing exposure scenario controlling environmental exposure for 5: Use of coatings and adhesives

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1860 20% Fraction of Regional tonnage used locally: Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1019

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: Other operational conditions of use affecting environmental None exposure:

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of (%):

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required.

to provide the required removal efficiency of 3 (%): Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

1000

1x10-5

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC13, PROC14

Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

and articles (multistage and/or signi	ificant contact)		processes for formulation of preparations*
Route of exposure	Contributing scenarios	Dose/Concentration	Justification
Long term exposure, Systemic, Dermal	Not applicable.	0.0822	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Inhalable	Not applicable.	0.457	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Dermal	Not applicable.	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Inhalable	Not applicable.	0.914	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Section 3.1Workers Exposure estim Contributing exposure scenario con		1: Calendering operations	
Route of exposure	Contributing scenarios	Dose/Concentration	Justification
Long term exposure, Systemic, Dermal	Not applicable.	0.0822	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Inhalable	Not applicable.	0.457	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC13, PROC14

Substance supplied to that use in form of: In a mixture

Sector of end use: SU03

Short term exposure, Systemic, Not applicable. Since the substance is not classified for Not applicable acute effects and therefore, no acute DNEL has been derived. Short term exposure, Local, Dermal Not applicable. Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived The ECETOC TRA tool has been used to Short term exposure, Local, Not applicable. 0.914 estimate workplace exposures unless Inhalable otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value **Section 3.1Workers Exposure estimation** Contributing exposure scenario controlling worker exposure for 2: Industrial spraying Route of exposure **Contributing scenarios Dose/Concentration Justification** Long term exposure, Systemic, The ECETOC TRA tool has been used to Not applicable. 0.1286 Dermal estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value The ECETOC TRA tool has been used to 0.457 Long term exposure, Systemic, Not applicable. Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Since the substance is not classified for Long term exposure, Local, Not applicable Not applicable. acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL **Dermal** has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived. Since the substance is not classified for Short term exposure, Systemic, Not applicable. Not applicable Combined acute effects and therefore, no acute DNEL has been derived. Short term exposure, Local, Dermal Not applicable. Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived Short term exposure, Local, Not applicable. 0.914 The ECETOC TRA tool has been used to estimate workplace exposures unless Inhalable otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value **Section 3.1Workers Exposure estimation** Contributing exposure scenario controlling worker exposure for 3: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities Route of exposure **Dose/Concentration Justification Contributing scenarios** The ECETOC TRA tool has been used to Long term exposure, Systemic, 0.0411 Not applicable. **Dermal** estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value The ECETOC TRA tool has been used to Long term exposure, Systemic, Not applicable. 0.457 Inhalable 0.548 estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value

Not applicable.

Not applicable.

Pentaethylenehexamine, PEHA

Long term exposure, Systemic,

Long term exposure, Local, Dermal Not applicable.

Combined

Not applicable.

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC13, PROC14

Substance supplied to that use in form of: In a mixture

Not applicable.

Not applicable.

Sector of end use: SU03 Subsequent service life relevant for that use: No.

ERC08d, ERC08e, ERC08f, ERC11a

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c,

Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for Inhalable acute effects and therefore, no acute DNEL has been derived. Not applicable. Short term exposure, Systemic, Since the substance is not classified for Not applicable acute effects and therefore, no acute DNEL Dermal has been derived Since the substance is not classified for Not applicable. Short term exposure, Systemic, Not applicable acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Combined has been derived Short term exposure, Local, Dermal Not applicable. Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Short term exposure, Local, Not applicable. 0.914 The ECETOC TRA tool has been used to estimate workplace exposures unless Inhalable 1.097 otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value

Section 3.1Workers Exposure estimation

Section 3.1Workers Exposure estimation

Contributing exposure scenario controlling worker exposure for 4: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities **Dose/Concentration Justification** Route of exposure **Contributing scenarios** The ECETOC TRA tool has been used to Long term exposure, Systemic, Not applicable. 0.0822 **Dermal** estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value The ECETOC TRA tool has been used to Not applicable. 0.457 Long term exposure, Systemic, Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived.

Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for

acute effects and therefore, no acute DNEL **Dermal** has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for

acute effects and therefore, no acute DNEL Inhalable has been derived

Since the substance is not classified for Short term exposure, Systemic, Not applicable Not applicable. acute effects and therefore, no acute DNEL Combined has been derived.

Not applicable. Since the substance is not classified for Short term exposure, Local, Dermal Not applicable.

acute effects and therefore, no acute DNEL has been derived

0.914 The ECETOC TRA tool has been used to Short term exposure, Local, Not applicable. estimate workplace exposures unless Inhalable otherwise indicated. The PROC with the

highest exposure level is given since the exposure estimates for other PROC are below this value

filling line, including weighing)

Contributing scenarios Dose/Concentration Route of exposure Justification

Long term exposure, Systemic, 0.0822 The ECETOC TRA tool has been used to Not applicable. estimate workplace exposures unless **Dermal**

Contributing exposure scenario controlling worker exposure for 5: Transfer of substance or preparation into small containers (dedicated

otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value

Pentaethylenehexamine, PEHA Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b,

PROC09, PROC13, PROC14 Substance supplied to that use in form of: In a mixture

Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Long term exposure, Systemic, 0.457 The ECETOC TRA tool has been used to Not applicable. estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Long term exposure, Local, Not applicable. Since the substance is not classified for Not applicable acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable. Since the substance is not classified for Not applicable acute effects and therefore, no acute DNEL **Dermal** has been derived. Not applicable. Since the substance is not classified for Short term exposure, Systemic, Not applicable acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable. Since the substance is not classified for Not applicable Combined acute effects and therefore, no acute DNEL has been derived. Short term exposure, Local, Dermal Not applicable. Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived Short term exposure, Local, Not applicable. 0.914 The ECETOC TRA tool has been used to estimate workplace exposures unless Inhalable otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value **Section 3.1Workers Exposure estimation** Contributing exposure scenario controlling worker exposure for 6: Treatment of articles by dipping and pouring Route of exposure **Contributing scenarios Dose/Concentration** Justification The ECETOC TRA tool has been used to Long term exposure, Systemic, 0.0411 Not applicable. Dermal estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value The ECETOC TRA tool has been used to 0.548 Long term exposure, Systemic, Not applicable. Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Not applicable. Since the substance is not classified for Long term exposure, Local, Not applicable acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL **Dermal** has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived Since the substance is not classified for Short term exposure, Systemic, Not applicable. Not applicable Combined acute effects and therefore, no acute DNEL has been derived. Not applicable. Since the substance is not classified for Short term exposure, Local, Dermal Not applicable. acute effects and therefore, no acute DNEL has been derived. Short term exposure, Local, Not applicable. 1.097 The ECETOC TRA tool has been used to estimate workplace exposures unless Inhalable

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC13, PROC14

Substance supplied to that use in form of: In a mixture Sector of end use: SU03

below this value

Sector of end use: SUU3

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05,

ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c,

otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

ERC08d, ERC08e, ERC08f, ERC11a

Section 3.1Workers Exposure estim		7: Desilvation of annualist to	
extrusion, pelletisation	trolling worker exposure for	7: Production of preparations"	or articles by tabletting, compression,
Route of exposure	Contributing scenarios	Dose/Concentration	Justification
Long term exposure, Systemic, Dermal	Not applicable.	0.0822	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Inhalable	Not applicable.	0.457	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Dermal	Not applicable.	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Inhalable	Not applicable.	0.914	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 0: Ashless dispersant

Release from point source

	(local exposure estimation) kg/day	exposure estimation kg/day	
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0.027	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	4.35x10-4	8.10x10-4	EUSES calculation
Grassland averaged mg/kg dwt	8.48x10-4	1.22x10-3	EUSES calculation
Groundwater mg/l	Not evaluated.	1.29x10-5	EUSES calculation

Total release for regional

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC13, PROC14

Substance supplied to that use in form of: In a mixture

Justification

Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Local concentration PEC air (local+regional) Justification During emission mg/m³ 7.37x10-6 Not evaluated. **EUSES** calculation Annual average mg/m³ 7.37x10-6 7.37x10-6 **EUSES** calculation Annual deposition mg/m2/d 3.74x10-5 Not evaluated. **EUSES** calculation Local concentration PEC aquatic (local+regional) Justification Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 1: Use as an epoxy curing agent

Total release for regional Justification Release from point source (local exposure estimation) exposure estimation kg/day kg/day Waste water **EUSES** calculation 737 Surface water Not evaluated. **EUSES** calculation air (direct + STP) 0.231 **EUSES** calculation Soil (direct releases only) Not evaluated. 6 94 Not applicable. **Justification** Value Concentration in sewage (PECstp) Not applicable as there is no **EUSES** calculation release to wastewater. **EUSES** calculation Concentration in sewage sludge Not applicable as there is no mg/kg dwt release to wastewater. **Local concentration** PEC aquatic (local+regional) **Justification** Fresh water mg/l 0 8.15x10-3 **EUSES** calculation Marine water mg/l 0 8.02x10-4 **EUSES** calculation Intermittent release. mg/l Not applicable. Not applicable. Not applicable. **Local concentration** PEC sediment (local+regional) **Justification** Fresh water sediment mg/kg dwt Not evaluated. 2.61 **EUSES** calculation Marine water sediment mg/kg dwt Not evaluated. 0.256 **EUSES** calculation Local concentration PEC soil (local+regional) Justification 3.75x10-4 **EUSES** calculation Agricultural soil averaged mg/kg dwt Grassland averaged mg/kg dwt 3 75x10-4 **FUSES** calculation Groundwater mg/l Not evaluated 5 9x10-6 **FUSES** calculation PEC air (local+regional) Justification Local concentration During emission mg/m³ Not evaluated. EUSES calculation 0 6.87x10-13 **EUSES** calculation Annual average mg/m³ Annual deposition mg/m2/d Not evaluated. 0 **FUSES** calculation

Section 3.2 Environment Exposure estimation

Local concentration

Not applicable.

Contributing exposure scenario controlling environmental exposure for 2: Epoxy curing agent in paint

PEC aquatic (local+regional)

Not applicable.

Total release for regional **Justification** Release from point source (local exposure estimation) exposure estimation kg/day kg/day Waste water 0 737 **EUSES** calculation **EUSES** calculation Surface water Not evaluated n **EUSES** calculation 0.231 air (direct + STP) Soil (direct releases only) Not evaluated. Not applicable. 6 94 Value Justification Concentration in sewage (PECstp) Not applicable as there is no **EUSES** calculation release to wastewater. **EUSES** calculation Concentration in sewage sludge Not applicable as there is no release to wastewater. mg/kg dwt Justification **Local concentration** PEC aquatic (local+regional) Fresh water mg/l 0 8.15x10-3 **EUSES** calculation Marine water mg/l 8.02x10-4 **EUSES** calculation Intermittent release, mg/l Not applicable. Not applicable. Not applicable. **Justification** Local concentration PEC sediment (local+regional)

Pentaethylenehexamine, PEHA

Micro-organism mg/l

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC13, PROC14

Justification

Not applicable.

Substance supplied to that use in form of: In a mixture

Sector of end use: SU03 Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Fresh water sediment mg/kg dwt Not evaluated. 2.61 **EUSES** calculation Marine water sediment mg/kg dwt Not evaluated. 0.256 **EUSES** calculation **Local concentration** PEC soil (local+regional) **Justification** Agricultural soil averaged mg/kg 3.75x10-4 **EUSES** calculation dwt Grassland averaged mg/kg dwt 0 3 75x10-4 **EUSES** calculation Groundwater mg/l Not evaluated. 5.91x10-6 **EUSES** calculation PEC air (local+regional) Local concentration **Justification** During emission mg/m³ Not evaluated. **EUSES** calculation Annual average mg/m³ 6 87x10-13 **EUSES** calculation Annual deposition mg/m2/d 0 Not evaluated. **EUSES** calculation **Local concentration** PEC aquatic (local+regional) **Justification** Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 3: Lube oil use

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	8.49x10-4	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	8.49x10-6	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	3.07x10-4	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	2.35x10-7	8.15x10-3	EUSES calculation
Marine water mg/l	3.05x10-7	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.257	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	8.40x10-8	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	1.64x10-7	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	2.36x10-9	Not evaluated.	EUSES calculation
Annual average mg/m³	1.42x10-9	1.42x10-9	EUSES calculation
Annual deposition mg/m2/d	7.21x10-9	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 4: Laboratory chemicals

Total release for regional **Justification** Release from point source (local exposure estimation) exposure estimation kg/day kg/day Waste water 0.022 737 **EUSES** calculation Surface water Not evaluated. 0 **EUSES** calculation **EUSES** calculation air (direct + STP) 1.10x10-5 0.231 Soil (direct releases only) Not evaluated. 6.94 Not applicable. **Value Justification** Concentration in sewage (PECstp) 7.96x10-3 **EUSES** calculation mg/l

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC13, PROC14

Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c,

ERC08d, ERC08e, ERC08f, ERC11a

Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	6.09x10-6	8.15x10-3	EUSES calculation
Marine water mg/l	7.92x10-6	8.10x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.259	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	1.81x10-7	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	3.52x10-7	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	3.06x10-9	Not evaluated.	EUSES calculation
Annual average mg/m³	3.06x10-9	3.06x10-9	EUSES calculation
Annual deposition mg/m2/d	1.55x10-8	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 5: Use of coatings and adhesives

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0.012	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	1.67x10-4	5.42x10-4	EUSES calculation
Grassland averaged mg/kg dwt	3.26x10-4	7.01x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	8.61x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	3.45x10-6	Not evaluated.	EUSES calculation
Annual average mg/m³	2.83x10-6	2.83x10-6	EUSES calculation
Annual deposition mg/m2/d	1.44x10-5	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC13, PROC14

Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Section 4: Guidance to check compliance with the exposure scenario

Environment	Not available.
Health	Not available.

Section 5. Remarks: Additional good practice advice beyond the REACH CSA

Environment	Not applicable.
Health	Not applicable.
Additional good practices	Not applicable.

Annex to the extended Safety Data Sheet (eSDS)

Identification of the substance or mixture

Product definition UVCB

Product name Pentaethylenehexamine, PEHA

Section 1: Title

Short title of the exposure scenario Identified use name: Use of ethylenamines in open processes with high exposure potential and

> evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13,

PROC14, PROC19

Substance supplied to that use in form of: In a mixture

Sector of end use: SU03

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c,

ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

List of use descriptors Identified use name: Use of ethylenamines in open processes with high exposure potential and

> evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13,

PROC14, PROC19

Substance supplied to that use in form of: In a mixture

Sector of end use: SU03

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c,

ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Section 2: Operational conditions and risk management measures

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 0: Mixing or blending in batch processes for formulation of preparations*

and articles (multistage and/or significant contact)

Product Characteristics: Liquid. Covers concentrations up to 2%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Not applicable.

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion Not applicable.

from source towards the worker:

Organisational measures to prevent/limit releases,

Not applicable.

dispersion and exposure:

Personal protection:

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 1: Calendering operations

Product Characteristics: Liquid. Covers concentrations up to 2%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

from source towards the worker:

Not applicable.

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14, PROC19 Substance supplied to that use in form of: In a mixture

Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

103/200

Industrial

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 2: Industrial spraying

Product Characteristics: Liquid. Covers concentrations up to 2%

Amounts used: Not applicable

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Personal protection:

Not applicable.

Use the following local exhaust ventilation types: Treat air emission to provide a typical removal efficiency of (%): 90%

Not applicable.

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls. Wear appropriate respiratory protection. with a

minimum efficacy of 90%

Section 2.1 Control of worker exposure

Contributing exposure 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. Covers concentrations up to 2%

Not applicable. Amounts used:

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Not applicable.

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Use the following local exhaust ventilation types: Treat air emission to provide a typical

removal efficiency of (%): 90%

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 4: Transfer of substance or preparation (charging/discharging) from/to

vessels/large containers at dedicated facilities

Product Characteristics: Liquid. Covers concentrations up to 2%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

from source towards the worker:

Not applicable.

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 5: Transfer of substance or preparation into small containers (dedicated

filling line, including weighing)

Product Characteristics: Liquid. Covers concentrations up to 2%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Not applicable.

Technical conditions and measures at process level

(source) to prevent release:

Indoor, industrial setting

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b,

PROC09, PROC10, PROC13, PROC14, PROC19 Substance supplied to that use in form of: In a mixture

Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Technical conditions and measures to control dispersion

from source towards the worker:

Personal protection:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 6: Roller application or brushing Liquid. Covers concentrations up to 2% **Product Characteristics:**

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Not applicable.

Not applicable.

Not applicable.

Not applicable.

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Use the following local exhaust ventilation types: Treat air emission to provide a typical

removal efficiency of (%): 90%

Organisational measures to prevent/limit releases,

dispersion and exposure: Personal protection:

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 7: Treatment of articles by dipping and pouring

Product Characteristics: Liquid. Covers concentrations up to 2%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Not applicable.

Not applicable.

Other operational conditions affecting worker exposure: Indoor. industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Use the following local exhaust ventilation types: Treat air emission to provide a typical

removal efficiency of (%): 90%

Organisational measures to prevent/limit releases,

dispersion and exposure:

Personal protection:

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 8: Production of preparations* or articles by tabletting, compression,

extrusion, pelletisation

Product Characteristics: Liquid. Covers concentrations up to 2%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg Human factors not influenced by risk management:

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release: Technical conditions and measures to control dispersion

Not applicable.

from source towards the worker:

Not applicable.

Organisational measures to prevent/limit releases, dispersion and exposure:

Not applicable.

Personal protection:

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14, PROC19

Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 9: Hand-mixing with intimate contact and only PPE available

Product Characteristics: Liquid. Covers concentrations up to 2%

Amounts used: Not applicable

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Not applicable.

removal efficiency of (%): 90%

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

dispersion and exposure:

Organisational measures to prevent/limit releases,

Not applicable.

Personal protection:

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Use the following local exhaust ventilation types: Treat air emission to provide a typical

Section 2.2: Control of environmental exposure

Contributing exposure scenario controlling environmental exposure for 0: Ashless dispersant

Operational conditions: Indoor/Outdoor use.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): Fraction of Regional tonnage used locally: 20% 967 Annual site tonnage (tonnes/year): Average Local Daily Tonnage (kg/day): 2649

Frequency and duration of use:

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None

exposure:

Release fraction to air from process (initial release prior to

Release fraction to soil from process (initial release prior to RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required. to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Product Characteristics: Not applicable.

4840

Continuous release

1 00x10-5

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Contributing exposure scenario controlling environmental exposure for 1: Use as an epoxy curing agent

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable

Concentration of substance in mixture or article:

Amounts used:

1860 Regional use tonnage (tonnes/year): Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1240

Frequency and duration of use: Continuous release

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14, PROC19 Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Emission Days (days/year): 300 **Environmental factors not influenced by risk management:** Local marine water dilution factor: 1000 None. Other operational conditions of use affecting environmental Release fraction to air from process (initial release prior to 1.00x10-5 RMM): Release fraction to soil from process (initial release prior to RMM): Release fraction to wastewater from process (initial release prior to RMM): Technical conditions and measures at process level (source) to Not applicable. prevent release: Technical on-site conditions and measures to reduce or limit Soil emission controls are not applicable as there is no direct release to soil. discharges, air emissions and releases to soil: No air emission controls required; required removal efficiency is 0%. Treat air emission to provide a typical removal efficiency of (%): Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required. to provide the required removal efficiency of 3 (%): Organisational measures to prevent/limit release from site: Conditions and measures related to municipal sewage treatment plant: Contributing exposure scenario controlling environmental exposure for 2: Epoxy curing agent in paint Operational conditions: Indoor/Outdoor use. Product Characteristics: Not applicable. Concentration of substance in mixture or article: Amounts used: Regional use tonnage (tonnes/year): 1860 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1240 Frequency and duration of use: Continuous release. 300 Emission Days (days/year): Environmental factors not influenced by risk management: Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None. exposure: 1 00x10-5 Release fraction to air from process (initial release prior to Release fraction to soil from process (initial release prior to Release fraction to wastewater from process (initial release prior to RMM): Technical conditions and measures at process level (source) to Not applicable. prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14, PROC19 Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Contributing exposure scenario controlling environmental exposure for 3: Lube oil use Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1300 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 260 Average Local Daily Tonnage (kg/day): 1182

Frequency and duration of use: Continuous release.

1.00x10-5

1.00x10-3

Not applicable.

Emission Days (days/year): 220

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None.

exposure:

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to 1.00x10-3

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Treat on-site wastewater (prior to receiving water discharge) =>27.7 to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

plant:

Contributing exposure scenario controlling environmental exposure for 4: Laboratory chemicals

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 100 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 20.1 Average Local Daily Tonnage (kg/day): 55.1

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None.

Release fraction to air from process (initial release prior to 1.00x10-5

RMM):

Release fraction to soil from process (initial release prior to 1.00x10-4

RMM):

0.02 Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of (%):

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

No air emission controls required; required removal efficiency is 0%.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14, PROC19

Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Treat on-site wastewater (prior to receiving water discharge) =>27.7 to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Contributing exposure scenario controlling environmental exposure for 5: Use of coatings and adhesives

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1860 20% Fraction of Regional tonnage used locally: Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1019

Frequency and duration of use: Continuous release.

365 Emission Days (days/year):

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 None.

Other operational conditions of use affecting environmental exposure:

Release fraction to air from process (initial release prior to 1x10-5

Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required.

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Section 3: Exposure estimation

Section 3.1Workers Exposure estimation

Contributing exposure scenario controlling worker exposure for 0: Mixing or blending in batch processes for formulation of preparations*

and articles (multistage and/or significant contact)

Route of exposure **Contributing scenarios Dose/Concentration Justification**

Long term exposure, Systemic,

Dermal

Not applicable.

0.05

The ECETOC TRA tool has been used to

estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

Long term exposure, Systemic,

Inhalable

Not applicable.

0.61

below this value

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value

Long term exposure, Systemic,

Combined

Not applicable.

Not applicable.

Not applicable.

Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14, PROC19 Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for Inhalable acute effects and therefore, no acute DNEL has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL **Dermal** has been derived. Since the substance is not classified for Short term exposure, Systemic, Not applicable Not applicable. acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Combined has been derived Short term exposure, Local, Dermal Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived The ECETOC TRA tool has been used to Short term exposure, Local, Not applicable. 1.22 estimate workplace exposures unless Inhalable otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value

Section 3.1Workers Exposure estimation
Contributing exposure scenario controlling worker exposure for 1: Calendering operations

Route of exposure

Contributing scenarios

Dose/Concentration

Long term exposure, Systemic,
Dermal

Not applicable.

0.05

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

estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value

The ECETOC TRA tool has been used to

Inhalable

Not applicable.

Long term exposure, Systemic,

Inhalable

estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value

 Long term exposure, Systemic,
 Not applicable.
 Not applicable.
 Not applicable.

 Combined
 Not applicable.

Long term exposure, Local, DermalNot applicable.Not applicable.Not applicable.Long term exposure, Local,Not applicableNot applicable.Since the subst

able Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.

Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.

0.61

Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL

Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL

Combined acute effects and therefore, no acute DNE has been derived.

Short term exposure, Local, Dermal Not applicable Not applicable. Since the substance is not classified for

acute effects and therefore, no acute DNEL

Short term exposure, Local, Not applicable.

1.22 The ECETOC TRA tool has been used to estimate workplace exposures unless

otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value

Section 3.1Workers Exposure estimation

Contributing exposure scenario controlling worker exposure for 2: Industrial spraying

Route of exposure Contributing scenarios Dose/Concentration Justification

Long term exposure, Systemic,
Dermal

Not applicable.

0.09

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14, PROC19 Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Long term exposure, Systemic, Not applicable. The ECETOC TRA tool has been used to Not applicable. estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Not applicable. Long term exposure, Systemic, Not applicable. Not applicable. Combined Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable. Since the substance is not classified for Not applicable acute effects and therefore, no acute DNEL **Dermal** has been derived. Not applicable Not applicable. Since the substance is not classified for Short term exposure, Systemic, Inhalable acute effects and therefore, no acute DNEL has been derived. Not applicable. Since the substance is not classified for Short term exposure, Systemic, Not applicable acute effects and therefore, no acute DNEL Combined has been derived. Short term exposure, Local, Dermal Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Short term exposure, Local, 1.22 The ECETOC TRA tool has been used to Not applicable. estimate workplace exposures unless Inhalable otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value **Section 3.1Workers Exposure estimation** Contributing exposure scenario controlling worker exposure for 3: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities Route of exposure **Contributing scenarios Dose/Concentration Justification** Long term exposure, Systemic, Not applicable. The ECETOC TRA tool has been used to Not applicable. estimate workplace exposures unless Dermal otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. The ECETOC TRA tool has been used to estimate workplace exposures unless Inhalable otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Not applicable. Not applicable. Long term exposure, Systemic, Not applicable. Combined Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL **Dermal** has been derived. Since the substance is not classified for Short term exposure, Systemic, Not applicable Not applicable. Inhalable acute effects and therefore, no acute DNEL has been derived Not applicable. Since the substance is not classified for Short term exposure, Systemic, Not applicable acute effects and therefore, no acute DNEL Combined has been derived. Short term exposure, Local, Dermal Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. The ECETOC TRA tool has been used to Short term exposure, Local, Not applicable. Not applicable. Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14, PROC19

Substance supplied to that use in form of: In a mixture Sector of end use: SU03

below this value

highest exposure level is given since the exposure estimates for other PROC are

	d facilities		
Route of exposure	Contributing scenarios	Dose/Concentration	Justification
Long term exposure, Systemic, Dermal	Not applicable.	0.05 0.09	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Inhalable	Not applicable.	0.61	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Inhalable	Not applicable.	1.22	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Section 3.1Workers Exposure estimated Contributing exposure scenario confilling line, including weighing)		5: Transfer of substance or pre	paration into small containers (dedicated
Route of exposure	Contributing scenarios	Dose/Concentration	Justification
Long term exposure, Systemic, Dermal	Not applicable.	0.05	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Inhalable	Not applicable.	0.61	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Chart town over a company Constraints	Not applicable	Not applicable.	Since the substance is not classified for
Short term exposure, Systemic, Inhalable			acute effects and therefore, no acute DNEL has been derived.

Pentaethylenehexamine, PEHA

Section 3.1Workers Exposure estimation

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14, PROC19 Substance supplied to that use in form of: In a mixture Sector of end use: SU03

acute effects and therefore, no acute DNEL has been derived. Short term exposure, Local, Not applicable. Not applicable. The ECETOC TRA tool has been used to estimate workplace exposures unless Inhalable otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Section 3.1Workers Exposure estimation Contributing exposure scenario controlling worker exposure for 6: Roller application or brushing Route of exposure **Contributing scenarios Dose/Concentration Justification** Long term exposure, Systemic, Not applicable. 0.09 The ECETOC TRA tool has been used to estimate workplace exposures unless Dermal otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value 0.61 Long term exposure, Systemic, Not applicable. The ECETOC TRA tool has been used to estimate workplace exposures unless Inhalable otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable. Since the substance is not classified for Not applicable acute effects and therefore, no acute DNEL **Dermal** has been derived. Short term exposure, Systemic, Since the substance is not classified for Not applicable Not applicable. Inhalable acute effects and therefore, no acute DNEL has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Combined has been derived Not applicable. Since the substance is not classified for Short term exposure, Local, Dermal Not applicable acute effects and therefore, no acute DNEL has been derived. The ECETOC TRA tool has been used to Not applicable. 1 22 Short term exposure, Local, Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value **Section 3.1Workers Exposure estimation** Contributing exposure scenario controlling worker exposure for 7: Treatment of articles by dipping and pouring Route of exposure **Contributing scenarios Dose/Concentration** Long term exposure, Systemic, The ECETOC TRA tool has been used to Not applicable. Not applicable. Dermal estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value The ECETOC TRA tool has been used to Long term exposure, Systemic, Not applicable. Not applicable. Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable. Not applicable Since the substance is not classified for acute effects and therefore, no acute DNEL **Dermal**

Not applicable.

Since the substance is not classified for

Pentaethylenehexamine, PEHA

Short term exposure, Local, Dermal Not applicable

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14, PROC19

Substance supplied to that use in form of: In a mixture Sector of end use: SU03

has been derived.

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for Inhalable acute effects and therefore, no acute DNEL has been derived. Short term exposure, Systemic, Not applicable. Since the substance is not classified for Not applicable acute effects and therefore, no acute DNEL Combined has been derived. Since the substance is not classified for Short term exposure, Local, Dermal Not applicable Not applicable. acute effects and therefore, no acute DNEL has been derived.

Section 3.1Workers Exposure estimation

Contributing exposure scenario controlling worker exposure for 8: Production of preparations* or articles by tabletting, compression,

extrusion, pelletisation

Contributing scenarios Dose/Concentration Route of exposure Justification

Short term exposure, Local,

Long term exposure, Systemic,

Dermal

Inhalable

Not applicable.

Not applicable.

Not applicable.

Not applicable.

The ECETOC TRA tool has been used to

estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

The ECETOC TRA tool has been used to

estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value

below this value

Long term exposure, Systemic,

Inhalable

Not applicable.

Not applicable.

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value Not applicable.

Long term exposure, Systemic,

Combined

Long term exposure, Local, Dermal Not applicable.

Long term exposure, Local,

Inhalable

Not applicable

Not applicable.

Not applicable. Not applicable. Not applicable.

Not applicable.

Since the substance is not classified for acute effects and therefore, no acute DNEL

has been derived.

Short term exposure, Systemic,

Short term exposure, Systemic,

Dermal

Inhalable

Not applicable

Not applicable

Not applicable. Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.

Since the substance is not classified for acute effects and therefore, no acute DNEL

has been derived

Short term exposure, Systemic,

Combined

Not applicable

Not applicable.

Since the substance is not classified for acute effects and therefore, no acute DNEL

has been derived.

Short term exposure, Local, Dermal Not applicable

Not applicable.

Since the substance is not classified for acute effects and therefore, no acute DNEL

has been derived.

Short term exposure, Local,

Inhalable

Not applicable.

Not applicable.

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the

exposure estimates for other PROC are below this value

Section 3.1Workers Exposure estimation

Contributing exposure scenario controlling worker exposure for 9: Hand-mixing with intimate contact and only PPE available **Dose/Concentration**

Route of exposure Long term exposure, Systemic,

Dermal

Not applicable.

Contributing scenarios

Not applicable.

Justification

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the

exposure estimates for other PROC are

Long term exposure, Systemic,

Inhalable

Not applicable.

Not applicable.

below this value The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the

highest exposure level is given since the exposure estimates for other PROC are

below this value

Not applicable.

Long term exposure, Systemic, Combined

Not applicable.

Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14, PROC19 Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for Inhalable acute effects and therefore, no acute DNEL has been derived. Short term exposure, Systemic, Not applicable. Not applicable Since the substance is not classified for acute effects and therefore, no acute DNEL **Dermal** has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Combined has been derived. Short term exposure, Local, Dermal Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Not applicable. Short term exposure, Local, Not applicable. The ECETOC TRA tool has been used to Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 0: Ashless dispersant

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0.027	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	4.35x10-4	8.10x10-4	EUSES calculation
Grassland averaged mg/kg dwt	8.48x10-4	1.22x10-3	EUSES calculation
Groundwater mg/l	Not evaluated.	1.29x10-5	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	7.37x10-6	Not evaluated.	EUSES calculation
Annual average mg/m³	7.37x10-6	7.37x10-6	EUSES calculation
Annual deposition mg/m2/d	3.74x10-5	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14, PROC19

Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 1: Use as an epoxy curing agent

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	0	Not evaluated.	EUSES calculation
Annual average mg/m³	0	6.87x10-13	EUSES calculation
Annual deposition mg/m2/d	0	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 2: Epoxy curing agent in paint

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14, PROC19 Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Local concentration PEC air (local+regional) **Justification** During emission mg/m³ 0 Not evaluated. **EUSES** calculation Annual average mg/m³ 0 6.87x10-13 **EUSES** calculation Annual deposition mg/m2/d **EUSES** calculation Not evaluated. PEC aquatic (local+regional) **Justification Local concentration** Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 3: Lube oil use

Justification Release from point source Total release for regional (local exposure estimation) exposure estimation kg/day kg/dav Waste water 8.49x10-4 737 **EUSES** calculation Surface water Not evaluated. 0 **EUSES** calculation air (direct + STP) 0.231 8 49x10-6 **EUSES** calculation Soil (direct releases only) Not evaluated. 6 94 Not applicable. Justification Value Concentration in sewage (PECstp) 3.07x10-4 **EUSES** calculation Concentration in sewage sludge **EUSES** calculation mg/kg dwt PEC aquatic (local+regional) **Local concentration Justification** Fresh water mg/l 2.35x10-7 8.15x10-3 **EUSES** calculation Marine water mg/l 3.05x10-7 8.02x10-4 **EUSES** calculation Intermittent release. mg/l Not applicable. Not applicable. Not applicable. **Local concentration** PEC sediment (local+regional) **Justification** Fresh water sediment mg/kg dwt Not evaluated. 2.61 **EUSES** calculation Marine water sediment mg/kg dwt Not evaluated 0.257 **EUSES** calculation PEC soil (local+regional) Local concentration Justification Agricultural soil averaged mg/kg 8.40x10-8 3.75x10-4 **EUSES** calculation dwt Grassland averaged mg/kg dwt 1.64x10-7 3.75x10-4 **EUSES** calculation Groundwater mg/l Not evaluated. 5.914x10-6 **EUSES** calculation **Local concentration** PEC air (local+regional) **Justification** During emission mg/m³ 2.36x10-9 Not evaluated. **EUSES** calculation Annual average mg/m³ 1.42x10-9 1.42x10-9 **EUSES** calculation Annual deposition mg/m2/d 7.21x10-9 Not evaluated. **EUSES** calculation **Local concentration** PEC aquatic (local+regional) **Justification** Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 4: Laboratory chemicals

	(local exposure estimation) kg/day	exposure estimation kg/day	Justification
Waste water	0.022	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	1.10x10-5	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	7.96x10-3	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	6.09x10-6	8.15x10-3	EUSES calculation
Marine water mg/l	7.92x10-6	8.10x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14, PROC19

Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Justification

Marine water sediment mg/kg dwt 0.259 **EUSES** calculation Not evaluated. **Local concentration** PEC soil (local+regional) **Justification EUSES** calculation Agricultural soil averaged mg/kg 1.81x10-7 3.75x10-4 Grassland averaged mg/kg dwt 3.52x10-7 3.75x10-4 **EUSES** calculation Groundwater mg/l 5.91x10-6 **EUSES** calculation Not evaluated. PEC air (local+regional) **Justification Local concentration** During emission mg/m³ 3.06x10-9 Not evaluated. **EUSES** calculation Annual average mg/m³ 3.06x10-9 3.06x10-9 **EUSES** calculation Annual deposition mg/m2/d 1.55x10-8 Not evaluated. **EUSES** calculation **Local concentration** PEC aquatic (local+regional) **Justification** Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 5: Use of coatings and adhesives

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0.012	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	1.67x10-4	5.42x10-4	EUSES calculation
Grassland averaged mg/kg dwt	3.26x10-4	7.01x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	8.61x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	3.45x10-6	Not evaluated.	EUSES calculation
Annual average mg/m³	2.83x10-6	2.83x10-6	EUSES calculation
Annual deposition mg/m2/d	1.44x10-5	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 4: Guidance to check compliance with the exposure scenario

Environment Not available.

Health Not available.

Section 5. Remarks: Additional good practice advice beyond the REACH CSA

EnvironmentNot applicable.HealthNot applicable.Additional good practicesNot applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial Process Category: PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14, PROC19 Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Annex to the extended Safety Data Sheet (eSDS)

Industrial

Identification of the substance or mixture

Product definition UVCB

Product name Pentaethylenehexamine, PEHA

Section 1: Title

Short title of the exposure scenario Identified use name: Use of ethylenamines in open processes with high exposure potential and

> evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial Process Category: PROC05, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14

Substance supplied to that use in form of: In a mixture

Sector of end use: SU03, SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c,

ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

List of use descriptors Identified use name: Use of ethylenamines in open processes with high exposure potential and

> evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial Process Category: PROC05, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14

Substance supplied to that use in form of: In a mixture

Sector of end use: SU03, SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c,

ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Section 2: Operational conditions and risk management measures

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 0: Mixing or blending in batch processes for formulation of preparations*

and articles (multistage and/or significant contact)

Product Characteristics: Liquid. Covers concentrations up to 0.5%

Not applicable. Amounts used:

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Indoor. industrial setting Other operational conditions affecting worker exposure:

Indoor, industrial setting and professional setting

Indoor, professional setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion Not applicable.

from source towards the worker:

Organisational measures to prevent/limit releases,

Not applicable.

Not applicable.

dispersion and exposure:

Personal protection:

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 1: Industrial spraying

Product Characteristics: Liquid. Covers concentrations up to 0.5%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg Human factors not influenced by risk management:

Not applicable.

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Use the following local exhaust ventilation types: Treat air emission to provide a typical

removal efficiency of (%): 90%

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial Process Category: PROC05, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14

Substance supplied to that use in form of: In a mixture Sector of end use: SU03. SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05,

ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 2: Transfer of substance or preparation (charging/discharging) from/to

vessels/large containers at non-dedicated facilities

Product Characteristics: Liquid. Covers concentrations up to 0.5%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor. industrial setting

Indoor. industrial setting and professional setting

Indoor. professional setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

from source towards the worker:

Not applicable.

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 3: Transfer of substance or preparation (charging/discharging) from/to

vessels/large containers at dedicated facilities

Product Characteristics: Liquid. Covers concentrations up to 0.5%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor. industrial setting Indoor. industrial setting and professional setting

Indoor, professional setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

from source towards the worker:

Not applicable.

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 4: Transfer of substance or preparation into small containers (dedicated

filling line, including weighing)

Product Characteristics: Liquid. Covers concentrations up to 0.5%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor. industrial setting

Indoor. industrial setting and professional setting

Indoor. professional setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

from source towards the worker:

Not applicable.

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Pentaethylenehexamine. PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial Process Category: PROC05, PROC07, PROC08a, PROC08b, PROC09,

PROC10, PROC13, PROC14
Substance supplied to that use in form of: In a mixture

Sector of end use: SU03, SU22 Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 5: Roller application or brushing

Product Characteristics: Liquid. Covers concentrations up to 0.5%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, industrial setting

Indoor, industrial setting and professional setting

Indoor. professional setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

from source towards the worker:

Not applicable.

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 6: Treatment of articles by dipping and pouring

Product Characteristics: Liquid. Covers concentrations up to 0.5%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor. industrial setting

Indoor, industrial setting and professional setting

Indoor. professional setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

from source towards the worker:

Not applicable.

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 7: Production of preparations* or articles by tabletting, compression,

extrusion, pelletisation

Product Characteristics: Liquid. Covers concentrations up to 0.5%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor. industrial setting

Indoor. industrial setting and professional setting

Indoor. professional setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

from source towards the worker:

Pentaethylenehexamine, PEHA

Not applicable.

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive $\,$

management supervision controls.

Section 2.2: Control of environmental exposure

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial

of preparations containing EA up to 0.5% - Industrial Process Category: PROC05, PROC07, PROC08a, PROC08b, PROC09,

PROC10, PROC13, PROC14
Substance supplied to that use in form of: In a mixture

Sector of end use: SU03, SU22 Subsequent service life relevant for that use: No.

ERC08d, ERC08e, ERC08f, ERC11a

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c,

Contributing exposure scenario controlling environmental exposure for 0: Ashless dispersant Operational conditions: Indoor/Outdoor use. **Product Characteristics:** Not applicable Concentration of substance in mixture or article: Amounts used: Regional use tonnage (tonnes/year): 4840 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 967 Average Local Daily Tonnage (kg/day): 2649 Frequency and duration of use: Continuous release. Emission Days (days/year): 365 Environmental factors not influenced by risk management: Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None. exposure: Release fraction to air from process (initial release prior to 1.00x10-5 RMM): Release fraction to soil from process (initial release prior to Release fraction to wastewater from process (initial release prior to RMM): Technical conditions and measures at process level (source) to Not applicable. prevent release: Technical on-site conditions and measures to reduce or limit Soil emission controls are not applicable as there is no direct release to soil. discharges, air emissions and releases to soil: Treat air emission to provide a typical removal efficiency of No air emission controls required; required removal efficiency is 0%. Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required. to provide the required removal efficiency of 3 (%): Organisational measures to prevent/limit release from site: Conditions and measures related to municipal sewage treatment plant: Contributing exposure scenario controlling environmental exposure for 1: Use as an epoxy curing agent Operational conditions: Indoor/Outdoor use. **Product Characteristics:** Not applicable. Concentration of substance in mixture or article: Amounts used: 1860 Regional use tonnage (tonnes/year): Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1240 Frequency and duration of use: Continuous release. Emission Days (days/year): 300 Environmental factors not influenced by risk management: Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None. Release fraction to air from process (initial release prior to 1 00x10-5 RMM): Release fraction to soil from process (initial release prior to RMM): Release fraction to wastewater from process (initial release prior to RMM): Technical conditions and measures at process level (source) to Not applicable.

prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

(%):

No air emission controls required; required removal efficiency is 0%.

Soil emission controls are not applicable as there is no direct release to soil.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial Process Category: PROC05, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14

Substance supplied to that use in form of: In a mixture Sector of end use: SU03, SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c,

ERC08d, ERC08e, ERC08f, ERC11a 122/200

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required. to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Contributing exposure scenario controlling environmental exposure for 2: Epoxy curing agent in paint

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1860 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1240

Frequency and duration of use:

Emission Days (days/year): 300

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 None.

Other operational conditions of use affecting environmental exposure:

Release fraction to air from process (initial release prior to

Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required.

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Continuous release.

1.00x10-5

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Contributing exposure scenario controlling environmental exposure for 3: Lube oil use

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1300 Fraction of Regional tonnage used locally: 20% 260 Annual site tonnage (tonnes/year): Average Local Daily Tonnage (kg/day): 1182

Continuous release. Frequency and duration of use:

Emission Days (days/year): 220

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None.

exposure:

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to RMM):

1.00x10-5

1.00x10-3

1 00x10-3

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial Process Category: PROC05, PROC07, PROC08a, PROC08b, PROC09,

PROC10, PROC13, PROC14 Substance supplied to that use in form of: In a mixture

Sector of end use: SU03. SU22 Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c,

ERC08d, ERC08e, ERC08f, ERC11a

Release fraction to wastewater from process (initial release prior to RMM):

Technical conditions and measures at process level (source) to prevent release:

Not applicable.

1 00x10-5

1.00x10-4

Not applicable.

0.02

Technical on-site conditions and measures to reduce or limit

Soil emission controls are not applicable as there is no direct release to soil.

discharges, air emissions and releases to soil: Treat air emission to provide a typical removal efficiency of

No air emission controls required; required removal efficiency is 0%.

Treat on-site wastewater (prior to receiving water discharge) =>27.7

to provide the required removal efficiency of 3 (%):

Conditions and measures related to municipal sewage treatment

Organisational measures to prevent/limit release from site:

Contributing exposure scenario controlling environmental exposure for 4: Laboratory chemicals

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

100 Regional use tonnage (tonnes/year): Fraction of Regional tonnage used locally: 20% 20 1 Annual site tonnage (tonnes/year): Average Local Daily Tonnage (kg/day):

Frequency and duration of use: Continuous release

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 None Other operational conditions of use affecting environmental exposure:

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to

RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of (%):

Treat on-site wastewater (prior to receiving water discharge) =>27.7 to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

plant:

Contributing exposure scenario controlling environmental exposure for 5: Use of coatings and adhesives

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1860 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1019

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Process Category: PROC05, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14

Substance supplied to that use in form of: In a mixture Sector of end use: SU03, SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c,

ERC08d, ERC08e, ERC08f, ERC11a

Local marine water dilution factor: Other operational conditions of use affecting environmental exposure:

Release fraction to air from process (initial release prior to

Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release prior to RMM):

Technical conditions and measures at process level (source) to prevent release:

Technical on-site conditions and measures to reduce or limit

Soil emission controls are not applicable as there is no direct release to soil.

discharges, air emissions and releases to soil: Treat air emission to provide a typical removal efficiency of

No air emission controls required; required removal efficiency is 0%.

to provide the required removal efficiency of 3 (%):

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required.

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Section 3: Exposure estimation

Section 3.1Workers Exposure estimation

Contributing exposure scenario controlling worker exposure for 0: Mixing or blending in batch processes for formulation of preparations*

1000

None.

1x10-5

Not applicable.

and articles (multistage and/or significant contact)

Route of exposure **Contributing scenarios Dose/Concentration Justification**

Long term exposure, Systemic, Not applicable. Not applicable. The ECETOC TRA tool has been used to

Dermal estimate workplace exposures unless otherwise indicated. The PROC with the

highest exposure level is given since the exposure estimates for other PROC are below this value

The ECETOC TRA tool has been used to Long term exposure, Systemic, Not applicable. Not applicable.

Inhalable

estimate workplace exposures unless otherwise indicated. The PROC with the

highest exposure level is given since the exposure estimates for other PROC are below this value

Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined

Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable.

Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for

acute effects and therefore, no acute DNEL Inhalable has been derived.

Short term exposure, Systemic, Not applicable. Since the substance is not classified for Not applicable

acute effects and therefore, no acute DNEL Dermal

has been derived. Since the substance is not classified for Short term exposure, Systemic, Not applicable Not applicable.

acute effects and therefore, no acute DNEL Inhalable

has been derived.

Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL

has been derived.

Short term exposure, Local, Dermal Not applicable Not applicable. Since the substance is not classified for

acute effects and therefore, no acute DNEL

has been derived.

Short term exposure, Local, Not applicable. Not applicable.

Inhalable

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial Process Category: PROC05, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14

Substance supplied to that use in form of: In a mixture Sector of end use: SU03, SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c,

ERC08d, ERC08e, ERC08f, ERC11a

Section 3.1Workers Exposure estimation Contributing exposure scenario controlling worker exposure for 1: Industrial spraying Route of exposure **Contributing scenarios Dose/Concentration Justification** Long term exposure, Systemic, The ECETOC TRA tool has been used to Not applicable. Not applicable. **Dermal** estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value The ECETOC TRA tool has been used to Long term exposure, Systemic, Not applicable. Not applicable. Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Since the substance is not classified for Long term exposure, Local, Not applicable Not applicable. acute effects and therefore, no acute DNEL Inhalable has been derived Short term exposure, Systemic, Not applicable. Not applicable Since the substance is not classified for **Dermal** acute effects and therefore, no acute DNEL has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for Inhalable acute effects and therefore, no acute DNEL has been derived. Since the substance is not classified for Short term exposure, Systemic, Not applicable Not applicable. acute effects and therefore, no acute DNEL Combined has been derived Since the substance is not classified for Short term exposure, Local, Dermal Not applicable Not applicable. acute effects and therefore, no acute DNEL has been derived. Short term exposure, Local, Not applicable. Not applicable. The ECETOC TRA tool has been used to Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value **Section 3.1Workers Exposure estimation** Contributing exposure scenario controlling worker exposure for 2: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities **Dose/Concentration** Route of exposure **Contributing scenarios Justification** Long term exposure, Systemic, The ECETOC TRA tool has been used to Not applicable. Not applicable. **Dermal** estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value The ECETOC TRA tool has been used to Long term exposure, Systemic, Not applicable. Not applicable. Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for Inhalable acute effects and therefore, no acute DNEL has been derived. Short term exposure, Systemic, Not applicable. Not applicable Since the substance is not classified for **Dermal** acute effects and therefore, no acute DNEL has been derived Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived Short term exposure, Systemic, Since the substance is not classified for Not applicable Not applicable. acute effects and therefore, no acute DNEL Combined has been derived. Short term exposure, Local, Dermal Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial Process Category: PROC05, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14

Substance supplied to that use in form of: In a mixture Sector of end use: SU03, SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Short term exposure, Local, Not applicable. Not applicable. The ECETOC TRA tool has been used to Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Section 3.1Workers Exposure estimation Contributing exposure scenario controlling worker exposure for 3: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities Route of exposure **Contributing scenarios Dose/Concentration** Justification Long term exposure, Systemic, Not applicable. Not applicable. The ECETOC TRA tool has been used to estimate workplace exposures unless **Dermal** otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. The ECETOC TRA tool has been used to estimate workplace exposures unless Inhalable otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined Not applicable. Long term exposure, Local, Dermal Not applicable. Not applicable. Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for Inhalable acute effects and therefore, no acute DNEL has been derived. Short term exposure, Systemic, Not applicable. Since the substance is not classified for Not applicable **Dermal** acute effects and therefore, no acute DNEL has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived. Not applicable. Since the substance is not classified for Short term exposure, Systemic, Not applicable acute effects and therefore, no acute DNEL Combined has been derived. Short term exposure, Local, Dermal Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Short term exposure, Local, Not applicable. Not applicable. The ECETOC TRA tool has been used to estimate workplace exposures unless Inhalable otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value **Section 3.1Workers Exposure estimation** Contributing exposure scenario controlling worker exposure for 4: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) Route of exposure **Contributing scenarios Dose/Concentration Justification** The ECETOC TRA tool has been used to Long term exposure, Systemic, Not applicable. Not applicable. Dermal estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the

exposure estimates for other PROC are

below this value Long term exposure, Systemic, Not applicable. Not applicable. The ECETOC TRA tool has been used to

Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value Not applicable. Not applicable. Not applicable. Long term exposure, Systemic,

Combined Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable.

Long term exposure, Local,

Since the substance is not classified for Not applicable Not applicable. acute effects and therefore, no acute DNEL Inhalable

has been derived.

Short term exposure, Systemic, Not applicable. Since the substance is not classified for Not applicable

Dermal acute effects and therefore, no acute DNEL

has been derived.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial Process Category: PROC05, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14

Substance supplied to that use in form of: In a mixture Sector of end use: SU03, SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Short term exposure, Systemic, Not applicable. Since the substance is not classified for Not applicable Inhalable acute effects and therefore, no acute DNEL has been derived. Short term exposure, Systemic, Not applicable. Since the substance is not classified for Not applicable acute effects and therefore, no acute DNEL Combined has been derived. Since the substance is not classified for Short term exposure, Local, Dermal Not applicable Not applicable.

below this value

otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

Not applicable.

acute effects and therefore, no acute DNEL

The ECETOC TRA tool has been used to

estimate workplace exposures unless

estimate workplace exposures unless otherwise indicated. The PROC with the

has been derived.

Section 3.1Workers Exposure estimation

Short term exposure, Local,

Inhalable

Inhalable

Combined

Contributing exposure scenario controlling worker exposure for 5: Roller application or brushing

Not applicable.

Route of exposure **Dose/Concentration Justification Contributing scenarios** Long term exposure, Systemic, Not applicable. Not applicable. The ECETOC TRA tool has been used to

estimate workplace exposures unless **Dermal** otherwise indicated. The PROC with the highest exposure level is given since the

exposure estimates for other PROC are below this value Not applicable. The ECETOC TRA tool has been used to Long term exposure, Systemic, Not applicable.

highest exposure level is given since the exposure estimates for other PROC are below this value

Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined

Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable.

Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for

Inhalable acute effects and therefore, no acute DNEL

has been derived

Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for **Dermal** acute effects and therefore, no acute DNEL

has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for

acute effects and therefore, no acute DNEL Inhalable has been derived.

Since the substance is not classified for Not applicable. Short term exposure, Systemic, Not applicable

acute effects and therefore, no acute DNEL Combined has been derived.

Short term exposure, Local, Dermal Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL

has been derived.

Short term exposure, Local, Not applicable. Not applicable. The ECETOC TRA tool has been used to estimate workplace exposures unless Inhalable

otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value **Section 3.1Workers Exposure estimation**

Contributing exposure scenario controlling worker exposure for 6: Treatment of articles by dipping and pouring

Route of exposure **Contributing scenarios Dose/Concentration**

The ECETOC TRA tool has been used to Long term exposure, Systemic, Not applicable. Not applicable. estimate workplace exposures unless **Dermal**

otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value Long term exposure, Systemic, Not applicable. Not applicable. The ECETOC TRA tool has been used to Inhalable estimate workplace exposures unless

otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value Long term exposure, Systemic, Not applicable. Not applicable. Not applicable.

Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable.

Pentaethylenehexamine, PEHA Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial Process Category: PROC05, PROC07, PROC08a, PROC08b, PROC09,

PROC10, PROC13, PROC14 Substance supplied to that use in form of: In a mixture Sector of end use: SU03, SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for Inhalable acute effects and therefore, no acute DNEL has been derived. Not applicable. Short term exposure, Systemic, Not applicable Since the substance is not classified for acute effects and therefore, no acute DNEL Dermal has been derived Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable. Since the substance is not classified for Not applicable Combined acute effects and therefore, no acute DNEL

Short term exposure, Local, Dermal Not applicable

has been derived. Not applicable. Since the substance is not classified for

acute effects and therefore, no acute DNEL

has been derived.

Short term exposure, Local,

Inhalable

Not applicable.

Not applicable.

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value

Section 3.1Workers Exposure estimation

Contributing exposure scenario controlling worker exposure for 7: Production of preparations* or articles by tabletting, compression, extrusion, pelletisation

Route of exposure

Long term exposure, Systemic, **Dermal**

Contributing scenarios Not applicable.

Dose/Concentration Not applicable.

Justification

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value

Long term exposure, Systemic,

Inhalable

Not applicable.

Not applicable.

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value Not applicable.

Long term exposure, Systemic, Combined

Long term exposure, Local, Dermal Not applicable.

Long term exposure, Local,

Inhalable

Not applicable

Not applicable.

Not applicable.

Not applicable.

Not applicable.

Not applicable.

Not applicable.

Since the substance is not classified for acute effects and therefore, no acute DNEL

Since the substance is not classified for acute effects and therefore, no acute DNEL

has been derived.

Short term exposure, Systemic, **Dermal**

Short term exposure, Systemic,

Short term exposure, Systemic,

Short term exposure, Local, Dermal Not applicable

Not applicable

Not applicable

Not applicable.

has been derived. Since the substance is not classified for acute effects and therefore, no acute DNEL

has been derived.

Not applicable Not applicable. Combined

Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.

Not applicable.

Since the substance is not classified for acute effects and therefore, no acute DNEL

has been derived.

Short term exposure, Local,

Inhalable

Not applicable.

Not applicable.

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

otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 0: Ashless dispersant

Total release for regional Justification Release from point source exposure estimation kg/day (local exposure estimation) kg/day

737 Waste water 0 **EUSES** calculation Surface water Not evaluated. **EUSES** calculation air (direct + STP) 0.027 0.231 **EUSES** calculation Soil (direct releases only) Not evaluated. 6.94 Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial Process Category: PROC05, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14

Substance supplied to that use in form of: In a mixture Sector of end use: SU03, SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Justification Concentration in sewage (PECstp) **EUSES** calculation EUSES Not applicable as there is no release to wastewater. calculation Concentration in sewage sludge Not applicable as there is no **EUSES** calculation mg/kg dwt release to wastewater. PEC aquatic (local+regional) **Justification Local concentration EUSES** calculation Fresh water mg/l 8.15x10-3 8.02x10-4 **EUSES** calculation Marine water mg/l Intermittent release. mg/l Not applicable. Not applicable. Not applicable. **Local concentration** PEC sediment (local+regional) **Justification** Fresh water sediment mg/kg dwt Not evaluated. **EUSES** calculation Marine water sediment mg/kg dwt 0.256 **EUSES** calculation Not evaluated. **Local concentration** PEC soil (local+regional) **Justification** 4.35x10-4 8.10x10-4 **EUSES** calculation Agricultural soil averaged mg/kg Grassland averaged mg/kg dwt 8.48x10-4 1.22x10-3 **EUSES** calculation Groundwater mg/l Not evaluated. 1.29x10-5 **EUSES** calculation PEC air (local+regional) **Justification Local concentration** During emission mg/m³ **EUSES** calculation 7.37x10-6 Not evaluated. Annual average mg/m³ 7.37x10-6 7.37x10-6 **EUSES** calculation Annual deposition mg/m2/d 3 74x10-5 Not evaluated. **EUSES** calculation **Local concentration** PEC aquatic (local+regional) **Justification** Not applicable. Micro-organism mg/l Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 1: Use as an epoxy curing agent

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	0	Not evaluated.	EUSES calculation
Annual average mg/m³	0	6.87x10-13	EUSES calculation
Annual deposition mg/m2/d	0	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial Process Category: PROC05, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14

Substance supplied to that use in form of: In a mixture Sector of end use: SU03, SU22 Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 2: Epoxy curing agent in paint

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	0	Not evaluated.	EUSES calculation
Annual average mg/m³	0	6.87x10-13	EUSES calculation
Annual deposition mg/m2/d	0	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 3: Lube oil use

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	8.49x10-4	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	8.49x10-6	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	3.07x10-4	EUSES calculation EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	2.35x10-7	8.15x10-3	EUSES calculation
Marine water mg/l	3.05x10-7	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.257	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	8.40x10-8	3.75x10-4	EUSES calculation

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial Process Category: PROC05, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14

Substance supplied to that use in form of: In a mixture Sector of end use: SU03, SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c,

ERC08d, ERC08e, ERC08f, ERC11a

Grassland averaged mg/kg dwt 1.64x10-7 3.75x10-4 **EUSES** calculation Groundwater mg/l Not evaluated. 5.91x10-6 **EUSES** calculation PEC air (local+regional) **Justification** Local concentration During emission mg/m³ Not evaluated. 2.36x10-9 **EUSES** calculation Annual average mg/m³ 1.42x10-9 1.42x10-9 **EUSES** calculation Annual deposition mg/m2/d 7.21x10-9 Not evaluated. **EUSES** calculation Local concentration PEC aquatic (local+regional) **Justification** Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 4: Laboratory chemicals

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0.022	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	1.10x10-5	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	7.96x10-3	EUSES calculation EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	6.09x10-6	8.15x10-3	EUSES calculation
Marine water mg/l	7.92x10-6	8.10x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.259	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	1.81x10-7	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	3.52x10-7	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	3.06x10-9	Not evaluated.	EUSES calculation
Annual average mg/m³	3.06x10-9	3.06x10-9	EUSES calculation
Annual deposition mg/m2/d	1.55x10-8	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 5: Use of coatings and adhesives

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0.012	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial Process Category: PROC05, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14

Substance supplied to that use in form of: In a mixture Sector of end use: SU03, SU22

Sector of end use. 3003, 3022

Subsequent service life relevant for that use: No.
Environmental Release Category: ERC01, ERC02, ERC04, ERC05,
ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c,
ERC08d, ERC08e, ERC08f, ERC11a

Marine water mg/l 0 8.02x10-4 **EUSES** calculation Intermittent release. mg/l Not applicable. Not applicable. Not applicable. **Local concentration** PEC sediment (local+regional) **Justification** Fresh water sediment mg/kg dwt Not evaluated. 2.61 **EUSES** calculation Marine water sediment mg/kg dwt 0.256 Not evaluated. **EUSES** calculation **Local concentration** PEC soil (local+regional) **Justification** Agricultural soil averaged mg/kg 1.67x10-4 5.42x10-4 **EUSES** calculation 3.26x10-4 7.01x10-4 **EUSES** calculation Grassland averaged mg/kg dwt **EUSES** calculation Groundwater mg/l Not evaluated. 8.61x10-6 **Local concentration** PEC air (local+regional) **Justification** During emission mg/m³ 3.45x10-6 Not evaluated. **EUSES** calculation 2.83x10-6 **EUSES** calculation Annual average mg/m³ 2.83x10-6 Annual deposition mg/m2/d 1.44x10-5 Not evaluated. **EUSES** calculation Local concentration PEC aquatic (local+regional) **Justification** Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 4: Guidance to check compliance with the exposure scenario

Environment Not available.
Health Not available.

Section 5. Remarks: Additional good practice advice beyond the REACH CSA

EnvironmentNot applicable.HealthNot applicable.Additional good practicesNot applicable.

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c,

ERC08d, ERC08e, ERC08f, ERC11a

Annex to the extended Safety Data Sheet (eSDS)

Professional

Identification of the substance or mixture

Product definition UVCB

Product name Pentaethylenehexamine, PEHA

Section 1: Title

Short title of the exposure scenario Identified use name: Use of ethylenamines in open processes with high exposure potential and

evaporation as most likely exposure form - Use of preparations containing EA up to 25% - Professional

Process Category: PROC05, PROC08a

Substance supplied to that use in form of: In a mixture

Sector of end use: SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c,

ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

List of use descriptors Identified use name: Use of ethylenamines in open processes with high exposure potential and

evaporation as most likely exposure form - Use of preparations containing EA up to 25% - Professional

Process Category: PROC05, PROC08a

Substance supplied to that use in form of: In a mixture

Sector of end use: SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c,

ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Section 2: Operational conditions and risk management measures

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 0: Mixing or blending in batch processes for formulation of preparations*

and articles (multistage and/or significant contact)

Product Characteristics: Liquid. Covers concentrations up to 25%

Not applicable. Amounts used:

Frequency and duration of use: Exposure duration per day: 15 min to <1 hour(s)

Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg Human factors not influenced by risk management:

Not applicable.

Indoor. professional setting Other operational conditions affecting worker exposure:

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

Not applicable.

Not applicable.

dispersion and exposure:

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity Personal protection: training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear appropriate respiratory protection. with a

minimum efficacy of 95%

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 1: Transfer of substance or preparation (charging/discharging) from/to

vessels/large containers at non-dedicated facilities

Liquid. Covers concentrations up to 25% **Product Characteristics:**

Amounts used: Not applicable.

Frequency and duration of use: Avoid carrying out operation for more than 15 minutes.

Human factors not influenced by risk management: Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor. professional setting Not applicable.

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Not applicable.

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 25% - Professional Process Category: PROC05, PROC08a Substance supplied to that use in form of: In a mixture Sector of end use: SU22

Personal protection:

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear appropriate respiratory protection, with a minimum efficacy of 95%

Section 2.2: Control of environmental exposure

Contributing exposure scenario controlling environmental exposure for 0: Ashless dispersant

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Regional use tonnage (tonnes/year): 4840 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 967 Average Local Daily Tonnage (kg/day): 2649

Emission Days (days/year):

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000

Other operational conditions of use affecting environmental exposure:

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required.

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

plant:

Concentration of substance in mixture or article:

Amounts used:

Continuous release. Frequency and duration of use:

365

None

1.00x10-5

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Contributing exposure scenario controlling environmental exposure for 1: Use as an epoxy curing agent

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

1860 Regional use tonnage (tonnes/year): 20% Fraction of Regional tonnage used locally: 372 Annual site tonnage (tonnes/year): Average Local Daily Tonnage (kg/day): 1240

Frequency and duration of use:

300 Emission Days (days/year):

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental

exposure:

Release fraction to air from process (initial release prior to

RMM): Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Continuous release

None.

1.00x10-5

Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 25% - Professional Process Category: PROC05, PROC08a Substance supplied to that use in form of: In a mixture Sector of end use: SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Soil emission controls are not applicable as there is no direct release to soil.

Treat air emission to provide a typical removal efficiency of No air emission controls required; required removal efficiency is 0%.

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required.

to provide the required removal efficiency of 3 (%): Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

plant:

Contributing exposure scenario controlling environmental exposure for 2: Epoxy curing agent in paint

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1860 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1240

Frequency and duration of use: Continuous release.

Emission Days (days/year): 300

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None. exposure:

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to Not applicable.

1.00x10-5

prevent release: Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Soil emission controls are not applicable as there is no direct release to soil.

Treat air emission to provide a typical removal efficiency of

plant:

No air emission controls required; required removal efficiency is 0%.

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required.

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

Contributing exposure scenario controlling environmental exposure for 3: Laboratory chemicals

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 100 20% Fraction of Regional tonnage used locally: Annual site tonnage (tonnes/year): 20.1 Average Local Daily Tonnage (kg/day): 55 1

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 None. Other operational conditions of use affecting environmental exposure:

Release fraction to air from process (initial release prior to

RMM):

1.00x10-5

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 25% - Professional Process Category: PROC05, PROC08a Substance supplied to that use in form of: In a mixture

Sector of end use: SU22 Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Release fraction to soil from process (initial release prior to 1.00x10-4 RMM): Release fraction to wastewater from process (initial release 0.02 prior to RMM): Technical conditions and measures at process level (source) to Not applicable. prevent release: Technical on-site conditions and measures to reduce or limit Soil emission controls are not applicable as there is no direct release to soil. discharges, air emissions and releases to soil: Treat air emission to provide a typical removal efficiency of No air emission controls required; required removal efficiency is 0%. Treat on-site wastewater (prior to receiving water discharge) =>27.7 to provide the required removal efficiency of 3 (%): Organisational measures to prevent/limit release from site: Conditions and measures related to municipal sewage treatment

n

0.01

5.00x10-3

Not applicable.

Contributing exposure scenario controlling environmental exposure for 4: Use of coatings and adhesives

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1860
Fraction of Regional tonnage used locally: 20%
Annual site tonnage (tonnes/year): 372
Average Local Daily Tonnage (kg/day): 1019

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000
Other operational conditions of use affecting environmental exposure: None

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to

RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

(%):
Treat on-site wastewater (prior to receiving water discharge) =>27.7

to provide the required removal efficiency of ³ (%):
Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

plant:

Section 3: Exposure estimation

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 25% - Professional Process Category: Process Category in form of Jp a mixture

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Substance supplied to that use in form of: In a mixture

Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Section 3.1Workers Exposure estimated Contributing exposure scenario con and articles (multistage and/or signi	trolling worker exposure for	0: Mixing or blending in batch p	processes for formulation of preparations*
Route of exposure	Contributing scenarios	Dose/Concentration	Justification
Long term exposure, Systemic, Dermal	Not applicable.	0.0685714	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Inhalable	Not applicable.	0.3656 0.365575	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DN has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DN has been derived.
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DN has been derived.
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DI has been derived.
Short term exposure, Local, Dermal	Not applicable.	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DN has been derived.
Short term exposure, Local, Inhalable	Not applicable.	0.73115	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
vessels/large containers at non-dedi Route of exposure	trolling worker exposure for icated facilities Contributing scenarios	Dose/Concentration	paration (charging/discharging) from/to
Long term exposure, Systemic, Dermal	Not applicable.	0.0685714	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Inhalable	Not applicable.	0.365575 0.45697	The ECETOC TRA tool has been used t estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, nhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DN has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DI has been derived.
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DN

Pentaethylenehexamine, PEHA

Inhalable

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 25% - Professional Process Category: PROC05, PROC08a Substance supplied to that use in form of: In a mixture Sector of end use: SU22

Subsequent service life relevant for that use: No.
Environmental Release Category: ERC01, ERC02, ERC04, ERC05,
ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c,
ERC08d, ERC08e, ERC08f, ERC11a

has been derived.

acute effects and therefore, no acute DNEL

Short term exposure, Systemic, Not applicable. Since the substance is not classified for Not applicable acute effects and therefore, no acute DNEL has been derived.

Short term exposure, Local, Dermal Not applicable. Not applicable. Since the substance is not classified for

acute effects and therefore, no acute DNEL

has been derived.

Short term exposure, Local,

Inhalable

Not applicable.

0.73115 0.91393 The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 0: Ashless dispersant

Justification Release from point source Total release for regional (local exposure estimation) exposure estimation kg/day kg/day Waste water 0 737 **EUSES** calculation **Surface water** Not evaluated. **EUSES** calculation air (direct + STP) 0.027 0.231 EUSES calculation Soil (direct releases only) Not evaluated. 6.94 Not applicable. Value **Justification EUSES** calculation Concentration in sewage (PECstp) Not applicable as there is no release to wastewater. Concentration in sewage sludge Not applicable as there is no **EUSES** calculation release to wastewater. mg/kg dwt **Local concentration** PEC aquatic (local+regional) **Justification** Fresh water mg/l 8 15x10-3 **EUSES** calculation Marine water mg/l 8.02x10-4 **EUSES** calculation Intermittent release. mg/l Not applicable. Not applicable. **EUSES** calculation **Local concentration** PEC sediment (local+regional) **Justification** Fresh water sediment mg/kg dwt Not evaluated. 2 61 **EUSES** calculation 0.256 Marine water sediment mg/kg dwt Not evaluated **EUSES** calculation Local concentration PEC soil (local+regional) **Justification** Agricultural soil averaged mg/kg 4.35x10-4 8.10x10-4 **EUSES** calculation Grassland averaged mg/kg dwt 8 48x10-4 1 22x10-3 **EUSES** calculation Groundwater mg/l **EUSES** calculation Not evaluated 1.29x10-5 **Local concentration** PEC air (local+regional) **Justification** During emission mg/m³ 7.37x10-6 Not evaluated. **EUSES** calculation Annual average mg/m³ 7.37x10-6 7.37x10-6 **EUSES** calculation Annual deposition mg/m2/d 3.74x10-5 Not evaluated. **EUSES** calculation **Local concentration** PEC aquatic (local+regional) **Justification** Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 1: Use as an epoxy curing agent

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 25% - Professional Process Category: PROC05, PROC08a Substance supplied to that use in form of: In a mixture Sector of end use: SU22

Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	EUSES calculation
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	0	Not evaluated.	EUSES calculation
Annual average mg/m³	0	6.87x10-13	EUSES calculation
Annual deposition mg/m2/d	0	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 2: Epoxy curing agent in paint

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	EUSES calculation
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	0	Not evaluated.	EUSES calculation
Annual average mg/m³	0	6.87x10-13	EUSES calculation
Annual deposition mg/m2/d	0	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 3: Laboratory chemicals

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0.022	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	1.10x10-5	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 25% - Professional Process Category: PROC05, PROC08a Substance supplied to that use in form of: In a mixture Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Concentration in sewage (PECstp) 7.96x10-3 EUSES calculation Concentration in sewage sludge **EUSES** calculation mg/kg dwt **Local concentration** PEC aquatic (local+regional) **Justification** Fresh water mg/l 6.09x10-6 8.15x10-3 **EUSES** calculation Marine water mg/l 7.92x10-6 8.10x10-4 **EUSES** calculation Intermittent release. mg/l Not applicable. Not applicable. **EUSES** calculation **Local concentration** PEC sediment (local+regional) **Justification** Fresh water sediment mg/kg dwt Not evaluated. **EUSES** calculation Marine water sediment mg/kg dwt Not evaluated. 0.259 **EUSES** calculation **Local concentration** PEC soil (local+regional) Justification Agricultural soil averaged mg/kg 1.81x10-7 3.75x10-4 **EUSES** calculation Grassland averaged mg/kg dwt 3.75x10-4 3.52x10-7 **EUSES** calculation Groundwater mg/l 5.91x10-6 **EUSES** calculation Not evaluated. **Local concentration** PEC air (local+regional) **Justification** During emission mg/m³ 3.06x10-9 Not evaluated. **EUSES** calculation Annual average mg/m³ 3.06x10-9 3.06x10-9 **EUSES** calculation Annual deposition mg/m2/d 1.55x10-8 **EUSES** calculation Not evaluated. PEC aquatic (local+regional) **Local concentration** Justification Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 4: Use of coatings and adhesives

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0.010	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	3.68x10-3	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	2.82x10-6	8.15x10-3	EUSES calculation
Marine water mg/l	3.67x10-6	8.06x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	EUSES calculation
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.258	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	1.15x10-12	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	2.25x10-12	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	1.95x10-14	Not evaluated.	EUSES calculation
Annual average mg/m³	1.95x10-14	7.07x10-13	EUSES calculation
Annual deposition mg/m2/d	9.90x10-14	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 25% - Professional Process Category: PROC05, PROC08a Substance supplied to that use in form of: In a mixture Sector of end use: SU22

Section 4: Guidance to check compliance with the exposure scenario

Environment	Not available.
Health	Not available.

Section 5. Remarks: Additional good practice advice beyond the REACH CSA

Environment	Not applicable.
Health	Not applicable.
Additional good practices	Not applicable.

Annex to the extended Safety Data Sheet (eSDS)

Professional

Identification of the substance or mixture

Product definition UVCB

Product name Pentaethylenehexamine, PEHA

Section 1: Title

Short title of the exposure scenario Identified use name: Use of ethylenamines in open processes with high exposure potential and

evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Professional

Process Category: PROC08a, PROC10, PROC11 Substance supplied to that use in form of: In a mixture

Sector of end use: SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c,

ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

List of use descriptors Identified use name: Use of ethylenamines in open processes with high exposure potential and

evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Professional

Process Category: PROC08a, PROC10, PROC11 Substance supplied to that use in form of: In a mixture

Sector of end use: SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c,

ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Section 2: Operational conditions and risk management measures

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 0: Transfer of substance or preparation (charging/discharging) from/to

vessels/large containers at non-dedicated facilities

Product Characteristics: Liquid. Covers concentrations up to 15%

Not applicable. Amounts used:

Frequency and duration of use: Exposure duration per day: 15 min to <1 hour(s)

Human factors not influenced by risk management: Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg

Not applicable.

Indoor. professional setting Other operational conditions affecting worker exposure:

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

Organisational measures to prevent/limit releases,

from source towards the worker:

removal efficiency of (%): 90%

Use the following local exhaust ventilation types: Treat air emission to provide a typical

Not applicable.

dispersion and exposure:

Personal protection:

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 1: Roller application or brushing

Liquid. Covers concentrations up to 15% **Product Characteristics:**

Amounts used: Not applicable.

Frequency and duration of use: Exposure duration per day: 15 min to <1 hour(s)

Human factors not influenced by risk management: Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, professional setting Not applicable.

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases, dispersion and exposure:

Not applicable.

Not applicable.

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity Personal protection:

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear appropriate respiratory protection. with a

minimum efficacy of 95%

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Professional Process Category: PROC08a, PROC10, PROC11 Substance supplied to that use in form of: In a mixture Sector of end use: SU22

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 2: Non industrial spraying

Product Characteristics: Liquid. Covers concentrations up to 10%

Amounts used: Not applicable.

Frequency and duration of use: Exposure duration per day: 15 min to <1 hour(s)

Human factors not influenced by risk management: Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, professional setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

from source towards the worker:

Use the following local exhaust ventilation types: Treat air emission to provide a typical

removal efficiency of (%): 90%

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection:

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.2: Control of environmental exposure

Contributing exposure scenario controlling environmental exposure for 0: Ashless dispersant

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): Fraction of Regional tonnage used locally: 20% 967 Annual site tonnage (tonnes/year): Average Local Daily Tonnage (kg/day): 2649

Frequency and duration of use: Continuous release

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None.

exposure:

Release fraction to air from process (initial release prior to

Release fraction to soil from process (initial release prior to RMM):

Release fraction to wastewater from process (initial release prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required.

to provide the required removal efficiency of 3 (%): Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

plant:

4840

1.00x10-5

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Contributing exposure scenario controlling environmental exposure for 1: Use as an epoxy curing agent

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1860 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1240

Frequency and duration of use: Continuous release

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Professional Process Category: PROC08a, PROC10, PROC11 Substance supplied to that use in form of: In a mixture Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

300 Emission Days (days/year): **Environmental factors not influenced by risk management:** Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None exposure: Release fraction to air from process (initial release prior to 1.00x10-5 RMM): Release fraction to soil from process (initial release prior to RMM): Release fraction to wastewater from process (initial release prior to RMM): Technical conditions and measures at process level (source) to Not applicable prevent release: Technical on-site conditions and measures to reduce or limit Soil emission controls are not applicable as there is no direct release to soil. discharges, air emissions and releases to soil: Treat air emission to provide a typical removal efficiency of No air emission controls required; required removal efficiency is 0%. (%): Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required. to provide the required removal efficiency of 3 (%): Organisational measures to prevent/limit release from site: Conditions and measures related to municipal sewage treatment plant: Contributing exposure scenario controlling environmental exposure for 2: Epoxy curing agent in paint Operational conditions: Indoor/Outdoor use. Product Characteristics: Not applicable. Concentration of substance in mixture or article: Amounts used: 1860 Regional use tonnage (tonnes/year): Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1240 Frequency and duration of use: Continuous release Emission Days (days/year): 300 Environmental factors not influenced by risk management: Local marine water dilution factor: 1000

1 00x10-5

None Other operational conditions of use affecting environmental

exposure:

Release fraction to air from process (initial release prior to

Release fraction to soil from process (initial release prior to RMM):

Release fraction to wastewater from process (initial release

Pentaethylenehexamine, PEHA

prior to RMM):

Technical conditions and measures at process level (source) to prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil: Treat air emission to provide a typical removal efficiency of

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required. to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Professional Process Category: PROC08a, PROC10, PROC11 Substance supplied to that use in form of: In a mixture

Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a Contributing exposure scenario controlling environmental exposure for 3: Laboratory chemicals Operational conditions: Indoor use.

Product Characteristics: Not applicable

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 100 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 20.1 Average Local Daily Tonnage (kg/day): 55 1

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 None. Other operational conditions of use affecting environmental exposure:

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to 1.00x10-4

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Treat on-site wastewater (prior to receiving water discharge) =>27.7

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

plant:

Contributing exposure scenario controlling environmental exposure for 4: Use of coatings and adhesives

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1860 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1019

Continuous release. Frequency and duration of use:

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None.

exposure:

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to

RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

0.01

Technical conditions and measures at process level (source) to

prevent release:

Not applicable.

5.00x10-3

1.00x10-5

Not applicable.

0.02

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Soil emission controls are not applicable as there is no direct release to soil.

Treat air emission to provide a typical removal efficiency of (%):

No air emission controls required; required removal efficiency is 0%.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Professional Process Category: PROC08a, PROC10, PROC11 Substance supplied to that use in form of: In a mixture Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Treat on-site wastewater (prior to receiving water discharge) =>27.7 to provide the required removal efficiency of ³ (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Section 3: Exposure estimation

iiiialable			has been derived.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNE
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Systemic,	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Systemic, Inhalable	Not applicable.	0.457	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
			otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Dermal	Not applicable.	0.0822	The ECETOC TRA tool has been used to estimate workplace exposures unless
Route of exposure	Contributing scenarios	Dose/Concentration	Justification
Section 3.1Workers Exposure estim Contributing exposure scenario cor		1: Roller application or brushing	g
			highest exposure level is given since the exposure estimates for other PROC are below this value
Short term exposure, Local, Inhalable	Not applicable.	1.097 0.914	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the
Short term exposure, Local, Dermal	Not applicable.	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEI has been derived.
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNE has been derived.
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEI has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNE has been derived.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEI has been derived.
Long term exposure, Local, Dermal		Not applicable.	Not applicable.
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Systemic, Inhalable	Not applicable.	0.548 0.457	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Dermal	Not applicable.	0.0411	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
	•		
Route of exposure	Contributing scenarios	Dose/Concentration	Justification

Pentaethylenehexamine, PEHA Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use

exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Professional Process Category: PROC08a, PROC10, PROC11 Substance supplied to that use in form of: In a mixture

Substance supplied to that use in form of: In a mixture Sector of end use: SU22 Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Short term exposure, Systemic, Not applicable. Not applicable Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived. Since the substance is not classified for Short term exposure, Systemic, Not applicable Not applicable. acute effects and therefore, no acute DNEL

has been derived. Since the substance is not classified for Short term exposure, Local, Dermal Not applicable. Not applicable. acute effects and therefore, no acute DNEL

has been derived 0.914

The ECETOC TRA tool has been used to Short term exposure, Local, Not applicable. estimate workplace exposures unless Inhalable otherwise indicated. The PROC with the

highest exposure level is given since the exposure estimates for other PROC are below this value

Section 3.1Workers Exposure estimation

Combined

Contributing exposure scenario controlling worker exposure for 2: Non industrial spraying

Route of exposure **Contributing scenarios Dose/Concentration Justification**

The ECETOC TRA tool has been used to Long term exposure, Systemic, Not applicable. 0.214 Dermal estimate workplace exposures unless

otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value

Long term exposure, Systemic, Not applicable. 0 121 The ECETOC TRA tool has been used to Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the

highest exposure level is given since the exposure estimates for other PROC are below this value

Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined

Not applicable. Long term exposure, Local, Dermal Not applicable. Not applicable.

Since the substance is not classified for Long term exposure, Local, Not applicable Not applicable.

acute effects and therefore, no acute DNEL Inhalable has been derived.

Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for

acute effects and therefore, no acute DNEL **Dermal** has been derived

Short term exposure, Systemic, Since the substance is not classified for Not applicable Not applicable.

acute effects and therefore, no acute DNEL Inhalable has been derived.

Since the substance is not classified for Short term exposure, Systemic, Not applicable Not applicable. Combined acute effects and therefore, no acute DNEL

has been derived.

Not applicable. Since the substance is not classified for Short term exposure, Local, Dermal Not applicable.

acute effects and therefore, no acute DNEL

has been derived.

Short term exposure, Local, Not applicable. 0.243 The ECETOC TRA tool has been used to

estimate workplace exposures unless Inhalable otherwise indicated. The PROC with the

highest exposure level is given since the exposure estimates for other PROC are

below this value

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 0: Ashless dispersant

Total release for regional Release from point source Justification

(local exposure estimation) exposure estimation kg/day kg/day

Waste water 737 **EUSES** calculation Surface water Not evaluated. O **FUSES** calculation air (direct + STP) 0.027 0.231 **EUSES** calculation

Soil (direct releases only) Not evaluated. 6.94 Not applicable.

Value **Justification**

Concentration in sewage (PECstp) Not applicable as there is no **EUSES** calculation mg/l release to wastewater.

Pentaethylenehexamine, PEHA Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Professional Process Category: PROC08a, PROC10, PROC11 Substance supplied to that use in form of: In a mixture

Sector of end use: SU22 Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Concentration in sewage sludge Not applicable as there is no **EUSES** calculation mg/kg dwt release to wastewater. **Local concentration** PEC aquatic (local+regional) **Justification** Fresh water mg/l 8.15x10-3 **EUSES** calculation Marine water mg/l 0 8.02x10-4 **EUSES** calculation Intermittent release, mg/l Not applicable. Not applicable. Not applicable. **Local concentration** PEC sediment (local+regional) **Justification** Fresh water sediment mg/kg dwt Not evaluated. 2.61 **EUSES** calculation Marine water sediment mg/kg dwt Not evaluated. 0.256 **EUSES** calculation PEC soil (local+regional) **Local concentration Justification** Agricultural soil averaged mg/kg 4.35x10-4 8.10x10-4 **EUSES** calculation dwt Grassland averaged mg/kg dwt 8.48x10-4 1.22x10-3 **EUSES** calculation Groundwater mg/l Not evaluated. 1.29x10-5 **EUSES** calculation **Local concentration** PEC air (local+regional) **Justification** During emission mg/m³ 7.37x10-6 Not evaluated. **EUSES** calculation Annual average mg/m³ 7.37x10-6 7.37x10-6 **EUSES** calculation Annual deposition mg/m2/d 3.74x10-5 Not evaluated. **EUSES** calculation PEC aquatic (local+regional) **Local concentration Justification** Not applicable. Micro-organism mg/l Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 1: Use as an epoxy curing agent

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	0	Not evaluated.	EUSES calculation
Annual average mg/m³	0	6.87x10-13	EUSES calculation
Annual deposition mg/m2/d	0	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 2: Epoxy curing agent in paint

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	0	Not evaluated.	EUSES calculation
Annual average mg/m³	0	6.87x10-13	EUSES calculation
Annual deposition mg/m2/d	0	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 3: Laboratory chemicals

Total release for regional

exposure estimation kg/day

Release from point source

(local exposure estimation)

Waste water	kg/day 0.022	707	EUSES calculation
	***	737	
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	1.10x10-5	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	7.96x10-3	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	6.09x10-6	8.15x10-3	EUSES calculation
Marine water mg/l	7.92x10-6	8.10x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.259	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	1.81x10-7	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	3.52x10-7	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Professional Process Category: PROC08a, PROC10, PROC11 Substance supplied to that use in form of: In a mixture Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Justification

Local concentration PEC air (local+regional) **Justification** During emission mg/m³ 3.06x10-9 Not evaluated. **EUSES** calculation Annual average mg/m³ 3.06x10-9 3 06x10-9 **EUSES** calculation Annual deposition mg/m2/d **EUSES** calculation 1.55x10-8 Not evaluated. Local concentration PEC aquatic (local+regional) Justification Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 4: Use of coatings and adhesives

Release from point source (local exposure estimation)

Total release for regional Justification exposure estimation kg/day

kg/dayWaste waterNot applicable.737EUSES calculationSurface waterNot evaluated.0EUSES calculationair (direct + STP)Not applicable.0.231EUSES calculation

Soil (direct releases only)

Not applicable.

Value

0.231

EUSES calculation

Not applicable.

Value

Justification

Concentration in sewage (PECstp) 3.68x10-3 EUSES calculation

mg/l

Concentration in sewage sludge 0 EUSES calculation mg/kg dwt

Local concentrationPEC aquatic (local+regional)JustificationFresh water mg/l2.82x10-68.15x10-3EUSES calculationMarine water mg/l3.67x10-68.06x10-4EUSES calculationIntermittent release. mg/lNot applicable.Not applicable.Not applicable.

Local concentration PEC sediment (local+regional) Justification

Fresh water sediment mg/kg dwt Not evaluated. 2.61 EUSES calculation

Marine water sediment mg/kg dwt Not evaluated. 0.258 EUSES calculation

Local concentration PEC soil (local+regional) Justification

Agricultural soil averaged mg/kg 1.15x10-12 3.75x10-4 EUSES calculation

Grassland averaged mg/kg dwt 2.25x10-12 3.75x10-4 EUSES calculation

Groundwater mg/I Not evaluated. 5.91x10-6 EUSES calculation

Justification Local concentration PEC air (local+regional) EUSES calculation During emission mg/m³ 1 95x10-14 Not evaluated Annual average mg/m³ 1.95x10-14 7 07x10-3 **EUSES** calculation Annual deposition mg/m2/d 9.90x10-14 Not evaluated. **EUSES** calculation Local concentration PEC aquatic (local+regional) **Justification**

Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 4: Guidance to check compliance with the exposure scenario

Environment Not available.

Health Not available.

Section 5. Remarks: Additional good practice advice beyond the REACH CSA

Environment Not applicable.

Health Not applicable.

Additional good practices Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 15% - Professional Process Category: PROC08a, PROC10, PROC11 Substance supplied to that use in form of: In a mixture Sector of end use: SU22

Annex to the extended Safety Data Sheet (eSDS)

Professional

Identification of the substance or mixture

Product definition UVCB

Product name Pentaethylenehexamine, PEHA

Section 1: Title

Short title of the exposure scenario Identified use name: Use of ethylenamines in open processes with high exposure potential and

evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Professional

Process Category: PROC08a, PROC11

Substance supplied to that use in form of: In a mixture

Sector of end use: SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c,

ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

List of use descriptors Identified use name: Use of ethylenamines in open processes with high exposure potential and

evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Professional

Process Category: PROC08a, PROC11

Substance supplied to that use in form of: In a mixture

Sector of end use: SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c,

ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Section 2: Operational conditions and risk management measures

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 0: Transfer of substance or preparation (charging/discharging) from/to

vessels/large containers at non-dedicated facilities

Product Characteristics: Liquid. Covers concentrations up to 2%

Not applicable. Amounts used:

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg

Not applicable.

Indoor. professional setting Other operational conditions affecting worker exposure:

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Use the following local exhaust ventilation types: Treat air emission to provide a typical removal efficiency of (%): 90%

Not applicable.

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity Personal protection: training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 1: Non industrial spraying

Product Characteristics: Liquid. Covers concentrations up to 2%

Amounts used: Not applicable.

Frequency and duration of use: Avoid carrying out operation for more than 4 hours.

Human factors not influenced by risk management: Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg Other operational conditions affecting worker exposure: Indoor, professional setting

Technical conditions and measures at process level Not applicable.

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Use the following local exhaust ventilation types: Treat air emission to provide a typical

removal efficiency of (%): 90%

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls. Wear appropriate respiratory protection. with a

minimum efficacy of 90%

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Professional Process Category: PROC08a, PROC11 Substance supplied to that use in form of: In a mixture

Sector of end use: SU22 Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Contributing exposure scenario controlling environmental exposure for 0: Ashless dispersant

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 4840 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 967 Average Local Daily Tonnage (kg/day): 2649

Frequency and duration of use: Continuous release.

365 Emission Days (days/year):

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 None. Other operational conditions of use affecting environmental

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to

RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

(%):

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required.

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

plant:

Contributing exposure scenario controlling environmental exposure for 1: Use as an epoxy curing agent

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

1860 Regional use tonnage (tonnes/year): Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1240

Frequency and duration of use: Continuous release.

Emission Days (days/year): 300

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None.

exposure:

Release fraction to air from process (initial release prior to

Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Not applicable.

1.00x10-5

1.00x10-5

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

No air emission controls required; required removal efficiency is 0%.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Professional Process Category: PROC08a, PROC11 Substance supplied to that use in form of: In a mixture

Sector of end use: SU22 Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05,

ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required. to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

plant:

Contributing exposure scenario controlling environmental exposure for 2: Epoxy curing agent in paint

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

1860 Regional use tonnage (tonnes/year): Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1240

Frequency and duration of use: Continuous release.

Emission Days (days/year): 300

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None

exposure:

Release fraction to air from process (initial release prior to 1.00x10-5

RMM):

Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit

Soil emission controls are not applicable as there is no direct release to soil. discharges, air emissions and releases to soil:

Not applicable.

Treat air emission to provide a typical removal efficiency of

No air emission controls required; required removal efficiency is 0%.

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required.

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Contributing exposure scenario controlling environmental exposure for 3: Laboratory chemicals

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

100 Regional use tonnage (tonnes/year): Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 20.1 Average Local Daily Tonnage (kg/day): 55.1

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 None. Other operational conditions of use affecting environmental

exposure:

Release fraction to air from process (initial release prior to 1.00x10-5

RMM):

Release fraction to soil from process (initial release prior to 1.00x10-4

RMM):

Release fraction to wastewater from process (initial release 0.02

prior to RMM):

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Professional Process Category: PROC08a, PROC11

Substance supplied to that use in form of: In a mixture Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Technical conditions and measures at process level (source) to prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Soil emission controls are not applicable as there is no direct release to soil.

Treat air emission to provide a typical removal efficiency of No air emission controls required; required removal efficiency is 0%.

Not applicable.

Treat on-site wastewater (prior to receiving water discharge) =>27.7

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

plant:

Contributing exposure scenario controlling environmental exposure for 4: Use of coatings and adhesives

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1860 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1019

Frequency and duration of use: Continuous release.

365 **Emission Days (days/year):**

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None. exposure:

Release fraction to air from process (initial release prior to

Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of No air emission controls required; required removal efficiency is 0%.

(%): Treat on-site wastewater (prior to receiving water discharge) =>27.7

to provide the required removal efficiency of 3 (%): Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

plant:

Section 3: Exposure estimation

Section 3.1Workers Exposure estimation

Contributing exposure scenario controlling worker exposure for 0: Transfer of substance or preparation (charging/discharging) from/to

5 00x10-3

Not applicable.

0.01

vessels/large containers at non-dedicated facilities Route of exposure

Long term exposure, Systemic,

Dermal

Contributing scenarios

Not applicable.

Dose/Concentration

Not applicable.

Justification

Soil emission controls are not applicable as there is no direct release to soil.

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

highest exposure level is given since the exposure estimates for other PROC are

below this value

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Professional Process Category: PROC08a, PROC11 Substance supplied to that use in form of: In a mixture

Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Long term exposure, Systemic, Not applicable. The ECETOC TRA tool has been used to Not applicable. estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable. Not applicable Since the substance is not classified for acute effects and therefore, no acute DNEL **Dermal** has been derived Not applicable. Since the substance is not classified for Short term exposure, Systemic, Not applicable acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for Combined acute effects and therefore, no acute DNEL has been derived. Short term exposure, Local, Dermal Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived Short term exposure, Local, Not applicable. Not applicable. The ECETOC TRA tool has been used to estimate workplace exposures unless Inhalable otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value **Section 3.1Workers Exposure estimation** Contributing exposure scenario controlling worker exposure for 1: Non industrial spraying **Dose/Concentration** Route of exposure **Contributing scenarios Justification** The ECETOC TRA tool has been used to Long term exposure, Systemic, Not applicable. 0.21 estimate workplace exposures unless Dermal otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, 0.15 The ECETOC TRA tool has been used to Not applicable. estimate workplace exposures unless Inhalable otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for Inhalable acute effects and therefore, no acute DNEL has been derived. Short term exposure, Systemic, Not applicable. Since the substance is not classified for Not applicable acute effects and therefore, no acute DNEL **Dermal** has been derived. Short term exposure, Systemic, Not applicable. Since the substance is not classified for Not applicable Inhalable acute effects and therefore, no acute DNEL has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Combined has been derived. Not applicable. Since the substance is not classified for Short term exposure, Local, Dermal Not applicable acute effects and therefore, no acute DNEL has been derived. The ECETOC TRA tool has been used to 0.30 Short term exposure, Local, Not applicable. Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the

below this value

highest exposure level is given since the exposure estimates for other PROC are

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 0: Ashless dispersant

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0.027	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	4.35x10-4	8.10x10-4	EUSES calculation
Grassland averaged mg/kg dwt	8.48x10-4	1.22x10-3	EUSES calculation
Groundwater mg/l	Not evaluated.	1.29x10-5	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	7.37x10-6	Not evaluated.	EUSES calculation
Annual average mg/m³	7.37x10-6	7.37x10-6	EUSES calculation
Annual deposition mg/m2/d	3.74x10-5	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 1: Use as an epoxy curing agent

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Professional Process Category: PROC08a, PROC11
Substance supplied to that use in form of: In a mixture

Sector of end use: SU22
Subsequent service life relevant for that use: No.
Environmental Release Category: ERC01, ERC02, ERC04, ERC05,
ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c,
ERC08d, ERC08e, ERC08f, ERC11a

During emission mg/m³ 0 Not evaluated. **EUSES** calculation Annual average mg/m³ 0 6.87x10-13 **EUSES** calculation Annual deposition mg/m2/d Not evaluated. **EUSES** calculation **Local concentration** PEC aquatic (local+regional) **Justification** Not applicable. Micro-organism mg/l Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 2: Epoxy curing agent in paint

Release from point source Total release for regional **Justification** (local exposure estimation) exposure estimation kg/day kg/day Waste water 737 **FUSES** calculation Surface water **EUSES** calculation Not evaluated. 0 air (direct + STP) 0.231 **EUSES** calculation Soil (direct releases only) Not evaluated. 6 94 Not applicable. **Justification** Concentration in sewage (PECstp) Not applicable as there is no **EUSES** calculation release to wastewater. Concentration in sewage sludge **EUSES** calculation Not applicable as there is no mg/kg dwt release to wastewater. **Local concentration** PEC aquatic (local+regional) **Justification** Fresh water mg/l 8.15x10-3 **EUSES** calculation Marine water mg/l 8.02x10-4 **EUSES** calculation Intermittent release. mg/l Not applicable. Not applicable. Not applicable. **Local concentration** PEC sediment (local+regional) **Justification** Fresh water sediment mg/kg dwt Not evaluated. 2.61 **EUSES** calculation Marine water sediment mg/kg dwt Not evaluated. 0.256 **EUSES** calculation **Local concentration** PEC soil (local+regional) **Justification** 3.75x10-4 **EUSES** calculation Agricultural soil averaged mg/kg Grassland averaged mg/kg dwt 3.75x10-4 **EUSES** calculation Groundwater mg/l Not evaluated. 5.91x10-6 **EUSES** calculation **Local concentration** PEC air (local+regional) **Justification** During emission mg/m³ 0 Not evaluated. **FUSES** calculation 0 Annual average mg/m³ 6 87x10-13 **EUSES** calculation Annual deposition mg/m2/d Not evaluated. **EUSES** calculation **Local concentration** PEC aquatic (local+regional) **Justification**

Section 3.2 Environment Exposure estimation

Not applicable.

Release from point source

Contributing exposure scenario controlling environmental exposure for 3: Laboratory chemicals

Not applicable.

Total release for regional

	(local exposure estimation) kg/day	exposure estimation kg/day	Justinication
Waste water	0.022	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	1.10x10-5	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	7.96x10-3	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	6.09x10-6	8.15x10-3	EUSES calculation
Marine water mg/l	7.92x10-6	8.10x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.259	EUSES calculation

Pentaethylenehexamine, PEHA

Micro-organism mg/l

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Professional Process Category: PROC08a, PROC11

Substance supplied to that use in form of: In a mixture Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Not applicable.

Justification

Local concentration PEC soil (local+regional) Justification Agricultural soil averaged mg/kg 1.81x10-7 3.75x10-4 **EUSES** calculation dwt Grassland averaged mg/kg dwt 3.52x10-7 3.75x10-4 **EUSES** calculation Groundwater mg/l **EUSES** calculation Not evaluated. 5.91x10-6 **Local concentration** PEC air (local+regional) **Justification** During emission mg/m³ Not applicable. Not evaluated. **EUSES** calculation Annual average mg/m³ Not applicable. Not applicable. **EUSES** calculation Annual deposition mg/m2/d Not applicable. Not evaluated. **EUSES** calculation **Local concentration** PEC aquatic (local+regional) **Justification** Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 4: Use of coatings and adhesives

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0.010	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	3.68x10-3	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	2.82x10-6	8.15x10-3	EUSES calculation
Marine water mg/l	3.67x10-6	8.06x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.258	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	1.15x10-12	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	2.25x10-12	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	1.95x10-14	Not evaluated.	EUSES calculation
Annual average mg/m³	1.95x10-14	7.07x10-13	EUSES calculation
Annual deposition mg/m2/d	9.90x10-14	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 4: Guidance to check compliance with the exposure scenario

ſ	Environment	Not available.
	Health	Not available.

Section 5. Remarks: Additional good practice advice beyond the REACH CSA

Environment	Not applicable.
Health	Not applicable.
Additional good practices	Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Professional Process Category: PROC08a, PROC11

Substance supplied to that use in form of: In a mixture Sector of end use: SU22

Annex to the extended Safety Data Sheet (eSDS)

Professional

Identification of the substance or mixture

Product definition UVCB

Product name Pentaethylenehexamine, PEHA

Section 1: Title

Short title of the exposure scenario Identified use name: Use of ethylenamines in open processes with high exposure potential and

evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Professional

Process Category: PROC08a, PROC11

Substance supplied to that use in form of: In a mixture

Sector of end use: SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c,

ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

List of use descriptors Identified use name: Use of ethylenamines in open processes with high exposure potential and

evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Professional

Process Category: PROC08a, PROC11

Substance supplied to that use in form of: In a mixture

Sector of end use: SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c,

ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Section 2: Operational conditions and risk management measures

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 0: Transfer of substance or preparation (charging/discharging) from/to

vessels/large containers at non-dedicated facilities

Product Characteristics: Liquid. Covers concentrations up to 0.5%

Not applicable. Amounts used:

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg Human factors not influenced by risk management:

Not applicable.

Not applicable.

Indoor. professional setting Other operational conditions affecting worker exposure:

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity Personal protection: training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 1: Non industrial spraying

Product Characteristics: Liquid. Covers concentrations up to 0.5%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, professional setting Not applicable.

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Use the following local exhaust ventilation types: Treat air emission to provide a typical

removal efficiency of (%): 90%

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Professional Process Category: PROC08a, PROC11 Substance supplied to that use in form of: In a mixture

Sector of end use: SU22 Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Contributing exposure scenario controlling environmental exposure for 0: Ashless dispersant

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 4840 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 967 Average Local Daily Tonnage (kg/day): 2649

Frequency and duration of use: Continuous release.

365 Emission Days (days/year):

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 None. Other operational conditions of use affecting environmental

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to

RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

(%):

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required.

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Contributing exposure scenario controlling environmental exposure for 1: Use as an epoxy curing agent

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

1860 Regional use tonnage (tonnes/year): Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1240

Frequency and duration of use: Continuous release.

Emission Days (days/year): 300

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None.

exposure:

Release fraction to air from process (initial release prior to

Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Not applicable.

1.00x10-5

1.00x10-5

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

No air emission controls required; required removal efficiency is 0%.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Professional Process Category: PROC08a, PROC11

Substance supplied to that use in form of: In a mixture Sector of end use: SU22 Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required. to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

plant:

Contributing exposure scenario controlling environmental exposure for 2: Epoxy curing agent in paint

1.00x10-5

Not applicable.

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

1860 Regional use tonnage (tonnes/year): Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1240

Frequency and duration of use: Continuous release.

Emission Days (days/year): 300

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 None

Other operational conditions of use affecting environmental

exposure:

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required.

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Contributing exposure scenario controlling environmental exposure for 3: Laboratory chemicals

Operational conditions: Indoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

100 Regional use tonnage (tonnes/year): Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 20.1 Average Local Daily Tonnage (kg/day): 55.1

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 None. Other operational conditions of use affecting environmental

exposure:

Release fraction to air from process (initial release prior to 1.00x10-5

RMM):

Release fraction to soil from process (initial release prior to 1.00x10-4

RMM):

Release fraction to wastewater from process (initial release 0.02

prior to RMM):

Pentaethylenehexamine, PEHA

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Professional Process Category: PROC08a, PROC11

Substance supplied to that use in form of: In a mixture

Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Identified use name: Use of ethylenamines in open processes with high

Technical conditions and measures at process level (source) to prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Soil emission controls are not applicable as there is no direct release to soil.

Treat air emission to provide a typical removal efficiency of No air emission controls required; required removal efficiency is 0%.

Treat on-site wastewater (prior to receiving water discharge) =>27.7 to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

plant:

Contributing exposure scenario controlling environmental exposure for 4: Use of coatings and adhesives

Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1860 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1019

Frequency and duration of use: Continuous release.

Emission Days (days/year):

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None. exposure:

Release fraction to air from process (initial release prior to

Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of No air emission controls required; required removal efficiency is 0%.

(%):

to provide the required removal efficiency of 3 (%):

Dermal

Operational conditions: Indoor/Outdoor use.

Product Characteristics:

365

Not applicable.

5 00x10-3

0.01

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

Treat on-site wastewater (prior to receiving water discharge) =>27.7

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Section 3: Exposure estimation

Section 3.1Workers Exposure estimation

Contributing exposure scenario controlling worker exposure for 0: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

Route of exposure Long term exposure, Systemic, **Contributing scenarios** Not applicable.

Dose/Concentration

Not applicable.

Justification

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Professional Process Category: PROC08a, PROC11 Substance supplied to that use in form of: In a mixture Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Long term exposure, Systemic, Not applicable. The ECETOC TRA tool has been used to Not applicable. estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable. Not applicable Since the substance is not classified for acute effects and therefore, no acute DNEL **Dermal** has been derived Not applicable. Since the substance is not classified for Short term exposure, Systemic, Not applicable acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for Combined acute effects and therefore, no acute DNEL has been derived. Short term exposure, Local, Dermal Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived Short term exposure, Local, Not applicable. Not applicable. The ECETOC TRA tool has been used to estimate workplace exposures unless Inhalable otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value **Section 3.1Workers Exposure estimation** Contributing exposure scenario controlling worker exposure for 1: Non industrial spraying **Dose/Concentration** Route of exposure **Contributing scenarios Justification** The ECETOC TRA tool has been used to Long term exposure, Systemic, Not applicable. 0.11 estimate workplace exposures unless Dermal otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, 0.30 The ECETOC TRA tool has been used to Not applicable. estimate workplace exposures unless Inhalable otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for Inhalable acute effects and therefore, no acute DNEL has been derived. Short term exposure, Systemic, Not applicable. Since the substance is not classified for Not applicable acute effects and therefore, no acute DNEL **Dermal** has been derived. Short term exposure, Systemic, Not applicable. Since the substance is not classified for Not applicable Inhalable acute effects and therefore, no acute DNEL has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Combined has been derived. Not applicable. Since the substance is not classified for Short term exposure, Local, Dermal Not applicable acute effects and therefore, no acute DNEL has been derived. The ECETOC TRA tool has been used to 1.22 Short term exposure, Local, Not applicable. Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Professional Process Category: PROC08a, PROC11

Substance supplied to that use in form of: In a mixture Sector of end use: SU22

Subsequent service life relevant for that use: No.
Environmental Release Category: ERC01, ERC02, ERC04, ERC05,
ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c,
ERC08d, ERC08e, ERC08f, ERC11a

below this value

highest exposure level is given since the exposure estimates for other PROC are

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 0: Ashless dispersant

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0.027	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	4.35x10-4	8.10x10-4	EUSES calculation
Grassland averaged mg/kg dwt	8.48x10-4	1.22x10-3	EUSES calculation
Groundwater mg/l	Not evaluated.	1.29x10-5	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	7.37x10-6	Not evaluated.	EUSES calculation
Annual average mg/m³	7.37x10-6	7.37x10-6	EUSES calculation
Annual deposition mg/m2/d	3.74x10-5	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 1: Use as an epoxy curing agent

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	0	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Professional Process Category: PROC08a, PROC11 Substance supplied to that use in form of: In a mixture

Sector of end use: SU22
Subsequent service life relevant for that use: No.
Environmental Release Category: ERC01, ERC02, ERC04, ERC05,
ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c,
ERC08d, ERC08e, ERC08f, ERC11a

During emission mg/m³ 0 Not evaluated. **EUSES** calculation Annual average mg/m³ 0 6.87x10-13 **EUSES** calculation Annual deposition mg/m2/d Not evaluated. **EUSES** calculation **Local concentration** PEC aquatic (local+regional) **Justification** Not applicable. Micro-organism mg/l Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 2: Epoxy curing agent in paint

Release from point source Total release for regional **Justification** (local exposure estimation) exposure estimation kg/day kg/day Waste water 737 **FUSES** calculation Surface water **EUSES** calculation Not evaluated. 0 air (direct + STP) 0.231 **EUSES** calculation Soil (direct releases only) Not evaluated. 6 94 Not applicable. **Justification** Concentration in sewage (PECstp) Not applicable as there is no **EUSES** calculation release to wastewater. Concentration in sewage sludge **EUSES** calculation Not applicable as there is no mg/kg dwt release to wastewater. **Local concentration** PEC aquatic (local+regional) **Justification** Fresh water mg/l 8.15x10-3 **EUSES** calculation Marine water mg/l 8.02x10-4 **EUSES** calculation Intermittent release. mg/l Not applicable. Not applicable. Not applicable. **Local concentration** PEC sediment (local+regional) **Justification** Fresh water sediment mg/kg dwt Not evaluated. 2.61 **EUSES** calculation Marine water sediment mg/kg dwt Not evaluated. 0.256 **EUSES** calculation **Local concentration** PEC soil (local+regional) **Justification** 3.75x10-4 **EUSES** calculation Agricultural soil averaged mg/kg Grassland averaged mg/kg dwt 3.75x10-4 **EUSES** calculation Groundwater mg/l Not evaluated. 5.91x10-6 **EUSES** calculation PEC air (local+regional) **Justification Local concentration** During emission mg/m³ 0 Not evaluated. **FUSES** calculation 0 6 87x10-13 **EUSES** calculation Annual average mg/m³ Annual deposition mg/m2/d Not evaluated. **EUSES** calculation **Local concentration** PEC aquatic (local+regional) **Justification**

Section 3.2 Environment Exposure estimation

Not applicable.

Release from point source

Contributing exposure scenario controlling environmental exposure for 3: Laboratory chemicals

Not applicable.

Total release for regional

	(local exposure estimation) kg/day	exposure estimation kg/day	
Waste water	0.022	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	1.10x10-5	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	7.96x10-3	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	6.09x10-6	8.15x10-3	EUSES calculation
Marine water mg/l	7.92x10-6	8.10x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.257	EUSES calculation

Pentaethylenehexamine, PEHA

Micro-organism mg/l

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Professional Process Category: PROC08a, PROC11

Substance supplied to that use in form of: In a mixture Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC02, ERC04, ERC05, ERC06a, ERC06b, ERC06c, ERC06d, ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f, ERC11a

Not applicable.

Justification

Local concentration PEC soil (local+regional) Justification Agricultural soil averaged mg/kg 1.81x10-7 3.75x10-4 **EUSES** calculation dwt Grassland averaged mg/kg dwt 3.52x10-7 3.75x10-4 **EUSES** calculation Groundwater mg/l Not evaluated. 5.91x10-6 **EUSES** calculation **Local concentration** PEC air (local+regional) **Justification** During emission mg/m³ 3.06x10-9 Not evaluated. **EUSES** calculation Annual average mg/m³ 3.06x10-9 3.06x10-9 **EUSES** calculation Annual deposition mg/m2/d 1.55x10-8 Not evaluated. **EUSES** calculation **Local concentration** PEC aquatic (local+regional) **Justification** Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 4: Use of coatings and adhesives

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0.010	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	0	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	3.68x10-3	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	2.82x10-6	8.15x10-3	EUSES calculation
Marine water mg/l	3.67x10-6	8.06x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.259	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	1.15x10-12	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	2.25x10-12	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	1.95x10-14	Not evaluated.	EUSES calculation
Annual average mg/m³	1.95x10-14	7.07x10-13	EUSES calculation
Annual deposition mg/m2/d	9.90x10-14	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 4: Guidance to check compliance with the exposure scenario

Environment	Not available.
Health	Not available.

Section 5. Remarks: Additional good practice advice beyond the REACH CSA

Environment	Not applicable.
Health	Not applicable.
Additional good practices	Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of ethylenamines in open processes with high exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Professional Process Category: PROC08a, PROC11

Substance supplied to that use in form of: In a mixture Sector of end use: SU22

Annex to the extended Safety Data Sheet (eSDS)

Identification of the substance or mixture

Product definition UVCB

Product name Pentaethylenehexamine, PEHA

Section 1: Title

Short title of the exposure scenario Identified use name: Use of preparations containing ethylenamines in open processes with low exposure

potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% -

ndustrial

Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC13, PROC16

Substance supplied to that use in form of: In a mixture

Sector of end use: SU03, SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b

List of use descriptors Identified use name: Use of preparations containing ethylenamines in open processes with low exposure

potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% -

Industrial

Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC13, PROC16

Substance supplied to that use in form of: In a mixture Sector of end use: SU03, SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b

Section 2: Operational conditions and risk management measures

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 0: Mixing or blending in batch processes for formulation of preparations*

and articles (multistage and/or significant contact)

Product Characteristics: Liquid. Covers concentrations up to 2%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work 10: m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor. industrial setting Indoor. professional setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

from source towards the worker:

Not applicable.

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection:

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 1: Calendering operations

Product Characteristics: Liquid. Covers concentrations up to 2%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work 10: m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, industrial setting

Indoor. professional setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

from source towards the worker:

Not applicable.

Organisational measures to prevent/limit releases,

Not applicable.

dispersion and exposure:

Pentaethylenehexamine, PEHA

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial

Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC12, PROC14, PR

PROC13, PROC16 Substance supplied to that use in form of: In a mixture

Sector of end use: SU03, SU22 Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b

168/200

Industrial

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity Personal protection:

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 2: Transfer of substance or preparation (charging/discharging) from/to

vessels/large containers at non-dedicated facilities

Product Characteristics: Liquid. Covers concentrations up to 2%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work 10: m³/d Default Body weight: Workers: 70 kg

Not applicable.

Other operational conditions affecting worker exposure: Indoor, industrial setting

Indoor, professional setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Use the following local exhaust ventilation types: Treat air emission to provide a typical removal efficiency of (%): 90%

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 3: Transfer of substance or preparation (charging/discharging) from/to

vessels/large containers at dedicated facilities

Product Characteristics: Liquid. Covers concentrations up to 2%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work 10: m³/d Default Body weight: Workers: 70 kg

Indoor, industrial setting Other operational conditions affecting worker exposure:

Indoor. professional setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Not applicable.

Not applicable.

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 4: Transfer of substance or preparation into small containers (dedicated

filling line, including weighing)

Product Characteristics: Liquid. Covers concentrations up to 2%

Amounts used: Not applicable.

Covers daily exposures up to 8 hours (unless stated differently). Frequency and duration of use:

Default breathing volume Light work 10: m³/d Default Body weight: Workers: 70 kg Human factors not influenced by risk management:

Other operational conditions affecting worker exposure: Indoor, industrial setting Indoor. professional setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

from source towards the worker:

Not applicable.

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Pentaethylenehexamine, PEHA

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% -

Industrial Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09,

PROC13, PROC16

Substance supplied to that use in form of: In a mixture Sector of end use: SU03, SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b,

ERC08d, ERC10b

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 5: Treatment of articles by dipping and pouring

Product Characteristics: Liquid. Covers concentrations up to 2%

Amounts used:

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work 10: m³/d Default Body weight: Workers: 70 kg

Not applicable.

Not applicable.

Other operational conditions affecting worker exposure: Indoor, industrial setting

Indoor, professional setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Use the following local exhaust ventilation types: Treat air emission to provide a typical

removal efficiency of (%): 90%

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 6: Using material as fuel sources, limited exposure to unburned product to

be expected

Product Characteristics: Liquid. Covers concentrations up to 2%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work 10: m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, industrial setting

Indoor. professional setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

from source towards the worker:

Not applicable.

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 7: Roller application or brushing

Product Characteristics: Liquid. Covers concentrations up to 2%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work 10: m³/d Default Body weight: Workers: 70 kg

Not applicable.

Other operational conditions affecting worker exposure: Indoor. industrial setting

Indoor. professional setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Use the following local exhaust ventilation types: Treat air emission to provide a typical

removal efficiency of (%): 90%

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.2: Control of environmental exposure

Contributing exposure scenario controlling environmental exposure for 0: Fuel additive.

 $Operational\ conditions:\ Indoor/Outdoor\ use.$

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1860
Fraction of Regional tonnage used locally: 20%
Annual site tonnage (tonnes/year): 372
Average Local Daily Tonnage (kg/day): 1019

Frequency and duration of use: Continuous release.

Pentaethylenehexamine, PEHA

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% -

Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC13, PROC16

Substance supplied to that use in form of: In a mixture Sector of end use: SU03, SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b

170/200

Industrial

365 Emission Days (days/year): **Environmental factors not influenced by risk management:** Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None exposure: Release fraction to air from process (initial release prior to 1.00x10-5 RMM): Release fraction to soil from process (initial release prior to RMM): Release fraction to wastewater from process (initial release prior to RMM): Technical conditions and measures at process level (source) to Not applicable prevent release: Technical on-site conditions and measures to reduce or limit Soil emission controls are not applicable as there is no direct release to soil. discharges, air emissions and releases to soil: Treat air emission to provide a typical removal efficiency of No air emission controls required; required removal efficiency is 0%. (%): Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required. to provide the required removal efficiency of 3 (%): Organisational measures to prevent/limit release from site: Conditions and measures related to municipal sewage treatment plant: Contributing exposure scenario controlling environmental exposure for 1: Use in detergents and cleaners, including professional Operational conditions: Indoor/Outdoor use. Product Characteristics: Not applicable. Concentration of substance in mixture or article: Amounts used: 1860 Regional use tonnage (tonnes/year): Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1019 Frequency and duration of use: Continuous release. Emission Days (days/year): 365 Environmental factors not influenced by risk management: Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None Release fraction to air from process (initial release prior to 1.00x10-5 RMM): Release fraction to soil from process (initial release prior to 1.00x10-4 RMM): Release fraction to wastewater from process (initial release 0.185 prior to RMM): Technical conditions and measures at process level (source) to Not applicable. prevent release: Technical on-site conditions and measures to reduce or limit Soil emission controls are not applicable as there is no direct release to soil. discharges, air emissions and releases to soil: Treat air emission to provide a typical removal efficiency of No air emission controls required; required removal efficiency is 0%. (%): Treat on-site wastewater (prior to receiving water discharge) =>27.7 to provide the required removal efficiency of 3 (%): Organisational measures to prevent/limit release from site: Conditions and measures related to municipal sewage treatment

Pentaethylenehexamine, PEHA

plant:

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial

Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC13, PROC16

Substance supplied to that use in form of: In a mixture

Sector of end use: SU03, SU22 Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b

Contributing exposure scenario controlling environmental exposure for 2: Wood preservative.

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 2420 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 484 Average Local Daily Tonnage (kg/day): 1326

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 None. Other operational conditions of use affecting environmental exposure:

Release fraction to air from process (initial release prior to

Release fraction to soil from process (initial release prior to

0.02 Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release: Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Treat on-site wastewater (prior to receiving water discharge) =>27.7

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment

plant:

Section 3: Exposure estimation

Long term exposure, Systemic,

Route of exposure

Section 3.1Workers Exposure estimation

Contributing exposure scenario controlling worker exposure for 0: Mixing or blending in batch processes for formulation of preparations* and articles (multistage and/or significant contact)

1 00x10-5

Not applicable.

reduce of exposure	Continuating accidance	D036/00HCeHtration	dustilication
Long term exposure, Systemic, Dermal	Not applicable.	0.055	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic.	Not applicable.	0.61	The PROC with the highest exposure level

Long term exposure, Systemic, Not applicable. 0.61 Inhalable

Contributing scenarios

is given since the exposure estimates for other PROC are below this value Not applicable. Not applicable. Not applicable.

Dose/Concentration

Combined Not applicable.

Long term exposure, Local, Dermal Not applicable. Not applicable.

Not applicable Not applicable. Since the substance is not classified for Long term exposure, Local, acute effects and therefore, no acute DNEL Inhalable

has been derived. Short term exposure, Systemic, Not applicable. Not applicable Since the substance is not classified for

Dermal acute effects and therefore, no acute DNEL has been derived Short term exposure, Systemic, Not applicable. Since the substance is not classified for Not applicable

acute effects and therefore, no acute DNEL Inhalable has been derived.

Since the substance is not classified for Short term exposure, Systemic, Not applicable Not applicable. acute effects and therefore, no acute DNEL Combined

has been derived.

Pentaethylenehexamine, PEHA

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% -

Soil emission controls are not applicable as there is no direct release to soil.

Justification

No air emission controls required; required removal efficiency is 0%.

İndustrial Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09,

PROC13, PROC16 Substance supplied to that use in form of: In a mixture

Sector of end use: SU03, SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d. ERC10b

Section 3.1Workers Exposure estim			
Section 3. I Workers Exposure esting	ation		
Contributing exposure scenario cor	ntrolling worker exposure for	1: Calendering operations	
Route of exposure	Contributing scenarios	Dose/Concentration	Justification
Long term exposure, Systemic, Dermal	Not applicable.	0.055	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Inhalable	Not applicable.	0.61	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Dermal	• •	Not applicable.	Not applicable.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Dermal	Not applicable	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.	Not applicable.
Short term exposure, Local, Inhalable	Not applicable.	1.22	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
	ation ntrolling worker exposure for		is given since the exposure estimates for other PROC are below this value
Inhalable Section 3.1Workers Exposure estim Contributing exposure scenario cor	ation ntrolling worker exposure for		is given since the exposure estimates for other PROC are below this value
Inhalable Section 3.1Workers Exposure estim Contributing exposure scenario cor vessels/large containers at non-ded	ation ntrolling worker exposure for icated facilities	2: Transfer of substance or prepara	is given since the exposure estimates for other PROC are below this value
Inhalable Section 3.1Workers Exposure estim Contributing exposure scenario cor vessels/large containers at non-ded Route of exposure Long term exposure, Systemic,	ation htrolling worker exposure for licated facilities Contributing scenarios	2: Transfer of substance or prepara Dose/Concentration	is given since the exposure estimates for other PROC are below this value ation (charging/discharging) from/to Justification The PROC with the highest exposure level is given since the exposure estimates for
Inhalable Section 3.1Workers Exposure estim Contributing exposure scenario cor vessels/large containers at non-ded Route of exposure Long term exposure, Systemic, Dermal Long term exposure, Systemic,	nation itrolling worker exposure for licated facilities Contributing scenarios Not applicable.	2: Transfer of substance or prepara Dose/Concentration 0.110	is given since the exposure estimates for other PROC are below this value ation (charging/discharging) from/to Justification The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value The PROC with the highest exposure level is given since the exposure estimates for
Inhalable Section 3.1Workers Exposure estim Contributing exposure scenario cor vessels/large containers at non-ded Route of exposure Long term exposure, Systemic, Dermal Long term exposure, Systemic, Inhalable Long term exposure, Systemic,	nation itrolling worker exposure for icated facilities Contributing scenarios Not applicable. Not applicable. Not applicable.	2: Transfer of substance or prepara Dose/Concentration 0.110 0.305	is given since the exposure estimates for other PROC are below this value ation (charging/discharging) from/to Justification The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Inhalable Section 3.1Workers Exposure estim Contributing exposure scenario cor vessels/large containers at non-ded Route of exposure Long term exposure, Systemic, Dermal Long term exposure, Systemic, Inhalable Long term exposure, Systemic, Combined	nation itrolling worker exposure for icated facilities Contributing scenarios Not applicable. Not applicable. Not applicable.	2: Transfer of substance or prepara Dose/Concentration 0.110 0.305 Not applicable.	is given since the exposure estimates for other PROC are below this value ation (charging/discharging) from/to Justification The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Not applicable.
Inhalable Section 3.1Workers Exposure estim Contributing exposure scenario cor vessels/large containers at non-ded Route of exposure Long term exposure, Systemic, Dermal Long term exposure, Systemic, Inhalable Long term exposure, Systemic, Combined Long term exposure, Local, Dermal Long term exposure, Local,	nation itrolling worker exposure for licated facilities Contributing scenarios Not applicable. Not applicable. Not applicable. Not applicable.	2: Transfer of substance or prepara Dose/Concentration 0.110 0.305 Not applicable. Not applicable.	is given since the exposure estimates for other PROC are below this value ation (charging/discharging) from/to Justification The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Not applicable. Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL
Inhalable Section 3.1Workers Exposure estim Contributing exposure scenario cor vessels/large containers at non-ded Route of exposure Long term exposure, Systemic, Dermal Long term exposure, Systemic, Inhalable Long term exposure, Systemic, Combined Long term exposure, Local, Dermal Long term exposure, Local, Inhalable Short term exposure, Systemic,	nation itrolling worker exposure for icated facilities Contributing scenarios Not applicable. Not applicable. Not applicable. Not applicable. Not applicable. Not applicable. Not applicable	2: Transfer of substance or prepara Dose/Concentration 0.110 0.305 Not applicable. Not applicable. Not applicable.	is given since the exposure estimates for other PROC are below this value ation (charging/discharging) from/to Justification The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Not applicable. Not applicable. Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Since the substance is not classified for acute effects and therefore, no acute DNEL
Inhalable Section 3.1Workers Exposure estim Contributing exposure scenario corvessels/large containers at non-ded Route of exposure Long term exposure, Systemic, Dermal Long term exposure, Systemic, Inhalable Long term exposure, Systemic, Combined Long term exposure, Local, Dermal Long term exposure, Local, Inhalable Short term exposure, Systemic, Dermal Short term exposure, Systemic,	nation itrolling worker exposure for icated facilities Contributing scenarios Not applicable. Not applicable. Not applicable. Not applicable. Not applicable. Not applicable	2: Transfer of substance or prepara Dose/Concentration 0.110 0.305 Not applicable. Not applicable. Not applicable. Not applicable.	is given since the exposure estimates for other PROC are below this value ation (charging/discharging) from/to Justification The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Not applicable. Not applicable. Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Inhalable Section 3.1Workers Exposure estim Contributing exposure scenario corvessels/large containers at non-ded Route of exposure Long term exposure, Systemic, Dermal Long term exposure, Systemic, Inhalable Long term exposure, Systemic, Combined Long term exposure, Local, Dermal Long term exposure, Local, Inhalable Short term exposure, Systemic, Dermal Short term exposure, Systemic, Inhalable Short term exposure, Systemic, Inhalable Short term exposure, Systemic,	ation Itrolling worker exposure for icated facilities Contributing scenarios Not applicable. Not applicable. Not applicable. Not applicable	2: Transfer of substance or prepara Dose/Concentration 0.110 0.305 Not applicable. Not applicable. Not applicable. Not applicable. Not applicable. Not applicable.	is given since the exposure estimates for other PROC are below this value ation (charging/discharging) from/to Justification The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Not applicable. Not applicable. Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.

Since the substance is not

been derived.

1.22

classified for acute effects and therefore, no acute DNEL has Not applicable.

The PROC with the highest exposure level is given since the exposure estimates for

Pentaethylenehexamine, PEHA

Short term exposure, Local, Dermal Not applicable

Not applicable.

Short term exposure, Local,

Inhalable

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial

Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC13, PROC13, PROC14

PROC13, PROC16
Substance supplied to that use in form of: In a mixture

Sector of end use: SU03, SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b

Section 3.1Workers Exposure estima	ation		
Contributing exposure scenario con vessels/large containers at dedicate	trolling worker exposure for 3	: Transfer of substance or prepara	tion (charging/discharging) from/to
Route of exposure	Contributing scenarios	Dose/Concentration	Justification
Long term exposure, Systemic, Dermal	Not applicable.	0.055	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Inhalable	Not applicable.	0.61	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Local, Dermal	Not applicable	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.	Not applicable.
Short term exposure, Local, Inhalable	Not applicable.	1.22	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Section 3.1Workers Exposure estimated Contributing exposure scenario confilling line, including weighing)		: Transfer of substance or prepara	tion into small containers (dedicated
Route of exposure	Contributing scenarios	Dose/Concentration	Justification
Long term exposure, Systemic, Dermal	Not applicable.	0.055	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Inhalable	Not applicable.	0.61	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.

Not applicable.

Not applicable.

been derived.

1.22

Since the substance is not

classified for acute effects and therefore, no acute DNEL has

Pentaethylenehexamine, PEHA

Short term exposure, Systemic,

Short term exposure, Systemic,

Short term exposure, Local,

Short term exposure, Local, Dermal Not applicable

Inhalable

Combined

Inhalable

Not applicable

Not applicable

Not applicable.

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial

Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC13, PROC13

PROC13, PROC16
Substance supplied to that use in form of: In a mixture

Sector of end use: SU03, SU22 Subsequent service life relevant for that use: No.

Since the substance is not classified for acute effects and therefore, no acute DNEL

Since the substance is not classified for acute effects and therefore, no acute DNEL

The PROC with the highest exposure level

is given since the exposure estimates for

other PROC are below this value

has been derived.

has been derived.

Not applicable.

Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b

Section 3.1Workers Exposure estimation					
Contributing exposure scenario controlling worker exposure for 5: Treatment of articles by dipping and pouring					
Route of exposure	Contributing scenarios	Dose/Concentration	Justification		
Long term exposure, Systemic, Dermal	Not applicable.	Not applicable.	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value		
Long term exposure, Systemic, Inhalable	Not applicable.	Not applicable.	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value		
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.		
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.		
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.		
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.		
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.		
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.		
Short term exposure, Local, Dermal	Not applicable	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.	Not applicable.		
Short term exposure, Local, Inhalable	Not applicable.	0.61	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value		
Section 3.1Workers Exposure estimated Contributing exposure scenario con be expected		6: Using material as fuel sources, li	mited exposure to unburned product to		
Route of exposure	Contributing scenarios	Dose/Concentration	Justification		
Long term exposure, Systemic, Dermal	Not applicable.	Not applicable.	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value		
Long term exposure, Systemic, Inhalable	Not applicable.	Not applicable.	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value		
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.		
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.		
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.		
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.		
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL		

Not applicable.

been derived.

Not applicable.

Since the substance is not

classified for acute effects and therefore, no acute DNEL has

Pentaethylenehexamine, PEHA

Short term exposure, Systemic,

Short term exposure, Local,

Short term exposure, Local, Dermal Not applicable

Not applicable

Not applicable.

Combined

Inhalable

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% -İndustrial

has been derived.

has been derived.

Not applicable.

Since the substance is not classified for

acute effects and therefore, no acute DNEL

The PROC with the highest exposure level

is given since the exposure estimates for other PROC are below this value

Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09,

PROC13, PROC16 Substance supplied to that use in form of: In a mixture

Sector of end use: SU03, SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b

Section 3.1Workers Exposure estimation Contributing exposure scenario controlling worker exposure for 7: Roller application or brushing				
Route of exposure	Contributing scenarios	Dose/Concentration	Justification	
Long term exposure, Systemic, Dermal	Not applicable.	Not applicable.	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value	
Long term exposure, Systemic, Inhalable	Not applicable.	Not applicable.	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value	
Long term exposure, Systemic, Combined	Not applicable.	Not applicable.	Not applicable.	
Long term exposure, Local, Dermal	Not applicable.	Not applicable.	Not applicable.	
Long term exposure, Local, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.	
Short term exposure, Systemic, Dermal	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.	
Short term exposure, Systemic, Inhalable	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.	
Short term exposure, Systemic, Combined	Not applicable	Not applicable.	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.	
Short term exposure, Local, Dermal	Not applicable	Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.	Not applicable.	
Short term exposure, Local, Inhalable	Not applicable.	Not applicable.	The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value	

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 0: Fuel additive.

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	5.10x10-6	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	8.37x10-8	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	1.63x10-7	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	1.42x10-9	Not evaluated.	EUSES calculation
Annual average mg/m³	1.42x10-9	1.42x10-9	EUSES calculation
Annual deposition mg/m2/d	7.18x10-9	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Industrial

Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC13, PROC16

PROC13, PROC16
Substance supplied to that use in form of: In a mixture

Sector of end use: SU03, SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 1: Use in detergents and cleaners, including professional

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	11.5	547	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	4.6x10-4	0.116	EUSES calculation
Soil (direct releases only)	Not evaluated.	5.96	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	4.14	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	3.17x10-3	9.5x10-3	EUSES calculation
Marine water mg/l	4.7x10-3	4.8x10-3	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	1.4	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.39	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	Not evaluated.	3.38x10-4	EUSES calculation
Grassland averaged mg/kg dwt	Not evaluated.	3.3x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	9.2x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	1.3x10-7	Not evaluated.	EUSES calculation
Annual average mg/m³	1.3x10-7	1.3x10-7	EUSES calculation
Annual deposition mg/m2/d	6.5x10-7	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 2: Wood preservative.

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0.241	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	1.21x10-4	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	0.087	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	6.67x10-5	8.21x10-3	EUSES calculation
Marine water mg/l	8.68x10-5	8.89x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.63	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.284	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	1.98x10-6	3.77x10-4	EUSES calculation
Grassland averaged mg/kg dwt	3.86x10-6	3.79x10-4	EUSES calculation

Pentaethylenehexamine, PEHA

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% -

Industrial Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09,

PROC13, PROC16
Substance supplied to that use in form of: In a mixture

Sector of end use: SU03, SU22 Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b

Groundwater mg/l Not evaluated. 5.94x10-6 **EUSES** calculation

PEC air (local+regional) **Local concentration Justification** During emission mg/m³ Not evaluated. **EUSES** calculation 3.35x10-8 Annual average mg/m³ **EUSES** calculation 3.35x10-8 3.35x10-8 Annual deposition mg/m2/d 1.70x10-7 Not evaluated. **EUSES** calculation

PEC aquatic (local+regional) **Local concentration Justification** Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 4: Guidance to check compliance with the exposure scenario

Environment Not available. Health Not available.

Section 5. Remarks: Additional good practice advice beyond the REACH CSA

Environment Not applicable. Not applicable. Health **Additional good practices** Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% -

Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC13, PROC16 Substance supplied to that use in form of: In a mixture

Sector of end use: SU03, SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b

Annex to the extended Safety Data Sheet (eSDS)

Identification of the substance or mixture

Product definition UVCB

Product name Pentaethylenehexamine, PEHA

Section 1: Title

Short title of the exposure scenario Identified use name: Use of preparations containing ethylenamines in open processes with low exposure

potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% -

Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC16

Substance supplied to that use in form of: In a mixture

Sector of end use: SU03

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b

List of use descriptors Identified use name: Use of preparations containing ethylenamines in open processes with low exposure

potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% -Industrial

Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC16

Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b

Section 2: Operational conditions and risk management measures

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 0: Mixing or blending in batch processes for formulation of preparations*

and articles (multistage and/or significant contact)

Product Characteristics: Liquid. Covers concentrations up to 0.5%

Not applicable. Amounts used:

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Default breathing volume Light work 10: m³/d Default Body weight: Workers: 70 kg Human factors not influenced by risk management:

Not applicable.

Not applicable.

Not applicable.

Indoor. industrial setting Other operational conditions affecting worker exposure:

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Personal protection:

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 1: Calendering operations

Product Characteristics: Liquid. Covers concentrations up to 0.5%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work 10: m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, industrial setting Not applicable.

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Not applicable.

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity Personal protection:

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

management supervision controls.

Pentaethylenehexamine, PEHA

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% -

Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC16

Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d. ERC10b

179/200

Industrial

Industrial

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 2: Transfer of substance or preparation (charging/discharging) from/to

vessels/large containers at non-dedicated facilities

Product Characteristics: Liquid. Covers concentrations up to 0.5%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work 10: m³/d Default Body weight: Workers: 70 kg

Not applicable.

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Not applicable.

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 3: Transfer of substance or preparation (charging/discharging) from/to

vessels/large containers at dedicated facilities

Product Characteristics: Liquid. Covers concentrations up to 0.5%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work 10: m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

from source towards the worker:

Not applicable.

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 4: Transfer of substance or preparation into small containers (dedicated

filling line, including weighing)

Product Characteristics: Liquid. Covers concentrations up to 0.5%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work 10: m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

from source towards the worker:

Not applicable

Organisational measures to prevent/limit releases,

dispersion and exposure:

Personal protection:

Not applicable.

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 5: Roller application or brushing

Product Characteristics: Liquid. Covers concentrations up to 0.5%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Default breathing volume Light work 10: m³/d Default Body weight: Workers: 70 kg Human factors not influenced by risk management:

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

Not applicable.

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% -

Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09,

PROC10, PROC13, PROC16

Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d. ERC10b

180/200

Industrial

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity Personal protection:

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 6: Treatment of articles by dipping and pouring

Product Characteristics: Liquid. Covers concentrations up to 0.5%

Amounts used: Not applicable

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work 10: m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

from source towards the worker:

Not applicable.

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Personal protection: Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 7: Using material as fuel sources, limited exposure to unburned product to

be expected

Product Characteristics: Liquid. Covers concentrations up to 0.5%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work 10: m³/d Default Body weight: Workers: 70 kg

Other operational conditions affecting worker exposure: Indoor, industrial setting

Technical conditions and measures at process level

(source) to prevent release:

Not applicable.

Technical conditions and measures to control dispersion

from source towards the worker:

Not applicable.

Organisational measures to prevent/limit releases,

dispersion and exposure:

Not applicable.

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity Personal protection:

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.2: Control of environmental exposure

Contributing exposure scenario controlling environmental exposure for 0: Fuel additive.

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1860 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1019

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None. exposure:

1.00x10-5

Release fraction to air from process (initial release prior to

Release fraction to soil from process (initial release prior to

RMM):

Release fraction to wastewater from process (initial release prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Not applicable.

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

Soil emission controls are not applicable as there is no direct release to soil.

Pentaethylenehexamine, PEHA

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% -

Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09,

PROC10, PROC13, PROC16

Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d. ERC10b

Treat air emission to provide a typical removal efficiency of No air emission controls required; required removal efficiency is 0%. (%):

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required. to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Contributing exposure scenario controlling environmental exposure for 1: Use in detergents and cleaners, including professional

1.00x10-4

Not applicable.

0.185

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

1860 Regional use tonnage (tonnes/year): Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1019

Frequency and duration of use: Continuous release.

Emission Days (days/year):

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None.

exposure:

Release fraction to air from process (initial release prior to 1.00x10-5

RMM):

Release fraction to soil from process (initial release prior to

RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit Soil emission controls are not applicable as there is no direct release to soil.

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of No air emission controls required; required removal efficiency is 0%.

Treat on-site wastewater (prior to receiving water discharge) =>27.7

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Contributing exposure scenario controlling environmental exposure for 2: Wood preservative.

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 2420 20% Fraction of Regional tonnage used locally: Annual site tonnage (tonnes/year): 484 Average Local Daily Tonnage (kg/day): 1326

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 None. Other operational conditions of use affecting environmental

exposure:

Release fraction to air from process (initial release prior to

RMM):

1.00x10-5

Pentaethylenehexamine, PEHA

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% -

Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC16

Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b,

ERC08d. ERC10b

Release fraction to soil from process (initial release prior to 0 RMM):

Release fraction to wastewater from process (initial release 0.02 prior to RMM):

Technical conditions and measures at process level (source) to Not applicable prevent release:

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil:

narges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of No air emission controls required; required removal efficiency is 0%.

Soil emission controls are not applicable as there is no direct release to soil.

Treat on-site wastewater (prior to receiving water discharge) =>27.7 to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Section 3: Exposure estimation

Inhalable

Section 3.1Workers Exposure estimation Contributing exposure scenario controlling worker exposure for 0: Mixing or blending in batch processes for formulation of preparations* and articles (multistage and/or significant contact) Route of exposure **Contributing scenarios Dose/Concentration Justification** Long term exposure, Systemic, The ECETOC TRA tool has been used to Not applicable. Not applicable. estimate workplace exposures unless **Dermal** otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Not applicable. The ECETOC TRA tool has been used to Long term exposure, Systemic, Not applicable.

Long term exposure, Systemic, Not applicable. Not applicable. Not applicable.

Combined

Not applicable.

Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable.

Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL

has been derived.

Short term exposure, Systemic,

Not applicable

Not applicable.

Since the substance is not classified for

Dermalacute effects and therefore, no acute DNEL has been derived.

Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL

Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for

Combined acute effects and therefore, no acute DNEL has been derived.

Short term exposure, Local, Dermal Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived.

Short term exposure, Local, Inhalable

Not applicable.

Not applicable.

Not applicable.

Not applicable.

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value

estimate workplace exposures unless

otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

Pentaethylenehexamine, PEHA

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial

Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC16

Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b,

ERC08d, ERC10b

Section 3.1Workers Exposure estimation Contributing exposure scenario controlling worker exposure for 1: Calendering operations Route of exposure **Contributing scenarios Dose/Concentration Justification** The ECETOC TRA tool has been used to Long term exposure, Systemic, Not applicable. Not applicable. **Dermal** estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value The ECETOC TRA tool has been used to Long term exposure, Systemic, Not applicable. Not applicable. estimate workplace exposures unless Inhalable otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Since the substance is not classified for Long term exposure, Local, Not applicable Not applicable. acute effects and therefore, no acute DNEL Inhalable has been derived Short term exposure, Systemic, Not applicable. Not applicable Since the substance is not classified for acute effects and therefore, no acute DNEL **Dermal** has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived Since the substance is not classified for Short term exposure, Systemic, Not applicable Not applicable. acute effects and therefore, no acute DNEL Combined has been derived. Short term exposure, Local, Dermal Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Short term exposure, Local, Not applicable. Not applicable. The ECETOC TRA tool has been used to Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Section 3.1Workers Exposure estimation Contributing exposure scenario controlling worker exposure for 2: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities Route of exposure **Contributing scenarios Dose/Concentration Justification** Long term exposure, Systemic, Not applicable. 0.027 The ECETOC TRA tool has been used to estimate workplace exposures unless **Dermal** otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. 0.76 The ECETOC TRA tool has been used to estimate workplace exposures unless Inhalable otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable. Since the substance is not classified for Not applicable **Dermal** acute effects and therefore, no acute DNEL has been derived. Since the substance is not classified for Short term exposure, Systemic, Not applicable Not applicable. acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Combined has been derived.

Pentaethylenehexamine, PEHA

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% -

Industrial Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC13, PROC15

PROC10, PROC13, PROC16
Substance supplied to that use in form of: In a mixture

Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b

has been derived. Short term exposure, Local, Not applicable. 1.52 The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value **Section 3.1Workers Exposure estimation** Contributing exposure scenario controlling worker exposure for 3: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities Route of exposure **Contributing scenarios Dose/Concentration Justification** Long term exposure, Systemic, The ECETOC TRA tool has been used to Not applicable. Not applicable. Dermal estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value The ECETOC TRA tool has been used to Long term exposure, Systemic, Not applicable. Not applicable. Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Since the substance is not classified for Long term exposure, Local, Not applicable Not applicable. acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable. Since the substance is not classified for Not applicable acute effects and therefore, no acute DNEL **Dermal** has been derived. Not applicable. Since the substance is not classified for Short term exposure, Systemic, Not applicable acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for Combined acute effects and therefore, no acute DNEL has been derived. Since the substance is not classified for Short term exposure, Local, Dermal Not applicable Not applicable. acute effects and therefore, no acute DNEL has been derived. Short term exposure, Local, Not applicable. Not applicable. The ECETOC TRA tool has been used to Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value **Section 3.1Workers Exposure estimation** Contributing exposure scenario controlling worker exposure for 4: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) **Contributing scenarios Dose/Concentration** Route of exposure Justification The ECETOC TRA tool has been used to Long term exposure, Systemic, Not applicable. Not applicable. estimate workplace exposures unless **Dermal** otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value The ECETOC TRA tool has been used to Long term exposure, Systemic, Not applicable. Not applicable. Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined Not applicable. Long term exposure, Local, Dermal Not applicable. Not applicable. Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived.

Not applicable.

Since the substance is not classified for acute effects and therefore, no acute DNEL

Pentaethylenehexamine, PEHA

Short term exposure, Local, Dermal Not applicable

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% -Industrial

Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC16

Substance supplied to that use in form of: In a mixture

Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b

Dermal acute effects and therefore, no acute DNEL has been derived. Short term exposure, Systemic, Not applicable. Since the substance is not classified for Not applicable Inhalable acute effects and therefore, no acute DNEL has been derived. Not applicable. Since the substance is not classified for Short term exposure, Systemic, Not applicable acute effects and therefore, no acute DNEL Combined has been derived. Short term exposure, Local, Dermal Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Short term exposure, Local, Not applicable. The ECETOC TRA tool has been used to Not applicable. Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value **Section 3.1Workers Exposure estimation** Contributing exposure scenario controlling worker exposure for 5: Roller application or brushing **Contributing scenarios Justification** Route of exposure **Dose/Concentration** The ECETOC TRA tool has been used to Long term exposure, Systemic, Not applicable. 0.027 estimate workplace exposures unless **Dermal** otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, 0.76 The ECETOC TRA tool has been used to Not applicable. Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived. Not applicable. Short term exposure, Systemic, Not applicable Since the substance is not classified for **Dermal** acute effects and therefore, no acute DNEL has been derived. Short term exposure, Systemic, Not applicable. Not applicable Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived. Since the substance is not classified for Short term exposure, Systemic, Not applicable Not applicable. acute effects and therefore, no acute DNEL Combined has been derived. Short term exposure, Local, Dermal Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. Short term exposure, Local, Not applicable. 1.52 The ECETOC TRA tool has been used to Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value **Section 3.1Workers Exposure estimation** Contributing exposure scenario controlling worker exposure for 6: Treatment of articles by dipping and pouring Route of exposure **Contributing scenarios Dose/Concentration** Long term exposure, Systemic, The ECETOC TRA tool has been used to Not applicable. Not applicable. estimate workplace exposures unless **Dermal** otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. The ECETOC TRA tool has been used to Not applicable. estimate workplace exposures unless Inhalable otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value

Not applicable.

Pentaethylenehexamine, PEHA

Short term exposure, Systemic,

Not applicable

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% -

Industrial

Since the substance is not classified for

Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC16

Substance supplied to that use in form of: In a mixture

Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b

Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL **Dermal** has been derived. Since the substance is not classified for Short term exposure, Systemic, Not applicable Not applicable. acute effects and therefore, no acute DNEL Inhalable has been derived. Since the substance is not classified for Not applicable. Short term exposure, Systemic, Not applicable Combined acute effects and therefore, no acute DNEL has been derived. Short term exposure, Local, Dermal Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL has been derived. The ECETOC TRA tool has been used to Short term exposure, Local, Not applicable. Not applicable. Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Section 3.1Workers Exposure estimation Contributing exposure scenario controlling worker exposure for 7: Using material as fuel sources, limited exposure to unburned product to be expected

Route of exposure Contributing scenarios Dose/Concentration Justification The ECETOC TRA tool has been used to Long term exposure, Systemic, Not applicable. Not applicable. **Dermal** estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Long term exposure, Systemic, Not applicable. Not applicable. The ECETOC TRA tool has been used to estimate workplace exposures unless Inhalable otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value Not applicable. Long term exposure, Systemic, Not applicable. Not applicable. Combined Long term exposure, Local, Dermal Not applicable. Not applicable. Not applicable. Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for Inhalable acute effects and therefore, no acute DNEL has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL **Dermal** has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Inhalable has been derived. Not applicable. Since the substance is not classified for Short term exposure, Systemic, Not applicable acute effects and therefore, no acute DNEL Combined has been derived. Since the substance is not classified for Short term exposure, Local, Dermal Not applicable Not applicable. acute effects and therefore, no acute DNEL has been derived.

Not applicable.

Pentaethylenehexamine, PEHA

Short term exposure, Local,

Inhalable

Not applicable.

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% - Industrial

below this value

Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC16

PROC10, PROC13, PROC16
Substance supplied to that use in form of: In a mixture

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

otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 0: Fuel additive.

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	5.10x10-6	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	Not applicable as there is no release to wastewater.	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	Not applicable as there is no release to wastewater.	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	0	8.15x10-3	EUSES calculation
Marine water mg/l	0	8.02x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.61	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.256	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	8.37x10-8	3.75x10-4	EUSES calculation
Grassland averaged mg/kg dwt	1.63x10-7	3.75x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.91x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	1.42x10-9	Not evaluated.	EUSES calculation
Annual average mg/m³	1.42x10-9	1.42x10-9	EUSES calculation
Annual deposition mg/m2/d	7.18x10-9	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 1: Use in detergents and cleaners, including professional

Pentaethylenehexamine PFHA		Identified use name: Use of preparations containing ethylenamic	
Grassland averaged mg/kg dwt	Not evaluated.	3.3x10-4	EUSES calculation
Agricultural soil averaged mg/kg dwt	Not evaluated.	3.38x10-4	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Marine water sediment mg/kg dwt	Not evaluated.	0.39	EUSES calculation
Fresh water sediment mg/kg dwt	Not evaluated.	1.4	EUSES calculation
	Local concentration	PEC sediment (local+regional)	Justification
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
Marine water mg/l	4.7x10-3	4.8x10-3	EUSES calculation
Fresh water mg/l	3.17x10-3	9.5x10-3	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
Concentration in sewage (PECstp) mg/l	4.14	EUSES CAICUIALION	
Concentration in cowage (RECotn)	Value 4.14	Justification EUSES calculation	
con (direct releases only)			Not applicable.
Soil (direct releases only)	Not evaluated.	5.96	Not applicable.
air (direct + STP)	4.6x10-4	0.116	EUSES calculation
Waste water Surface water	11.5 Not evaluated.	547 0	EUSES calculation EUSES calculation
	(local exposure estimation) kg/day	exposure estimation kg/day	
	Release from point source	Total release for regional	Justification

Pentaethylenehexamine, PEHA

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% -

Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC13, PROC16

PROC10, PROC13, PROC16
Substance supplied to that use in form of: In a mixture

Sector of end use: SU03

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b,

ERC08d, ERC10b

Groundwater mg/l Not evaluated. 9.2x10-6 **EUSES** calculation **Local concentration** PEC air (local+regional) **Justification**

During emission mg/m³ 1.3x10-7 Not evaluated. **EUSES** calculation Annual average mg/m³ 1.3x10-7 1.3x10-7 **EUSES** calculation Annual deposition mg/m2/d 6.5x10-7 Not evaluated. **EUSES** calculation

PEC aquatic (local+regional) **Local concentration Justification** Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 2: Wood preservative.

Justification Release from point source Total release for regional (local exposure estimation) exposure estimation kg/day

kg/day

0.241 737 **EUSES** calculation Waste water **Surface water** Not evaluated O **FUSES** calculation 1.21x10-4 0.231 **EUSES** calculation air (direct + STP) Soil (direct releases only) Not evaluated. Not applicable. 6.94

Value Justification 0.087 **EUSES** calculation

Concentration in sewage (PECstp)

Concentration in sewage sludge **EUSES** calculation

mg/kg dwt

Local concentration PEC aquatic (local+regional) Fresh water mg/l 6.67x10-5 8.21x10-3 **EUSES** calculation Marine water mg/l 8.68x10-5 8.89x10-4 **EUSES** calculation Not applicable. Intermittent release. mg/l Not applicable. Not applicable. **Local concentration** PEC sediment (local+regional) **Justification** Fresh water sediment mg/kg dwt 2.63 **EUSES** calculation Not applicable

Marine water sediment mg/kg dwt Not applicable 0.284 **EUSES** calculation PEC soil (local+regional) Justification Local concentration

Agricultural soil averaged mg/kg 1.98x10-6 3.77x10-4

Grassland averaged mg/kg dwt 3.86x10-6 3.79x10-4 **EUSES** calculation Groundwater mg/l 5.94x10-6 **EUSES** calculation Not evaluated.

Local concentration PEC air (local+regional) **Justification** During emission mg/m³ 3.35x10-8 Not evaluated. **EUSES** calculation Annual average mg/m³ 3.35x10-8 3.35x10-8 **EUSES** calculation Annual deposition mg/m2/d 1.70x10-7 Not evaluated. **EUSES** calculation

PEC aquatic (local+regional) **Local concentration Justification** Not applicable. Micro-organism mg/l Not applicable. Not applicable.

Section 4: Guidance to check compliance with the exposure scenario

Not available. **Environment** Health Not available.

Section 5. Remarks: Additional good practice advice beyond the REACH CSA

Environment Not applicable. Health Not applicable. Additional good practices Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% -

Justification

EUSES calculation

Process Category: PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC16

Substance supplied to that use in form of: In a mixture Sector of end use: SU03

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b

Annex to the extended Safety Data Sheet (eSDS)

Professional

Identification of the substance or mixture

Product definition UVCB

Product name Pentaethylenehexamine, PEHA

Section 1: Title

Short title of the exposure scenario Identified use name: Use of preparations containing ethylenamines in open processes with low exposure

potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% -

Process Category: PROC08a, PROC10

Substance supplied to that use in form of: In a mixture

Sector of end use: SU03, SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure List of use descriptors

potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% -

Professional

Process Category: PROC08a, PROC10

Substance supplied to that use in form of: In a mixture Sector of end use: SU03, SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b

Section 2: Operational conditions and risk management measures

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 0: Transfer of substance or preparation (charging/discharging) from/to

vessels/large containers at non-dedicated facilities

Product Characteristics: Liquid. Covers concentrations up to 2%

Not applicable. Amounts used:

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg

Not applicable.

Not applicable.

Indoor. professional setting Other operational conditions affecting worker exposure:

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Personal protection:

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

Use the following local exhaust ventilation types: Treat air emission to provide a typical

management supervision controls.

removal efficiency of (%): 90%

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 1: Roller application or brushing

Product Characteristics: Liquid. Covers concentrations up to 2%

Amounts used: Not applicable.

Frequency and duration of use: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management: Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg Other operational conditions affecting worker exposure: Indoor, professional setting

Technical conditions and measures at process level Not applicable.

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure: Personal protection:

Use the following local exhaust ventilation types: Treat air emission to provide a typical removal efficiency of (%): 90%

Not applicable.

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity

training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Pentaethylenehexamine, PEHA

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% -Professional

Process Category: PROC08a, PROC10 Substance supplied to that use in form of: In a mixture Sector of end use: SU03, SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d. ERC10b

Contributing exposure scenario controlling environmental exposure for 0: Fuel additive.

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1860 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1019

Frequency and duration of use: Continuous release.

365 Emission Days (days/year):

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 None. Other operational conditions of use affecting environmental

Release fraction to air from process (initial release prior to

RMM):

Release fraction to soil from process (initial release prior to

RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

(%):

Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required.

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Contributing exposure scenario controlling environmental exposure for 1: Use in detergents and cleaners, including professional

1.00x10-5

Not applicable.

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

1860 Regional use tonnage (tonnes/year): Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1019

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None.

exposure:

Release fraction to air from process (initial release prior to

Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release

prior to RMM): Technical conditions and measures at process level (source) to

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

Not applicable.

1.00x10-5

1 00x10-4

0 185

Soil emission controls are not applicable as there is no direct release to soil.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

No air emission controls required; required removal efficiency is 0%.

Pentaethylenehexamine, PEHA

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% -Professional Professional

Process Category: PROC08a, PROC10 Substance supplied to that use in form of: In a mixture

Sector of end use: SU03, SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b,

ERC08d. ERC10b 191/200 Treat on-site wastewater (prior to receiving water discharge) =>27.7 to provide the required removal efficiency of ³ (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Contributing exposure scenario controlling environmental exposure for 2: Wood preservative.

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 2420
Fraction of Regional tonnage used locally: 20%
Annual site tonnage (tonnes/year): 484
Average Local Daily Tonnage (kg/day): 1326

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000
per operational conditions of use affecting environmental None

Other operational conditions of use affecting environmental exposure:

D.I.

Release fraction to air from process (initial release prior to 1.00x10-5

RMM):

Release fraction to soil from process (initial release prior to

Release fraction to wastewater from process (initial release

prior to RMM):

Technical conditions and measures at process level (source) to

prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

(%):

Treat on-site wastewater (prior to receiving water discharge) =>27.7

to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Section 3: Exposure estimation

Section 3.1Workers Exposure estimation

Contributing exposure scenario controlling worker exposure for 0: Transfer of substance or preparation (charging/discharging) from/to

0.02

Not applicable.

vessels/large containers at non-dedicated facilities

Route of exposure Contributing scenarios Dose/Concentration Justification

The ECCTOC TRU

Long term exposure, Systemic, Dermal

Dermai

Not applicable. Not applica

Not applicable. The ECETOC TRA tool has been used to estimate workplace exposures unless

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value

Long term exposure, Systemic,

Inhalable

0.305

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the

highest exposure level is given since the exposure estimates for other PROC are

below this value

Long term exposure, Systemic, Not applicable.

Not applicable.

Combined

Long term exposure, Local, Dermal Not applicable.

Not applicable.

Not applicable.

Not applicable. Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% -

Process Category: PROC08a, PROC10 Substance supplied to that use in form of: In a mixture Sector of end use: SU03, SU22

Sector of end use: SU03, SU22 Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b

192/200

Professional

Long term exposure, Local, Not applicable Not applicable. Since the substance is not classified for Inhalable acute effects and therefore, no acute DNEL has been derived. Since the substance is not classified for Short term exposure, Systemic, Not applicable. Not applicable acute effects and therefore, no acute DNEL Dermal has been derived. Since the substance is not classified for Short term exposure, Systemic, Not applicable Not applicable. acute effects and therefore, no acute DNEL Inhalable has been derived. Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for acute effects and therefore, no acute DNEL Combined has been derived. Since the substance is not classified for Short term exposure, Local, Dermal Not applicable Not applicable. acute effects and therefore, no acute DNEL

0.61

Section 3.1Workers Exposure estimation

Short term exposure, Local,

Long term exposure, Systemic,

Inhalable

Contributing exposure scenario controlling worker exposure for 1: Roller application or brushing

Not applicable.

Not applicable.

Route of exposure **Contributing scenarios Dose/Concentration Justification** Long term exposure, Systemic, The ECETOC TRA tool has been used to Not applicable. Not applicable. Dermal estimate workplace exposures unless

otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value

0.305

exposure estimates for other PROC are below this value

Long term exposure, Systemic, Not applicable. Not applicable. Not applicable. Combined

Not applicable. Long term exposure, Local, Dermal Not applicable. Not applicable.

Since the substance is not classified for Long term exposure, Local, Not applicable Not applicable.

Inhalable acute effects and therefore, no acute DNEL has been derived.

Short term exposure, Systemic, Not applicable. Not applicable Since the substance is not classified for

acute effects and therefore, no acute DNEL **Dermal**

has been derived. Since the substance is not classified for Short term exposure, Systemic, Not applicable Not applicable.

acute effects and therefore, no acute DNEL Inhalable has been derived.

Short term exposure, Systemic, Not applicable Not applicable. Since the substance is not classified for

acute effects and therefore, no acute DNEL Combined

has been derived.

acute effects and therefore, no acute DNEL

Not applicable.

has been derived.

The ECETOC TRA tool has been used to

Short term exposure, Local, 0.61 Not applicable.

Inhalable estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value

has been derived

below this value

The ECETOC TRA tool has been used to

The ECETOC TRA tool has been used to

estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the

Since the substance is not classified for

estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

Section 3.2 Environment Exposure estimation

Short term exposure, Local, Dermal Not applicable

Contributing exposure scenario controlling environmental exposure for 0: Fuel additive.

Release from point source Total release for regional **Justification** (local exposure estimation) exposure estimation kg/day kg/day Waste water **EUSES** calculation 0 737 Surface water Not evaluated. Λ **EUSES** calculation 0.231 air (direct + STP) 5 10x10-6 **EUSES** calculation Soil (direct releases only) Not evaluated. 6 94 Not applicable. **Value Justification**

Pentaethylenehexamine, PEHA

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% -

> Process Category: PROC08a, PROC10 Substance supplied to that use in form of: In a mixture Sector of end use: SU03, SU22 Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d. ERC10b

193/200

Professional

Concentration in sewage (PECstp) Not applicable as there is no **EUSES** calculation release to wastewater. Concentration in sewage sludge Not applicable as there is no **EUSES** calculation release to wastewater. mg/kg dwt **Justification Local concentration** PEC aquatic (local+regional) Fresh water mg/l 8.15x10-3 **EUSES** calculation Marine water mg/l 8.02x10-4 **EUSES** calculation Intermittent release. mg/l Not applicable. Not applicable. Not applicable. **Local concentration** PEC sediment (local+regional) **Justification** Fresh water sediment mg/kg dwt 2.61 EUSES calculation Not evaluated. Marine water sediment mg/kg dwt Not evaluated. 0.256 **EUSES** calculation **Local concentration** PEC soil (local+regional) **Justification** Agricultural soil averaged mg/kg 8.37x10-8 3.75x10-4 **EUSES** calculation Grassland averaged mg/kg dwt 1.63x10-7 3.75x10-4 **EUSES** calculation Groundwater mg/l Not evaluated. 5.91x10-6 **EUSES** calculation **Local concentration** PEC air (local+regional) **Justification** During emission mg/m³ Not evaluated. **EUSES** calculation 1.42x10-9 Annual average mg/m³ **EUSES** calculation 1.42x10-9 1.42x10-9 Annual deposition mg/m2/d Not evaluated. 7.18x10-9 **EUSES** calculation **Local concentration** PEC aquatic (local+regional) **Justification** Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 1: Use in detergents and cleaners, including professional

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	11.5	547	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	4.6x10-4	0.116	EUSES calculation
Soil (direct releases only)	Not evaluated.	5.96	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	4.14	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	3.17x10-3	9.5x10-3	EUSES calculation
Marine water mg/l	4.7x10-3	4.8x10-3	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	1.4	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.39	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	Not evaluated.	3.38x10-4	EUSES calculation
Grassland averaged mg/kg dwt	Not evaluated.	3.3x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	9.2x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	1.3x10-7	Not evaluated.	EUSES calculation
Annual average mg/m³	1.3x10-7	1.3x10-7	EUSES calculation
Annual deposition mg/m2/d	6.5x10-7	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 2% - Professional

Process Category: PROC08a, PROC10
Substance supplied to that use in form of: In a mixture
Sector of end use: SU03, SU22
Subsequent service life relevant for that use: No.
Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b,
ERC08d, ERC10b

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 2: Wood preservative.

	Release from point source (local exposure estimation)	Total release for regional exposure estimation kg/day	Justification
	kg/day	oxposure communering au,	
Waste water	0.241	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	1.21x10-4	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	Not applicable.
	Value	Justification	
Concentration in sewage (PECstp) mg/l	0.087	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	6.67x10-5	8.21x10-3	EUSES calculation
Marine water mg/l	8.68x10-5	8.89x10-4	EUSES calculation
Intermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.63	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.284	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	1.98x10-6	3.77x10-4	EUSES calculation
Grassland averaged mg/kg dwt	3.86x10-6	3.79x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.94x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
During emission mg/m³	3.35x10-8	Not evaluated.	EUSES calculation
Annual average mg/m³	3.35x10-8	3.35x10-8	EUSES calculation
Annual deposition mg/m2/d	1.70x10-7	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification

Section 4: Guidance to check compliance with the exposure scenario

Environment	Not available.
Health	Not available.

Not applicable.

Section 5. Remarks: Additional good practice advice beyond the REACH CSA

Not applicable.

Environment	Not applicable.
Health	Not applicable.
Additional good practices	Not applicable.

Micro-organism mg/l

Not applicable.

ERC08d, ERC10b

Annex to the extended Safety Data Sheet (eSDS)

Identification of the substance or mixture

Product definition UVCB

Product name Pentaethylenehexamine, PEHA

Section 1: Title

Short title of the exposure scenario Identified use name: Use of preparations containing ethylenamines in open processes with low exposure

potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% -

Process Category: PROC08a

Substance supplied to that use in form of: In a mixture

Sector of end use: SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b

List of use descriptors Identified use name: Use of preparations containing ethylenamines in open processes with low exposure

potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% -

Professional

Process Category: PROC08a

Substance supplied to that use in form of: In a mixture

Sector of end use: SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b

Section 2: Operational conditions and risk management measures

Section 2.1 Control of worker exposure

Contributing exposure scenario controlling worker exposure for 0: Transfer of substance or preparation (charging/discharging) from/to

vessels/large containers at non-dedicated facilities

Product Characteristics: Liquid. Covers concentrations up to 0.5%

Amounts used: Not applicable.

Covers daily exposures up to 8 hours (unless stated differently). Frequency and duration of use:

Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg Human factors not influenced by risk management:

Not applicable.

Not applicable.

Other operational conditions affecting worker exposure: Indoor. professional setting

Technical conditions and measures at process level

(source) to prevent release:

Technical conditions and measures to control dispersion

from source towards the worker:

Organisational measures to prevent/limit releases,

dispersion and exposure:

Personal protection:

Not applicable.

Wear chemical-resistant gloves (tested to EN374) in combination with specific activity training. Wear chemical-resistant gloves (tested to EN374) in combination with intensive

management supervision controls.

Section 2.2: Control of environmental exposure

Contributing exposure scenario controlling environmental exposure for 0: Fuel additive.

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable.

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 1860 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1019

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000

Pentaethylenehexamine, PEHA

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% -

Professional

Professional

Process Category: PROC08a Substance supplied to that use in form of: In a mixture

Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b,

ERC08d. ERC10b 196/200

None. Other operational conditions of use affecting environmental Release fraction to air from process (initial release prior to 1.00x10-5 Release fraction to soil from process (initial release prior to RMM): Release fraction to wastewater from process (initial release prior to RMM): Technical conditions and measures at process level (source) to Not applicable. prevent release: Technical on-site conditions and measures to reduce or limit Soil emission controls are not applicable as there is no direct release to soil. discharges, air emissions and releases to soil: Treat air emission to provide a typical removal efficiency of No air emission controls required; required removal efficiency is 0%. Treat on-site wastewater (prior to receiving water discharge) No wastewater treatment required. to provide the required removal efficiency of 3 (%): Organisational measures to prevent/limit release from site: Conditions and measures related to municipal sewage treatment plant: Contributing exposure scenario controlling environmental exposure for 1: Use in detergents and cleaners, including professional Operational conditions: Indoor/Outdoor use. Product Characteristics: Not applicable. Concentration of substance in mixture or article: Amounts used: Regional use tonnage (tonnes/year): 1860 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 372 Average Local Daily Tonnage (kg/day): 1019 Frequency and duration of use: Continuous release. 365 Emission Days (days/year): Environmental factors not influenced by risk management: Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None. exposure: Release fraction to air from process (initial release prior to 1 00x10-5 Release fraction to soil from process (initial release prior to 1.00x10-4 0.185

Release fraction to wastewater from process (initial release prior to RMM):

Technical conditions and measures at process level (source) to prevent release:

Technical on-site conditions and measures to reduce or limit

discharges, air emissions and releases to soil: Treat air emission to provide a typical removal efficiency of

Treat on-site wastewater (prior to receiving water discharge) =>27.7 to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

plant:

Not applicable.

Soil emission controls are not applicable as there is no direct release to soil.

No air emission controls required; required removal efficiency is 0%.

Conditions and measures related to municipal sewage treatment

Pentaethylenehexamine, PEHA

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% -

Process Category: PROC08a

Substance supplied to that use in form of: In a mixture Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b,

ERC08d. ERC10b

197/200

Professional Professional

Contributing exposure scenario controlling environmental exposure for 2: Wood preservative.

Operational conditions: Indoor/Outdoor use.

Product Characteristics: Not applicable

Concentration of substance in mixture or article:

Amounts used:

Regional use tonnage (tonnes/year): 2420 Fraction of Regional tonnage used locally: 20% Annual site tonnage (tonnes/year): 484 Average Local Daily Tonnage (kg/day): 1326

Frequency and duration of use: Continuous release.

Emission Days (days/year): 365

Environmental factors not influenced by risk management:

Local marine water dilution factor: 1000 Other operational conditions of use affecting environmental None. exposure:

Release fraction to air from process (initial release prior to

1.00x10-5

Release fraction to soil from process (initial release prior to

RMM):

Release fraction to wastewater from process (initial release

prior to RMM):

0.02

Technical conditions and measures at process level (source) to prevent release:

Technical on-site conditions and measures to reduce or limit

Not applicable.

discharges, air emissions and releases to soil:

Treat air emission to provide a typical removal efficiency of

No air emission controls required; required removal efficiency is 0%.

Soil emission controls are not applicable as there is no direct release to soil.

(%):

Treat on-site wastewater (prior to receiving water discharge) =>27.7 to provide the required removal efficiency of 3 (%):

Organisational measures to prevent/limit release from site:

Conditions and measures related to municipal sewage treatment plant:

Section 3: Exposure estimation

Section 3.1Workers Exposure estimation

Contributing exposure scenario controlling worker exposure for 0: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

Route of exposure **Contributing scenarios Dose/Concentration** Justification

Long term exposure, Systemic,

Dermal

Not applicable.

0.027

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value

Long term exposure, Systemic,

Inhalable

Not applicable.

0.76

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

otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are

below this value Not applicable.

Long term exposure, Systemic, Not applicable. Not applicable.

Combined

Long term exposure, Local, Dermal Not applicable. Long term exposure, Local,

Inhalable

Not applicable

Not applicable

Not applicable.

Not applicable.

Not applicable. Since the substance is not classified for

acute effects and therefore, no acute DNEL

has been derived.

Short term exposure, Systemic, Not applicable

Inhalable

Not applicable.

Not applicable.

Since the substance is not classified for acute effects and therefore, no acute DNEL

has been derived.

Since the substance is not classified for

acute effects and therefore, no acute DNEL

has been derived.

Pentaethylenehexamine, PEHA

Short term exposure, Systemic,

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% -Professional Professional

Process Category: PROC08a

Substance supplied to that use in form of: In a mixture Sector of end use: SU22

Subsequent service life relevant for that use: No.

Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d. ERC10b

Short term exposure, Systemic, Not applicable. Since the substance is not classified for Not applicable acute effects and therefore, no acute DNEL has been derived.

Short term exposure, Local, Dermal Not applicable Not applicable. Since the substance is not classified for

acute effects and therefore, no acute DNEL

has been derived.

Inhalable

Short term exposure, Local,

Not applicable.

1.52

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. The PROC with the highest exposure level is given since the exposure estimates for other PROC are below this value

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 0: Fuel additive.

Release from point source Total release for regional Justification (local exposure estimation) exposure estimation kg/day kg/day Waste water 737 **EUSES** calculation 0 Surface water Not evaluated. **FUSES** calculation air (direct + STP) 5.10x10-6 0.231 **EUSES** calculation Soil (direct releases only) Not evaluated. 6.94 **EUSES** calculation **Justification EUSES** calculation Concentration in sewage (PECstp) Not applicable as there is no release to wastewater. Concentration in sewage sludge **EUSES** calculation Not applicable as there is no release to wastewater. mg/kg dwt PEC aquatic (local+regional) Justification Local concentration 0 **EUSES** calculation Fresh water mg/l 8.15x10-3 Marine water mg/l 0 8.02x10-4 **EUSES** calculation Intermittent release. mg/l Not applicable. Not applicable. Not applicable. **Local concentration** PEC sediment (local+regional) **Justification** Fresh water sediment mg/kg dwt Not evaluated. 2.61 **EUSES** calculation Marine water sediment mg/kg dwt Not evaluated. 0.256 **EUSES** calculation PEC soil (local+regional) **Justification Local concentration** 8.37x10-8 3.75x10-4 **EUSES** calculation Agricultural soil averaged mg/kg Grassland averaged mg/kg dwt 1.63x10-7 3.75x10-4 **EUSES** calculation Groundwater mg/l Not evaluated. 5.91x10-6 **EUSES** calculation **Local concentration** PEC air (local+regional) **Justification** During emission mg/m³ 1 42x10-9 Not evaluated. EUSES calculation Annual average mg/m³ 1 42x10-9 1 42x10-9 **FUSES** calculation Annual deposition mg/m2/d Not evaluated. 7 18x10-9 **FUSES** calculation **Local concentration** PEC aquatic (local+regional) **Justification** Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 1: Use in detergents and cleaners, including professional

Release from point source Total release for regional **Justification** (local exposure estimation) exposure estimation kg/day kg/day Waste water 11.5 547 **EUSES** calculation Not evaluated. Surface water **EUSES** calculation air (direct + STP) 4.6x10-4 0.116 **EUSES** calculation Soil (direct releases only) Not evaluated. 5.96 **EUSES** calculation **Value Justification** Concentration in sewage (PECstp) 4.14 **EUSES** calculation mg/l Concentration in sewage sludge **EUSES** calculation mg/kg dwt

Local concentration PEC aquatic (local+regional) **Justification** 3.17x10-3 9.5x10-3 **EUSES** calculation Fresh water mg/l

Pentaethylenehexamine, PEHA

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% -Professional Professional

Process Category: PROC08a Substance supplied to that use in form of: In a mixture

Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b, ERC08d. ERC10b

Marine water mg/l 4.7x10-3 4.8x10-3 **EUSES** calculation Intermittent release. mg/l Not applicable. Not applicable. Not applicable. **Local concentration** PEC sediment (local+regional) **Justification** Fresh water sediment mg/kg dwt **EUSES** calculation Not evaluated. 1.4 Marine water sediment mg/kg dwt Not evaluated. 0.39 **EUSES** calculation **Local concentration** PEC soil (local+regional) **Justification** Agricultural soil averaged mg/kg Not evaluated. 3.38x10-4 **EUSES** calculation Grassland averaged mg/kg dwt Not evaluated. 3.3x10-4 **EUSES** calculation Groundwater mg/l Not evaluated. 9.2x10-6 **EUSES** calculation **Local concentration** PEC air (local+regional) **Justification** During emission mg/m³ 1.3x10-7 Not evaluated. **EUSES** calculation Annual average mg/m³ 1.3x10-7 1.3x10-7 **EUSES** calculation Annual deposition mg/m2/d 6.5x10-7 Not evaluated. **EUSES** calculation **Local concentration** PEC aquatic (local+regional) **Justification** Micro-organism mg/l Not applicable. Not applicable. Not applicable.

Section 3.2 Environment Exposure estimation

Contributing exposure scenario controlling environmental exposure for 2: Wood preservative.

	Release from point source (local exposure estimation) kg/day	Total release for regional exposure estimation kg/day	Justification
Waste water	0.241	737	EUSES calculation
Surface water	Not evaluated.	0	EUSES calculation
air (direct + STP)	1.21x10-4	0.231	EUSES calculation
Soil (direct releases only)	Not evaluated.	6.94	EUSES calculation
	Value	Justification	
Concentration in sewage (PECstp) mg/l	0.087	EUSES calculation	
Concentration in sewage sludge mg/kg dwt	0	EUSES calculation	
	Local concentration	PEC aquatic (local+regional)	Justification
Fresh water mg/l	6.67x10-5	8.21x10-3	EUSES calculation
Marine water mg/l	8.68x10-5	8.89x10-4	EUSES calculation
ntermittent release. mg/l	Not applicable.	Not applicable.	Not applicable.
	Local concentration	PEC sediment (local+regional)	Justification
Fresh water sediment mg/kg dwt	Not evaluated.	2.63	EUSES calculation
Marine water sediment mg/kg dwt	Not evaluated.	0.284	EUSES calculation
	Local concentration	PEC soil (local+regional)	Justification
Agricultural soil averaged mg/kg dwt	1.98x10-6	3.77x10-4	EUSES calculation
Grassland averaged mg/kg dwt	3.86x10-6	3.79x10-4	EUSES calculation
Groundwater mg/l	Not evaluated.	5.94x10-6	EUSES calculation
	Local concentration	PEC air (local+regional)	Justification
Ouring emission mg/m³	3.35x10-8	Not evaluated.	EUSES calculation
nnual average mg/m³	3.35x10-8	3.35x10-8	EUSES calculation
Annual deposition mg/m2/d	1.70x10-7	Not evaluated.	EUSES calculation
	Local concentration	PEC aquatic (local+regional)	Justification
Micro-organism mg/l	Not applicable.	Not applicable.	Not applicable.

Section 4: Guidance to check compliance with the exposure scenario

EnvironmentNot available.HealthNot available.

Section 5. Remarks: Additional good practice advice beyond the REACH CSA

EnvironmentNot applicable.HealthNot applicable.Additional good practicesNot applicable.

Pentaethylenehexamine, PEHA

Identified use name: Use of preparations containing ethylenamines in open processes with low exposure potential and evaporation as most likely exposure form - Use of preparations containing EA up to 0.5% -

Professional
Process Category: PROC08a

Substance supplied to that use in form of: In a mixture Sector of end use: SU22

Subsequent service life relevant for that use: No. Environmental Release Category: ERC01, ERC04, ERC08a, ERC08b,

ERC08d, ERC10b