# 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 |
|---|---|
| 01-2119485826-22-0000 | Delamine BV |

**CAS number** : 4067-16-7

**Product description** : Not applicable

**Product type** : Liquid.

**Other means of identification** : 3,6,9,12-tetraazatetradecamethylenediamine; Pentaethylenehexamine; 3,6,9, 12-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** : Industrial 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% - Industrial |
| 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 |
| Handling of solid products with small amounts of unbound ethylenamines - 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 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 - |

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

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 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
Netherlands
Telephone number: +31-334676897

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

### 1.4 Emergency telephone number

**Supplier**

**Telephone number** : GBK/Infotrac ID 104075 : International (001) 352 323 3500 (24 hours per day)

# 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]**

# SECTION 2: Hazards identification

Acute Tox. 4, H302
Acute Tox. 4, H312
Skin Corr. 1B, 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 or 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**

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

**Response** : IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF IN EYES:
Rinse cautiously with water for several minutes.
Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.

**Storage** : Store locked up.

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

**Hazardous ingredients** : 3,6,9,12-tetra-azatetradecamethylenediamine

**Supplemental label elements** : Not applicable.

## SECTION 2: Hazards identification

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

**Special packaging requirements**

**Containers to be fitted with child-resistant fastenings** : Not applicable.

**Tactile warning of danger** : Not 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. 1907/2006, Annex XIII** : No

**Other hazards which do not result in classification** : Not applicable.

## SECTION 3: Composition/information on ingredients

**Substance/mixture** : UVCB

| Product/ingredient name | Identifiers | % | Classification 67/548/EEC | Classification Regulation (EC) No. 1272/2008 [CLP] | Type |
|---|---|---|---|---|---|
| 3,6,9,12-tetra-azatetradecamethylenediamine | REACH #: 01-2119485826-22<br>EC: 223-775-9<br>CAS: 4067-16-7<br>Index: 612-064-00-2 | 100 | Xn; R21/22<br>C; R34<br>R43<br>N; R50/53 | Acute Tox. 4, H302<br>Acute Tox. 4, H312<br>Skin Corr. 1B, H314<br>Eye Dam. 1, H318<br>Skin Sens. 1, H317<br>Aquatic Acute 1, H400<br>Aquatic Chronic 1, H410 | [*] |
| 3,6,9,12-tetra-azatetradecamethylenediamine | EC: 223-775-9<br>CAS: 4067-16-7<br>Index: 612-064-00-2 | 70 - 80 | Xn; R21/22<br>C; R34<br>R43<br>N; R50/53 | Acute Tox. 4, H302<br>Acute Tox. 4, H312<br>Skin Corr. 1B, H314<br>Eye Dam. 1, H318<br>Skin Sens. 1, H317<br>Aquatic Acute 1, H400<br>Aquatic Chronic 1, H410 | [A] |
| amines, polyethylenepoly- | EC: 268-626-9<br>CAS: 68131-73-7<br>Index: 612-121-00-1 | 15 - 25 | Xn; R21/22<br>C; R34<br>R43 | Acute Tox. 4, H302<br>Acute Tox. 4, H312<br>Skin Corr. 1B, H314 | [A] |

## SECTION 3: Composition/information on ingredients

| | | | | | |
|---|---|---|---|---|---|
| 3,6,<br>9-triazaundecamethylenediamine | EC: 203-986-2<br>CAS: 112-57-2<br>Index: 612-060-00-0 | 1 - 10 | N; R50/53<br><br>Xn; R21/22<br>C; R34<br>R43<br>N; R51/53<br><br>**See Section 16 for the full text of the R-phrases declared above.** | Eye Dam. 1, H318<br>Skin Sens. 1, H317<br>Aquatic Acute 1, H400<br>Aquatic Chronic 1, H410<br>Acute Tox. 4, H302<br>Acute Tox. 4, H312<br>Skin Corr. 1A, H314<br>Eye Dam. 1, H318<br>Skin Sens. 1, H317<br>Aquatic Chronic 2, H411<br>**See Section 16 for the full text of the H statements declared above.** | [A] |

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

[*] 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.

## SECTION 4: First aid measures

**Ingestion** : Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

**Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

### 4.2 Most important symptoms and effects, both acute and delayed

**Potential acute health effects**

**Eye contact** : Causes serious eye damage.

**Inhalation** : No known significant effects or critical hazards.

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

**Ingestion** : Harmful if swallowed. Corrosive to the digestive tract. Causes burns.

**Over-exposure signs/symptoms**

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

**Inhalation** : No specific data.

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

**Ingestion** : Adverse symptoms may include the following:
stomach pains

### 4.3 Indication of any immediate medical attention and special treatment needed

**Notes to physician** : 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, $CO_2$, 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 thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides

## 5.3 Advice for firefighters

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

**Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

# 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.

## 6.3 Methods and material for containment and cleaning up

## SECTION 6: Accidental release measures

**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. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product.

**6.4 Reference to other sections** : See Section 1 for emergency contact information.
See Section 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

## SECTION 7: Handling and storage

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.

**Seveso Directive - Reporting thresholds (in tonnes)**

**Danger criteria**

# SECTION 7: Handling and storage

| Category | Notification and MAPP threshold | Safety report threshold |
|---|---|---|
| E1: Hazardous to the aquatic environment - Acute 1 or Chronic 1 | 100 | 200 |
| C9i: Very toxic for the environment | 100 | 200 |

### 7.3 Specific end use(s)

**Recommendations** : No specific data.

**Industrial sector specific solutions** : No specific data.

# 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.

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

#### DNELs/DMELs

| 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 |

## SECTION 8: Exposure controls/personal protection

| | | | | | |
|---|---|---|---|---|---|
| | 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/cm² | Consumers | Local |

**PNECs**

| Product/ingredient name | Compartment Detail | Value | Method Detail |
|---|---|---|---|
| 3,6,9,12-tetra-azatetradecamethylenediamine | Secondary Poisoning | 0.29 mg/kg | Assessment Factors |
| | Fresh water | 2.5 µg/l | Assessment Factors |
| | Marine | 2.5 µg/l | Assessment Factors |
| | Fresh water sediment | 0.22 mg/kg dwt | - |
| | Marine water sediment | 0.14 mg/kg dwt | - |
| | Soil | 0.18 mg/kg dwt | - |
| | 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. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

**Skin protection**

**Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated. > 8 hours (breakthrough time): neoprene

## SECTION 8: Exposure controls/personal protection

**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 range** : 426°C

**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 [room temperature]

**Vapour density** : Not available.

**Relative density** : Not available.

**Solubility(ies)** : Not available.

**Solubility in water** : >500 g/l

**Partition coefficient: n-octanol/water** : -3.67

**Auto-ignition temperature** : 335°C

## SECTION 9: Physical and chemical properties

**Decomposition temperature** : Not available.

**Viscosity** : Not available.

**Explosive properties** : Not applicable.

**Oxidising properties** : None.

### 9.2 Other information

**Density** : 1.003 g/cm³ [20°C]

**Physical/chemical properties comments** : No additional information.

## SECTION 10: Stability and reactivity

**10.1 Reactivity** : No specific test data related to reactivity available for this product or its ingredients.

**10.2 Chemical stability** : The product is stable.

**10.3 Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.

Under normal conditions of storage and use, hazardous polymerisation will not occur.

**10.4 Conditions to avoid** : 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 | - |
| 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**

## SECTION 11: Toxicological information

**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.

### Sensitisation

| 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<br><br>Subject: Mammalian-Animal<br>Cell: Germ | Negative |

**Conclusion/Summary** : No mutagenic effect.

### Carcinogenicity

**Conclusion/Summary** : skin No carcinogenic effect.

### 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

**Eye contact** : Causes serious eye damage.

## SECTION 11: Toxicological information

**Inhalation** : No known significant effects or critical hazards.

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

**Ingestion** : Harmful if swallowed. Corrosive to the digestive tract. Causes burns.

### Symptoms related to the physical, chemical and toxicological characteristics

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

**Inhalation** : No specific data.

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

**Ingestion** : Adverse symptoms may include the following:
stomach pains

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

#### Short term exposure

**Potential immediate effects** : No specific data.

**Potential delayed effects** : No specific data.

#### Long term exposure

**Potential immediate effects** : No specific data.

**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.

**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.

# SECTION 11: Toxicological information

**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 |
| | Acute EC50 0.7 mg/l Fresh water | Algae | 72 hours |
| | Acute EC50 17.5 mg/l Fresh water | Daphnia | 48 hours |
| | Acute LC50 180 mg/l Fresh water | Fish | 96 hours |
| | Acute NOEC 0.25 mg/l Fresh water | Algae | 72 hours |
| | Chronic NOEC 0.8 mg/l Fresh water | Daphnia | 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 | $LogP_{ow}$ | BCF | Potential |
|---|---|---|---|
| 3,6,9,12-tetra-azatetradecamethylenediamine | -3.67 | - | low |

## 12.4 Mobility in soil

**Soil/water partition coefficient ($K_{OC}$)** : >3000

**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.

## SECTION 13: Disposal considerations

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

### 13.1 Waste treatment methods

**Product**

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

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

**Packaging**

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

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

## SECTION 14: Transport information

| | ADR/RID | ADN | IMDG | IATA |
|---|---|---|---|---|
| **14.1 UN number** | UN2735 | UN2735 | UN2735 | UN2735 |
| **14.2 UN proper shipping name** | POLYAMINES, LIQUID, CORROSIVE, N.O.S.(3,6,9,12-tetra-azatetradecamethylenediamine) | POLYAMINES, LIQUID, CORROSIVE, N.O.S.(3,6,9,12-tetra-azatetradecamethylenediamine) | POLYAMINES, LIQUID, CORROSIVE, N.O.S.(3,6,9,12-tetra-azatetradecamethylenediamine). Marine pollutant (Amines, polyethylenepoly-) | Polyamines, liquid, corrosive, n.o.s.(3,6,9,12-tetra-azatetradecamethylenediamine) |
| **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. |
| | | | | |

## SECTION 14: Transport information

| | | | | |
|---|---|---|---|---|
| **Additional information** | The environmentally hazardous substance mark is not required when transported in sizes of ≤5 L or ≤5 kg.<br><br>**Hazard identification number**<br>80<br><br>**Limited quantity**<br>5 L<br><br>**Special provisions**<br>274<br><br>**Tunnel code**<br>(E) | The environmentally hazardous substance mark is not required when transported in sizes of ≤5 L or ≤5 kg.<br><br>**Special provisions**<br>274 | The marine pollutant mark is not required when transported in sizes of ≤5 L or ≤5 kg.<br><br>**Emergency schedules (EmS)**<br>F-A, S-B<br><br>**Special provisions**<br>223, 274 | The environmentally hazardous substance mark may appear if required by other transportation regulations.<br>**Passenger and Cargo Aircraft**<br>Quantity limitation: 5 L<br>Packaging instructions: 852<br>**Cargo Aircraft Only**<br>Quantity limitation: 60 L<br>Packaging instructions: 856<br>**Limited Quantities - Passenger Aircraft**<br>Quantity limitation: 1 L<br>Packaging instructions: Y841<br><br>**Special provisions**<br>A3, A803 |

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

**14.7 Transport in bulk according to Annex II of MARPOL 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 on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles** : Not applicable.

**Other EU regulations**

## SECTION 15: Regulatory information

**Europe inventory** : All components are listed or exempted.

**Seveso Directive**

This product is controlled under the Seveso Directive.

**Danger criteria**

| Category |
| --- |
| E1: Hazardous to the aquatic environment - Acute 1 or Chronic 1<br>C9i: Very toxic for the environment |

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

**Key literature references and sources for data** : Regulation (EC) No. 1272/2008 [CLP]; European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), concluded in Geneva on 30 September 1957 plus amendments (Uniform text: Journal of Laws 27/2009 pos. 162 plus amendments); Regulation for the transport of dangerous materials on the Rhine (ADN); Occupational exposure limits; International regulations

**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. 1B, 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 |

## SECTION 16: Other information

**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.
H411 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 (dermal) - Category 4 |
| Aquatic Acute 1, H400 | ACUTE AQUATIC HAZARD - Category 1 |
| Aquatic Chronic 1, H410 | LONG-TERM AQUATIC HAZARD - Category 1 |
| Aquatic Chronic 2, H411 | LONG-TERM AQUATIC HAZARD - Category 2 |
| Eye Dam. 1, H318 | SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1 |
| Skin Corr. 1A, H314 | SKIN CORROSION/IRRITATION - Category 1A |
| Skin Corr. 1B, H314 | SKIN CORROSION/IRRITATION - Category 1B |
| 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.
R51/53- 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

**Training advice** : Ensure operatives are trained to minimise exposures. Training staff on good practice.

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**Date of previous issue** : 08/04/2014

**Version** : 7

**Notice to reader**

**To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.**
**Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.**

**Annex to the extended Safety Data Sheet (eSDS)**

**Consumer**

## Identification of the substance or mixture

| | |
|---|---|
| **Product definition** | UVCB |
| **Product name** | Pentaethylenehexamine, PEHA |

## Section 1 Title

| | |
|---|---|
| **Short title of the exposure scenario/List of use descriptors** | **Identified use name:** Consumer uses of ethyleneamines<br>**Sector of end use:** SU21<br>**Subsequent service life relevant for that use:** No.<br>**Environmental Release Category:** ERC08a, ERC08b, ERC08c, ERC08d, ERC08e, ERC08f<br>**Market sector by type of chemical product:** PC01, PC09b<br>**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 environmental exposure

**Contributing scenario controlling environmental exposure for 0: Use in detergents and cleaners, including professional**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day)** | 1019 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | |
| **Release fraction to air from process (initial release prior to RMM)** | 0 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 1 |
| **Conditions and measures related to municipal sewage treatment plant:** | |
| **Estimated substance removal from wastewater via on-site sewage treatment** | Not available. |
| **Total efficiency of removal from wastewater after on-site and off-site (domestic treatment plant) RMMs** | Not available. |

| | |
|---|---|
| **Maximum allowable site tonnage ($M_{Safe}$) based on release following total wastewater treatment removal** | Not available. |
| **Assumed on-site sewage treatment plant flow** | Not available. |

**Contributing scenario controlling environmental exposure for 1: Use of coatings and adhesives**

Operational conditions: Not determined

| | |
|---|---|
| **Product characteristics:** | Indoor/Outdoor use |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day)** | 1019 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | |
| **Release fraction to air from process (initial release prior to RMM)** | 0 |
| **Release fraction to soil from process (initial release prior to RMM)** | 5.00x10-3 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.1 |
| **Conditions and measures related to municipal sewage treatment plant:** | |
| **Estimated substance removal from wastewater via on-site sewage treatment** | Not available. |
| **Total efficiency of removal from wastewater after on-site and off-site (domestic treatment plant) RMMs** | Not available. |
| **Maximum allowable site tonnage ($M_{Safe}$) based on release following total wastewater treatment removal** | Not available. |
| **Assumed on-site sewage treatment plant flow** | Not available. |

**Contributing scenario controlling environmental exposure for 2: Lube oil use**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 372 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 74.4 |
| **Average Local Daily Tonnage (kg/day)** | 204 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | |

| | |
|---|---|
| **Release fraction to air from process (initial release prior to RMM)** | 0 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Conditions and measures related to municipal sewage treatment plant:** | |
| **Estimated substance removal from wastewater via on-site sewage treatment** | Not available. |
| **Total efficiency of removal from wastewater after on-site and off-site (domestic treatment plant) RMMs** | Not available. |
| **Maximum allowable site tonnage ($M_{Safe}$) based on release following total wastewater treatment removal** | Not available. |
| **Assumed on-site sewage treatment plant flow** | Not available. |

**Section 2.2 Control of consumer exposure**

**Contributing scenario controlling consumer exposure for 0: Use in detergents and cleaners, including professional**

| | |
|---|---|
| **Physical state:** | Physical state: liquid<br>Molecular weight: 146.23 g/mole<br>Vapour pressure: 0.346 Pa*s at 25°C |

**Contributing scenarios: Operational conditions and risk management measures**

Product category(ies) 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 category(ies) 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 category(ies) 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 category(ies) 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 2.2 Control of consumer exposure

### Contributing scenario controlling consumer exposure for 1: Use of coatings and adhesives

**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 category(ies) 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 category(ies) 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 category(ies) 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 category(ies) 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 2.2 Control of consumer exposure

### Contributing scenario controlling consumer exposure for 2: Lube oil use

**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 category(ies) 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 category(ies) 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 category(ies) 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 category(ies) 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 3 Exposure estimation and reference to its source

### Section 3.1 Environment - Exposure estimation

**Contributing scenario controlling environmental exposure for 0: 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** | 0.382 | 737 | EUSES calculation |
| **Surface water** | Not evaluated. | 0 | EUSES calculation |
| **air (direct + STP)** | 0 | 0.231 ; Regional PEC [ Total ] : 6.87x10-13 | EUSES calculation |
| **Soil (direct releases only)** | Not evaluated. | 6.94; Regional PEC natural soil: 3.75x10-4 | Not applicable. |
| | **Value** | **Justification** | |
| **Concentration in sewage (PECstp) mg/l** | 0.138 | EUSES calculation | |
| **Concentration in sewage sludge mg/kg dwt** | 0 | EUSES calculation | |
| | **Local concentration** | **PEC aquatic (local+regional)** | **Justification** |
| **Fresh water mg/l** | 1.06x10-4 | 8.25x10-3 ;Regional PEC[Total]: 8.19x10-3 | EUSES calculation |
| **Marine water mg/l** | 1.38x10-4 | 9.39x10-4 ;Regional PEC[Total]: 8.03x10-4 | 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. | 2.64; 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** |
| **Agricultural soil averaged mg/kg dwt** | 4.33x10-11 | 3.75x10-4; Regional PEC [Total]: 3.71x10-4 | EUSES calculation |
| **Grassland averaged mg/kg dwt** | 8.43x10-11 | 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** | 7.32x10-13 | Not evaluated. | EUSES calculation |

| | | | |
|---|---|---|---|
| **Annual average mg/m³** | 7.32x10-13 | 1.42x10-12 | EUSES calculation |
| **Annual deposition mg/m²/d** | 3.71x10-12 | Not evaluated. | EUSES calculation |
| | **Local concentration** | **PEC aquatic (local+regional)** | **Justification** |
| **Micro-organism mg/l** | Not applicable. | Not applicable. | Not applicable. |

**Section 3.1 Environment - Exposure estimation**

**Contributing scenario controlling environmental exposure for 1: 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 ; Regional PEC [ Total ] : 6.87x10-13 | EUSES calculation |
| **Soil (direct releases only)** | Not evaluated. | 6.94; Regional PEC natural soil: 3.75x10-4 | 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 3.1 Environment - Exposure estimation**

**Contributing scenario controlling environmental exposure for 2: Lube oil use**

| | **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 ; Regional PEC [ Total ] : 6.87x10-13 | EUSES calculation |
| **Soil (direct releases only)** | Not evaluated. | 6.94; Regional PEC natural soil: 3.75x10-4 | 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; Regional PEC [Total]: 3.71x10-4 | 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 Exposure estimation - Consumers**

**Exposure estimation and reference to its source - Consumers: 2: Use in detergents and cleaners, including professional**

| | **Contributing scenario:** | **Frequency (1/Year):** | **Weight fraction of substance in the article::** | **Body weight:** | **Calculation method:** |
|---|---|---|---|---|---|
| **Exposure estimation and reference to its source - Consumers: 0: Use in detergents and cleaners, including professional** | Adhesives, sealants - Mixing and loading; Adhesives, sealants - Application(s); Fillers, putties, plasters, modelling clay - Mixing and loading; Fillers, putties, plasters, modelling clay - Application(s) | 3; 3; 2; 2 | 25%; 5%; 25%; 5% | 60 kg | ConsExpo 4.1 |

**Inhalation :**

**Mode of release:** evaporation

## Exposure estimation and reference to its source - Consumers: 1: Use in detergents and cleaners, including professional

| **Exposure (minutes):** | **Application duration:** | **Amount/concentration applied (g):** | **Room volume (m³):** | **Room volume x ventilation rate: (l/h):** |
|---|---|---|---|---|
| 5; 90; 5; 90 | 5; 30; 5; 30 | 20; 20; 200; 200 | 1; 20; 1; 20 | 0.6 |

| **Release area (cm2):** | **Temperature (°C):** | **Mass transfer rate:** | **Contributing scenario Molecular weight (g/mole):** | **Uptake fraction (Update model):** | **Inhalation rate:** |
|---|---|---|---|---|---|
| 20; 500; 100; 50 | 20 | 3.09E+03 | 550 | 1 | 32.9 |

**Dermal:**

**Application methods:** instant

| Surface area (Skin contact area) cm2: | Product amount (g): | Uptake fraction (Update model): | Inhalation event (mg/m³): |
|---|---|---|---|
| 2; 43; 2; 22 | 0.05; 0.1; 0.02; 1 | 1 | 11.2; 3.0; 11.5; 3.1 |

| Inhalation mg/m³ (Concentration on day of exposure): | Dermal load (mg/cm2): | Dermal External dose (mg/kg bw): | Dermal (Internal 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 |

| Dermal (External dose) mg/kg bw/day: | Inhalation event/Exposure mg/m³ (Short term exposure): | Dermal systemic exposure (external dose) with gloves (90% efficiency) mg/kg bw/day (Long term exposure): | Inhalation (mg/kg/day) Long term exposure: |
|---|---|---|---|
| 0.002; 0.001; 5E-4; 0.001 | 11.2; 3.0; 11.5; 3.1 | 0.0002; 0.0001; 5E-5; 0.0001 | 0.039; 0.188; 0.040; 0.191 |

**Section 3.2 Exposure estimation - Consumers**

**Exposure estimation and reference to its source - Consumers: 5: Use of coatings and adhesives**

| | Contributing scenario: | Frequency (1/Year): | Weight fraction of substance in the article:: | Body weight: | Calculation method: |
|---|---|---|---|---|---|
| Exposure estimation and reference to its source - Consumers: 3: Use of coatings and adhesives | Adhesives, sealants - Mixing and loading; Adhesives, sealants - Application(s); Fillers, putties, plasters, modelling clay - Mixing and loading; Fillers, putties, plasters, modelling clay - Application(s) | 3; 3; 2; 2 | 25%; 5%; 25%; 5% | 60 kg | ConsExpo 4.1 |

**Inhalation :**

**Mode of release:** evaporation

## Exposure estimation and reference to its source - Consumers: 4: Use of coatings and adhesives

| Exposure (minutes): | Application duration: | Amount/concentration applied (g): | Room volume (m³): | Room volume x ventilation rate: (l/h): |
|---|---|---|---|---|
| 5; 90; 5; 90 | 5; 30; 5; 30 | 20; 20; 200; 200 | 1; 20; 1; 20 | 0.6 |

| Release area (cm2): | Temperature (°C): | Mass transfer rate: | Contributing scenario Molecular weight (g/mole): | Uptake fraction (Update model): | Inhalation rate: |
|---|---|---|---|---|---|
| 20; 500; 100; 50 | 20 | 3.09E+03 | 550 | 1 | 32.9 |

**Dermal:**

**Application methods:** instant

| Surface area (Skin contact area) cm2: | Product amount (g): | Uptake fraction (Update model): | Inhalation event (mg/m³): |
|---|---|---|---|
| 2; 43; 2; 22 | 0.05; 0.1; 0.02; 1 | 1 | 11.2; 3.0; 11.5; 3.1 |

| Inhalation mg/m³ (Concentration on day of exposure): | Dermal load (mg/cm2): | Dermal External dose (mg/kg bw): | Dermal (Internal 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 |

| Dermal (External dose) mg/kg bw/day: | Inhalation event/Exposure mg/m³ (Short term exposure): | Dermal systemic exposure (external dose) with gloves (90% efficiency) mg/kg bw/day (Long term exposure): | Inhalation (mg/kg/day) Long term exposure: |
|---|---|---|---|
| 0.002; 0.001; 5E-4; 0.001 | 11.2; 3.0; 11.5; 3.1 | 0.0002; 0.0001; 5E-5; 0.0001 | 0.039; 0.188; 0.040; 0.191 |

**Section 3.2 Exposure estimation - Consumers**

**Exposure estimation and reference to its source - Consumers: 9: Lube oil use**

| | Contributing scenario: | Frequency (1/Year): | Weight fraction of substance in the article:: | Body weight: | Calculation method: |
|---|---|---|---|---|---|
| **Exposure estimation and reference to its source - Consumers: 7: Lube oil use** | Adhesives, sealants - Mixing and loading; Adhesives, sealants - Application(s); Fillers, putties, plasters, modelling clay - Mixing and loading; Fillers, putties, plasters, modelling clay - Application(s) | 3; 3; 2; 2 | 25%; 5%; 25%; 5% | 60 kg | ConsExpo 4.1 |

**Inhalation :**

**Mode of release:** evaporation

## Exposure estimation and reference to its source - Consumers: 8: Lube oil use

| Exposure (minutes): | Application duration: | Amount/concentration applied (g): | Room volume (m³): | Room volume x ventilation rate: (l/h): |
|---|---|---|---|---|
| 5; 90; 5; 90 | 5; 30; 5; 30 | 20; 20; 200; 200 | 1; 20; 1; 20 | 0.6 |

| Release area (cm2): | Temperature (°C): | Mass transfer rate: | Contributing scenario Molecular weight (g/mole): | Uptake fraction (Update model): | Inhalation rate: |
|---|---|---|---|---|---|
| 20; 500; 100; 50 | 20 | 3.09E+03 | 550 | 1 | 32.9 |

**Dermal:**

**Application methods:** instant

| Surface area (Skin contact area) cm2: | Product amount (g): | Uptake fraction (Update model): | Inhalation event (mg/m³): |
|---|---|---|---|
| 2; 43; 2; 22 | 0.05; 0.1; 0.02; 1 | 1 | 11.2; 3.0; 11.5; 3.1 |

| Inhalation mg/m³ (Concentration on day of exposure): | Dermal load (mg/cm2): | Dermal External dose (mg/kg bw): | Dermal (Internal 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 |

| Dermal (External dose) mg/kg bw/day: | Inhalation event/Exposure mg/m³ (Short term exposure): | Dermal systemic exposure (external dose) with gloves (90% efficiency) mg/kg bw/day (Long term exposure): | Inhalation (mg/kg/day) Long term exposure: |
|---|---|---|---|
| 0.002; 0.001; 5E-4; 0.001 | 11.2; 3.0; 11.5; 3.1 | 0.0002; 0.0001; 5E-5; 0.0001 | 0.039; 0.188; 0.040; 0.191 |

**Section 3.3 Exposure estimation- Consumers**

**Contributing scenario controlling consumer exposure for 6: Use in detergents and cleaners, including professional**

| Route of exposure | Contributing scenarios | Dose/Concentration | Justification |
|---|---|---|---|
| **Long term exposure, Systemic, Dermal** | Not applicable. | Not applicable. | Not applicable. |
| **Long term exposure, Systemic, Inhalable** | Not applicable. | Not applicable. | Not applicable. |
| **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. | Not applicable. |

| | | | |
|---|---|---|---|
| **Long term exposure, Systemic, Oral** | Not applicable. | Not applicable. | Not applicable. |
| **Short term exposure, Systemic, Dermal** | Not applicable. | Not applicable. | Not applicable. |
| **Short term exposure, Systemic, Inhalable** | | Not applicable. | Not applicable. |
| **Short term exposure, Systemic, Combined** | Not applicable. | Not applicable. | Not applicable. |
| **Short term exposure, Local, Dermal** | Not applicable. | Not applicable. | Not applicable. |
| **Short term exposure, Local, Inhalable** | Not applicable. | Not applicable. | Not applicable. |
| **Short term exposure, Systemic, Oral** | Not applicable. | Not applicable. | Not applicable. |

**Section 3.3 Exposure estimation- Consumers**

**Contributing scenario controlling consumer exposure for 10: Use of coatings and adhesives**

| Route of exposure | Contributing scenarios | Dose/Concentration | Justification |
|---|---|---|---|
| **Long term exposure, Systemic, Dermal** | Not applicable. | Not applicable. | Not applicable. |
| **Long term exposure, Systemic, Inhalable** | Not applicable. | Not applicable. | Not applicable. |
| **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. | Not applicable. |
| **Long term exposure, Systemic, Oral** | Not applicable. | Not applicable. | Not applicable. |
| **Short term exposure, Systemic, Dermal** | Not applicable. | Not applicable. | Not applicable. |
| **Short term exposure, Systemic, Inhalable** | | Not applicable. | Not applicable. |
| **Short term exposure, Systemic, Combined** | Not applicable. | Not applicable. | Not applicable. |
| **Short term exposure, Local, Dermal** | Not applicable. | Not applicable. | Not applicable. |
| **Short term exposure, Local, Inhalable** | Not applicable. | Not applicable. | Not applicable. |
| **Short term exposure, Systemic, Oral** | Not applicable. | Not applicable. | Not applicable. |

**Section 3.3 Exposure estimation- Consumers**

**Contributing scenario controlling consumer exposure for 11: Lube oil use**

| Route of exposure | Contributing scenarios | Dose/Concentration | Justification |
|---|---|---|---|
| **Long term exposure, Systemic, Dermal** | Not applicable. | Not applicable. | Not applicable. |
| **Long term exposure, Systemic, Inhalable** | Not applicable. | Not applicable. | Not applicable. |
| **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. | Not applicable. |
| **Long term exposure, Systemic, Oral** | Not applicable. | Not applicable. | Not applicable. |
| **Short term exposure, Systemic, Dermal** | Not applicable. | Not applicable. | Not applicable. |
| **Short term exposure, Systemic, Inhalable** | | Not applicable. | Not applicable. |
| **Short term exposure, Systemic, Combined** | Not applicable. | Not applicable. | Not applicable. |
| **Short term exposure, Local, Dermal** | Not applicable. | Not applicable. | Not applicable. |

| | | | |
|---|---|---|---|
| **Short term exposure, Local, Inhalable** | Not applicable. | Not applicable. | Not applicable. |
| **Short term exposure, Systemic, Oral** | Not applicable. | Not applicable. | Not applicable. |

**Section 4: Guidance to DU to evaluate whether 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. |

**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/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<br>**Process Category:** PROC21, PROC24<br>**Sector of end use:** SU22<br>**Subsequent service life relevant for that use:** No.<br>**Environmental Release Category:** ERC06d |

## Section 2: Operational conditions and risk management measures

### Section 2.1 Control of environmental exposure

**Contributing scenario controlling environmental exposure for 0: Ashless dispersant**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 4840 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 967 |
| **Average Local Daily Tonnage (kg/day):** | 2649 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1240 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 300 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1240 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 300 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 3: Laboratory chemicals**

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 100 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 20.1 |
| **Average Local Daily Tonnage (kg/day):** | 55.1 |

| | |
|---|---|
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 1.00x10-4 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.02 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1019 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 0 |

| | |
|---|---|
| **Release fraction to soil from process (initial release prior to RMM)** | 5.00x10-3 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.01 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.2 Control of worker exposure**

**Contributing 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:** | 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers 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 3: Exposure estimation

### Section 3.1 Environment - Exposure estimation

**Contributing 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 3.1 Environment - Exposure estimation

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation

### Contributing 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 3.1 Environment - Exposure estimation

### Contributing 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** | 9.90 | Not evaluated. | EUSES calculation |
| | **Local concentration** | **PEC aquatic (local+regional)** | **Justification** |
| **Micro-organism mg/l** | Not applicable. | Not applicable. | Not applicable. |

**Section 3.2 Workers - Exposure estimation**

**Contributing 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, 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** | 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. | 0.12 | 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 Workers - Exposure estimation**

**Contributing 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 | 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. | 0.12 | 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 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/List of use descriptors** | **Identified use name:** Handling of solid products with small amounts of unbound ethylenamines - Use of preparations containing EA up to 2% - Professional<br>**Process Category:** PROC21, PROC24<br>**Sector of end use:** SU22<br>**Subsequent service life relevant for that use:** No.<br>**Environmental Release Category:** ERC06d |

## Section 2: Operational conditions and risk management measures

### Section 2.1 Control of environmental exposure

**Contributing scenario controlling environmental exposure for 0: Ashless dispersant**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 4840 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 967 |
| **Average Local Daily Tonnage (kg/day):** | 2649 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1240 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 300 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1240 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 300 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 3: Laboratory chemicals**

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 100 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 20.1 |
| **Average Local Daily Tonnage (kg/day):** | 55.1 |

| | |
|---|---|
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 1.00x10-4 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.02 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1019 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 0 |

| | |
|---|---|
| **Release fraction to soil from process (initial release prior to RMM)** | 5.00x10-3 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.01 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.2 Control of worker exposure**

**Contributing 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 |
| **Other given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers 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 3: Exposure estimation

### Section 3.1 Environment - Exposure estimation

**Contributing 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 3.1 Environment - Exposure estimation

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.2 Workers - Exposure estimation**

**Contributing 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, Dermal** | Not applicable. | 0.0003 | 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. | 0.02 | 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, 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. | 0.03 | 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 Workers - Exposure estimation**

**Contributing 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. | 0.0003 | 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. | 0.02 | 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, 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. | 0.03 | 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 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)**

**Industrial**

## Identification of the substance or mixture

| | |
|---|---|
| **Product definition** | UVCB |
| **Product name** | Pentaethylenehexamine, PEHA |

## Section 1: Title

| | |
|---|---|
| **Short title of the exposure scenario/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<br>**Process Category:** PROC01, PROC02, PROC03, PROC04, PROC05, PROC08a, PROC08b, PROC09, PROC15<br>**Substance supplied to that use in form of:** As such<br>**Sector of end use:** SU03<br>**Subsequent service life relevant for that use:** No.<br>**Environmental Release Category:** ERC01, ERC02, ERC06a |

## Section 2: Operational conditions and risk management measures

### Section 2.1 Control of environmental exposure

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

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1.86x10-4 |
| **Fraction of Regional tonnage used locally** | 3.72x10-3 |
| **Annual site tonnage** | 3.72x10-3 |
| **Average Local Daily Tonnage (kg/day):** | 10192 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1000 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | 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)** | 1.61x10-8 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **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 on-site sewage treatment plant flow** | 2000 |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1.86x10-4 |
| **Fraction of Regional tonnage used locally** | 3.72x10-3 |
| **Annual site tonnage** | 3.72x10-3 |
| **Average Local Daily Tonnage (kg/day):** | 10192 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1000 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | 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)** | 1.61x10-8 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **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 on-site sewage treatment plant flow** | 2000 |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 3720 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 744 |
| **Average Local Daily Tonnage (kg/day):** | 2000 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | Indoor industrial setting |
| **Release fraction to air from process (initial release prior to RMM)** | 0 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 3720 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 744 |
| **Average Local Daily Tonnage (kg/day):** | 2038 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions 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)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 5.0x10-5 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **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 on-site sewage treatment plant flow** | 2000 |

**Section 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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:** | 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 |
| **Other given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing scenario controlling worker exposure for 5: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities**

| | |
|---|---|
| **Product characteristics:** | Liquid. 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 1 hour. |
| **Human factors not influenced by risk management:** | Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg |
| **Other given operational conditions affecting workers 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 95% |

**Section 2.2 Control of worker exposure**

**Contributing scenario controlling worker exposure for 6: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities**

| | |
|---|---|
| **Product characteristics:** | Liquid. 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 |
| **Other given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing scenario controlling worker exposure for 8: Use a 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 given operational conditions affecting workers 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 3: Exposure estimation

### Section 3.1 Environment - Exposure estimation

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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** | |
| **Concentration in sewage (PECstp) mg/l** | 0.037 | EUSES calculation | |
| **Concentration in sewage sludge mg/kg dwt** | 0 | EUSES calculation | |
| | **Local concentration** | **PEC aquatic (local+regional)** | **Justification** |
| **Fresh water mg/l** | 2.82x10-5 | 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 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 Workers - Exposure estimation**

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

| Route of exposure | Contributing scenarios | Dose/Concentration | Justification |
|---|---|---|---|
| Long term exposure, Systemic, Dermal | 1.1 | 0.007 | 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 | 1.1 | 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 | 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 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 Workers - Exposure estimation**

**Contributing 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. | 0.14 | 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. | 0.548 | 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. | 0.55 | 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 Workers - Exposure estimation**

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

| Route of exposure | Contributing scenarios | Dose/Concentration | Justification |
|---|---|---|---|
| **Long term exposure, Systemic, Dermal** | Not applicable. | 0.14 | 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. | 0.30 | 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. | 0.62 | 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 Workers - Exposure estimation**

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

| Route of exposure | Contributing scenarios | Dose/Concentration | Justification |
|---|---|---|---|
| Long term exposure, Systemic, Dermal | 1.3 | 0.14 | 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 | 1.3 | 0.30 | 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 | 1.3 | 0.62 | 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 4: 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 | 1.4 | 0.27 | 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 | 1.4 | 0.30 | 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** | 1.4 | 0.60 | 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 5: 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** | 1.5 | 0.27 | 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** | 1.5 | 0.37 | 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** | 1.5 | 0.74 | 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 6: 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, Dermal | 1.2 | 0.14 | 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 | 1.2 | 0.548 | 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 | 1.2 | 0.55 | 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 7: 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, Dermal | 1.3 | 0.14 | 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 | 1.3 | 0.30 | 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** | 1.3 | 0.62 | 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 8: Use a laboratory reagent**

| Route of exposure | Contributing scenarios | Dose/Concentration | Justification |
|---|---|---|---|
| **Long term exposure, Systemic, Dermal** | Not applicable. | 0.14 | 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. | 0.30 | 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. | 0.62 | 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 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)**

**Industrial**

## Identification of the substance or mixture

| | |
|---|---|
| **Product definition** | UVCB |
| **Product name** | Pentaethylenehexamine, PEHA |

## Section 1: Title

| | |
|---|---|
| **Short title of the exposure scenario/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<br>**Process Category:** PROC05, PROC08a, PROC08b, PROC09<br>**Substance supplied to that use in form of:** As such<br>**Sector of end use:** SU03<br>**Subsequent service life relevant for that use:** No.<br>**Environmental Release Category:** ERC01, ERC02, ERC06a |

## Section 2: Operational conditions and risk management measures

### Section 2.1 Control of environmental exposure

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

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1.86x10-4 |
| **Fraction of Regional tonnage used locally** | 3.72x10-3 |
| **Annual site tonnage** | 3.72x10-3 |
| **Average Local Daily Tonnage (kg/day):** | 10192 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1000 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | 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)** | 1.61x10-8 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **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 on-site sewage treatment plant flow** | 2000 |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1.86x10-4 |
| **Fraction of Regional tonnage used locally** | 3.72x10-3 |
| **Annual site tonnage** | 3.72x10-3 |
| **Average Local Daily Tonnage (kg/day):** | 10192 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1000 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | 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)** | 1.61x10-8 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **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 on-site sewage treatment plant flow** | 2000 |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 3720 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 744 |
| **Average Local Daily Tonnage (kg/day):** | 2000 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | Indoor industrial setting |
| **Release fraction to air from process (initial release prior to RMM)** | 0 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 3720 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 744 |
| **Average Local Daily Tonnage (kg/day):** | 2038 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions 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)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 5.0x10-5 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **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 on-site sewage treatment plant flow** | 2000 |

**Section 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers 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 3: Exposure estimation**

**Section 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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** | |
| **Concentration in sewage (PECstp) mg/l** | 0.037 | EUSES calculation | |
| **Concentration in sewage sludge mg/kg dwt** | 0 | EUSES calculation | |
| | **Local concentration** | **PEC aquatic (local+regional)** | **Justification** |
| **Fresh water mg/l** | 2.82x10-5 | 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 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 Workers - Exposure estimation**

**Contributing 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 | 2.1 | 0.005 | 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 | 2.1 | 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 | 2.1 | 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 3.2 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 1: 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 | 2.2 | 0.005 | 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 | 2.2 | 0.31 | 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** | 2.2 | 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 |

**Section 3.2 Workers - Exposure estimation**

**Contributing 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, Dermal** | Not applicable. | 0.005 | 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 3.2 Workers - Exposure estimation**

**Contributing 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, Dermal | Not applicable. | 0.005 | 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 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. |

## Identification of the substance or mixture

| | |
|---|---|
| **Product definition** | UVCB |
| **Product name** | Pentaethylenehexamine, PEHA |

## Section 1: Title

| | |
|---|---|
| **Short title of the exposure scenario/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<br>**Process Category:** PROC05, PROC08a, PROC08b, PROC09<br>**Substance supplied to that use in form of:** As such<br>**Sector of end use:** SU03<br>**Subsequent service life relevant for that use:** No.<br>**Environmental Release Category:** ERC01, ERC02, ERC06a |

## Section 2: Operational conditions and risk management measures

### Section 2.1 Control of environmental exposure

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

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1.86x10-4 |
| **Fraction of Regional tonnage used locally** | 3.72x10-3 |
| **Annual site tonnage** | 3.72x10-3 |
| **Average Local Daily Tonnage (kg/day):** | 10192 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1000 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | 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)** | 1.61x10-8 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **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 on-site sewage treatment plant flow** | 2000 |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1.86x10-4 |
| **Fraction of Regional tonnage used locally** | 3.72x10-3 |
| **Annual site tonnage** | 3.72x10-3 |
| **Average Local Daily Tonnage (kg/day):** | 10192 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1000 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | 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)** | 1.61x10-8 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **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 on-site sewage treatment plant flow** | 2000 |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 3720 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 744 |
| **Average Local Daily Tonnage (kg/day):** | 2000 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | Indoor industrial setting |
| **Release fraction to air from process (initial release prior to RMM)** | 0 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 3720 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 744 |
| **Average Local Daily Tonnage (kg/day):** | 2038 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions 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)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 5.0x10-5 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **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 on-site sewage treatment plant flow** | 2000 |

**Section 2.2 Control of worker exposure**

**Contributing 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) |
| **Human factors not influenced by risk management:** | Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg |
| **Other given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 |
| **Other given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 |
| **Other given operational conditions affecting workers 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 3: Exposure estimation**

**Section 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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** | |
| **Concentration in sewage (PECstp) mg/l** | 0.037 | EUSES calculation | |
| **Concentration in sewage sludge mg/kg dwt** | 0 | EUSES calculation | |
| | **Local concentration** | **PEC aquatic (local+regional)** | **Justification** |
| **Fresh water mg/l** | 2.82x10-5 | 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 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 Workers - Exposure estimation**

**Contributing 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. | 0.001 | 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. | 0.76 | 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 |
| 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 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 1: 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 | 3.1 | 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 | 3.1 | 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 |
| 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 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 Workers - Exposure estimation**

**Contributing 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, 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. | 0.76 | 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 |
| **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 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 Workers - Exposure estimation**

**Contributing 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, 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. | 0.76 | 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 |
| 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 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 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/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<br>**Process Category:** PROC08a<br>**Substance supplied to that use in form of:** As such<br>**Sector of end use:** SU22<br>**Subsequent service life relevant for that use:** No.<br>**Environmental Release Category:** ERC01, ERC02, ERC06a |

## Section 2: Operational conditions and risk management measures

### Section 2.1 Control of environmental exposure

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

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1.86x10-4 |
| **Fraction of Regional tonnage used locally** | 3.72x10-3 |
| **Annual site tonnage** | 3.72x10-3 |
| **Average Local Daily Tonnage (kg/day):** | 10192 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1000 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | 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)** | 1.61x10-8 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **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 on-site sewage treatment plant flow** | 2000 |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1.86x10-4 |
| **Fraction of Regional tonnage used locally** | 3.72x10-3 |
| **Annual site tonnage** | 3.72x10-3 |
| **Average Local Daily Tonnage (kg/day):** | 10192 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1000 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | 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)** | 1.61x10-8 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **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 on-site sewage treatment plant flow** | 2000 |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 3720 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 744 |
| **Average Local Daily Tonnage (kg/day):** | 2000 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | Indoor industrial setting |
| **Release fraction to air from process (initial release prior to RMM)** | 0 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

## Section 2.1 Control of environmental exposure

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

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 3720 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 744 |
| **Average Local Daily Tonnage (kg/day):** | 2038 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 225 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions 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)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 5.0x10-5 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **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 on-site sewage treatment plant flow** | 2000 |

**Section 2.2 Control of worker exposure**

**Contributing 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) |
| **Human factors not influenced by risk management:** | Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg |
| **Other given operational conditions affecting workers 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 3: Exposure estimation**

**Section 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 |
| **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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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** | |
| **Concentration in sewage (PECstp) mg/l** | 0.037 | EUSES calculation | |
| **Concentration in sewage sludge mg/kg dwt** | 0 | EUSES calculation | |
| | **Local concentration** | **PEC aquatic (local+regional)** | **Justification** |
| **Fresh water mg/l** | 2.82x10-5 | 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 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 Workers - Exposure estimation**

**Contributing 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 | 2.2 | 0.005 | 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 | 2.2 | 0.31 | 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 | 2.2 | 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 |

**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/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<br>**Process Category:** PROC08a<br>**Substance supplied to that use in form of:** As such<br>**Sector of end use:** SU22<br>**Subsequent service life relevant for that use:** No.<br>**Environmental Release Category:** ERC01, ERC02, ERC06a |

## Section 2: Operational conditions and risk management measures

### Section 2.1 Control of environmental exposure

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

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1.86x10-4 |
| **Fraction of Regional tonnage used locally** | 3.72x10-3 |
| **Annual site tonnage** | 3.72x10-3 |
| **Average Local Daily Tonnage (kg/day):** | 10192 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1000 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | 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)** | 1.61x10-8 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **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 on-site sewage treatment plant flow** | 2000 |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1.86x10-4 |
| **Fraction of Regional tonnage used locally** | 3.72x10-3 |
| **Annual site tonnage** | 3.72x10-3 |
| **Average Local Daily Tonnage (kg/day):** | 10192 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1000 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | 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)** | 1.61x10-8 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **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 on-site sewage treatment plant flow** | 2000 |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 3720 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 744 |
| **Average Local Daily Tonnage (kg/day):** | 2000 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | Indoor industrial setting |
| **Release fraction to air from process (initial release prior to RMM)** | 0 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 3720 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 744 |
| **Average Local Daily Tonnage (kg/day):** | 2038 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 225 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions 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)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 5.0x10-5 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **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 on-site sewage treatment plant flow** | 2000 |

**Section 2.2 Control of worker exposure**

**Contributing 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) |
| **Human factors not influenced by risk management:** | Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg |
| **Other given operational conditions affecting workers 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 3: Exposure estimation**

**Section 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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** | |
| **Concentration in sewage (PECstp) mg/l** | 0.037 | EUSES calculation | |
| **Concentration in sewage sludge mg/kg dwt** | 0 | EUSES calculation | |
| | **Local concentration** | **PEC aquatic (local+regional)** | **Justification** |
| **Fresh water mg/l** | 2.82x10-5 | 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 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 Workers - Exposure estimation

**Contributing 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 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 |
| 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 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 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)**

**Industrial**

## Identification of the substance or mixture

| | |
|---|---|
| **Product definition** | UVCB |
| **Product name** | Pentaethylenehexamine, PEHA |

## Section 1: Title

| | |
|---|---|
| **Short title of the exposure scenario/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<br>**Process Category:** PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC13, PROC14<br>**Substance supplied to that use in form of:** In a mixture<br>**Sector of end use:** SU03<br>**Subsequent service life relevant for that use:** No.<br>**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 environmental exposure

**Contributing scenario controlling environmental exposure for 0: Ashless dispersant**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 4840 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 967 |
| **Average Local Daily Tonnage (kg/day):** | 2649 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |

| | |
|---|---|
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1240 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 300 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |

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

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1240 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 300 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 3: Lube oil use**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1300 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 260 |
| **Average Local Daily Tonnage (kg/day):** | 1182 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 220 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 1.00x10-3 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 1.00x10-3 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 4: Laboratory chemicals**

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 100 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 20.1 |
| **Average Local Daily Tonnage (kg/day):** | 55.1 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 1.00x10-4 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.02 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 5: Use of coatings and adhesives**

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1019 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.2 Control of worker exposure**

**Contributing 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% |
| **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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing scenario controlling worker exposure for 2: Spraying in industrial settings and applications**

| | |
|---|---|
| **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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing scenario controlling worker exposure for 3: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities**

| | |
|---|---|
| **Product characteristics:** | Liquid. 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing scenario controlling worker exposure for 4: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities**

| | |
|---|---|
| **Product characteristics:** | Liquid. 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 |
| **Other given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing scenario controlling worker exposure for 7: Production of preparations or articles by tabletting, compression, extrusion, pelletisation**

| | |
|---|---|
| **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 given operational conditions affecting workers 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 3: Exposure estimation

### Section 3.1 Environment - Exposure estimation

**Contributing 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 3.1 Environment - Exposure estimation

**Contributing 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. | 5.9x10-6 | 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 | |
| **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 3.1 Environment - Exposure estimation**

**Contributing 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 3.2 Workers - Exposure estimation**

**Contributing 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. | 0.0822 | 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 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. |
| **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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 2: Spraying in industrial settings and applications**

| Route of exposure | Contributing scenarios | Dose/Concentration | Justification |
|---|---|---|---|
| **Long term exposure, Systemic, Dermal** | Not applicable. | 0.1286 | 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 Workers - Exposure estimation**

**Contributing 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, 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 |
| **Long term exposure, Systemic, Inhalable** | Not applicable. | 0.457<br>0.548 | 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<br>1.097 | 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 4: 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, 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 5: 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, 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 6: Treatment of articles by dipping and pouring**

| Route of exposure | Contributing scenarios | Dose/Concentration | Justification |
|---|---|---|---|
| **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 |
| **Long term exposure, Systemic, Inhalable** | Not applicable. | 0.548 | 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. | 1.097 | 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 7: Production of preparations or articles by tabletting, compression, extrusion, pelletisation**

| 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 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)**

**Industrial**

## Identification of the substance or mixture

| | |
|---|---|
| **Product definition** | UVCB |
| **Product name** | Pentaethylenehexamine, PEHA |

## Section 1: Title

| | |
|---|---|
| **Short title of the exposure scenario/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<br>**Process Category:** PROC05, PROC06, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14, PROC19<br>**Substance supplied to that use in form of:** In a mixture<br>**Sector of end use:** SU03<br>**Subsequent service life relevant for that use:** No.<br>**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 environmental exposure

**Contributing scenario controlling environmental exposure for 0: Ashless dispersant**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 4840 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 967 |
| **Average Local Daily Tonnage (kg/day):** | 2649 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |

| | |
|---|---|
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1240 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 300 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |

| | |
|---|---|
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1240 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 300 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 3: Lube oil use**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1300 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 260 |
| **Average Local Daily Tonnage (kg/day):** | 1182 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 220 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 1.00x10-3 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 1.00x10-3 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 4: Laboratory chemicals**

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 100 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 20.1 |
| **Average Local Daily Tonnage (kg/day):** | 55.1 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 1.00x10-4 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.02 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 5: Use of coatings and adhesives**

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1019 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing scenario controlling worker exposure for 2: Spraying in industrial settings and applications**

| | |
|---|---|
| **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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing scenario controlling worker exposure for 3: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities**

| | |
|---|---|
| **Product characteristics:** | Liquid. 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing scenario controlling worker exposure for 4: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities**

| | |
|---|---|
| **Product characteristics:** | Liquid. 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing scenario controlling worker exposure for 6: Roller application or brushing of adhesive and other coating**

| | |
|---|---|
| **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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 |
| **Other given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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) |
| **Human factors not influenced by risk management:** | Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg |
| **Other given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 |
| **Other given operational conditions affecting workers 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 3: Exposure estimation

**Section 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation

### Contributing 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 3.1 Environment - Exposure estimation

### Contributing 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. | 5.914x10-6 | 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 3.1 Environment - Exposure estimation**

**Contributing 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 | |
| **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 3.1 Environment - Exposure estimation**

**Contributing 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 3.2 Workers - Exposure estimation**

**Contributing 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 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 3.2 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 1: Calendering operations**

| 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. |
| **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 3.2 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 2: Spraying in industrial settings and applications**

| 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 |
| **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 |
| **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 3.2 Workers - Exposure estimation**

**Contributing 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, Dermal** | 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 |

| | | | |
|---|---|---|---|
| **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 |
| **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 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 4: 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, Dermal** | Not applicable. | 0.05<br>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 3.2 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 5: 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, 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. |
| **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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 6: Roller application or brushing of adhesive and other coating**

| 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 |
| **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 3.2 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 7: 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 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 |
| **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 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 8: Production of preparations or articles by tabletting, compression, extrusion, pelletisation**

| Route of exposure | Contributing scenarios | Dose/Concentration | Justification |
|---|---|---|---|
| **Long term exposure, Systemic, Dermal** | 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 |
| **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 |
| **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 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 9: Hand-mixing with intimate contact and only PPE available**

| Route of exposure | Contributing scenarios | Dose/Concentration | Justification |
|---|---|---|---|
| **Long term exposure, Systemic, Dermal** | 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 |
| **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 |
| **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 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 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)**

**Industrial**

## Identification of the substance or mixture

| | |
|---|---|
| **Product definition** | UVCB |
| **Product name** | Pentaethylenehexamine, PEHA |

## Section 1: Title

| | |
|---|---|
| **Short title of the exposure scenario/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<br>**Process Category:** PROC05, PROC07, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC14<br>**Substance supplied to that use in form of:** In a mixture<br>**Sector of end use:** SU03, SU22<br>**Subsequent service life relevant for that use:** No.<br>**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 environmental exposure

**Contributing scenario controlling environmental exposure for 0: Ashless dispersant**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 4840 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 967 |
| **Average Local Daily Tonnage (kg/day):** | 2649 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |

| | |
|---|---|
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1240 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 300 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |

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

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1240 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 300 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 3: Lube oil use**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1300 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 260 |
| **Average Local Daily Tonnage (kg/day):** | 1182 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 220 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 1.00x10-3 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 1.00x10-3 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 4: Laboratory chemicals**

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 100 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 20.1 |
| **Average Local Daily Tonnage (kg/day):** | 55.1 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 1.00x10-4 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.02 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 5: Use of coatings and adhesives**

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1019 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.2 Control of worker exposure**

**Contributing 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) |
| **Human factors not influenced by risk management:** | Default breathing volume Light work: 10 m³/d Default Body weight: Workers: 70 kg |
| **Other given operational conditions affecting workers exposure:** | Indoor industrial setting<br>Indoor industrial setting and professional setting<br>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 2.2 Control of worker exposure**

**Contributing scenario controlling worker exposure for 1: Spraying in industrial settings and applications**

| | |
|---|---|
| **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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers exposure:** | Indoor industrial setting<br>Indoor industrial setting and professional setting<br>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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers exposure:** | Indoor industrial setting<br>Indoor industrial setting and professional setting<br>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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers exposure:** | Indoor industrial setting<br>Indoor industrial setting and professional setting<br>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 2.2 Control of worker exposure**

**Contributing scenario controlling worker exposure for 5: Roller application or brushing of adhesive and other coating**

| | |
|---|---|
| **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 given operational conditions affecting workers exposure:** | Indoor industrial setting<br>Indoor industrial setting and professional setting<br>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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers exposure:** | Indoor industrial setting<br>Indoor industrial setting and professional setting<br>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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers exposure:** | Indoor industrial setting<br>Indoor industrial setting and professional setting<br>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 3: Exposure estimation

### Section 3.1 Environment - Exposure estimation

**Contributing 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 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 3.1 Environment - Exposure estimation

**Contributing 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. |

**Section 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 |
| **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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 |
| **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 3.2 Workers - Exposure estimation**

**Contributing 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. | 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 |
| **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 |
| **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 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 1: Spraying in industrial settings and applications**

| Route of exposure | Contributing scenarios | Dose/Concentration | Justification |
|---|---|---|---|
| **Long term exposure, Systemic, Dermal** | 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 |

| | | | |
|---|---|---|---|
| **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 |
| **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 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 Workers - Exposure estimation**

**Contributing 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, Dermal** | 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 |
| **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 |
| **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 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 Workers - Exposure estimation**

**Contributing 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, Dermal** | 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 |
| **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 |
| **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 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 Workers - Exposure estimation**

**Contributing 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 |
|---|---|---|---|
| **Long term exposure, Systemic, Dermal** | 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 |
| **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 |
| **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 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 5: Roller application or brushing of adhesive and other coating**

| Route of exposure | Contributing scenarios | Dose/Concentration | Justification |
|---|---|---|---|
| **Long term exposure, Systemic, Dermal** | 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 |
| **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 |
| **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 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 6: 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 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 |
| **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 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 7: Production of preparations or articles by tabletting, compression, extrusion, pelletisation**

| Route of exposure | Contributing scenarios | Dose/Concentration | Justification |
|---|---|---|---|
| **Long term exposure, Systemic, Dermal** | 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 |
| **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 |
| **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 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 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/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<br>**Process Category:** PROC05, PROC08a<br>**Substance supplied to that use in form of:** In a mixture<br>**Sector of end use:** SU22<br>**Subsequent service life relevant for that use:** No.<br>**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 environmental exposure

**Contributing scenario controlling environmental exposure for 0: Ashless dispersant**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 4840 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 967 |
| **Average Local Daily Tonnage (kg/day):** | 2649 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |

| | |
|---|---|
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1240 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 300 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |

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

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1240 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 300 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 3: Laboratory chemicals**

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 100 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 20.1 |
| **Average Local Daily Tonnage (kg/day):** | 55.1 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 1.00x10-4 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.02 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1019 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 0 |
| **Release fraction to soil from process (initial release prior to RMM)** | 5.00x10-3 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.01 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.2 Control of worker exposure**

**Contributing 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% |
| **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 given operational conditions affecting workers 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. Wear appropriate respiratory protection. with a minimum efficacy of 95% |

**Section 2.2 Control of worker exposure**

**Contributing 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 25% |
| **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 given operational conditions affecting workers 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. Wear appropriate respiratory protection. with a minimum efficacy of 95% |

## Section 3: Exposure estimation

**Section 3.1 Environment - Exposure estimation**

**Contributing 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. | 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** | 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 3.1 Environment - Exposure estimation**

**Contributing 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. | 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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. | 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. | 0.259 | 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 3.1 Environment - Exposure estimation**

**Contributing 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. |

**Section 3.2 Workers - Exposure estimation**

**Contributing 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. | 0.0685714 | 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 | 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. | 0.73115 | 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 3.2 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 1: 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. | 0.0685714 | 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. | 0.45697 | 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 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. | 0.91393 | 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 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/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<br>**Process Category:** PROC08a, PROC10, PROC11<br>**Substance supplied to that use in form of:** In a mixture<br>**Sector of end use:** SU22<br>**Subsequent service life relevant for that use:** No.<br>**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 environmental exposure

**Contributing scenario controlling environmental exposure for 0: Ashless dispersant**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 4840 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 967 |
| **Average Local Daily Tonnage (kg/day):** | 2649 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |

| | |
|---|---|
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1240 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 300 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |

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

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1240 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 300 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 3: Laboratory chemicals**

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 100 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 20.1 |
| **Average Local Daily Tonnage (kg/day):** | 55.1 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 1.00x10-4 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.02 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1019 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 0 |
| **Release fraction to soil from process (initial release prior to RMM)** | 5.00x10-3 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.01 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.2 Control of worker exposure**

**Contributing 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% |
| **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 given operational conditions affecting workers 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 worker exposure**

**Contributing scenario controlling worker exposure for 1: Roller application or brushing of adhesive and other coating**

| | |
|---|---|
| **Product characteristics:** | Liquid. Covers concentrations up to 15% |
| **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 given operational conditions affecting workers 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. Wear appropriate respiratory protection. with a minimum efficacy of 95% |

**Section 2.2 Control of worker exposure**

**Contributing scenario controlling worker exposure for 2: Spraying outside industrial settings and/or applications**

| | |
|---|---|
| **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 given operational conditions affecting workers 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 3: Exposure estimation

### Section 3.1 Environment - Exposure estimation

**Contributing 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 3.1 Environment - Exposure estimation

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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** | Not applicable. | 737 | EUSES calculation |
| **Surface water** | Not evaluated. | 0 | EUSES calculation |
| **air (direct + STP)** | Not applicable. | 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 | 7.07x10-3 | 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 3.2 Workers - Exposure estimation**

**Contributing 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. | 0.0411 | 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 |
| **Long term exposure, Systemic, Inhalable** | Not applicable. | 0.548<br>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. | 1.097<br>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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 1: Roller application or brushing of adhesive and other coating**

| 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 2: Spraying outside industrial settings and/or applications**

| Route of exposure | Contributing scenarios | Dose/Concentration | Justification |
|---|---|---|---|
| **Long term exposure, Systemic, Dermal** | Not applicable. | 0.214 | 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. | 0.121 | 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. | 0.243 | 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 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/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<br>**Process Category:** PROC08a, PROC11<br>**Substance supplied to that use in form of:** In a mixture<br>**Sector of end use:** SU22<br>**Subsequent service life relevant for that use:** No.<br>**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 environmental exposure

**Contributing scenario controlling environmental exposure for 0: Ashless dispersant**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 4840 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 967 |
| **Average Local Daily Tonnage (kg/day):** | 2649 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |

| | |
|---|---|
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1240 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 300 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |

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

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1240 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 300 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 3: Laboratory chemicals**

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 100 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 20.1 |
| **Average Local Daily Tonnage (kg/day):** | 55.1 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 1.00x10-4 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.02 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1019 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 0 |
| **Release fraction to soil from process (initial release prior to RMM)** | 5.00x10-3 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.01 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.2 Control of worker exposure**

**Contributing 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) |
| **Human factors not influenced by risk management:** | Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg |
| **Other given operational conditions affecting workers 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 worker exposure**

**Contributing scenario controlling worker exposure for 1: Spraying outside industrial settings and/or applications**

| | |
|---|---|
| **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 given operational conditions affecting workers 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. Wear appropriate respiratory protection. with a minimum efficacy of 90% |

## Section 3: Exposure estimation

**Section 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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** | 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.2 Workers - Exposure estimation**

**Contributing 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. | 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 |
| **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 |
| **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 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 1: Spraying outside industrial settings and/or applications**

| Route of exposure | Contributing scenarios | Dose/Concentration | Justification |
|---|---|---|---|
| **Long term exposure, Systemic, Dermal** | Not applicable. | 0.21 | 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. | 0.15 | 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. | 0.30 | 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 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/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<br>**Process Category:** PROC08a, PROC11<br>**Substance supplied to that use in form of:** In a mixture<br>**Sector of end use:** SU22<br>**Subsequent service life relevant for that use:** No.<br>**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 environmental exposure

**Contributing scenario controlling environmental exposure for 0: Ashless dispersant**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 4840 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 967 |
| **Average Local Daily Tonnage (kg/day):** | 2649 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |

| | |
|---|---|
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1240 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 300 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |

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

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1240 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 300 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 3: Laboratory chemicals**

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 100 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 20.1 |
| **Average Local Daily Tonnage (kg/day):** | 55.1 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 1.00x10-4 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.02 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1019 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 0 |
| **Release fraction to soil from process (initial release prior to RMM)** | 5.00x10-3 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.01 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.2 Control of worker exposure**

**Contributing 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) |
| **Human factors not influenced by risk management:** | Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg |
| **Other given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing scenario controlling worker exposure for 1: Spraying outside industrial settings and/or applications**

| | |
|---|---|
| **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 given operational conditions affecting workers 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 3: Exposure estimation

**Section 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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. | 0.257 | 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.2 Workers - Exposure estimation**

**Contributing 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. | 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 |
| **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 |
| **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 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 1: Spraying outside industrial settings and/or applications**

| Route of exposure | Contributing scenarios | Dose/Concentration | Justification |
|---|---|---|---|
| **Long term exposure, Systemic, Dermal** | Not applicable. | 0.11 | 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. | 0.30 | 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 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)**

**Industrial**

## Identification of the substance or mixture

| | |
|---|---|
| **Product definition** | UVCB |
| **Product name** | Pentaethylenehexamine, PEHA |

## Section 1: Title

| | |
|---|---|
| **Short title of the exposure scenario/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<br>**Process Category:** PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC13, PROC16<br>**Substance supplied to that use in form of:** In a mixture<br>**Sector of end use:** SU03, SU22<br>**Subsequent service life relevant for that use:** No.<br>**Environmental Release Category:** ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b |

## Section 2: Operational conditions and risk management measures

### Section 2.1 Control of environmental exposure

**Contributing scenario controlling environmental exposure for 0: Fuel additive.**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1019 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |

| | |
|---|---|
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 1: Use in detergents and cleaners, including professional**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1019 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 1.00x10-4 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.185 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |

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

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 2: Wood preservative.**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 2420 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 484 |
| **Average Local Daily Tonnage (kg/day):** | 1326 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1000 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.02 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers exposure:** | Indoor industrial setting<br>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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers exposure:** | Indoor industrial setting<br>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 2.2 Control of worker exposure**

**Contributing 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 |
| **Other given operational conditions affecting workers exposure:** | Indoor industrial setting<br>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 worker exposure**

**Contributing 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 |
| **Other given operational conditions affecting workers exposure:** | Indoor industrial setting<br>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 2.2 Control of worker exposure**

**Contributing 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. |
| **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 given operational conditions affecting workers exposure:** | Indoor industrial setting<br>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 2.2 Control of worker exposure**

**Contributing scenario controlling worker exposure for 5: 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 |
| **Other given operational conditions affecting workers exposure:** | Indoor industrial setting<br>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 worker exposure**

**Contributing 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 given operational conditions affecting workers exposure:** | Indoor industrial setting<br>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 2.2 Control of worker exposure**

**Contributing scenario controlling worker exposure for 7: Roller application or brushing of adhesive and other coating**

| | |
|---|---|
| **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 given operational conditions affecting workers exposure:** | Indoor industrial setting<br>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 3: Exposure estimation

**Section 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 |
| **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 |
|---|---|---|---|
| **Micro-organism mg/l** | Not applicable. | Not applicable. | Not applicable. |

**Section 3.2 Workers - Exposure estimation**

**Contributing 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. | 0.055 | 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 | 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 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 1: Calendering operations**

| Route of exposure | Contributing scenarios | Dose/Concentration | Justification |
|---|---|---|---|
| **Long term exposure, Systemic, Dermal** | Not applicable. | 0.055 | 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 | 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 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 Workers - Exposure estimation**

**Contributing 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, Dermal** | Not applicable. | 0.110 | 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. | 0.305 | 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 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 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 Workers - Exposure estimation**

**Contributing 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, Dermal** | Not applicable. | 0.055 | 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 | 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 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 Workers - Exposure estimation**

**Contributing 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 |
|---|---|---|---|
| **Long term exposure, Systemic, Dermal** | Not applicable. | 0.055 | 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 | 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 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 Workers - Exposure estimation**

**Contributing 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. | 0.110 | 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. | 0.305 | 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 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 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 6: Using material as fuel sources, limited exposure to unburned product to be expected**

| Route of exposure | Contributing scenarios | Dose/Concentration | Justification |
|---|---|---|---|
| **Long term exposure, Systemic, Dermal** | Not applicable. | 0.055 | 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 | 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 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 7: Roller application or brushing of adhesive and other coating**

| Route of exposure | Contributing scenarios | Dose/Concentration | Justification |
|---|---|---|---|
| **Long term exposure, Systemic, Dermal** | 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 |
| **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 |
| **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 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 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)**

**Industrial**

## Identification of the substance or mixture

| | |
|---|---|
| **Product definition** | UVCB |
| **Product name** | Pentaethylenehexamine, PEHA |

## Section 1: Title

| | |
|---|---|
| **Short title of the exposure scenario/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<br>**Process Category:** PROC05, PROC06, PROC08a, PROC08b, PROC09, PROC10, PROC13, PROC16<br>**Substance supplied to that use in form of:** In a mixture<br>**Sector of end use:** SU03<br>**Subsequent service life relevant for that use:** No.<br>**Environmental Release Category:** ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b |

## Section 2: Operational conditions and risk management measures

### Section 2.1 Control of environmental exposure

**Contributing scenario controlling environmental exposure for 0: Fuel additive.**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1019 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |

| | |
|---|---|
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 1: Use in detergents and cleaners, including professional**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1019 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 1.00x10-4 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.185 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |

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

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 2: Wood preservative.**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 2420 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 484 |
| **Average Local Daily Tonnage (kg/day):** | 1326 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1000 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.02 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.2 Control of worker exposure**

**Contributing 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) |
| **Human factors not influenced by risk management:** | Default breathing volume Light work 10: m³/d Default Body weight: Workers: 70 kg |
| **Other given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing scenario controlling worker exposure for 5: Roller application or brushing of adhesive and other coating**

| | |
|---|---|
| **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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers 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 3: Exposure estimation

**Section 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 applicable | 2.63 | EUSES calculation |
| **Marine water sediment mg/kg dwt** | Not applicable | 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 |
|---|---|---|---|
| **Micro-organism mg/l** | Not applicable. | Not applicable. | Not applicable. |

**Section 3.2 Workers - Exposure estimation**

**Contributing 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. | 0.027 | 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 |

| | | | |
|---|---|---|---|
| **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 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 1: Calendering operations**

| 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 |
| **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 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 Workers - Exposure estimation**

**Contributing 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, 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 |
| **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 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 Workers - Exposure estimation**

**Contributing 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, 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 |
| **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 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 Workers - Exposure estimation**

**Contributing 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 |
|---|---|---|---|
| **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 |
| **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 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 5: Roller application or brushing of adhesive and other coating**

| 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 |
| **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 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 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 6: Treatment of articles by dipping and pouring**

| 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 |
| 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 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 Workers - Exposure estimation**

**Contributing 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 |
|---|---|---|---|
| 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 |
| 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 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 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/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% - Professional<br>**Process Category:** PROC08a, PROC10<br>**Substance supplied to that use in form of:** In a mixture<br>**Sector of end use:** SU03, SU22<br>**Subsequent service life relevant for that use:** No.<br>**Environmental Release Category:** ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b |

## Section 2: Operational conditions and risk management measures

### Section 2.1 Control of environmental exposure

**Contributing scenario controlling environmental exposure for 0: Fuel additive.**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1019 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 1: Use in detergents and cleaners, including professional**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1019 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 1.00x10-4 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.185 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 2: Wood preservative.**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 2420 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 484 |
| **Average Local Daily Tonnage (kg/day):** | 1326 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1000 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.02 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.2 Control of worker exposure**

**Contributing 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) |
| **Human factors not influenced by risk management:** | Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg |
| **Other given operational conditions affecting workers 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 worker exposure**

**Contributing scenario controlling worker exposure for 1: Roller application or brushing of adhesive and other coating**

| | |
|---|---|
| **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 given operational conditions affecting workers 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 3: Exposure estimation

**Section 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 3.1 Environment - Exposure estimation**

**Contributing 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 |
| **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 |
|---|---|---|---|
| **Micro-organism mg/l** | Not applicable. | Not applicable. | Not applicable. |

**Section 3.2 Workers - Exposure estimation**

**Contributing 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. | 0.110 | 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. | 0.305 | 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 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. | 0.61 | 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 |

**Section 3.2 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 1: Roller application or brushing of adhesive and other coating**

| Route of exposure | Contributing scenarios | Dose/Concentration | Justification |
|---|---|---|---|
| **Long term exposure, Systemic, Dermal** | Not applicable. | 0.110 | 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. | 0.305 | 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 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. | 0.61 | 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 |

## 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/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<br>**Process Category:** PROC08a<br>**Substance supplied to that use in form of:** In a mixture<br>**Sector of end use:** SU22<br>**Subsequent service life relevant for that use:** No.<br>**Environmental Release Category:** ERC01, ERC04, ERC08a, ERC08b, ERC08d, ERC10b |

## Section 2: Operational conditions and risk management measures

### Section 2.1 Control of environmental exposure

**Contributing scenario controlling environmental exposure for 0: Fuel additive.**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1019 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 1: Use in detergents and cleaners, including professional**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1019 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 1.00x10-4 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.185 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 2: Wood preservative.**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 2420 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 484 |
| **Average Local Daily Tonnage (kg/day):** | 1326 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1000 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.02 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.2 Control of worker exposure**

**Contributing 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) |
| **Human factors not influenced by risk management:** | Default breathing volume Light work 10 m³/d Default Body weight: Workers: 70 kg |
| **Other given operational conditions affecting workers 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 3: Exposure estimation**

**Section 3.1 Environment - Exposure estimation**

**Contributing 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 | 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** | 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 3.1 Environment - Exposure estimation**

**Contributing 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 | EUSES calculation |

| | 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 3.1 Environment - Exposure estimation**

**Contributing 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 |
| **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** |
| **Micro-organism mg/l** | Not applicable. | Not applicable. | Not applicable. |

**Section 3.2 Workers - Exposure estimation**

**Contributing 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 |
| **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 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 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/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% - Industrial<br>**Process Category:** PROC21, PROC24<br>**Sector of end use:** SU22<br>**Subsequent service life relevant for that use:** No.<br>**Environmental Release Category:** ERC06d |

## Section 2: Operational conditions and risk management measures

### Section 2.1 Control of environmental exposure

**Contributing scenario controlling environmental exposure for 0: Ashless dispersant**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 4840 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 967 |
| **Average Local Daily Tonnage (kg/day):** | 2649 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1240 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 300 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1240 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 300 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 3: Laboratory chemicals**

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 100 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 20.1 |
| **Average Local Daily Tonnage (kg/day):** | 55.1 |

| | |
|---|---|
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 1.00x10-4 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.02 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1019 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 0 |

| | |
|---|---|
| **Release fraction to soil from process (initial release prior to RMM)** | 5.00x10-3 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.01 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 5: Lube oil use**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 4840 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 967 |
| **Average Local Daily Tonnage (kg/day):** | 2649 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.2 Control of worker exposure**

**Contributing 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:** | 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 given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers 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 3: Exposure estimation

### Section 3.1 Environment - Exposure estimation

**Contributing 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 | Table R16.23[ REACH ] |
| | **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 3.1 Environment - Exposure estimation

**Contributing 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 | Table R16.23[ REACH ] |
| | **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 3.1 Environment - Exposure estimation**

**Contributing 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 | Table R16.23[ REACH ] |
| | **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 3.1 Environment - Exposure estimation

### Contributing 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 | Table R16.23[ REACH ] |
| | **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 3.1 Environment - Exposure estimation

### Contributing 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 | 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 | Table R16.23[ REACH ] |
| | **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 3.1 Environment - Exposure estimation**

**Contributing scenario controlling environmental exposure for 5: 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 | Table R16.23[ REACH ] |
| | **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 Workers - Exposure estimation**

**Contributing 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, 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 | 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. | 0.12 | 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 Workers - Exposure estimation**

**Contributing 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 | 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. | 0.12 | 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 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/List of use descriptors** | **Identified use name:** Handling of solid products with small amounts of unbound ethylenamines - Use of preparations containing EA up to 2% - Industrial<br>**Process Category:** PROC21, PROC24<br>**Sector of end use:** SU22<br>**Subsequent service life relevant for that use:** No.<br>**Environmental Release Category:** ERC06d |

## Section 2: Operational conditions and risk management measures

### Section 2.1 Control of environmental exposure

**Contributing scenario controlling environmental exposure for 0: Ashless dispersant**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 4840 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 967 |
| **Average Local Daily Tonnage (kg/day):** | 2649 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1240 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 300 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1240 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 300 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 3: Laboratory chemicals**

Operational conditions: Indoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 100 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 20.1 |
| **Average Local Daily Tonnage (kg/day):** | 55.1 |

| | |
|---|---|
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 1.00x10-4 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.02 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

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

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 1860 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 372 |
| **Average Local Daily Tonnage (kg/day):** | 1019 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 0 |

| | |
|---|---|
| **Release fraction to soil from process (initial release prior to RMM)** | 5.00x10-3 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0.01 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | =>27.7 |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.1 Control of environmental exposure**

**Contributing scenario controlling environmental exposure for 5: Lube oil use**

Operational conditions: Indoor/Outdoor use

| | |
|---|---|
| **Product characteristics:** | Not applicable. |
| **Amounts used:** | |
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | 4840 |
| **Fraction of Regional tonnage used locally** | 20% |
| **Annual site tonnage** | 967 |
| **Average Local Daily Tonnage (kg/day):** | 2649 |
| **Maximum daily site tonnage** | Not available. |
| **Frequency and duration of use:** | Continuous release |
| **Emission Days (days/year)** | 365 |
| **Environment factors not influenced by risk management:** | |
| **Local freshwater dilution factor** | 1300 |
| **Local marine water dilution factor** | 1000 |
| **Other given operational conditions affecting environmental exposure:** | None. |
| **Release fraction to air from process (initial release prior to RMM)** | 1.00x10-5 |
| **Release fraction to soil from process (initial release prior to RMM)** | 0 |
| **Release fraction to wastewater from process (initial release prior to RMM)** | 0 |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |
| **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) to provide the required removal efficiency of** | No wastewater treatment required. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Organisational measures to prevent/limit release from site:** | |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.2 Control of worker exposure**

**Contributing 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 |
| **Other given operational conditions affecting workers 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 2.2 Control of worker exposure**

**Contributing 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 given operational conditions affecting workers 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 3: Exposure estimation

### Section 3.1 Environment - Exposure estimation

**Contributing 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 | Table R16.23 [ REACH ] |
| | **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 3.1 Environment - Exposure estimation

**Contributing 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 | Table R16.23 [ REACH ] |
| | **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 3.1 Environment - Exposure estimation**

**Contributing 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 | Table R16.23 [ REACH ] |
| | **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 3.1 Environment - Exposure estimation

### Contributing 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 | Table R16.23 [ REACH ] |
| | **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 3.1 Environment - Exposure estimation

### Contributing 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 | 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 | Table R16.23 [ REACH ] |
| | **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 3.1 Environment - Exposure estimation**

**Contributing scenario controlling environmental exposure for 5: 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 | Table R16.23 [ REACH ] |
| | **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 Workers - Exposure estimation**

**Contributing 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, Dermal | Not applicable. | 0.0003 | 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. | 0.02 | 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, 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. | 0.03 | 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 Workers - Exposure estimation**

**Contributing 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. | 0.0003 | 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. | 0.02 | 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, 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. | 0.03 | 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 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. |

## Identification of the substance or mixture

| | |
|---|---|
| **Product definition** | UVCB |
| **Product name** | Pentaethylenehexamine, PEHA |

## Section 1: Title

| | |
|---|---|
| **Short title of the exposure scenario/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<br>**Process Category:** PROC05, PROC08a, PROC08b, PROC09<br>**Substance supplied to that use in form of:** In a mixture<br>**Sector of end use:** SU03<br>**Subsequent service life relevant for that use:** No.<br>**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 environmental exposure

**Contributing scenario controlling environmental exposure for 0:**

**Amounts used:**

| | |
|---|---|
| **Fraction of EU tonnage used in region** | Not available. |
| **Regional use tonnage** | Not available. |
| **Fraction of Regional tonnage used locally** | Not available. |
| **Annual site tonnage** | Not available. |
| **Average Local Daily Tonnage (kg/day):** | Not available. |
| **Maximum daily site tonnage** | Not available. |

**Frequency and duration of use:**

| | |
|---|---|
| **Emission Days (days/year)** | Not available. |

**Environment factors not influenced by risk management:**

| | |
|---|---|
| **Local freshwater dilution factor** | Not available. |
| **Local marine water dilution factor** | Not available. |

**Other given operational conditions affecting environmental exposure:**

| | |
|---|---|
| **Release fraction to air from process (initial release prior to RMM)** | Not available. |
| **Release fraction to soil from process (initial release prior to RMM)** | Not available. |
| **Release fraction to wastewater from process (initial release prior to RMM)** | Not available. |
| **Release fraction to air from wide dispersive use (regional only)** | Not available. |
| **Release fraction to soil from wide dispersive use (regional only)** | Not available. |
| **Release fraction to wastewater from wide dispersive use** | Not available. |

**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 available. |
| **Treat on-site wastewater (prior to receiving water discharge) to provide the required removal efficiency of** | Not available. |
| **If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of** | Not available. |
| **Conditions and measures related to municipal sewage treatment plant:** | |

**Section 2.2 Control of worker exposure**

**Contributing scenario controlling worker exposure for 0:**

**Section 3: Exposure estimation**

**Section 3.1 Environment - Exposure estimation**

**Contributing scenario controlling environmental exposure for 0:**

| | **Release from point source (local exposure estimation) kg/day** | **Total release for regional exposure estimation kg/day** | **Justification** |
|---|---|---|---|
| **Waste water** | Not applicable. | Not applicable. | Not applicable. |
| **Surface water** | Not applicable. | Not applicable. | Not applicable. |
| **air (direct + STP)** | Not applicable. | Not applicable. | Not applicable. |
| **Soil (direct releases only)** | Not applicable. | Not applicable. | Not applicable. |
| | **Value** | **Justification** | |
| **Concentration in sewage (PECstp) mg/l** | Not applicable. | Not applicable. | |
| **Concentration in sewage sludge mg/kg dwt** | Not applicable. | Not applicable. | |
| | **Local concentration** | **PEC aquatic (local+regional)** | **Justification** |
| **Fresh water mg/l** | Not applicable. | Not applicable. | Not applicable. |
| **Marine water mg/l** | Not applicable. | Not applicable. | Not applicable. |
| **Intermittent release. mg/l** | Not applicable. | Not applicable. | Not applicable. |
| | **Local concentration** | **PEC sediment (local+regional)** | **Justification** |
| **Fresh water sediment mg/kg dwt** | Not applicable. | Not applicable. | Not applicable. |
| **Marine water sediment mg/kg dwt** | Not applicable. | | Not applicable. |
| | **Local concentration** | **PEC soil (local+regional)** | **Justification** |
| **Agricultural soil averaged mg/kg dwt** | Not applicable. | Not applicable. | Not applicable. |
| **Grassland averaged mg/kg dwt** | Not applicable. | Not applicable. | Not applicable. |
| **Groundwater mg/l** | Not applicable. | Not applicable. | Not applicable. |
| | **Local concentration** | **PEC air (local+regional)** | **Justification** |
| **During emission mg/m³** | Not applicable. | Not applicable. | Not applicable. |
| **Annual average mg/m³** | Not applicable. | Not applicable. | Not applicable. |
| **Annual deposition mg/m²/d** | Not applicable. | Not applicable. | Not applicable. |
| | **Local concentration** | **PEC aquatic (local+regional)** | **Justification** |
| **Micro-organism mg/l** | Not applicable. | Not applicable. | Not applicable. |

**Section 3.2 Workers - Exposure estimation**

**Contributing scenario controlling worker exposure for 0:**

| Route of exposure | Contributing scenarios | Dose/Concentration | Justification |
|---|---|---|---|
| **Long term exposure, Systemic, Dermal** | Not applicable. | Not applicable. | Not applicable. |
| **Long term exposure, Systemic, Inhalable** | Not applicable. | Not applicable. | Not applicable. |
| **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. | Not applicable. |
| **Short term exposure, Systemic, Dermal** | Not applicable. | Not applicable. | Not applicable. |
| **Short term exposure, Systemic, Inhalable** | Not applicable. | Not applicable. | Not applicable. |
| **Short term exposure, Systemic, Combined** | Not applicable. | Not applicable. | Not applicable. |
| **Short term exposure, Local, Dermal** | Not applicable. | Not applicable. | Not applicable. |
| **Short term exposure, Local, Inhalable** | 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. |