

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

## ETHYLENEDIAMINE (EDA)

Version 5

Revision Date 07.08.2018

Print Date 09.04.2019

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

#### 1.1 Product identifier

Trade name : ETHYLENEDIAMINE (EDA)

Substance name : Ethylenediamine

REACH Registration Number : 01-2119480383-37-0000

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

Use of the Substance/Mixture : Specific use(s): Refer to attached exposure scenario Annex.

#### 1.3 Details of the supplier of the safety data sheet

Company : Akzo Nobel  
Functional Chemicals AB  
SE 444 85 Stenungsund  
Sweden

Telephone : +4630385000

Telefax : +46303770551

E-mail address : QTS@nouryon.com

#### 1.4 Emergency telephone number

Emergency telephone number : 24 hours emergency response number: +31 57 06 79211  
Kemiakuten-SE: 020 99 60 00

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### SECTION 2: HAZARDS IDENTIFICATION

#### 2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

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Flammable liquids, 3, H226  
Acute toxicity, 4, H302  
Acute toxicity, 4, H332  
Acute toxicity, 3, H311  
Skin corrosion, 1B, H314  
Serious eye damage, 1, H318  
Respiratory sensitisation, 1B, H334  
Skin sensitisation, 1B, H317  
Chronic aquatic toxicity, 3, H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

## 2.2 Label elements

### Labelling (REGULATION (EC) No 1272/2008)

Pictogram	:	
Signal word	:	Danger
Hazard statements	:	H226 Flammable liquid and vapour. H302 + H332 Harmful if swallowed or if inhaled. H311 Toxic in contact with skin. H314 Causes severe skin burns and eye damage. H317 May cause an allergic skin reaction. H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled. H412 Harmful to aquatic life with long lasting effects.
Precautionary statements	:	<b>Prevention:</b> P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray. P280 Wear protective gloves/ protective clothing/ eye protection/ face protection. <b>Response:</b> P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor. P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor. P342 + P311 If experiencing respiratory symptoms:

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P370 + P378

Call a POISON CENTER/doctor.  
In case of fire: Use dry sand, dry  
chemical or alcohol-resistant foam to  
extinguish.

## **Hazardous components which must be listed on the label:**

Ethylenediamine

107-15-3

## **2.3 Other hazards**

No further data available.

PBT and vPvB assessment : This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

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## SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

### 3.1 Substances

Pure substance/mixture : Substance  
CAS-No. : 107-15-3

#### Hazardous substance

Chemical name	PBT vPvB OEL	CAS-No. EC-No. REACH No.	Classification (REGULATION (EC) No 1272/2008)	Concentration [%]
Ethylenediamine		107-15-3 203-468-6 01-2119480383-37	Flam. Liq. 3; H226 Acute Tox. 4; H302 Acute Tox. 4; H332 Acute Tox. 3; H311 Skin Corr. 1B; H314 Eye Dam. 1; H318 Resp. Sens. 1B; H334 Skin Sens. 1B; H317 Aquatic Chronic 3; H412	>= 90 - <= 100

For the full text of the H-Statements mentioned in this Section, see Section 16.

#### REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59).

Status : • Ethylenediamine

## SECTION 4: FIRST AID MEASURES

### 4.1 Description of first aid measures

General advice : Immediate medical attention is required.  
Move out of dangerous area.  
Show this safety data sheet to the doctor in attendance.  
Symptoms of poisoning may appear several hours later.

If inhaled : If breathed in, move person into fresh air.  
Consult a physician after significant exposure.

In case of skin contact : Take off contaminated clothing and shoes immediately.  
Rinse immediately with plenty of water.  
Immediate medical treatment is necessary as untreated wounds from corrosion of the skin heal slowly and with difficulty.  
Take victim immediately to hospital.

In case of eye contact : Rinse with plenty of water.  
Get medical attention immediately. Continue to rinse during transport.  
Remove contact lenses.  
Protect unharmed eye.  
Keep eye wide open while rinsing.

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Small amounts splashed into eyes can cause irreversible tissue damage and blindness.

If swallowed : Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. Take victim immediately to hospital. Do not induce vomiting! May cause chemical burns in mouth and throat.

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

Symptoms : The symptoms and effects are as expected from the hazards as shown in section 2. No specific product related symptoms are known.

Risks : Harmful if swallowed or if inhaled.  
Toxic in contact with skin.  
May cause an allergic skin reaction.  
Causes serious eye damage.  
May cause allergy or asthma symptoms or breathing difficulties if inhaled.  
Causes severe burns.

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

Treatment : Treat symptomatically.

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## SECTION 5: FIREFIGHTING MEASURES

### 5.1 Extinguishing media

Suitable extinguishing media : Carbon dioxide (CO<sub>2</sub>)  
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

### 5.2 Special hazards arising from the substance or mixture

Specific hazards during firefighting / Specific hazards arising from the chemical : Water spray may be ineffective unless used by experienced firefighters.  
Do not allow run-off from fire fighting to enter drains or water courses.

Combustion products : Carbon oxides  
Nitrogen oxides (NO<sub>x</sub>)

### 5.3 Advice for firefighters

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus.  
Further information : Use water spray to cool unopened containers.  
Collect contaminated fire extinguishing water separately. This must not be discharged into drains.  
Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.  
For safety reasons in case of fire, cans should be stored separately in closed containments.

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## SECTION 6: ACCIDENTAL RELEASE MEASURES

### 6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions : Use personal protective equipment.  
Wear respiratory protection.  
Ensure adequate ventilation.  
Remove all sources of ignition.  
Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Emergency measures on accidental release : Evacuate personnel to safe areas.  
Only qualified personnel equipped with suitable protective equipment may intervene.  
Prevent unauthorised persons entering the zone.

### 6.2 Environmental precautions

Environmental precautions : Prevent product from entering drains.  
If the product contaminates rivers and lakes or drains inform respective authorities.

### 6.3 Methods and materials for containment and cleaning up

Methods for cleaning up /  
Methods for containment : Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

### 6.4 Reference to other sections

For disposal considerations see section 13.  
For personal protection see section 8.

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## SECTION 7: HANDLING AND STORAGE

### 7.1 Precautions for safe handling

Advice on safe handling : Persons with a history of skin sensitisation problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used.

: For personal protection see section 8.  
Avoid formation of aerosol.  
Do not breathe vapours or spray mist.  
Avoid contact with skin, eyes and clothing.  
Smoking, eating and drinking should be prohibited in the application area.  
Provide sufficient air exchange and/or exhaust in work rooms.  
Container may be opened only under exhaust ventilation hood.  
Open drum carefully as content may be under pressure.  
Dispose of rinse water in accordance with local and national regulations.

Advice on protection against fire and explosion : Avoid formation of aerosol.  
Keep away from sources of ignition - No smoking.

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No sparking tools should be used.  
Take measures to prevent the build up of electrostatic charge.

## 7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Prevent unauthorized access.  
No smoking.  
Keep in a well-ventilated place.  
Reacts with copper, aluminium, zinc and their alloys.  
Electrical installations / working materials must comply with the technological safety standards.

Other data : No decomposition if stored and applied as directed.

## 7.3 Specific end use(s)

Specific use(s) : Refer to attached exposure scenario Annex.

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## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1 Control parameters

#### Components with workplace control parameters

Contains no substances with occupational exposure limit values.

#### Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006

Substance name	End Use	Exposure routes	Potential health effects	Value
Ethylenediamine	Workers	Inhalation	Long-term systemic effects	25 mg/m <sup>3</sup>
	Workers	Skin contact	Long-term systemic effects	3.6 mg/kg bw/day
	Consumers	Inhalation	Long-term systemic effects	12.5 mg/m <sup>3</sup>
	Consumers	Oral	Long-term systemic effects	0.275 mg/kg bw/day

#### Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006

Substance name	Environmental Compartment	Value
Ethylenediamine	Fresh water	0.016 mg/l
	Marine water	0.002 mg/l
	Intermittent use/release	0.167 mg/l
	Fresh water sediment	7.68 mg/kg dry weight
	Marine sediment	0.768 mg/kg dry weight
	Soil	4.36 mg/kg dry weight
	Sewage treatment plant	0.5 mg/l
	Secondary Poisoning	4.9 mg/kg food

### 8.2 Exposure controls

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## Engineering controls

Effective exhaust ventilation system

Ensure that eyewash stations and safety showers are close to the workstation location.

## Personal protective equipment

Respiratory protection : In the case of vapour or aerosol formation use a respirator with an approved filter.  
Wear full face mask supplied with:  
Gas cartridge K (ammonia, green).

Hand protection : butyl-rubber

Eye protection : Safety glasses with side-shields conforming to EN166

Skin and body protection : Protective suit

Hygiene measures : Avoid contact with skin, eyes and clothing.  
When using do not eat or drink.  
When using do not smoke.  
Wash hands before breaks and immediately after handling the product.  
Wash contaminated clothing before re-use.

## Environmental exposure controls

General advice : Prevent product from entering drains.  
If the product contaminates rivers and lakes or drains inform respective authorities.

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## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

### 9.1 Information on basic physical and chemical properties

#### Appearance

Form : viscous liquid

Colour : colourless  
light yellow

Odour : ammoniacal

Odour Threshold : No data available

#### Safety data

pH : 12.8 at 25 % solution

Melting point/range : 11 °C  
at 1,013 hPa

Boiling point/boiling range : 117 °C  
at 1,013 hPa

Flash point : 38 °C  
at 1,013 hPa  
Method: closed cup



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Ignition temperature	: > 300 °C
Evaporation rate	: No data available
Flammability (solid, gas)	: Not applicable
Flammability (liquids)	: Flammable liquid and vapour.
Lower explosion limit	: 2 %(V)
Upper explosion limit	: 17 %(V)
Vapour pressure	: 17.3 hPa at 26.6 °C
Relative vapour density	: 2.1
Density	: 895 kg/m <sup>3</sup> at 20 °C
Relative density	: 897 at 20 °C
Water solubility	: completely miscible
Solubility in other solvents	: Very soluble in ethanol and benzene.
Partition coefficient: n-octanol/water	: log Pow: -1.6 at 20 °C
Auto-ignition temperature	: 385 - 405 °C at 1,013 hPa
Decomposition temperature	: No data available
Viscosity, dynamic	: 1.265 mPa.s at 25 °C
Viscosity, kinematic	: No data available
Explosive properties	: Not explosive
Oxidizing properties	: The substance or mixture is not classified as oxidizing.

## 9.2 Other information

This safety datasheet only contains information relating to safety and does not replace any product information or product specification.

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## SECTION 10: STABILITY AND REACTIVITY

### 10.1 Reactivity

Stable under normal conditions.

### 10.2 Chemical stability

Stable under recommended storage conditions.

### 10.3 Possibility of hazardous reactions

Heating can release hazardous gases.

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## 10.4 Conditions to avoid

Conditions to avoid : Heat, flames and sparks.

## 10.5 Incompatible materials

Materials to avoid : Reacts with copper, aluminium, zinc and their alloys.  
Strong acids and oxidizing agents  
Halogenated compounds

## 10.6 Hazardous decomposition products

Hazardous decomposition products : Nitrogen oxides (NO<sub>x</sub>)

Thermal decomposition : No data available

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## SECTION 11: TOXICOLOGICAL INFORMATION

### 11.1 Information on toxicological effects

#### Product information:

Acute toxicity : Harmful if swallowed or if inhaled.  
Toxic in contact with skin.

Skin corrosion/irritation : Causes severe burns.

Serious eye damage/eye irritation : Causes serious eye damage.

Respiratory or skin sensitisation : Respiratory sensitisation: May cause allergy or asthma symptoms or breathing difficulties if inhaled.  
Skin sensitisation: May cause an allergic skin reaction.

Germ cell mutagenicity : Not classified based on available information.

Carcinogenicity : Not classified based on available information.

Reproductive toxicity : Not classified based on available information.

STOT - single exposure : Not classified based on available information.

STOT - repeated exposure : Not classified based on available information.

Aspiration hazard : Not classified based on available information.

Further information : Solvents may degrease the skin.

#### Toxicology data for the components:

##### Ethylenediamine

#### Acute toxicity:

Acute oral toxicity : LD50: > 300 - 2,000 mg/kg  
Species: Rat

Acute inhalation toxicity : LC50 (Rat): > 10 - 20 mg/l  
Exposure time: 4 h  
Test atmosphere: vapour

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Acute dermal toxicity	: LD50: > 200 - 1,000 mg/kg Species: Rabbit
Skin corrosion/irritation	: Result: Causes burns.
Serious eye damage/eye irritation	: Result: Risk of serious damage to eyes.
Respiratory or skin sensitisation	: Result: The product is a skin sensitiser, sub-category 1B.  Result: The product is a respiratory sensitiser, sub-category 1B.
Germ cell mutagenicity	
Genotoxicity in vitro	: Result: Not mutagenic.  Positive results were obtained in some in vitro tests.
Genotoxicity in vivo	: Result: No evidence of genotoxic effects in vivo.
Carcinogenicity	: Based on available data, the classification criteria are not met.
Reproductive toxicity	: Based on available data, the classification criteria are not met.
STOT - single exposure	: Based on available data, the classification criteria are not met.
STOT - repeated exposure	: Based on available data, the classification criteria are not met.
Aspiration hazard	: No data available

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## SECTION 12: ECOLOGICAL INFORMATION

### Product information:

#### Ecotoxicology Assessment

Additional ecological information : An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.  
Harmful to aquatic life with long lasting effects.

### 12.1 Toxicity

#### Components:

#### Ecotoxicology Assessment

#### Ethylenediamine

Acute aquatic toxicity : Harmful to aquatic life.  
  
Chronic aquatic toxicity : Harmful to aquatic life with long lasting effects.

#### Test result

#### Ethylenediamine

Toxicity to fish : LC50: > 100 mg/l  
Exposure time: 96 h

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Species: *Poecilia reticulata* (guppy)

Toxicity to daphnia and other aquatic invertebrates : EC50: > 10 - 100 mg/l  
Exposure time: 48 h  
Species: *Daphnia magna* (Water flea)

Toxicity to algae : EC50: > 100 mg/l  
Exposure time: 72 h  
Species: *Pseudokirchneriella subcapitata* (green algae)

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC: > 0.1 - 1 mg/l  
Exposure time: 21 d  
Species: *Daphnia magna* (Water flea)

## 12.2 Persistence and degradability

### Product information:

Biodegradability : Result: Readily biodegradable.

### Components:

#### Ethylenediamine

Biodegradability : Result: Readily biodegradable.  
>60% BOD, 28 days, Closed Bottle Test (OECD 301D).

## 12.3 Bioaccumulative potential

### Product information:

Bioaccumulation : Not expected considering the low log Pow value.

### Components:

#### Ethylenediamine

Bioaccumulation : Not expected considering the low log Pow value.

## 12.4 Mobility in soil

### Product information:

Mobility : Adsorption to solid soil phase is possible.

### Components:

#### Ethylenediamine

Mobility : Adsorption to solid soil phase is possible.  
Groundwater contamination is unlikely.  
Transport to air is not expected.

## 12.5 Results of PBT and vPvB assessment

### Product information:

PBT and vPvB assessment : This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

### Components:

#### Ethylenediamine

PBT and vPvB assessment : This substance is not considered to be a PBT (Persistent, Bioaccumulation, Toxic)  
This substance is not considered to be vPvB (very Persistent)

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nor very Bioaccumulating)

## 12.6 Other adverse effects

### Product information:

Biochemical Oxygen Demand (BOD) : No data available

### Components:

#### Ethylenediamine

Biochemical Oxygen Demand (BOD) : No data available

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## SECTION 13: DISPOSAL CONSIDERATIONS

### 13.1 Waste treatment methods

Product : The product should not be allowed to enter drains, water courses or the soil.  
Do not contaminate ponds, waterways or ditches with chemical or used container.  
Hazardous waste  
Dispose of contents/container in accordance with local regulation.

Contaminated packaging : Empty remaining contents.  
Dispose of as unused product.  
Do not burn, or use a cutting torch on, the empty drum.

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## SECTION 14: TRANSPORT INFORMATION

### 14.1 UN number

ADR : UN 1604  
RID : UN 1604  
IMDG-Code : UN 1604  
IATA-DGR : UN 1604

### 14.2 Proper shipping name

ADR : ETHYLENEDIAMINE  
RID : ETHYLENEDIAMINE  
IMDG-Code : ETHYLENEDIAMINE  
IATA-DGR : Ethylenediamine

### 14.3 Transport hazard class

ADR : 8  
RID : 8  
IMDG-Code : 8  
IATA-DGR : 8

### 14.4 Packing group

ADR  
Packing group : II  
Classification Code : CF1  
Hazard Identification Number : 83  
Labels : 8 (3)  
Tunnel restriction code : (D/E)  
RID  
Packing group : II  
Classification Code : CF1

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Hazard Identification Number : 83  
Labels : 8 (3)  
**IMDG-Code**  
Packing group : II  
Labels : 8 (3)  
EmS Code : F-E, S-C

**IATA-DGR**  
Packing instruction (cargo aircraft) : 855  
Packing instruction (passenger aircraft) : 851  
Packing instruction (LQ) : Y840  
Packing group : II  
Labels : 8 (3)

## 14.5 Environmental hazards

**ADR**  
Environmentally hazardous : no

**RID**  
Environmentally hazardous : no

**IMDG-Code**  
Marine pollutant : no

**IATA-DGR**  
Environmentally hazardous : no

## 14.6 Special precautions for user

Not applicable

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

Not applicable for product as supplied.

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## SECTION 15: REGULATORY INFORMATION

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

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.

P5c	FLAMMABLE LIQUIDS	Quantity 1 5,000 t	Quantity 2 50,000 t
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#### Notification status

DSL : YES. All components of this product are on the Canadian DSL  
AICS : YES. On the inventory, or in compliance with the inventory  
NZIoC : YES. On the inventory, or in compliance with the inventory  
ENCS : YES. On the inventory, or in compliance with the inventory  
ISHL : YES. On the inventory, or in compliance with the inventory  
KECI : YES. On the inventory, or in compliance with the inventory  
PICCS : YES. On the inventory, or in compliance with the inventory  
IECSC : YES. On the inventory, or in compliance with the inventory  
TCSI : YES. On the inventory, or in compliance with the inventory  
TSCA : YES. All chemical substances in this product are either listed on the TSCA Inventory or in compliance with a TSCA Inventory exemption.

For explanation of abbreviation see section 16.

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## 15.2 Chemical safety assessment

Ethylenediamine : A Chemical Safety Assessment has been carried out for this substance.

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## SECTION 16: OTHER INFORMATION

### Full text of H-Statements referred to under sections 2 and 3.

H226 : Flammable liquid and vapour.  
H302 : Harmful if swallowed.  
H311 : Toxic in contact with skin.  
H314 : Causes severe skin burns and eye damage.  
H317 : May cause an allergic skin reaction.  
H318 : Causes serious eye damage.  
H332 : Harmful if inhaled.  
H334 : May cause allergy or asthma symptoms or breathing difficulties if inhaled.  
H412 : Harmful to aquatic life with long lasting effects.

### Full text of other abbreviations

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road; AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - Substance of Very High Concern; TCSI - Taiwan Chemical Substance Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

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## **Further information**

This data sheet contains changes from the previous version in section(s):  
Composition/information on ingredients

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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## Annex :

Use as an intermediate

Industrial formulation

Industrial use as a Processing aid

Industrial use, Processing aid / Scavenging agent in refinery streams / Corrosion inhibitors

Use of functional fluids in small devices

Monomer use in epoxy, PU, adhesives, coatings and other polymers, Industrial

Monomer use in epoxy, PU, adhesives, coatings and other polymers, Professional

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## 1. Short title of Exposure Scenario: Use as an intermediate

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Main User Groups	: SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Environmental Release Categories	: ERC6a, ERC6c: Use of intermediate, Industrial use of monomers for manufacture of thermoplastics
Process categories	: PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC15: Use as laboratory reagent

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## 2.1 Contributing scenario controlling environmental exposure for: ERC6a, ERC6c: Use of intermediate, Industrial use of monomers for manufacture of thermoplastics

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### Amount used

Maximum daily site tonnage (kg/day):	: 5000 kg/day
Fraction of EU tonnage used in region:	: 100 %
Fraction of Regional tonnage used locally:	: 1 %

### Environment factors not influenced by risk management

Flow rate	: 18,000 m <sup>3</sup> /day
Dilution Factor (River)	: 10
Dilution Factor (Coastal Areas)	: 100

### Other given operational conditions affecting environmental exposure

Number of emission days per year	: 220
Emission or Release Factor: Air	: 0.1 %
Emission or Release Factor: Water	: 0.7 %
Emission or Release Factor: Soil	: 0 %
Additional Risk Management	: 92 %
Measures for water	
Remarks	: For example, Incineration, Ion exchange processes

### Technical conditions and measures / Organizational measures

Exposure time	: Continuous use/release
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### Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	: Sewage treatment plant
Flow rate of sewage treatment plant effluent	: 2,000 m <sup>3</sup> /day
Percentage removed from waste water	: 90.4 %

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## 2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

---

Activity : General exposures, Closed systems

### Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).  
Physical Form (at time of use) : liquid

### Frequency and duration of use

Exposure duration : > 240 min  
Frequency of use : <= 240 days/year

### Human factors not influenced by risk management

Dermal exposure : Palm of one hand (240 cm<sup>2</sup>)

### Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor  
Outdoor / Indoor : Outdoor

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

Assumes a good basic standard of occupational hygiene is implemented

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

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.  
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.  
(Effectiveness (of a measure): 95 %)

---

## 2.3 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

---

Activity : General exposures, Continuous process, Open systems

### Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).  
Physical Form (at time of use) : liquid

### Frequency and duration of use

Exposure duration : > 240 min  
Frequency of use : <= 240 days/year

### Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm<sup>2</sup>)

### Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

### Technical conditions and measures

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

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

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Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

(Effectiveness (of a measure): 95 %)

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

---

## 2.4 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

---

Activity : Use in contained batch processes

### Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : liquid

### Frequency and duration of use

Exposure duration : > 240 min

Frequency of use : <= 240 days/year

### Human factors not influenced by risk management

Dermal exposure : Palm of one hand (240 cm<sup>2</sup>)

### Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

### Technical conditions and measures

Local exhaust ventilation is required at any step if there is opportunity for significant exposure.

(Effectiveness (of a measure): 90 %)

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear suitable coveralls to prevent exposure to the skin., Use suitable eye protection.

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

(Effectiveness (of a measure): 95 %)

---

## 2.5 Contributing scenario controlling worker exposure for: PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

---

Activity : Use in contained batch processes, Process sampling

### Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : liquid

### Frequency and duration of use

Exposure duration : > 240 min

Frequency of use : <= 240 days/year

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## Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm<sup>2</sup>)

## Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

## Technical conditions and measures

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

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

Assumes a good basic standard of occupational hygiene is implemented

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

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

(Effectiveness (of a measure): 95 %)

---

## 2.6 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

---

Activity : Laboratory activities

### Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : liquid

### Frequency and duration of use

Exposure duration : < 240 min

Frequency of use : <= 240 days/year

## Human factors not influenced by risk management

Dermal exposure : Palm of one hand (240 cm<sup>2</sup>)

## Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

## Technical conditions and measures

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

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

Assumes a good basic standard of occupational hygiene is implemented

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

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

(Effectiveness (of a measure): 95 %)

---

## 3. Exposure estimation and reference to its source

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## Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC6a	EUSES		Fresh water		0.014 mg/L	0.86
			Fresh water sediment		6.613 mg/kg dry weight	0.86
			Marine water		0.001 mg/L	0.688
			Marine sediment		0.66 mg/kg dry weight	0.859
			Sewage treatment plant		0.134 mg/L	0.269
			Soil		1.176 mg/kg dry weight	0.27

## Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value	Level of Exposure	RCR
PROC1	ECETOC TRA v3.0		Long term inhalation	0.025 mg/m <sup>3</sup>	< 0.01
			Long term dermal	0.002 mg/kg bw/day	< 0.01
PROC2	ECETOC TRA v3.0		Long term inhalation	1.252 mg/m <sup>3</sup>	0.05
			Long term dermal	0.068 mg/kg bw/day	0.019
PROC3	ECETOC TRA		Long term inhalation	2.504 mg/m <sup>3</sup>	0.1
			Long term dermal	0.034 mg/kg bw/day	< 0.01
PROC4	ECETOC TRA v3.0		Long term inhalation	5.008 mg/m <sup>3</sup>	0.2
			Long term dermal	0.343 mg/kg bw/day	0.095
PROC15	ECETOC TRA v3.0		Long term inhalation	1.502 mg/m <sup>3</sup>	0.06
			Long term dermal	0.01 mg/kg bw/day	< 0.01

ERC6a: Use of intermediate

ERC6c: Industrial use of monomers for manufacture of thermoplastics

PROC1: Use in closed process, no likelihood of exposure

PROC15: Use as laboratory reagent

PROC2: Use in closed, continuous process with occasional controlled exposure

PROC3: Use in closed batch process (synthesis or formulation)

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

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

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## 1. Short title of Exposure Scenario: Industrial formulation

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Main User Groups	: SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Environmental Release Categories	: ERC2: Formulation of preparations
Process categories	: PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15: Use as laboratory reagent

---

## 2.1 Contributing scenario controlling environmental exposure for: ERC2: Formulation of preparations

---

### Amount used

Maximum daily site tonnage (kg/day):	: 6300 kg/day
Fraction of EU tonnage used in region:	: 100 %
Fraction of Regional tonnage used locally:	: 10 %

### Environment factors not influenced by risk management

Flow rate	: 18,000 m <sup>3</sup> /day
Dilution Factor (River)	: 10
Dilution Factor (Coastal Areas)	: 100

### Other given operational conditions affecting environmental exposure

Number of emission days per year	: 220
Emission or Release Factor: Air	: 0.03 %
Emission or Release Factor: Water	: 0.05 %
Emission or Release Factor: Soil	: 0.01 %
Remarks	: spERC: ESVOC SpERC 2.2.v1
Additional Risk Management	: 90 %
Measures for water	
Remarks	: For example, Ion exchange processes, Incineration

### Technical conditions and measures / Organizational measures

Exposure time	: Continuous use/release
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## Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant : Sewage treatment plant  
Flow rate of sewage treatment plant effluent : 2,000 m<sup>3</sup>/day  
Percentage removed from waste water : 90.4 %

---

## 2.2 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

---

Activity : Use in contained batch processes

### Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).  
Physical Form (at time of use) : liquid

### Frequency and duration of use

Exposure duration : > 240 min  
Frequency of use : <= 240 days/year

### Human factors not influenced by risk management

Dermal exposure : Palm of one hand (240 cm<sup>2</sup>)

### Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

### Exposure routes

Inhalation exposure, Dermal exposure

### Technical conditions and measures

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness (of a measure): 95 %)  
Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

---

## 2.3 Contributing scenario controlling worker exposure for: PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

---

Activity : Use in contained batch processes, Process sampling

### Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

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Physical Form (at time of use) : liquid

## Frequency and duration of use

Exposure duration : > 240 min  
Frequency of use : <= 240 days/year

## Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm<sup>2</sup>)

## Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

## Technical conditions and measures

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

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

Assumes a good basic standard of occupational hygiene is implemented

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

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.  
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.  
(Effectiveness (of a measure): 95 %)

---

## 2.4 Contributing scenario controlling worker exposure for: PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)

---

Activity : Use in contained batch processes

## Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).  
Physical Form (at time of use) : liquid

## Frequency and duration of use

Exposure duration : > 240 min  
Frequency of use : <= 240 days/year

## Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm<sup>2</sup>)

## Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor  
Ventilation rate per hour : 1  
Remarks : Any, Room size

## Exposure routes

Inhalation exposure, Dermal exposure

## Technical conditions and measures

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 50 %)

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Use in contained systems (Effectiveness (of a measure): 90 %)

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.  
(Effectiveness (of a measure): 95 %)

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

---

## 2.5 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

---

Activity : Drum/batch transfers, Bulk transfers

### Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : liquid

### Frequency and duration of use

Duration of the activity : < 15 min

Frequency of use : <= 240 days/year

### Human factors not influenced by risk management

Dermal exposure : Both hands (960 cm<sup>2</sup>)

### Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor

Mass transfer rate : 1 - 10 L/min

### Exposure routes

Inhalation exposure, Dermal exposure

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.  
(Effectiveness (of a measure): 95 %)

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

---

## 2.6 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

---

Activity : Drum/batch transfers, Bulk transfers

### Product characteristics

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Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).  
Physical Form (at time of use) : liquid

## Frequency and duration of use

Duration of the activity : 1 - 4 h  
Frequency of use : <= 240 days/year

## Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm<sup>2</sup>)

## Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

## Exposure routes

Inhalation exposure, Dermal exposure

## Technical conditions and measures

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 95 %)

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness (of a measure): 95 %)  
Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

---

## 2.7 Contributing scenario controlling worker exposure for: PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

---

Activity : Drum and small package filling, Small package filling

## Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 5%.  
Physical Form (at time of use) : liquid

## Frequency and duration of use

Exposure duration : 1 - 4 h  
Frequency of use : <= 240 days/year

## Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm<sup>2</sup>)

## Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

## Exposure routes

Inhalation exposure, Dermal exposure

---

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exposure

## Technical conditions and measures

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.  
(Effectiveness (of a measure): 95 %)

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

---

## 2.8 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

---

Activity : Laboratory activities

### Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).  
Physical Form (at time of use) : liquid

### Frequency and duration of use

Exposure duration : < 240 min  
Frequency of use : <= 240 days/year

### Human factors not influenced by risk management

Dermal exposure : Palm of one hand (240 cm<sup>2</sup>)

### Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

## Technical conditions and measures

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

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

Assumes a good basic standard of occupational hygiene is implemented

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

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.  
(Effectiveness (of a measure): 95 %)

---

## 3. Exposure estimation and reference to its source

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### Environment

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Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC2	EUSES		Fresh water		0.015 mg/L	0.965
			Fresh water sediment		7.414 mg/kg dry weight	0.965
			Marine water		0.002 mg/L	0.77
			Marine sediment		0.74 mg/kg dry weight	0.965
			Sewage treatment plant		0.151 mg/L	0.302
			Soil		1.322 mg/kg dry weight	0.303

## Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value	Level of Exposure	RCR
PROC3	ECETOC TRA v3.0		Long term inhalation	2.504 mg/m <sup>3</sup>	0.1
			Long term dermal	0.034 mg/kg bw/day	< 0.01
PROC4	ECETOC TRA v3.0		Long term inhalation	5.008 mg/m <sup>3</sup>	0.2
			Long term dermal	0.343 mg/kg bw/day	0.095
PROC5	ART		Long term inhalation	2.6 mg/m <sup>3</sup>	0.104
	ECETOC TRA v3.0		Long term dermal	0.686 mg/kg bw/day	0.19
PROC8a	ART		Long term inhalation	3.1 mg/m <sup>3</sup>	0.124
	ECETOC TRA v3.0		Long term dermal	0.069 mg/kg bw/day	0.019
PROC8b	ECETOC TRA v3.0		Long term inhalation	1.878 mg/m <sup>3</sup>	0.075
			Long term dermal	0.411 mg/kg bw/day	0.114
PROC9	ECETOC TRA v3.0		Long term inhalation	1.502 mg/m <sup>3</sup>	0.06
			Long term dermal	0.041 mg/kg bw/day	0.011
PROC15	ECETOC TRA v3.0		Long term inhalation	1.502 mg/m <sup>3</sup>	0.06
			Long term dermal	0.01 mg/kg bw/day	< 0.01

ERC2: Formulation of preparations

PROC15: Use as laboratory reagent

PROC3: Use in closed batch process (synthesis or formulation)

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

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

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

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

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

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

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## 1. Short title of Exposure Scenario: Industrial use as a Processing aid

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Main User Groups	: SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Environmental Release Categories	: ERC4, ERC7: Use of non-reactive processing aid at industrial site (no inclusion into or onto article), Industrial use of substances in closed systems
Process categories	: PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation)

---

## 2.1 Contributing scenario controlling environmental exposure for: ERC4, ERC7: Use of non-reactive processing aid at industrial site (no inclusion into or onto article), Industrial use of substances in closed systems

---

### Amount used

Maximum daily site tonnage (kg/day):	: 500 kg/day
Fraction of EU tonnage used in region:	: 100 %
Fraction of Regional tonnage used locally:	: 0.046 %

### Environment factors not influenced by risk management

Flow rate	: 18,000 m <sup>3</sup> /day
Dilution Factor (River)	: 10
Dilution Factor (Coastal Areas)	: 100

### Other given operational conditions affecting environmental exposure

Number of emission days per year	: 20
Emission or Release Factor: Air	: 1 %
Emission or Release Factor: Water	: 0.01 %
Emission or Release Factor: Soil	: 0.1 %
Remarks	: ESVOC SpERC 7.13a.v1

### Technical conditions and measures / Organizational measures

Exposure time	: Continuous use/release
Compartment	: Fresh water, Fresh water sediment, Marine water, Marine sediment, Soil, Grassland, Sewage treatment plant

### Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	: Sewage treatment plant
Flow rate of sewage treatment plant effluent	: 2,000 m <sup>3</sup> /day
Percentage removed from waste water	: 90.4 %



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## **2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure**

---

Activity : General exposures, Closed systems

### **Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 25 %.

Physical Form (at time of use) : liquid

### **Frequency and duration of use**

Exposure duration : > 240 min

Remarks : Inhalation, Dermal

Frequency of use : <= 240 days/year

### **Human factors not influenced by risk management**

Dermal exposure : Palm of one hand (240 cm<sup>2</sup>)

### **Other operational conditions affecting workers exposure**

Outdoor / Indoor : Indoor

Outdoor / Indoor : Outdoor

### **Exposure routes**

Inhalation exposure, Dermal exposure

### **Organisational measures to prevent /limit releases, dispersion and exposure**

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Effectiveness (of a measure): 90 %)

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

---

## **2.3 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure**

---

Activity : General exposures, Continuous process, Open systems

### **Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 25 %.

Physical Form (at time of use) : liquid

### **Frequency and duration of use**

Exposure duration : > 240 min

Frequency of use : <= 240 days/year

### **Human factors not influenced by risk management**

Dermal exposure : Palms of both hands (480 cm<sup>2</sup>)

### **Other operational conditions affecting workers exposure**

Outdoor / Indoor : Indoor

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Outdoor / Indoor : Outdoor

## Exposure routes

Inhalation exposure, Dermal exposure

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

(Effectiveness (of a measure): 95 %)

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

---

## 2.4 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

---

Activity : Use in contained batch processes

### Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 25 %.

Physical Form (at time of use) : liquid

### Frequency and duration of use

Exposure duration : > 240 min

Frequency of use : <= 240 days/year

### Human factors not influenced by risk management

Dermal exposure : Palm of one hand (240 cm<sup>2</sup>)

### Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Outdoor / Indoor : Outdoor

## Exposure routes

Inhalation exposure, Dermal exposure

## Technical conditions and measures

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

(Effectiveness (of a measure): 95 %)

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

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## 3. Exposure estimation and reference to its source

### Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC4	EUSES		Fresh water		0.0007 mg/L	0.041
			Fresh water sediment		0.318 mg/kg dry weight	0.041
			Marine water		< 0.0001 mg/L	0.033
			Marine sediment		0.031 mg/kg dry weight	0.041
			Sewage treatment plant		0.002 mg/L	< 0.01
			Soil		0.022 mg/kg dry weight	< 0.01

### Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value	Level of Exposure	RCR
PROC1	ECETOC TRA v3.0		Long term inhalation	0.015 mg/m <sup>3</sup>	< 0.01
			Long term dermal	0.002 mg/kg bw/day	< 0.01
PROC2	ECETOC TRA v3.0		Long term inhalation	7.512 mg/m <sup>3</sup>	0.3
			Long term dermal	0.041 mg/kg bw/day	0.011
PROC3	ECETOC TRA v3.0		Long term inhalation	1.502 mg/m <sup>3</sup>	0.06
			Long term dermal	0.021 mg/kg bw/day	< 0.01

ERC4: Use of non-reactive processing aid at industrial site (no inclusion into or onto article)

ERC7: Industrial use of substances in closed systems

PROC1: Use in closed process, no likelihood of exposure

PROC2: Use in closed, continuous process with occasional controlled exposure

PROC3: Use in closed batch process (synthesis or formulation)

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

For further information, please also consult our Internet site: Downstream Users  
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## 1. Short title of Exposure Scenario: Industrial use, Processing aid / Scavenging agent in refinery streams / Corrosion inhibitors

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Main User Groups	: SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Environmental Release Categories	: ERC4, ERC7: Use of non-reactive processing aid at industrial site (no inclusion into or onto article), Industrial use of substances in closed systems
Process categories	: PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation)

---

## 2.1 Contributing scenario controlling environmental exposure for: ERC4, ERC7: Use of non-reactive processing aid at industrial site (no inclusion into or onto article), Industrial use of substances in closed systems

---

### Amount used

Maximum daily site tonnage (kg/day):	: 6000 kg/day
Fraction of EU tonnage used in region:	: 100 %
Fraction of Regional tonnage used locally:	: 10 %

### Environment factors not influenced by risk management

Flow rate	: 18,000 m <sup>3</sup> /day
Dilution Factor (River)	: 10
Dilution Factor (Coastal Areas)	: 100

### Other given operational conditions affecting environmental exposure

Number of emission days per year	: 365
Emission or Release Factor: Air	: 0.25 %
Emission or Release Factor: Water	: 0.001 %
Emission or Release Factor: Soil	: 0.0 %
Remarks	: spERC: ESVOC SpERC 7.12a.v1

### Technical conditions and measures / Organizational measures

Exposure time	: Continuous use/release
Compartment	: Fresh water, Fresh water sediment, Marine water, Marine sediment, Soil, Grassland, Sewage treatment plant

### Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	: Sewage treatment plant
Flow rate of sewage treatment plant effluent	: 2,000 m <sup>3</sup> /day
Percentage removed from waste water	: 90.4 %

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## 2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

---

Activity : General exposures, Closed systems

### Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 25 %.

Physical Form (at time of use) : liquid

### Frequency and duration of use

Exposure duration : > 240 min

Remarks : Inhalation, Dermal

Frequency of use : <= 240 days/year

### Human factors not influenced by risk management

Dermal exposure : Palm of one hand (240 cm<sup>2</sup>)

### Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Outdoor / Indoor : Outdoor

### Exposure routes

Inhalation exposure, Dermal exposure

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Effectiveness (of a measure): 90 %)

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

---

## 2.3 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

---

Activity : General exposures, Continuous process, Open systems

### Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 25 %.

Physical Form (at time of use) : liquid

### Frequency and duration of use

Exposure duration : > 240 min

Frequency of use : <= 240 days/year

### Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm<sup>2</sup>)

### Other operational conditions affecting workers exposure

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Outdoor / Indoor : Indoor  
Outdoor / Indoor : Outdoor

## Exposure routes

Inhalation exposure, Dermal exposure

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.  
(Effectiveness (of a measure): 95 %)  
Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

---

## 2.4 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

---

Activity : Use in contained batch processes

### Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 25 %.  
Physical Form (at time of use) : liquid

### Frequency and duration of use

Exposure duration : > 240 min  
Frequency of use : <= 240 days/year

### Human factors not influenced by risk management

Dermal exposure : Palm of one hand (240 cm<sup>2</sup>)

### Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor  
Outdoor / Indoor : Outdoor

## Exposure routes

Inhalation exposure, Dermal exposure

## Technical conditions and measures

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.  
(Effectiveness (of a measure): 95 %)

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Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

## 3. Exposure estimation and reference to its source

### Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC4	EUSES		Fresh water		< 0.0001 mg/L	0.042
			Fresh water sediment		0.341 mg/kg dry weight	0.044
			Marine water		< 0.0001 mg/L	0.035
			Marine sediment		0.034 mg/kg dry weight	0.044
			Sewage treatment plant		0.003 mg/L	< 0.01
			Soil		0.027 mg/kg dry weight	< 0.01

### Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value	Level of Exposure	RCR
PROC1	ECETOC TRA v3.0		Long term inhalation	0.015 mg/m <sup>3</sup>	< 0.01
			Long term dermal	0.002 mg/kg bw/day	< 0.01
PROC2	ECETOC TRA v3.0		Long term inhalation	7.512 mg/m <sup>3</sup>	0.3
			Long term dermal	0.041 mg/kg bw/day	0.011
PROC3	ECETOC TRA v3.0		Long term inhalation	1.502 mg/m <sup>3</sup>	0.06
			Long term dermal	0.021 mg/kg bw/day	< 0.01

ERC4: Use of non-reactive processing aid at industrial site (no inclusion into or onto article)

ERC7: Industrial use of substances in closed systems

PROC1: Use in closed process, no likelihood of exposure

PROC2: Use in closed, continuous process with occasional controlled exposure

PROC3: Use in closed batch process (synthesis or formulation)

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

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## 1. Short title of Exposure Scenario: Use of functional fluids in small devices

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Main User Groups : SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)  
Environmental Release Categories : ERC9a, ERC9b: Wide dispersive indoor use of substances in closed systems, Wide dispersive outdoor use of substances in closed systems  
Process categories : PROC20: Use of functional fluids in small devices

---

### 2.1 Contributing scenario controlling environmental exposure for: ERC9a, ERC9b: Wide dispersive indoor use of substances in closed systems, Wide dispersive outdoor use of substances in closed systems

---

#### Amount used

Maximum daily site tonnage : 12 kg/day  
(kg/day):  
Fraction of EU tonnage used in : 10 %  
region:  
Fraction of Regional tonnage used : 0.2 %  
locally:

#### Environment factors not influenced by risk management

Flow rate : 18,000 m<sup>3</sup>/day  
Dilution Factor (River) : 10

#### Other given operational conditions affecting environmental exposure

Number of emission days per year : 365  
Emission or Release Factor: Air : 5 %  
Emission or Release Factor: Water : 5 %  
Emission or Release Factor: Soil : 5 %

#### Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant : Municipal sewage treatment plant  
Flow rate of sewage treatment : 2,000 m<sup>3</sup>/day  
plant effluent  
Percentage removed from waste : 90.4 %  
water

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### 2.2 Contributing scenario controlling worker exposure for: PROC20: Use of functional fluids in small devices

---

Activity : Closed systems  
**Product characteristics**  
Concentration of the Substance in : Covers the percentage of the substance in the product up to  
Mixture/Article : 5%.  
Physical Form (at time of use) : liquid



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## Frequency and duration of use

Exposure duration : > 240 min  
Remarks : Inhalation, Dermal  
Frequency of use : <= 240 days/year

## Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm<sup>2</sup>)

## Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor  
Outdoor / Indoor : Outdoor

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

Assumes a good basic standard of occupational hygiene is implemented

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

Use suitable eye protection and gloves., Wear suitable protective clothing.

---

## 3. Exposure estimation and reference to its source

---

### Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC9a	EUSES		Fresh water		0.003 mg/L	0.208
			Fresh water sediment		1.595 mg/kg dry weight	0.208
			Marine water		0.0003 mg/L	0.166
			Marine sediment		0.159 mg/kg dry weight	0.207
			Sewage treatment plant		0.029 mg/L	0.058
			Soil		0.256 mg/kg dry weight	0.059

### Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value	Level of Exposure	RCR
PROC20	ECETOC TRA v3.0		Long term inhalation	7.011 mg/m <sup>3</sup>	0.28
			Long term dermal	0.342 mg/kg bw/day	0.095

ERC9a: Wide dispersive indoor use of substances in closed systems

ERC9b: Wide dispersive outdoor use of substances in closed systems

PROC20: Use of functional fluids in small devices

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

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## 1. Short title of Exposure Scenario: Monomer use in epoxy, PU, adhesives, coatings and other polymers, Industrial

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Main User Groups	: SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Environmental Release Categories	: ERC6a, ERC6b, ERC6c, ERC6d: Use of intermediate, Use of reactive processing aid at industrial site (no inclusion into or onto article), Industrial use of monomers for manufacture of thermoplastics, Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers
Process categories	: PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC7: Industrial spraying PROC8a: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring PROC14: Tableting, compression, extrusion, pelettisation, granulation PROC19: Manual activities involving hand contact PROC24: High (mechanical) energy work-up of substances bound in/on materials and/or articles

---

## 2.1 Contributing scenario controlling environmental exposure for: ERC5: Industrial use resulting in inclusion into or onto a matrix

---

### Amount used

Maximum daily site tonnage (kg/day):	: 800 kg/day
Fraction of EU tonnage used in region:	: 100 %
Fraction of Regional tonnage used locally:	: 10 %

### Environment factors not influenced by risk management

Flow rate	: 18,000 m <sup>3</sup> /day
Dilution Factor (River)	: 10

### Other given operational conditions affecting environmental exposure

Number of emission days per year	: 220
Emission or Release Factor: Air	: 1.7 %
Emission or Release Factor: Water	: 0 %
Emission or Release Factor: Soil	: 0 %
Remarks	: SpERC: FEICA 5.1b.v1

### Technical conditions and measures / Organizational measures

Exposure time	: Continuous use/release
Compartment	: Fresh water, Fresh water sediment, Marine water, Marine

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sediment, Soil, Grassland, Sewage treatment plant

## Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant : Municipal sewage treatment plant  
Flow rate of sewage treatment : 2,000 m<sup>3</sup>/day  
plant effluent  
Percentage removed from waste : 100 %  
water

---

## 2.2 Contributing scenario controlling worker exposure for: PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)

---

### Product characteristics

Concentration of the Substance in : Covers the percentage of the substance in the product up to  
Mixture/Article 5%.  
Physical Form (at time of use) : liquid

### Frequency and duration of use

Duration of the activity : > 4 h  
Frequency of use : <= 240 days/year  
Remarks : Covers daily exposures up to 8 hours

### Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm<sup>2</sup>)

### Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

### Exposure routes

Inhalation exposure, Dermal exposure

### Technical conditions and measures

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.  
(Effectiveness (of a measure): 95 %)  
Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

---

## 2.3 Contributing scenario controlling worker exposure for: PROC7: Industrial spraying

---

Activity : Spraying, Spraying (automatic/robotic)

### Product characteristics

Concentration of the Substance in : Covers percentage substance in the product up to 1 %.

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Mixture/Article  
Physical Form (at time of use) : liquid

## Frequency and duration of use

Duration of the activity : > 240 min  
Remarks : Inhalation, Dermal  
Frequency of use : <= 240 days/year  
Remarks : Covers daily exposures up to 8 hours

## Human factors not influenced by risk management

Dermal exposure : Both hands plus forearms (1500 cm2).

## Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

## Exposure routes

Inhalation exposure, Dermal exposure

## Technical conditions and measures

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.  
(Effectiveness (of a measure): 95 %)  
Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

---

## 2.4 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

---

Activity : Drum/batch transfers, Bulk transfers

## Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 5%.  
Physical Form (at time of use) : liquid

## Frequency and duration of use

Exposure duration : > 240 min  
Remarks : Inhalation, Dermal  
Frequency of use : <= 240 days/year

## Human factors not influenced by risk management

Dermal exposure : Both hands (960 cm2)

## Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

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## Technical conditions and measures

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.  
(Effectiveness (of a measure): 95 %)

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

---

## 2.5 Contributing scenario controlling worker exposure for: PROC10: Roller application or brushing

---

Activity : Roller, spreader, flow application

### Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 5%.

Physical Form (at time of use) : liquid

### Frequency and duration of use

Exposure duration : > 240 min

Remarks : Inhalation, Dermal

Frequency of use : <= 240 days/year

### Human factors not influenced by risk management

Dermal exposure : Both hands (960 cm<sup>2</sup>)

### Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

## Technical conditions and measures

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.  
(Effectiveness (of a measure): 95 %)

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

---

## 2.6 Contributing scenario controlling worker exposure for: PROC13: Treatment of articles by dipping and pouring

---

Activity : Dipping, immersion and pouring

### Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 5%.

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Physical Form (at time of use) : liquid

## Frequency and duration of use

Exposure duration : > 240 min  
Remarks : Inhalation, Dermal  
Frequency of use : <= 240 days/year

## Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm<sup>2</sup>)

## Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

## Technical conditions and measures

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.  
(Effectiveness (of a measure): 95 %)  
Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

---

## 2.7 Contributing scenario controlling worker exposure for: CS100: Production or preparation or articles by tableting, compression, extrusion or pelletisation

---

Activity : Production or preparation or articles by tableting, compression, extrusion or pelletisation

## Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 5%.  
Physical Form (at time of use) : liquid

## Frequency and duration of use

Duration of the activity : > 4 h  
Frequency of use : <= 240 days/year  
Remarks : Covers daily exposures up to 8 hours

## Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm<sup>2</sup>)

## Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

## Exposure routes

Inhalation exposure, Dermal exposure

## Technical conditions and measures

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

---

## 2.8 Contributing scenario controlling worker exposure for: PROC19: Manual activities involving hand contact

---

### Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 5%.

Physical Form (at time of use) : liquid

### Frequency and duration of use

Duration of the activity : 15 min - 1 h

Frequency of use : <= 240 days/year

### Human factors not influenced by risk management

Dermal exposure : Both hands and main part of arms (1980 cm<sup>2</sup>)

### Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

### Exposure routes

Inhalation exposure, Dermal exposure

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness (of a measure): 95 %)

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

Wear a respirator conforming to EN140 with Type A filter or better. (Effectiveness (of a measure): 90 %)

---

## 2.9 Contributing scenario controlling worker exposure for: PROC24: High (mechanical) energy work-up of substances bound in/on materials and/or articles

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### Product characteristics

Concentration of the Substance in : Covers percentage substance in the product up to 1 %.



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Mixture/Article  
Physical Form (at time of use) : Solid mixture, Dustiness: Medium

## Frequency and duration of use

Duration of the activity : > 4 h  
Frequency of use : ≤ 240 days/year  
Remarks : Covers daily exposures up to 8 hours

## Human factors not influenced by risk management

Dermal exposure : Palm of one hand (240 cm<sup>2</sup>)

## Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use  
Outdoor / Indoor : Outdoor use

## Exposure routes

Inhalation exposure, Dermal exposure

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

Assumes a good basic standard of occupational hygiene is implemented

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## 3. Exposure estimation and reference to its source

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### Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC5	EUSES		Fresh water		0.0004 mg/L	0.027
			Fresh water sediment		0.204 mg/kg dry weight	0.027
			Marine water		< 0.0001 mg/L	0.021
			Marine sediment		0.02 mg/kg dry weight	0.026
			Sewage treatment plant		0 mg/L	< 0.01
			Soil		0.002 mg/kg dry weight	< 0.01

### Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value	Level of Exposure	RCR
PROC5	ECETOC TRA v3.0		Long term inhalation	2.504 mg/m <sup>3</sup>	0.1
			Long term dermal	0.137 mg/kg bw/day	0.038
PROC7	ECETOC TRA v3.0		Long term inhalation	3.13 mg/m <sup>3</sup>	0.125

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			Long term dermal	0.214 mg/kg bw/day	0.06
PROC8a	ECETOC TRA v3.0		Long term inhalation	2.504 mg/m <sup>3</sup>	0.1
			Long term dermal	0.137 mg/kg bw/day	0.038
PROC10	ECETOC TRA v3.0		Long term inhalation	2.504 mg/m <sup>3</sup>	0.1
			Long term dermal	0.274 mg/kg bw/day	0.076
PROC13	ECETOC TRA v3.0		Long term inhalation	2.504 mg/m <sup>3</sup>	0.1
			Long term dermal	0.137 mg/kg bw/day	0.038
CS100	ECETOC TRA v3.0		Long term inhalation	2.504 mg/m <sup>3</sup>	0.1
			Long term dermal	0.137 mg/kg bw/day	0.038
PROC19	ECETOC TRA v3.0		Long term inhalation	0.501 mg/m <sup>3</sup>	0.02
			Long term dermal	0.283 mg/kg bw/day	0.079
PROC24	ECETOC TRA v3.0	Indoor	Long term inhalation	1 mg/m <sup>3</sup>	0.04
		Outdoor	Long term inhalation	0.75 mg/m <sup>3</sup>	0.03
			Long term dermal	0.288 mg/kg bw/day	0.08

CS100: Production or preparation or articles by tableting, compression, extrusion or pelletisation

ERC5: Industrial use resulting in inclusion into or onto a matrix

PROC10: Roller application or brushing

PROC13: Treatment of articles by dipping and pouring

PROC19: Manual activities involving hand contact

PROC24: High (mechanical) energy work-up of substances bound in/on materials and/or articles

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

PROC7: Industrial spraying

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

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

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For further information, please also consult our Internet site: Downstream Users  
[http://guidance.echa.europa.eu/downstream\\_users\\_en.htm](http://guidance.echa.europa.eu/downstream_users_en.htm)

# ETHYLENEDIAMINE (EDA)

Version 5

Revision Date 07.08.2018

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GB / EN

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## 1. Short title of Exposure Scenario: Monomer use in epoxy, PU, adhesives, coatings and other polymers, Professional

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Main User Groups	: SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Environmental Release Categories	: ERC8c, ERC8f: Wide dispersive indoor use resulting in inclusion into or onto a matrix, Wide dispersive outdoor use resulting in inclusion into or onto a matrix
Process categories	: PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC10: Roller application or brushing PROC11: Non-industrial spraying PROC13: Treatment of articles by dipping and pouring CS100: Production or preparation of articles by tableting, compression, extrusion or pelletisation PROC19: Manual activities involving hand contact

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## 2.1 Contributing scenario controlling environmental exposure for: ERC8c, ERC8f: Wide dispersive indoor use resulting in inclusion into or onto a matrix, Wide dispersive outdoor use resulting in inclusion into or onto a matrix

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### Amount used

Maximum daily site tonnage (kg/day):	: 2 kg/day
Fraction of EU tonnage used in region:	: 10 %
Fraction of Regional tonnage used locally:	: 0.2 %

### Environment factors not influenced by risk management

Flow rate	: 18,000 m <sup>3</sup> /day
Dilution Factor (River)	: 10

### Other given operational conditions affecting environmental exposure

Number of emission days per year	: 365
Emission or Release Factor: Air	: 0 %
Emission or Release Factor: Water	: 1.5 %
Emission or Release Factor: Soil	: 0 %
Remarks	: SpERC: FEICA 8c.1a.v1

### Technical conditions and measures / Organizational measures

Exposure time	: Continuous use/release
Compartment	: Fresh water, Fresh water sediment, Marine water, Marine sediment, Soil, Grassland, Sewage treatment plant

### Conditions and measures related to municipal sewage treatment plant

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Type of Sewage Treatment Plant : Municipal sewage treatment plant  
Flow rate of sewage treatment : 2,000 m<sup>3</sup>/day  
plant effluent  
Effectiveness (of a measure) : 90.4 %

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## 2.2 Contributing scenario controlling worker exposure for: PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)

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Activity : Indoor

### Product characteristics

Concentration of the Substance in : Covers the percentage of the substance in the product up to  
Mixture/Article 5%.  
Physical Form (at time of use) : liquid

### Frequency and duration of use

Duration of the activity : > 4 h  
Frequency of use : <= 240 days/year  
Remarks : Covers daily exposures up to 8 hours

### Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm<sup>2</sup>)

### Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use  
Ventilation rate per hour : 3  
Remarks : Use in large workrooms only.

### Exposure routes

Inhalation exposure, Dermal exposure

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)  
Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

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## 2.3 Contributing scenario controlling worker exposure for: PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)

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Activity : Outdoor

### Product characteristics

Concentration of the Substance in : Covers the percentage of the substance in the product up to  
Mixture/Article 5%.  
Physical Form (at time of use) : liquid

### Frequency and duration of use

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Duration of the activity : > 4 h  
Frequency of use : <= 240 days/year  
Remarks : Covers daily exposures up to 8 hours

## Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm<sup>2</sup>)

## Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor use

## Exposure routes

Inhalation exposure, Dermal exposure

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)  
Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

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## 2.4 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

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Activity : Indoor

### Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 5%.  
Physical Form (at time of use) : liquid

### Frequency and duration of use

Duration of the activity : > 4 h  
Frequency of use : <= 240 days/year  
Remarks : Covers daily exposures up to 8 hours

## Human factors not influenced by risk management

Dermal exposure : Both hands (960 cm<sup>2</sup>)

## Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use  
Ventilation rate per hour : 3  
Remarks : Use in large workrooms only.  
Mass transfer rate : 10 - 100 L/min

## Exposure routes

Inhalation exposure, Dermal exposure

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

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Assumes a good basic standard of occupational hygiene is implemented

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

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

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## 2.5 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

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Activity : Outdoor

### Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 5%.

Physical Form (at time of use) : liquid

### Frequency and duration of use

Duration of the activity : > 4 h

Frequency of use : <= 240 days/year

Remarks : Covers daily exposures up to 8 hours

### Human factors not influenced by risk management

Dermal exposure : Both hands (960 cm<sup>2</sup>)

### Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor use

### Exposure routes

Inhalation exposure, Dermal exposure

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

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## 2.6 Contributing scenario controlling worker exposure for: PROC10: Roller application or brushing

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Activity : Roller, spreader, flow application

### Product characteristics

Concentration of the Substance in Mixture/Article : Covers percentage substance in the product up to 1 %.

Physical Form (at time of use) : liquid

### Frequency and duration of use

Duration of the activity : > 240 min

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Remarks : Inhalation, Dermal  
Frequency of use : <= 240 days/year  
Remarks : Covers daily exposures up to 8 hours

## Human factors not influenced by risk management

Dermal exposure : Both hands (960 cm<sup>2</sup>)

## Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor  
Ventilation rate per hour : 3  
Remarks : Use in large workrooms only.  
Outdoor / Indoor : Outdoor  
Spreading of liquids on surfaces or work pieces : > 3 m<sup>2</sup>/hour

## Exposure routes

Inhalation exposure, Dermal exposure

## Technical conditions and measures

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 80 %)

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)  
Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.  
In case no LEV is present, a suitable respiratory protection with adequate effectiveness is required,  
Wear a respirator conforming to EN140 with Type A filter or better. (Effectiveness (of a measure): 90 %)

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## 2.7 Contributing scenario controlling worker exposure for: PROC11: Non-industrial spraying

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Activity : Spraying, Manual

### Product characteristics

Concentration of the Substance in Mixture/Article : Covers percentage substance in the product up to 1 %.  
Physical Form (at time of use) : liquid

### Frequency and duration of use

Duration of the activity : > 240 min  
Remarks : Inhalation, Dermal  
Frequency of use : <= 240 days/year  
Remarks : Covers daily exposures up to 8 hours

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## Human factors not influenced by risk management

Dermal exposure : Both hands plus forearms (1500 cm<sup>2</sup>).

## Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Outdoor / Indoor : Outdoor

## Exposure routes

Inhalation exposure, Dermal exposure

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

Wear a respirator conforming to EN140 with Type A filter or better. (Effectiveness (of a measure): 90 %)

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## 2.8 Contributing scenario controlling worker exposure for: PROC13: Treatment of articles by dipping and pouring

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Activity : Dipping, immersion and pouring

### Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 5%.

Physical Form (at time of use) : liquid

### Frequency and duration of use

Duration of the activity : > 240 min

Remarks : Inhalation, Dermal

Frequency of use : <= 240 days/year

Remarks : Covers daily exposures up to 8 hours

## Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm<sup>2</sup>)

## Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

## Technical conditions and measures

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 80 %)

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

Assumes a good basic standard of occupational hygiene is implemented



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

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

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## 2.9 Contributing scenario controlling worker exposure for: CS100: Production or preparation or articles by tableting, compression, extrusion or pelletisation

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### Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 5%.  
Physical Form (at time of use) : liquid

### Frequency and duration of use

Duration of the activity : > 4 h  
Frequency of use : <= 240 days/year  
Remarks : Covers daily exposures up to 8 hours

### Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm<sup>2</sup>)

### Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

### Exposure routes

Inhalation exposure, Dermal exposure

### Technical conditions and measures

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 80 %)

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

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## 2.10 Contributing scenario controlling worker exposure for: PROC19: Manual activities involving hand contact

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### Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 5%.  
Physical Form (at time of use) : liquid

### Frequency and duration of use

Duration of the activity : < 1 h  
Frequency of use : <= 240 days/year  
Exposure duration : < 1 h

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## Human factors not influenced by risk management

Dermal exposure : Both hands and main part of arms (1980 cm<sup>2</sup>)

## Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

## Exposure routes

Inhalation exposure, Dermal exposure

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

Assumes a good basic standard of occupational hygiene is implemented

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

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

Wear a respirator conforming to EN140 with Type A filter or better. (Effectiveness (of a measure): 90 %)

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## 2.11 Contributing scenario controlling worker exposure for: PROC24: High (mechanical) energy work-up of substances bound in/on materials and/or articles

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### Product characteristics

Concentration of the Substance in Mixture/Article : Covers percentage substance in the product up to 1 %.

Physical Form (at time of use) : Solid, medium dustiness

### Frequency and duration of use

Duration of the activity : > 4 h

Frequency of use : <= 240 days/year

Remarks : Covers daily exposures up to 8 hours

## Human factors not influenced by risk management

Dermal exposure : Palm of one hand (240 cm<sup>2</sup>)

## Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Outdoor / Indoor : Outdoor use

## Exposure routes

Inhalation exposure, Dermal exposure

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

Assumes a good basic standard of occupational hygiene is implemented

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## 3. Exposure estimation and reference to its source

### Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8c	EUSES		Fresh water		0.0006 mg/L	0.035
			Fresh water sediment		0.272 mg/kg dry weight	0.035
			Marine water		< 0.0001 mg/L	0.028
			Marine sediment		0.026 mg/kg dry weight	0.034
			Sewage treatment plant		0.002 mg/L	< 0.01
			Soil		0.014 mg/kg dry weight	< 0.01

### Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value	Level of Exposure	RCR
PROC5	ART	Indoor	Long term inhalation	1.9 mg/m <sup>3</sup>	0.076
	ECETOC TRA v3.0		Long term dermal	0.548 mg/kg bw/day	0.152
PROC5	ART	Outdoor	Long term inhalation	0.69 mg/m <sup>3</sup>	0.028
	ECETOC TRA v3.0		Long term dermal	0.548 mg/kg bw/day	0.152
PROC8a	ART	Indoor	Long term inhalation	5.8 mg/m <sup>3</sup>	0.232
	ECETOC TRA v3.0		Long term dermal	0.548 mg/kg bw/day	0.152
PROC8a	ART	Outdoor	Long term inhalation	2.1 mg/m <sup>3</sup>	0.084
	ECETOC TRA v3.0		Long term dermal	0.548 mg/kg bw/day	0.152
PROC10	ART	Indoor	Long term inhalation	0.58 mg/m <sup>3</sup>	0.023
	ART	Outdoor	Long term inhalation	1.764 mg/m <sup>3</sup>	0.071
	ECETOC TRA v3.0		Long term dermal	0.549 mg/kg bw/day	0.152
PROC11	ART	Indoor	Long term inhalation	3.8 mg/m <sup>3</sup>	0.152
	ART	Outdoor	Long term inhalation	1.4 mg/m <sup>3</sup>	0.056
	ECETOC TRA v3.0		Long term dermal	2.143 mg/kg bw/day	0.595
PROC13	ECETOC TRA		Long term	10.02 mg/m <sup>3</sup>	0.401

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	v3.0		inhalation		
			Long term dermal	0.548 mg/kg bw/day	0.152
CS100	ECETOC TRA v3.0		Long term inhalation	10.02 mg/m <sup>3</sup>	0.401
			Long term dermal	0.137 mg/kg bw/day	0.038
PROC19	ECETOC TRA v3.0		Long term inhalation	1.002 mg/m <sup>3</sup>	0.04
			Long term dermal	1.131 mg/kg bw/day	0.314
PROC24	ECETOC TRA v3.0	Indoor	Long term inhalation	2 mg/m <sup>3</sup>	0.08
		Outdoor	Long term inhalation	1.5 mg/m <sup>3</sup>	0.06
			Long term dermal	0.288 mg/kg bw/day	0.08

CS100: Production or preparation of articles by tableting, compression, extrusion or pelletisation

ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix

ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix

PROC10: Roller application or brushing

PROC11: Non-industrial spraying

PROC13: Treatment of articles by dipping and pouring

PROC19: Manual activities involving hand contact

PROC24: High (mechanical) energy work-up of substances bound in/on materials and/or articles

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

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

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

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[http://guidance.echa.europa.eu/downstream\\_users\\_en.htm](http://guidance.echa.europa.eu/downstream_users_en.htm)