# RHEOBYK-411



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

### 1.1 Product identifier

| | | |
|---|---|---|
| Trade name | : | RHEOBYK-411 |
| UFI | : | 5TQ3-30T1-100F-EADP |
| Product code | : | 000000000000129986 |

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

| | | |
|---|---|---|
| Use of the Substance/Mixture | : | Rheology Additive |

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

| | | |
|---|---|---|
| Company | : | BYK-Chemie GmbH<br>Abelstrasse 45<br>46483 Wesel |
| Telephone | : | +49 281 670-0 |
| Telefax | : | +49 281 65735 |
| Information | : | Regulatory Affairs |
| Telephone | : | +49 281 670-23532 |
| Telefax | : | +49 281 670-23533 |
| E-mail address | : | GHS.BYK@altana.com |

### 1.4 Emergency telephone number

| | |
|---|---|
| Europe | +44 1235 239670 |
| Middle East/Africa | +44 1235 239671 |
| Americas | +1 215 207 0061 |
| East/South East Asia | +65 3158 1074 |
| (Local India: 000 800 100 7479) | |

## SECTION 2: Hazards identification

### 2.1 Classification of the substance or mixture

**Classification (REGULATION (EC) No 1272/2008)**

| | |
|---|---|
| Skin irritation, Category 2 | H315: Causes skin irritation. |
| Eye irritation, Category 2 | H319: Causes serious eye irritation. |
| Reproductive toxicity, Category 1B | H360D: May damage the unborn child. |
| Specific target organ toxicity - single exposure, Category 3, Respiratory system | H335: May cause respiratory irritation. |

### 2.2 Label elements

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

Hazard pictograms :

Signal word : Danger

Hazard statements :

| | |
|---|---|
| H315 | Causes skin irritation. |
| H319 | Causes serious eye irritation. |
| H335 | May cause respiratory irritation. |
| H360D | May damage the unborn child. |

Precautionary statements :

**Prevention:**

| | |
|---|---|
| P201 | Obtain special instructions before use. |
| P261 | Avoid breathing mist or vapours. |
| P264 | Wash skin thoroughly after handling. |
| P280 | Wear protective gloves/ protective clothing/ eye protection/ face protection/ hearing protection. |

**Response:**

| | |
|---|---|
| P304 + P340 + P312 | IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell. |
| P308 + P313 | IF exposed or concerned: Get medical advice/ attention. |

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

- 872-50-4 N-methyl-2-pyrrolidone

**Additional Labelling**

Restricted to professional users.

### 2.3 Other hazards

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.

Ecological information: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Toxicological information: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

## SECTION 3: Composition/information on ingredients

### 3.2 Mixtures

Chemical nature : Solution of a modified urea

**Components**

| Chemical name | CAS-No.<br>EC-No.<br>Index-No.<br>Registration number | Classification | Concentration (% w/w) |
|---|---|---|---|
| N-methyl-2-pyrrolidone | 872-50-4<br>212-828-1<br>01-2119472430-46 | Skin Irrit. 2; H315<br>Eye Irrit. 2; H319<br>Repr. 1B; H360D<br>STOT SE 3; H335<br>(Respiratory system)<br>---<br>specific concentration limit<br>STOT SE 3; H335<br>>= 10 % | >= 50 - <= 100 |
| lithium chloride | 7447-41-8<br>231-212-3<br>01-2119560574-35 | Acute Tox. 4; H302<br>Skin Irrit. 2; H315<br>Eye Irrit. 2; H319<br>---<br>Acute toxicity estimate<br><br>Acute oral toxicity: 526 mg/kg | >= 1 - < 3 |
| Pyrrolidinone, dimethyl- | 60544-40-3 | Skin Irrit. 2; H315<br>Eye Irrit. 2; H319<br>Repr. 1B; H360<br>STOT SE 3; H335<br>(Respiratory system) | >= 0,3 - < 0,5 |

For explanation of abbreviations see section 16.

## SECTION 4: First aid measures

### 4.1 Description of first aid measures

General advice : Move out of dangerous area.
Show this safety data sheet to the doctor in attendance.
Do not leave the victim unattended.

If inhaled : If unconscious, place in recovery position and seek medical advice.
If symptoms persist, call a physician.

In case of skin contact : If skin irritation persists, call a physician.
If on skin, rinse well with water.
If on clothes, remove clothes.

In case of eye contact : Immediately flush eye(s) with plenty of water.
Remove contact lenses.
Protect unharmed eye.
Keep eye wide open while rinsing.

If eye irritation persists, consult a specialist.

If swallowed : Keep respiratory tract clear.
Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.
If symptoms persist, call a physician.
Take victim immediately to hospital.

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

Symptoms : No information available.

Risks : Causes skin irritation.
Causes serious eye irritation.
May cause respiratory irritation.
May damage the unborn child.

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

Treatment : No information available.

## SECTION 5: Firefighting measures

### 5.1 Extinguishing media

Suitable extinguishing media : Carbon dioxide (CO2)

Foam
Carbon dioxide (CO2)
Dry chemical

Water mist

Unsuitable extinguishing media : High volume water jet

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

Hazardous combustion products : Carbon oxides
Nitrogen oxides (NOx)
Halogenated compounds
Metal oxides
Hydrogen chloride

### 5.3 Advice for firefighters

Special protective equipment for firefighters : Wear self-contained breathing apparatus for firefighting if necessary.

Further information : Standard procedure for chemical fires.
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

## SECTION 6: Accidental release measures

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

Personal precautions : Use personal protective equipment.

### 6.2 Environmental precautions

Environmental precautions : Prevent product from entering drains.
Prevent further leakage or spillage if safe to do so.
If the product contaminates rivers and lakes or drains inform respective authorities.

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

Methods for cleaning up : Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust).
Keep in suitable, closed containers for disposal.

### 6.4 Reference to other sections

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

## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

Advice on safe handling : Avoid formation of aerosol.
Do not breathe vapours/dust.
Avoid contact with skin and eyes.
For personal protection see section 8.
Smoking, eating and drinking should be prohibited in the application area.
Provide sufficient air exchange and/or exhaust in work rooms.
Dispose of rinse water in accordance with local and national regulations.

Advice on protection against fire and explosion : Normal measures for preventive fire protection.

Hygiene measures : When using do not eat or drink. When using do not smoke.
Wash hands before breaks and at the end of workday.

### 7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Keep container tightly closed in a dry and well-ventilated place. Electrical installations / working materials must comply with the technological safety standards.

Further information on storage stability : No decomposition if stored and applied as directed.

### 7.3 Specific end use(s)

Specific use(s) : No data available

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

**Occupational Exposure Limits**

| Components | CAS-No. | Value type (Form of exposure) | Control parameters | Basis |
|---|---|---|---|---|
| N-methyl-2-pyrrolidone | 872-50-4 | TWA | 10 ppm<br>40 mg/m3 | 2009/161/EU |
| | Further information: Identifies the possibility of significant uptake through the skin, Indicative | | | |
| | | STEL | 20 ppm<br>80 mg/m3 | 2009/161/EU |
| | Further information: Identifies the possibility of significant uptake through the skin, Indicative | | | |
| | | TWA | 10 ppm<br>40 mg/m3 | 2004/37/EC |
| | Further information: Skin, Carcinogens or mutagens | | | |
| | | STEL | 20 ppm<br>80 mg/m3 | 2004/37/EC |
| | Further information: Skin, Carcinogens or mutagens | | | |

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

| Substance name | End Use | Exposure routes | Potential health effects | Value |
|---|---|---|---|---|
| N-methyl-2-pyrrolidone | Workers | Inhalation | Long-term local effects | 40 mg/m3 |
| | Workers | Inhalation | Long-term systemic effects | 14,4 mg/m3 |
| | Workers | Skin contact | Long-term systemic effects | 4,8 mg/kg |
| | Consumers | Inhalation | Long-term systemic effects | 3,6 mg/m3 |
| | Consumers | Inhalation | Long-term local effects | 4,5 mg/m3 |
| | Consumers | Ingestion | Long-term systemic effects | 0,85 mg/kg |
| | Consumer use | Skin contact | Long-term systemic effects | 2,4 mg/kg |
| Modified urea | Workers | Inhalation | Long-term systemic effects | 59 mg/m3 |
| | Workers | Dermal | Long-term systemic effects | 8,3 mg/kg |
| | Consumers | Inhalation | Long-term systemic effects | 15 mg/m3 |
| | Consumers | Dermal | Long-term systemic effects | 4,2 mg/kg |
| | Consumers | Oral | Long-term systemic effects | 4,2 mg/kg |
| lithium chloride | Workers | Inhalation | Acute systemic effects | 1,2 mg/m3 |

| | | | | |
|---|---|---|---|---|
| | Workers | Skin contact | Long-term systemic effects | 9,9 mg/kg |
| | Workers | Inhalation | Long-term systemic effects | 1,2 mg/m3 |
| | Consumers | Inhalation | Long-term systemic effects | 0,6 mg/m3 |
| | Consumers | Skin contact | Long-term systemic effects | 4,25 mg/kg |
| | Consumers | Ingestion | Long-term systemic effects | 0,43 mg/kg |
| | Consumers | Inhalation | Acute systemic effects | 0,6 mg/m3 |
| | Consumers | Ingestion | Acute systemic effects | 1,29 mg/kg |
| | Consumers | Inhalation | Long-term local effects | 0,6 mg/m3 |

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

| Substance name | Environmental Compartment | Value |
|---|---|---|
| N-methyl-2-pyrrolidone | Fresh water | 0,25 mg/l |
| | Marine water | 0,025 mg/l |
| | Fresh water sediment | 1,09 mg/kg |
| | Marine sediment | 0,109 mg/kg |
| | Soil | 0,07 mg/kg |
| | Sewage treatment plant | 10 mg/l |
| | Intermittent releases | 5 mg/l |
| lithium chloride | Fresh water | 2175 mg/l |
| | Fresh water sediment | 56,54 mg/kg |
| | Marine water | 217 mg/l |
| | Marine sediment | 5,654 mg/kg |
| | Soil | 10,44 mg/kg |
| | Sewage treatment plant | 1,402 mg/l |

### 8.2 Exposure controls

**Personal protective equipment**

Eye/face protection : Eye wash bottle with pure water
Tightly fitting safety goggles
Wear face-shield and protective suit for abnormal processing problems.

Hand protection
Material : butyl-rubber
Break through time : 120,00 min

Remarks : The suitability for a specific workplace should be discussed with the producers of the protective gloves.

Skin and body protection : Impervious clothing
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Respiratory protection : In the case of vapour formation use a respirator with an approved filter.

**Environmental exposure controls**

General advice : Prevent product from entering drains.
Prevent further leakage or spillage if safe to do so.
If the product contaminates rivers and lakes or drains inform respective authorities.

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

| | | |
|---|---|---|
| Physical state | : | liquid |
| Colour | : | light yellow |
| Odour | : | not significant |
| Odour Threshold | : | No data available |
| Melting point/ range | : | < 0 °C<br>Method: derived |
| Initial boiling point | : | 203,00 °C<br>Method: derived |
| Upper explosion limit / Upper flammability limit | : | 9,50 %(V) |
| Lower explosion limit / Lower flammability limit | : | 1,30 %(V) |
| Flash point | : | 91,00 °C<br>Method: 49 (Pensky-Martens) |
| Auto-ignition temperature | : | > 200 °C<br>Method: M0062 (Analytics Wesel) |
| Decomposition temperature | : | No data available |
| pH | : | 5 (20 °C)<br>Concentration: 1 %<br>Method: Universal pH-value indicator |
| Viscosity | | |
| Viscosity, dynamic | : | No data available |
| Viscosity, kinematic | : | No data available |
| Solubility(ies) | | |
| Water solubility | : | immiscible |
| Solubility in other solvents | : | No data available |

| | | |
|---|---|---|
| Partition coefficient: n-octanol/water | : | No data available |
| Vapour pressure | : | < 0,5000000 hPa (20,00 °C)<br>Method: derived |
| Relative density | : | No data available |
| Density | : | 1,0500 g/cm3 (20,00 °C)<br>Method: 4 (20°C oscillating U-tube) |
| Bulk density | : | Not applicable |
| Relative vapour density | : | No data available |

**9.2 Other information**

| | | |
|---|---|---|
| Flammability (liquids) | : | Sustains combustion |
| Evaporation rate | : | No data available |

## SECTION 10: Stability and reactivity

**10.1 Reactivity**

No decomposition if stored and applied as directed.

**10.2 Chemical stability**

No decomposition if stored and applied as directed.

**10.3 Possibility of hazardous reactions**

| | | |
|---|---|---|
| Hazardous reactions | : | No decomposition if stored and applied as directed. |

**10.4 Conditions to avoid**

| | | |
|---|---|---|
| Conditions to avoid | : | No data available |

**10.5 Incompatible materials**

| | | |
|---|---|---|
| Materials to avoid | : | Acids<br>Strong oxidizing agents<br>Alkalis |

**10.6 Hazardous decomposition products**

No decomposition if stored and applied as directed.

## SECTION 11: Toxicological information

### 11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

**Acute toxicity**

Not classified due to lack of data.

**Product:**

| | | |
|---|---|---|
| Acute oral toxicity | : | Acute toxicity estimate: > 2.000 mg/kg<br>Method: Calculation method |
| Acute dermal toxicity | : | Remarks: No data available |

**Components:**

**N-methyl-2-pyrrolidone:**

| | | |
|---|---|---|
| Acute oral toxicity | : | LD50 (Rat): 4.150 mg/kg<br>Method: OECD Test Guideline 401<br>GLP: no |
| Acute inhalation toxicity | : | LC50 (Rat): > 5,1 mg/l<br>Test atmosphere: dust/mist<br>Method: OECD Test Guideline 403<br>GLP: yes |
| Acute dermal toxicity | : | LD50 (Rat): > 5.000 mg/kg<br>Method: OECD Test Guideline 402<br>GLP: No information available. |

**lithium chloride:**

| | | |
|---|---|---|
| Acute oral toxicity | : | LD50 (Rat): 526 mg/kg<br>GLP: No information available. |
| Acute inhalation toxicity | : | LC50 (Rat): > 5,57 mg/l<br>Test atmosphere: dust/mist<br>Method: OECD Test Guideline 403<br>GLP: yes |
| Acute dermal toxicity | : | LD50 (Rat): > 2.000 mg/kg<br>Method: OECD Test Guideline 402<br>GLP: yes |

**Skin corrosion/irritation**

Causes skin irritation.

**Product:**

| | | |
|---|---|---|
| Remarks | : | May irritate skin.<br>May cause skin irritation in susceptible persons. |

**Components:**

**N-methyl-2-pyrrolidone:**

| | | |
|---|---|---|
| Species | : | Rabbit |
| Method | : | OECD Test Guideline 404 |
| Result | : | slight irritation |
| GLP | : | yes |

**Serious eye damage/eye irritation**

Causes serious eye irritation.

**Product:**

| | | |
|---|---|---|
| Remarks | : | Causes serious eye irritation. |

**Components:**

**N-methyl-2-pyrrolidone:**

| | | |
|---|---|---|
| Species | : | Rabbit |
| Method | : | OECD Test Guideline 405 |
| Result | : | Severe eye irritation |
| GLP | : | no |

**lithium chloride:**

| | | |
|---|---|---|
| Species | : | Rabbit |
| Method | : | OECD Test Guideline 405 |
| Result | : | Severe eye irritation |
| GLP | : | yes |

**Respiratory or skin sensitisation**

**Skin sensitisation**

Not classified due to lack of data.

**Respiratory sensitisation**

Not classified due to lack of data.

**Product:**

| | | |
|---|---|---|
| Remarks | : | No data available |

**Components:**

**N-methyl-2-pyrrolidone:**

| | | |
|---|---|---|
| Test Type | : | Mouse Local Lymph Node assay (LLNA) |
| Exposure routes | : | Skin contact |
| Species | : | Mouse |
| Method | : | OECD Test Guideline 429 |
| Result | : | Not a skin sensitizer. |
| GLP | : | yes |

**lithium chloride:**

| | | |
|---|---|---|
| Test Type | : | Buehler Test |
| Exposure routes | : | Skin contact |
| Species | : | Guinea pig |
| Method | : | OECD Test Guideline 406 |
| Result | : | Did not cause sensitisation on laboratory animals. |
| GLP | : | yes |

**Germ cell mutagenicity**

Not classified due to lack of data.

**Product:**

| | | |
|---|---|---|
| Genotoxicity in vitro | : | Remarks: No data available |
| Genotoxicity in vivo | : | Remarks: No data available |

**Carcinogenicity**

Not classified due to lack of data.

**Product:**

| | | |
|---|---|---|
| Remarks | : | No data available |

**Reproductive toxicity**

May damage the unborn child.

**Product:**

| | | |
|---|---|---|
| Effects on fertility | : | Remarks: No data available |
| Effects on foetal development | : | Remarks: No data available |
| Reproductive toxicity - Assessment | : | May damage the unborn child. |

**STOT - single exposure**

May cause respiratory irritation.

**Product:**

| | | |
|---|---|---|
| Remarks | : | No data available |

**STOT - repeated exposure**

Not classified due to lack of data.

**Product:**

| | | |
|---|---|---|
| Remarks | : | No data available |

**Aspiration toxicity**

Not classified due to lack of data.

**Product:**

No data available

### 11.2 Information on other hazards

**Endocrine disrupting properties**

Not classified due to lack of data.

**Product:**

Assessment : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

**Further information**

**Product:**

Remarks : No data available

## SECTION 12: Ecological information

### 12.1 Toxicity

**Product:**

Toxicity to fish : Remarks: No data available

Toxicity to algae/aquatic plants : Remarks: No data available

**Components:**

**N-methyl-2-pyrrolidone:**

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): > 500 mg/l
Exposure time: 96 h
Test Type: static test
GLP: no

Toxicity to algae/aquatic plants : (Scenedesmus subspicatus): > 500 mg/l
Exposure time: 72 h
GLP: no

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC: 12,5 mg/l
Exposure time: 21 d
Species: Daphnia magna (Water flea)
Test Type: semi-static test
Method: OECD Test Guideline 211
GLP: yes

**lithium chloride:**

| | | |
|---|---|---|
| Toxicity to fish | : | LC50 (Oncorhynchus mykiss (rainbow trout)): 158 mg/l<br>Exposure time: 96 h<br>Test Type: static test<br>Method: OECD Test Guideline 203<br>GLP: yes |
| Toxicity to daphnia and other aquatic invertebrates | : | EC50 (Daphnia magna (Water flea)): 249 mg/l<br>Exposure time: 48 h<br>Method: OECD Test Guideline 202<br>GLP: yes<br><br>NOEC (Daphnia magna (Water flea)): 63,4 mg/l<br>Exposure time: 48 h<br>Method: OECD Test Guideline 202<br>GLP: yes |
| Toxicity to algae/aquatic plants | : | (Desmodesmus subspicatus (green algae)): > 400 mg/l<br>Exposure time: 72 h<br>Method: OECD Test Guideline 201<br>GLP: yes |

### 12.2 Persistence and degradability

**Product:**

| | | |
|---|---|---|
| Biodegradability | : | Remarks: No data available |

**Components:**

**N-methyl-2-pyrrolidone:**

| | | |
|---|---|---|
| Biodegradability | : | Result: Readily biodegradable.<br>Method: OECD Test Guideline 301C<br>GLP: No information available. |

### 12.3 Bioaccumulative potential

**Product:**

| | | |
|---|---|---|
| Bioaccumulation | : | Remarks: No data available |

**Components:**

**N-methyl-2-pyrrolidone:**

| | | |
|---|---|---|
| Partition coefficient: n-octanol/water | : | log Pow: -0,46 (25 °C)<br>Method: OECD Test Guideline 107<br>GLP: no |

### 12.4 Mobility in soil

No data available

### 12.5 Results of PBT and vPvB assessment

**Product:**

| | | |
|---|---|---|
| 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. |

### 12.6 Endocrine disrupting properties

**Product:**

| | | |
|---|---|---|
| Assessment | : | The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher. |

### 12.7 Other adverse effects

**Product:**

| | | |
|---|---|---|
| Additional ecological information | : | No data available |

## SECTION 13: Disposal considerations

### 13.1 Waste treatment methods

| | | |
|---|---|---|
| Product | : | Do not dispose of waste into sewer.<br>Do not contaminate ponds, waterways or ditches with chemical or used container.<br>Send to a licensed waste management company. |
| Contaminated packaging | : | Empty remaining contents.<br>Dispose of as unused product.<br>Do not re-use empty containers. |

## SECTION 14: Transport information

### 14.1 UN number or ID number

| | | |
|---|---|---|
| **ADR** | : | Not regulated as a dangerous good |
| **IMDG** | : | Not regulated as a dangerous good |
| **IATA** | : | Not regulated as a dangerous good |

### 14.2 UN proper shipping name

| | | |
|---|---|---|
| **ADR** | : | Not regulated as a dangerous good |
| **IMDG** | : | Not regulated as a dangerous good |
| **IATA** | : | Not regulated as a dangerous good |

### 14.3 Transport hazard class(es)

| | | |
|---|---|---|
| **ADR** | : | Not regulated as a dangerous good |
| **IMDG** | : | Not regulated as a dangerous good |
| **IATA** | : | Not regulated as a dangerous good |

**14.4 Packing group**

| | | |
|---|---|---|
| **ADR** | : | Not regulated as a dangerous good |
| **IMDG** | : | Not regulated as a dangerous good |
| **IATA (Cargo)** | : | Not regulated as a dangerous good |
| **IATA (Passenger)** | : | Not regulated as a dangerous good |

**14.5 Environmental hazards**

Not regulated as a dangerous good

**14.6 Special precautions for user**

Not applicable

**14.7 Maritime transport in bulk according to IMO instruments**

Not applicable for product as supplied.

## SECTION 15: Regulatory information

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

| | | |
|---|---|---|
| REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles (Annex XVII) | : | Conditions of restriction for the following entries should be considered:<br>Number on list 3<br><br>Number on list 30: N-methyl-2-pyrrolidone<br><br>Number on list 71: N-methyl-2-pyrrolidone<br><br>Number on list 72: N-methyl-2-pyrrolidone<br><br>Number on list 75: If you intend to use this product as tattoo ink, please contact your vendor. |
| REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59). | : | N-methyl-2-pyrrolidone |
| REACH - List of substances subject to authorisation (Annex XIV) | : | Not applicable |
| Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving | | Not applicable |

dangerous substances.

### 15.2 Chemical safety assessment

Not applicable

## SECTION 16: Other information

Items where relevant changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

**Full text of H-Statements**

| | | |
|---|---|---|
| H302 | : | Harmful if swallowed. |
| H315 | : | Causes skin irritation. |
| H319 | : | Causes serious eye irritation. |
| H335 | : | May cause respiratory irritation. |
| H360 | : | May damage fertility or the unborn child. |
| H360D | : | May damage the unborn child. |

**Full text of other abbreviations**

| | | |
|---|---|---|
| Acute Tox. | : | Acute toxicity |
| Eye Irrit. | : | Eye irritation |
| Repr. | : | Reproductive toxicity |
| Skin Irrit. | : | Skin irritation |
| STOT SE | : | Specific target organ toxicity - single exposure |
| 2004/37/EC | : | Europe. Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens, mutagens or reprotoxic substances at work - Annex III |
| 2009/161/EU | : | Europe. COMMISSION DIRECTIVE 2009/161/EU establishing a third list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC and amending Commission Directive 2000/39/EC |
| 2004/37/EC / STEL | : | Short term exposure limit |
| 2004/37/EC / TWA | : | Long term exposure limit |
| 2009/161/EU / TWA | : | Limit Value - eight hours |
| 2009/161/EU / STEL | : | Short term exposure limit |

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIIC - Australian Inventory of Industrial Chemicals; 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 Harmonised 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 Organisation; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardisation; 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 - Organisation 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; TECI - Thailand Existing Chemicals Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

**Further information**

| **Classification of the mixture:** | | **Classification procedure:** |
|---|---|---|
| Skin Irrit. 2 | H315 | Calculation method |
| Eye Irrit. 2 | H319 | Calculation method |
| Repr. 1B | H360D | Calculation method |
| STOT SE 3 | H335 | Calculation method |

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.

REG_EU / EN

# Annex: Exposure Scenarios

### Table of Contents

## ES 1: Formulation or re-packing; Industrial uses (SU3).

### 1.1. Title section

| | | |
|---|---|---|
| **Exposure Scenario name** | : | Formulation & (re)packing of substances and mixtures |
| **Structured Short Title** | : | Formulation or re-packing; Industrial uses (SU3). |

| | | |
|---|---|---|
| **Environment** | | |
| **CS 1** | **Formulation of preparations** | ERC2 |
| **Worker** | | |
| **CS 2** | **Use in closed batch process (synthesis or formulation)** | PROC3 |
| **CS 3** | **Use in closed batch process (synthesis or formulation)** | PROC3 |
| **CS 4** | **Use in batch and other process (synthesis) where opportunity for exposure arises** | PROC4 |
| **CS 5** | **Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)** | PROC5 |

### 1.2. Conditions of use affecting exposure

#### 1.2.1. Control of environmental exposure: Formulation of preparations (ERC2)

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Physical form of product | : | Liquid |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Annual amount used in the EU | : | 7610000 kg |
| Maximum allowable site tonnage (MSafe) | : | 8.404.500 kg |
| Release type | : | Continuous release |
| Emission days | : | 300 |
| **Conditions and measures related to sewage treatment plant** | | |
| STP type | : | Municipal sewage treatment plant |
| STP sludge treatment | : | No application of sewage sludge to soil<br>Can be incinerated, when in compliance with local regulations. |

| **Other conditions affecting environmental exposure** | | |
|---|---|---|
| Local freshwater dilution factor | : | 187,61 |
| Local marine water dilution factor | : | 1.876,07 |

### 1.2.2. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

| **Product (article) characteristics** | | |
|---|---|---|
| Covers concentrations up to 100 % | | |
| Physical form of product | : | Liquid |
| Vapour pressure | : | 32 Pa |
| Temperature | : | 20 °C |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Duration | : | 480 min |
| Use frequency | : | 5 days/week |
| **Technical and organisational conditions and measures** | | |
| Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).<br>Inhalation - minimum efficiency of 30 % | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear suitable gloves tested to EN374.<br>Use suitable eye protection. | | |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor |
| Professional or industrial settings | : | Industrial use |
| Ventilation rate per hour | : | 3 |

### 1.2.3. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

| **Product (article) characteristics** |
|---|
| Covers concentrations up to 100 % |

| | | |
|---|---|---|
| Physical form of product | : | Liquid |
| Vapour pressure | : | 100 hPa |
| Temperature | : | 100 °C |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Duration | : | 480 min |
| Use frequency | : | 5 days/week |
| **Technical and organisational conditions and measures** | | |
| Local exhaust ventilation<br>Inhalation - minimum efficiency of 90 % | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear suitable gloves tested to EN374.<br>Dermal - minimum efficiency of 80 % | | |
| Use suitable eye protection. | | |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor |
| Professional or industrial settings | : | Industrial use |

**1.2.4. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)**

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Covers concentrations up to 100 % | | |
| Physical form of product | : | Liquid |
| Vapour pressure | : | 32 Pa |
| Temperature | : | 20 °C |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Duration | : | 480 min |
| Use frequency | : | 5 days/week |
| **Technical and organisational conditions and measures** | | |
| Provide a good standard of controlled ventilation (10 to 15 air changes per hour).<br>Inhalation - minimum efficiency of 70 % | | |

| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
|---|---|---|
| Wear suitable gloves tested to EN374.<br>Dermal - minimum efficiency of 80 % | | |
| Use suitable eye protection. | | |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor |
| Professional or industrial settings | : | Industrial use |

**1.2.5. Control of worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)**

| **Product (article) characteristics** | | |
|---|---|---|
| Covers concentrations up to 100 % | | |
| Physical form of product | : | Liquid |
| Vapour pressure | : | 100 hPa |
| Temperature | : | 100 °C |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Duration | : | 240 min |
| Use frequency | : | 5 days/week |
| **Technical and organisational conditions and measures** | | |
| Local exhaust ventilation<br>Inhalation - minimum efficiency of 90 % | | |
| Provide a good standard of controlled ventilation (5 to 10 air changes per hour).<br>Inhalation - minimum efficiency of 30 % | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.<br>Dermal - minimum efficiency of 90 % | | |
| Use suitable eye protection. | | |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor |
| Professional or industrial settings | : | Industrial use |

## 1.3. Exposure estimation and reference to its source

### 1.3.1. Environmental release and exposure: Formulation of preparations (ERC2)

| Protection Target | Exposure estimate | RCR |
|---|---|---|
| Sewage treatment plant | (ECETOC TRA environment v3) | 0,003 |

### 1.3.2. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

| Exposure route | Health effect | Exposure indicator | Exposure estimate | RCR |
|---|---|---|---|---|
| dermal | systemic | long-term | 0,686 mg/kg bw/day (ECETOC TRA worker v3) | 0,143 |
| inhalative | systemic | long-term | 8,674 mg/m³ (ECETOC TRA worker v3) | 0,602 |
| inhalative | local | long-term | 8,674 mg/m³ (ECETOC TRA worker v3) | 0,217 |

### 1.3.3. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

| Exposure route | Health effect | Exposure indicator | Exposure estimate | RCR |
|---|---|---|---|---|
| dermal | systemic | long-term | 0,137 mg/kg bw/day (ECETOC TRA worker v3) | 0,029 |
| inhalative | systemic | long-term | 4,131 mg/m³ (ECETOC TRA worker v3) | 0,287 |
| inhalative | local | long-term | 4,131 mg/m³ (ECETOC TRA worker v3) | 0,103 |

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

| Exposure route | Health effect | Exposure indicator | Exposure estimate | RCR |
|---|---|---|---|---|
| dermal | systemic | long-term | 1,371 mg/kg | 0,286 |

| | | | | |
|---|---|---|---|---|
| | | | bw/day (ECETOC TRA worker v3) | |
| inhalative | systemic | long-term | 6,196 mg/m³ (ECETOC TRA worker v3) | 0,430 |
| inhalative | local | long-term | 6,196 mg/m³ (ECETOC TRA worker v3) | 0,155 |

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

| Exposure route | Health effect | Exposure indicator | Exposure estimate | RCR |
|---|---|---|---|---|
| dermal | systemic | long-term | 0,823 mg/kg bw/day (ECETOC TRA worker v3) | 0,171 |
| inhalative | systemic | long-term | 8,674 mg/m³ (ECETOC TRA worker v3) | 0,602 |
| inhalative | local | long-term | 14,457 mg/m³ (ECETOC TRA worker v3) | 0,361 |

## 1.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

For scaling see
http://www.ecetoc.org/tra

## ES 2: Filling of equipment from drums or containers; Industrial uses (SU3).

### 2.1. Title section

| | | |
|---|---|---|
| **Exposure Scenario name** | : | Filling of equipment from drums or containers |
| **Structured Short Title** | : | Filling of equipment from drums or containers; Industrial uses (SU3). |

| | | |
|---|---|---|
| **Environment** | | |
| **CS 1** | **Formulation of preparations** | ERC2 |
| **Worker** | | |
| **CS 2** | **Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities** | PROC8a |
| **CS 3** | **Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities** | PROC8b |
| **CS 4** | **Transfer of substance or mixture into small containers (dedicated filling line, including weighing)** | PROC9 |
| **CS 5** | **Use as laboratory reagent** | PROC15 |

### 2.2. Conditions of use affecting exposure

#### 2.2.1. Control of environmental exposure: Formulation of preparations (ERC2)

#### 2.2.2. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities (PROC8a)

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Covers concentrations up to 100 % | | |
| Physical form of product | : | Liquid |
| Vapour pressure | : | 0,32 hPa |
| Temperature | : | 20 °C |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Duration | : | 480 min |
| Use frequency | : | 5 days/week |

| | | |
|---|---|---|
| **Technical and organisational conditions and measures** | | |
| Local exhaust ventilation<br>Inhalation - minimum efficiency of 90 % | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>Dermal - minimum efficiency of 90 % | | |
| Use suitable eye protection. | | |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor |
| Professional or industrial settings | : | Industrial use |

**2.2.3. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)**

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Covers concentrations up to 100 % | | |
| Physical form of product | : | Liquid |
| Vapour pressure | : | 0,32 hPa |
| Temperature | : | 20 °C |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Duration | : | 480 min |
| Use frequency | : | 5 days/week |
| **Technical and organisational conditions and measures** | | |
| Provide a good standard of controlled ventilation (5 to 10 air changes per hour).<br>Inhalation - minimum efficiency of 70 % | | |
| Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>Dermal - minimum efficiency of 90 % | | |
| Use suitable eye protection. | | |
| **Other conditions affecting workers exposure** | | |

| | | |
|---|---|---|
| Indoor or outdoor use | : | Indoor |
| Professional or industrial settings | : | Industrial use |

**2.2.4. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)**

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Covers concentrations up to 100 % | | |
| Physical form of product | : | Liquid |
| Vapour pressure | : | 0,32 hPa |
| Temperature | : | 20 °C |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Duration | : | 480 min |
| Use frequency | : | 5 days/week |
| **Technical and organisational conditions and measures** | | |
| Provide a good standard of controlled ventilation (5 to 10 air changes per hour).<br>Inhalation - minimum efficiency of 70 % | | |
| Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear suitable gloves tested to EN374.<br>Dermal - minimum efficiency of 80 % | | |
| Use suitable eye protection. | | |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor |
| Professional or industrial settings | : | Industrial use |

**2.2.5. Control of worker exposure: Use as laboratory reagent (PROC15)**

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Covers concentrations up to 100 % | | |
| Physical form of product | : | Liquid |
| Vapour pressure | : | 0,32 hPa |

| | | |
|---|---|---|
| Temperature | : | 20 °C |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Duration | : | 480 min |
| Use frequency | : | 5 days/week |
| **Technical and organisational conditions and measures** | | |
| Local exhaust ventilation<br>Inhalation - minimum efficiency of 90 % | | |
| Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear suitable gloves tested to EN374.<br>Dermal - minimum efficiency of 80 % | | |
| Use suitable eye protection. | | |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor |

## 2.3. Exposure estimation and reference to its source

### 2.3.1. Environmental release and exposure: Formulation of preparations (ERC2)

| **Additional information on exposure estimation** |
|---|
| No exposure assessment presented for the environment. |

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

| Exposure route | Health effect | Exposure indicator | Exposure estimate | RCR |
|---|---|---|---|---|
| dermal | systemic | long-term | 1,37 mg/kg bw/day (ECETOC TRA worker v3) | 0,286 |
| inhalative | systemic | long-term | 4,131 mg/m³ (ECETOC TRA worker v3) | 0,287 |
| inhalative | local | long-term | 4,131 mg/m³ (ECETOC TRA worker v3) | 0,103 |

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

| Exposure route | Health effect | Exposure indicator | Exposure estimate | RCR |
|---|---|---|---|---|
| dermal | systemic | long-term | 1,37 mg/kg bw/day (ECETOC TRA worker v3) | 0,286 |
| inhalative | systemic | long-term | 6,20 mg/m³ (ECETOC TRA worker v3) | 0,430 |
| inhalative | local | long-term | 6,20 mg/m³ (ECETOC TRA worker v3) | 0,155 |

### 2.3.4. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

| Exposure route | Health effect | Exposure indicator | Exposure estimate | RCR |
|---|---|---|---|---|
| dermal | systemic | long-term | 1,37 mg/kg bw/day (ECETOC TRA worker v3) | 0,286 |
| inhalative | systemic | long-term | 6,20 mg/m³ (ECETOC TRA worker v3) | 0,430 |
| inhalative | local | long-term | 6,20 mg/m³ (ECETOC TRA worker v3) | 0,155 |

### 2.3.5. Worker exposure: Use as laboratory reagent (PROC15)

| Exposure route | Health effect | Exposure indicator | Exposure estimate | RCR |
|---|---|---|---|---|
| dermal | systemic | long-term | 0,069 mg/kg bw/day (ECETOC TRA worker v3) | 0,014 |
| inhalative | systemic | long-term | 2,065 mg/m³ (ECETOC TRA worker v3) | 0,143 |
| inhalative | local | long-term | 2,065 mg/m³ (ECETOC TRA worker v3) | 0,051 |

### 2.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

For scaling see
http://www.ecetoc.org/tra

## ES 3: Processing aid; Industrial uses (SU3).

### 3.1. Title section

| | | |
|---|---|---|
| **Exposure Scenario name** | : | Processing aid |
| **Structured Short Title** | : | Processing aid; Industrial uses (SU3). |

| | | |
|---|---|---|
| **Environment** | | |
| **CS 1** | **Industrial use of processing aids in processes and products, not becoming part of articles** | ERC4 |
| **Worker** | | |
| **CS 2** | **Use in closed process, no likelihood of exposure** | PROC1 |
| **CS 3** | **Use in closed, continuous process with occasional controlled exposure** | PROC2 |
| **CS 4** | **Use in closed batch process (synthesis or formulation)** | PROC3 |
| **CS 5** | **Chemical production where opportunity for exposure arises** | PROC4 |

### 3.2. Conditions of use affecting exposure

#### 3.2.1. Control of environmental exposure: Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Physical form of product | : | Liquid |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Annual amount used in the EU | : | 2001000 kg |
| Release type | : | Continuous release |
| Emission days | : | 300 |
| **Conditions and measures related to sewage treatment plant** | | |
| STP type | : | Municipal sewage treatment plant |
| STP effluent | : | 2.000 m3/d |
| **Other conditions affecting environmental exposure** | | |
| Receiving surface water flow | : | 18.000 m3/d |
| Local freshwater dilution factor | : | 10 |

| | | |
|---|---|---|
| Local marine water dilution factor | : | 100 |

### 3.2.2. Control of worker exposure: Use in closed process, no likelihood of exposure (PROC1)

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Covers concentrations up to 100 % | | |
| Physical form of product | : | Liquid |
| Vapour pressure | : | 0,32 hPa |
| Temperature | : | 20 °C |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Duration | : | 480 min |
| Use frequency | : | 5 days/week |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor |

### 3.2.3. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Covers concentrations up to 100 % | | |
| Physical form of product | : | Liquid |
| Vapour pressure | : | 0,32 hPa |
| Temperature | : | 20 °C |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Duration | : | 480 min |
| Use frequency | : | 5 days/week |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear suitable gloves tested to EN374. | | |
| Use suitable eye protection. | | |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor |

### 3.2.4. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Covers concentrations up to 100 % | | |
| Physical form of product | : | Liquid |
| Vapour pressure | : | 0,32 hPa |
| Temperature | : | 20 °C |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Duration | : | 480 min |
| Use frequency | : | 5 days/week |
| **Technical and organisational conditions and measures** | | |
| Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).<br>Inhalation - minimum efficiency of 30 % | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear suitable gloves tested to EN374. | | |
| Use eye protection according to EN 166. | | |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor |

### 3.2.5. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Covers concentrations up to 100 % | | |
| Physical form of product | : | Liquid |
| Vapour pressure | : | 0,32 hPa |
| Temperature | : | 20 °C |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Duration | : | 480 min |

| | |
|---|---|
| Use frequency | : 5 days/week |
| **Technical and organisational conditions and measures** | |
| Provide a good standard of controlled ventilation (5 to 10 air changes per hour).<br>Inhalation - minimum efficiency of 70 % | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | |
| Wear suitable gloves tested to EN374.<br>Dermal - minimum efficiency of 80 % | |
| Use suitable eye protection. | |
| **Other conditions affecting workers exposure** | |
| Indoor or outdoor use | : Indoor |

## 3.3. Exposure estimation and reference to its source

### 3.3.1. Environmental release and exposure: Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)

| Protection Target | Exposure estimate | RCR |
|---|---|---|
| Sewage treatment plant | (ECETOC TRA environment v3) | 0,267 |

### 3.3.2. Worker exposure: Use in closed process, no likelihood of exposure (PROC1)

| Exposure route | Health effect | Exposure indicator | Exposure estimate | RCR |
|---|---|---|---|---|
| dermal | systemic | long-term | 0,034 (ECETOC TRA worker v3) | 0,007 |
| inhalative | systemic | long-term | 0,041 (ECETOC TRA worker v3) | 0,003 |
| inhalative | local | long-term | 0,041 (ECETOC TRA worker v3) | 0,001 |

### 3.3.3. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

| Exposure route | Health effect | Exposure indicator | Exposure estimate | RCR |
|---|---|---|---|---|
| dermal | systemic | long-term | 1,371 mg/kg | 0,286 |

| | | | | |
|---|---|---|---|---|
| | | | bw/day (ECETOC TRA worker v3) | |
| inhalative | systemic | long-term | 4,131 mg/m³ (ECETOC TRA worker v3) | 0,287 |
| inhalative | local | long-term | 4,131 mg/m³ (ECETOC TRA worker v3) | 0,103 |

### 3.3.4. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

| Exposure route | Health effect | Exposure indicator | Exposure estimate | RCR |
|---|---|---|---|---|
| dermal | systemic | long-term | 0,686 mg/kg bw/day (ECETOC TRA worker v3) | 0,143 |
| inhalative | systemic | long-term | 8,674 mg/m³ (ECETOC TRA worker v3) | 0,602 |
| inhalative | local | long-term | 8,674 mg/m³ (ECETOC TRA worker v3) | 0,217 |

### 3.3.5. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

| Exposure route | Health effect | Exposure indicator | Exposure estimate | RCR |
|---|---|---|---|---|
| dermal | systemic | long-term | 1,371 mg/kg bw/day (ECETOC TRA worker v3) | 0,286 |
| inhalative | systemic | long-term | 6,196 mg/m³ (ECETOC TRA worker v3) | 0,430 |
| inhalative | local | long-term | 6,196 mg/m³ (ECETOC TRA worker v3) | 0,155 |

## 3.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

For scaling see
http://www.ecetoc.org/tra

## ES 4: Use in laboratories; Industrial uses (SU3).

### 4.1. Title section

| | | |
|---|---|---|
| **Exposure Scenario name** | : | Laboratory activities |
| **Structured Short Title** | : | Use in laboratories; Industrial uses (SU3). |

| | | |
|---|---|---|
| **Environment** | | |
| **CS 1** | **Use of non-reactive processing aid at industrial site (no inclusion into or onto article)** | ERC4 |
| **Worker** | | |
| **CS 2** | **Use as laboratory reagent** | PROC15 |

### 4.2. Conditions of use affecting exposure

#### 4.2.1. Control of environmental exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4)

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Physical form of product | : | Liquid |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Annual amount used in the EU | : | 1000 kg |
| Maximum allowable site tonnage (MSafe) | : | 250,1 kg |
| Release type | : | Continuous release |
| Emission days | : | 20 |
| **Conditions and measures related to sewage treatment plant** | | |
| STP type | : | Municipal Sewage Treatment Plant |
| STP effluent | : | 2.000 m3/d |
| **Conditions and measures related to treatment of waste (including article waste)** | | |
| Waste treatment | : | Distillation of used process solvent |
| **Other conditions affecting environmental exposure** | | |

| | | |
|---|---|---|
| Receiving surface water flow | : | 18.000 m3/d |
| Local freshwater dilution factor | : | 10 |
| Local marine water dilution factor | : | 100 |

#### 4.2.2. Control of worker exposure: Use as laboratory reagent (PROC15)

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Covers concentrations up to 100 % | | |
| Physical form of product | : | Liquid |
| Vapour pressure | : | 0,32 hPa |
| Temperature | : | 20 °C |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Duration | : | 480 min |
| Use frequency | : | 5 days per week |
| **Technical and organisational conditions and measures** | | |
| Local exhaust ventilation<br>Inhalation - minimum efficiency of 90 % | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear suitable gloves tested to EN374.<br>Dermal - minimum efficiency of 80 % | | |
| Use suitable eye protection. | | |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor use |

### 4.3. Exposure estimation and reference to its source

#### 4.3.1. Environmental release and exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4)

| Protection Target | Exposure estimate | RCR |
|---|---|---|
| wastewater treatment plant microbes | (ECETOC TRA environment v3) | 0,200 |

#### 4.3.2. Worker exposure: Use as laboratory reagent (PROC15)

| Exposure route | Health effect | Exposure indicator | Exposure estimate | RCR |
|---|---|---|---|---|
| dermal | systemic | long-term | 0,069 mg/kg bw/day (ECETOC TRA worker v3) | 0,014 |
| inhalative | systemic | long-term | 2,065 mg/m³ (ECETOC TRA worker v3) | 0,143 |
| inhalative | systemic | long-term | 2,065 mg/m³ (ECETOC TRA worker v3) | 0,052 |

### 4.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

For scaling see
http://www.ecetoc.org/tra

## ES 5: Use in coatings; Industrial uses (SU3).

### 5.1. Title section

| | | |
|---|---|---|
| **Exposure Scenario name** | : | Use in coatings |
| **Structured Short Title** | : | Use in coatings; Industrial uses (SU3). |

| | | |
|---|---|---|
| **Environment** | | |
| **CS 1** | **Industrial use of processing aids in processes and products, not becoming part of articles** | ERC4 |
| **Worker** | | |
| **CS 2** | **Industrial spraying** | PROC7 |
| **CS 3** | **Roller application or brushing** | PROC10 |
| **CS 4** | **Treatment of articles by dipping and pouring** | PROC13 |

### 5.2. Conditions of use affecting exposure

#### 5.2.1. Control of environmental exposure: Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Physical form of product | : | Liquid |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Annual amount used in the EU | : | 350000 kg |
| Maximum allowable site tonnage (MSafe) | : | 12.506,7 kg |
| Release type | : | Continuous release |
| Emission days | : | 300 |
| **Conditions and measures related to sewage treatment plant** | | |
| STP type | : | Municipal sewage treatment plant |
| STP effluent | : | 2.000 m3/d |
| **Conditions and measures related to treatment of waste (including article waste)** | | |
| Waste treatment | : | Distillation of used process solvent |

| **Other conditions affecting environmental exposure** | | |
|---|---|---|
| Receiving surface water flow | : | 18.000 m3/d |
| Local freshwater dilution factor | : | 10 |
| Local marine water dilution factor | : | 100 |

### 5.2.2. Control of worker exposure: Industrial spraying (PROC7)

| **Product (article) characteristics** | | |
|---|---|---|
| Covers concentrations up to 100 % | | |
| Physical form of product | : | Liquid |
| Vapour pressure | : | 32 Pa |
| Temperature | : | 20 °C |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Duration | : | 480 min |
| Use frequency | : | 5 days/week |
| **Technical and organisational conditions and measures** | | |
| Local exhaust ventilation<br>Inhalation - minimum efficiency of 95 % | | |
| Provide a good standard of controlled ventilation (5 to 10 air changes per hour).<br>Inhalation - minimum efficiency of 70 % | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.<br>Dermal - minimum efficiency of 95 % | | |
| Use suitable eye protection. | | |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor use |
| **Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply** | | |
| Ensure that the direction of airflow is clearly away from the worker.<br>Ensure that direction of application is only horizontal or downward. | | |

### 5.2.3. Control of worker exposure: Roller application or brushing (PROC10)

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Covers concentrations up to 100 % | | |
| Physical form of product | : | Liquid |
| Vapour pressure | : | 32 Pa |
| Temperature | : | 20 °C |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Duration | : | 480 min |
| Use frequency | : | 5 days/week |
| **Technical and organisational conditions and measures** | | |
| Local exhaust ventilation<br>Inhalation - minimum efficiency of 90 % | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.<br>Dermal - minimum efficiency of 95 % | | |
| Use suitable eye protection. | | |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor use |

### 5.2.4. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Covers concentrations up to 100 % | | |
| Physical form of product | : | Liquid |
| Vapour pressure | : | 32 Pa |
| Temperature | : | 20 °C |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Duration | : | 480 min |
| Use frequency | : | 5 days/week |
| **Technical and organisational conditions and measures** | | |
| Local exhaust ventilation | | |

| |
|---|
| Inhalation - minimum efficiency of 90 % |
| **Conditions and measures related to personal protection, hygiene and health evaluation** |
| Wear suitable gloves tested to EN374.<br>Dermal - minimum efficiency of 80 % |
| Use suitable eye protection. |
| **Other conditions affecting workers exposure** |
| Indoor or outdoor use : Indoor use |

## 5.3. Exposure estimation and reference to its source

### 5.3.1. Environmental release and exposure: Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)

| Protection Target | Exposure estimate | RCR |
|---|---|---|
| wastewater treatment plant microbes | (ECETOC TRA environment v3) | 0,093 |

### 5.3.2. Worker exposure: Industrial spraying (PROC7)

| Exposure route | Health effect | Exposure indicator | Exposure estimate | RCR |
|---|---|---|---|---|
| dermal | systemic | long-term | 2,142 mg/kg bw/day (ECETOC TRA worker v3) | 0,446 |
| inhalative | systemic | long-term | 1 mg/m³ (ECETOC TRA worker v3) | 0,069 |
| inhalative | local | long-term | 1 mg/m³ (ECETOC TRA worker v3) | 0,025 |

### 5.3.3. Worker exposure: Roller application or brushing (PROC10)

| Exposure route | Health effect | Exposure indicator | Exposure estimate | RCR |
|---|---|---|---|---|
| dermal | systemic | long-term | 1,371 mg/kg bw/day (ECETOC TRA worker v3) | 0,286 |
| inhalative | systemic | long-term | 4,131 mg/m³ (ECETOC TRA | 0,287 |

| | | | | |
|---|---|---|---|---|
| | | | worker v3) | |
| inhalative | local | long-term | 4,131 mg/m³ (ECETOC TRA worker v3) | 0,103 |

#### 5.3.4. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

| Exposure route | Health effect | Exposure indicator | Exposure estimate | RCR |
|---|---|---|---|---|
| dermal | systemic | long-term | 2,743 mg/kg bw/day (ECETOC TRA worker v3) | 0,571 |
| inhalative | systemic | long-term | 4,130 mg/m³ (ECETOC TRA worker v3) | 0,286 |
| inhalative | local | long-term | 4,130 mg/m³ (ECETOC TRA worker v3) | 0,103 |

### 5.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

For scaling see
http://www.ecetoc.org/tra

## ES 6: Use in cleaning agents; Industrial uses (SU3).

### 6.1. Title section

| | | |
|---|---|---|
| **Exposure Scenario name** | : | Cleaning |
| **Structured Short Title** | : | Use in cleaning agents; Industrial uses (SU3). |

| | | |
|---|---|---|
| **Environment** | | |
| **CS 1** | **Industrial use of processing aids in processes and products, not becoming part of articles** | ERC4 |
| **Worker** | | |
| **CS 2** | **Industrial spraying** | PROC7 |
| **CS 3** | **Industrial spraying** | PROC7 |
| **CS 4** | **Roller application or brushing** | PROC10 |
| **CS 5** | **Treatment of articles by dipping and pouring** | PROC13 |
| **CS 6** | **Treatment of articles by dipping and pouring** | PROC13 |

### 6.2. Conditions of use affecting exposure

#### 6.2.1. Control of environmental exposure: Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Physical form of product | : | Liquid |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Annual amount used in the EU | : | 1046000 kg |
| Maximum allowable site tonnage (MSafe) | : | 20.963.000 kg |
| Release type | : | Continuous release |
| Emission days | : | 20 |
| **Conditions and measures related to sewage treatment plant** | | |
| STP type | : | Municipal Sewage Treatment Plant |
| STP effluent | : | 2.000 m3/d |

| | | |
|---|---|---|
| **Conditions and measures related to treatment of waste (including article waste)** | | |
| Waste treatment | : | Distillation of used process solvent |
| **Other conditions affecting environmental exposure** | | |
| Receiving surface water flow | : | 18.000 m3/d |
| Local freshwater dilution factor | : | 10 |
| Local marine water dilution factor | : | 100 |

**6.2.2. Control of worker exposure: Industrial spraying (PROC7)**

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Covers concentrations up to 100 % | | |
| Physical form of product | : | Liquid |
| Vapour pressure | : | 32 Pa |
| Temperature | : | 20 °C |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Duration | : | 480 min |
| Use frequency | : | 5 days/week |
| **Technical and organisational conditions and measures** | | |
| Local exhaust ventilation<br>Inhalation - minimum efficiency of 95 % | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.<br>Dermal - minimum efficiency of 95 % | | |
| Use suitable eye protection. | | |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor |
| Professional or industrial settings | : | Industrial use |
| **Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply** | | |
| Ensure that direction of application is only horizontal or downward.<br>Ensure that the direction of airflow is clearly away from the worker. | | |

### 6.2.3. Control of worker exposure: Industrial spraying (PROC7)

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Covers concentrations up to 100 % | | |
| Physical form of product | : | Liquid |
| Vapour pressure | : | 32 Pa |
| Temperature | : | 20 °C |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Duration | : | 480 min |
| Use frequency | : | 5 days/week |
| **Technical and organisational conditions and measures** | | |
| Local exhaust ventilation<br>Inhalation - minimum efficiency of 95 % | | |
| Provide a good standard of controlled ventilation (5 to 10 air changes per hour).<br>Inhalation - minimum efficiency of 70 % | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.<br>Dermal - minimum efficiency of 95 % | | |
| Use suitable eye protection. | | |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor |
| Professional or industrial settings | : | Industrial use |
| **Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply** | | |
| Ensure that direction of application is only horizontal or downward.<br>Ensure that the direction of airflow is clearly away from the worker. | | |

### 6.2.4. Control of worker exposure: Roller application or brushing (PROC10)

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Covers concentrations up to 100 % | | |
| Physical form of product | : | Liquid |
| Vapour pressure | : | 32 Pa |

| | | |
|---|---|---|
| Temperature | : | 20 °C |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Duration | : | 480 min |
| Use frequency | : | 5 days/week |
| **Technical and organisational conditions and measures** | | |
| Local exhaust ventilation<br>Inhalation - minimum efficiency of 90 % | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br>Dermal - minimum efficiency of 90 % | | |
| Wear suitable respiratory protection. | | |
| Use suitable eye protection. | | |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor use |

### 6.2.5. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Covers concentrations up to 100 % | | |
| Physical form of product | : | Liquid |
| Vapour pressure | : | 32 Pa |
| Temperature | : | 20 °C |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Duration | : | 480 min |
| Use frequency | : | 5 days/week |
| **Technical and organisational conditions and measures** | | |
| Local exhaust ventilation<br>Inhalation - minimum efficiency of 90 % | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. | | |

| | | |
|---|---|---|
| Dermal - minimum efficiency of 90 % | | |
| Wear suitable coveralls to prevent exposure to the skin.<br>Wear suitable respiratory protection. | | |
| Use suitable eye protection. | | |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor use |

**6.2.6. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)**

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Covers concentrations up to 100 % | | |
| Physical form of product | : | Liquid |
| Vapour pressure | : | 20000 Pa |
| Temperature | : | 140 °C |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Duration | : | 240 min |
| Use frequency | : | 5 days/week |
| **Technical and organisational conditions and measures** | | |
| Local exhaust ventilation<br>Inhalation - minimum efficiency of 90 % | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear suitable respiratory protection.<br>Inhalation - minimum efficiency of 90 % | | |
| Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.<br>Inhalation - minimum efficiency of 90 % | | |
| Use suitable eye protection. | | |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor use |

## 6.3. Exposure estimation and reference to its source

### 6.3.1. Environmental release and exposure: Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)

| Protection Target | Exposure estimate | RCR |
|---|---|---|
| wastewater treatment plant microbes | (ECETOC TRA environment v3) | 0,002 |

### 6.3.2. Worker exposure: Industrial spraying (PROC7)

| Exposure route | Health effect | Exposure indicator | Exposure estimate | RCR |
|---|---|---|---|---|
| dermal | systemic | long-term | 2,143 mg/kg bw/day (ECETOC TRA worker v3) | 0,446 |
| inhalative | systemic | long-term | 7,1 mg/m³ | 0,493 |
| inhalative | local | long-term | 7,1 mg/m³ | 0,178 |

### 6.3.3. Worker exposure: Industrial spraying (PROC7)

| Exposure route | Health effect | Exposure indicator | Exposure estimate | RCR |
|---|---|---|---|---|
| dermal | systemic | long-term | 2,143 mg/kg bw/day (ECETOC TRA worker v3) | 0,446 |
| inhalative | systemic | long-term | 1 mg/m³ | 0,069 |
| inhalative | local | long-term | 1 mg/m³ | 0,025 |

### 6.3.4. Worker exposure: Roller application or brushing (PROC10)

| Exposure route | Health effect | Exposure indicator | Exposure estimate | RCR |
|---|---|---|---|---|
| dermal | systemic | long-term | 2,743 mg/kg bw/day (ECETOC TRA worker v3) | 0,571 |
| inhalative | systemic | long-term | 4,131 mg/m³ (ECETOC TRA worker v3) | 0,287 |
| inhalative | local | long-term | 4,131 mg/m³ (ECETOC TRA | 0,103 |

| | | | | |
|---|---|---|---|---|
| | | | worker v3) | |

### 6.3.5. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

| Exposure route | Health effect | Exposure indicator | Exposure estimate | RCR |
|---|---|---|---|---|
| dermal | systemic | long-term | 1,371 mg/kg bw/day (ECETOC TRA worker v3) | 0,286 |
| inhalative | systemic | long-term | 4,131 mg/m³ (ECETOC TRA worker v3) | 0,287 |
| inhalative | local | long-term | 4,131 mg/m³ (ECETOC TRA worker v3) | 0,103 |

### 6.3.6. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

| Exposure route | Health effect | Exposure indicator | Exposure estimate | RCR |
|---|---|---|---|---|
| dermal | systemic | long-term | 0,823 mg/kg bw/day (ECETOC TRA worker v3) | 0,171 |
| inhalative | systemic | long-term | 6,196 mg/m³ (ECETOC TRA worker v3) | 0,430 |
| inhalative | local | long-term | 10,326 mg/m³ (ECETOC TRA worker v3) | 0,258 |

## 6.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

For scaling see
http://www.ecetoc.org/tra

## ES 7: Use in laboratories; Professional uses (SU22).

### 7.1. Title section

| | | |
|---|---|---|
| **Exposure Scenario name** | : | Laboratory activities |
| **Structured Short Title** | : | Use in laboratories; Professional uses (SU22). |

| | | |
|---|---|---|
| **Environment** | | |
| **CS 1** | **Wide dispersive indoor use of reactive substances in open systems** | ERC8b |
| **Worker** | | |
| **CS 2** | **Use as laboratory reagent** | PROC15 |

### 7.2. Conditions of use affecting exposure

#### 7.2.1. Control of environmental exposure: Wide dispersive indoor use of reactive substances in open systems (ERC8b)

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Physical form of product | : | Liquid |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Annual amount used in the EU | : | 1000 kg |
| Maximum allowable site tonnage (MSafe) | : | 2,3 kg |
| Release type | : | Continuous release |
| Emission days | : | 365 |
| **Conditions and measures related to sewage treatment plant** | | |
| STP type | : | Municipal Sewage Treatment Plant |
| STP effluent | : | 2.000 m3/d |
| **Other conditions affecting environmental exposure** | | |
| Receiving surface water flow | : | 18.000 m3/d |
| Local freshwater dilution factor | : | 10 |
| Local marine water dilution factor | : | 100 |

#### 7.2.2. Control of worker exposure: Use as laboratory reagent (PROC15)

| | | |
|---|---|---|
| **Product (article) characteristics** | | |
| Covers concentrations up to 100 % | | |
| Physical form of product | : | Liquid |
| Vapour pressure | : | 32 Pa |
| Temperature | : | 20 °C |
| **Amount used (or contained in articles), frequency and duration of use/exposure** | | |
| Duration | : | 480 min |
| Use frequency | : | 5 days/week |
| **Technical and organisational conditions and measures** | | |
| Provide a good standard of controlled ventilation (5 to 10 air changes per hour).<br>Inhalation - minimum efficiency of 70 % | | |
| **Conditions and measures related to personal protection, hygiene and health evaluation** | | |
| Wear suitable gloves tested to EN374.<br>Dermal - minimum efficiency of 80 % | | |
| Use suitable eye protection. | | |
| **Other conditions affecting workers exposure** | | |
| Indoor or outdoor use | : | Indoor use |

## 7.3. Exposure estimation and reference to its source

#### 7.3.1. Environmental release and exposure: Wide dispersive indoor use of reactive substances in open systems (ERC8b)

| Protection Target | Exposure estimate | RCR |
|---|---|---|
| wastewater treatment plant microbes | (ECETOC TRA environment v3) | 0,002 |

#### 7.3.2. Worker exposure: Use as laboratory reagent (PROC15)

| Exposure route | Health effect | Exposure indicator | Exposure estimate | RCR |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| dermal | systemic | long-term | 0,069 mg/kg bw/day (ECETOC TRA worker v3) | 0,014 |
| inhalative | systemic | long-term | 6,196 mg/m³ (ECETOC TRA worker v3) | 0,430 |
| inhalative | local | long-term | 6,196 mg/m³ (ECETOC TRA worker v3) | 0,154 |

### 7.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

For scaling see
http://www.ecetoc.org/tra