



# Safety Data Sheet

DOW CHEMICAL COMPANY LIMITED  
Safety Data Sheet according to Reg. (EC) N. 453/2010

**Product Name:** BUTYL CELLOSOLVE™ SOLVENT

**Revision Date:** 27.12.2013

**Print Date:** 17 Mar 2015

DOW CHEMICAL COMPANY LIMITED encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

## Section 1. Identification of the substance/preparation and of the company/undertaking

### 1.1 Product identifiers

**Product Name**

BUTYL CELLOSOLVE™ SOLVENT

**Chemical Name:** 2-Butoxyethanol; ethylene glycol monobutyl ether; butyl cellosolve

**CAS-No.** 111-76-2

**EC-No.** 203-905-0

**REACH Registration Number**

01-2119475108-36-0003

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

**Identified uses**

Industrial uses: Manufacture Formulation and (re)packing of substances and mixtures. Distribution of substance, industrial. Uses in Coatings, industrial. Uses in Coatings, professional. Professional use in cleaning agents. Uses in Coatings, consumer. Consumer use in cleaning products. For details on use descriptors and exposure scenarios, please refer to the extended part of the Safety Data Sheet.

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

**COMPANY IDENTIFICATION**

DOW CHEMICAL COMPANY LIMITED  
DIAMOND HOUSE, LOTUS PARK,  
KINGSBURY CRESCENT,  
STAINES  
England  
TW18 3AG  
UNITED KINGDOM

**Customer Information Number:**

0203 139 4000

[SDSQuestion@dow.com](mailto:SDSQuestion@dow.com)

### 1.4 EMERGENCY TELEPHONE NUMBER

**24-Hour Emergency Contact:**

0031 115 694 982

**Local Emergency Contact:**

00 31 115 69 4982

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## Section 2. Hazards Identification

### 2.1 Classification of the substance or mixture

#### Classification - REGULATION (EC) No 1272/2008

|                                   |            |      |                                |
|-----------------------------------|------------|------|--------------------------------|
| Acute toxicity (Dermal)           | Category 4 | H312 | Harmful in contact with skin.  |
| Acute toxicity (Oral)             | Category 4 | H302 | Harmful if swallowed.          |
| Acute toxicity (Inhalation)       | Category 4 | H332 | Harmful if inhaled.            |
| Skin corrosion/irritation         | Category 2 | H315 | Causes skin irritation.        |
| Serious eye damage/eye irritation | Category 2 | H319 | Causes serious eye irritation. |

#### Classification according to EU Directives 67/548/EEC or 1999/45/EC

|    |           |   |
|----|-----------|---|
| Xn | R20/21/22 | Harmful by inhalation, in contact with skin and if swallowed. |
| Xi | R36/38    | Irritating to eyes and skin.                                  |

### 2.2 Label elements

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

##### Hazard pictograms



#### Signal Word: Warning

##### Hazard statements:

**H302 + H312 + H332 Harmful if swallowed, in contact with skin or if inhaled.**

**H319 Causes serious eye irritation.**

**H315 Causes skin irritation.**

##### Precautionary Statements:

**P210** Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

**P270** Do not eat, drink or smoke when using this product.

**P280** Wear protective gloves/ protective clothing/ eye protection/ face protection.

**P370/P378** In case of fire: Use water fog or fine spray, foam, carbon dioxide fire extinguishers, or dry chemical fire extinguishers for extinction.

**P305 + P351 + P338** IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

**P302 + P352** IF ON SKIN: Wash with plenty of soap and water.

**P501** Dispose of contents and container to licensed, permitted incinerator, or other thermal destruction device.

### 2.3 Other Hazards

No information available.

## Section 3. Composition/information on ingredients

### 3.1 Substance

This product is a substance.

| CAS-No. / EC-No. / REACH No. Index                                  | Amount                   | Component   | Classification: REGULATION (EC) No 1272/2008   |
|---|--------------------------|---|--|
| CAS-No.<br>111-76-2<br>EC-No.<br>203-905-0<br>Index<br>603-014-00-0 | 01-<br>2119475108-<br>36 | > 99.0 %<br>2-Butoxyethanol;<br>ethylene glycol<br>monobutyl ether;<br>butyl cellosolve | Acute Tox., 4, H332<br>Acute Tox., 4, H312<br>Acute Tox., 4, H302<br>Eye cor/irr, 2, H319<br>Skin cor/irr, 2, H315 |

| CAS-No. / EC-No. / Index  | Amount   | Component   | Classification: 67/548/EEC |
|---|----------|---|----------------------------|
| CAS-No.<br>111-76-2<br>EC-No.<br>203-905-0<br>Index<br>603-014-00-0 | > 99.0 % | 2-Butoxyethanol;<br>ethylene glycol<br>monobutyl ether; butyl<br>cellosolve | Xn: R20/21/22; Xi: R36/38  |

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

## Section 4. First-aid measures

### 4.1 Description of first aid measures

**General advice:** First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

**Inhalation:** Move person to fresh air; if effects occur, consult a physician.

**Skin Contact:** Wash skin with plenty of water. Suitable emergency safety shower facility should be available in work area.

**Eye Contact:** Immediately flush eyes with water; remove contact lenses, if present, after the first 5 minutes, then continue flushing eyes for at least 15 minutes. Obtain medical attention without delay, preferably from an ophthalmologist. Suitable emergency eye wash facility should be immediately available.

**Ingestion:** Do not induce vomiting. Call a physician and/or transport to emergency facility immediately.

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

Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

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

Due to structural analogy and clinical data, this material may have a mechanism of intoxication similar to ethylene glycol. On that basis, treatment similar to ethylene glycol intoxication may be of benefit. In cases where several ounces (60 - 100 ml) have been ingested, consider the use of ethanol and hemodialysis in the treatment. Consult standard literature for details of treatment. If ethanol is used, a therapeutically effective blood concentration in the range of 100 - 150 mg/dl may be achieved by a rapid loading dose followed by a continuous intravenous infusion. Consult standard literature for details of treatment. 4-Methyl pyrazole (Antizol®) is an effective blocker of alcohol dehydrogenase and should be used in the treatment of ethylene glycol (EG), di- or triethylene glycol (DEG, TEG), ethylene glycol butyl ether (EGBE), or methanol intoxication if available. Fomepizole protocol (Brent, J. et al., New England Journal of Medicine, Feb. 8, 2001, 344:6, p. 424-9): loading dose 15 mg/kg intravenously, follow by bolus dose of 10 mg/kg every 12 hours; after 48 hours, increase bolus dose to 15 mg/kg every 12 hours. Continue fomepizole until serum methanol, EG, DEG, TEG or EGBE are undetectable. The signs and symptoms of poisoning include anion gap metabolic acidosis, CNS depression, renal tubular injury, and possible late stage cranial nerve involvement. Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed 24-48 hours for signs of respiratory distress. Maintain adequate ventilation and

oxygenation of the patient. In severe poisoning, respiratory support with mechanical ventilation and positive end expiratory pressure may be required. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

Repeated excessive exposure may aggravate preexisting blood disease (anemia).

## Section 5. Fire Fighting Measures

### 5.1 Extinguishing Media

Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

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

**Hazardous Combustion Products:** During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Carbon monoxide. Carbon dioxide.

**Unusual Fire and Explosion Hazards:** Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids.

### 5.3 Advice for firefighters

**Fire Fighting Procedures:** Keep people away. Isolate fire and deny unnecessary entry. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire. Move container from fire area if this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage.

**Special Protective Equipment for Firefighters:** Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

## Section 6. Accidental Release Measures

**6.1 Personal precautions, protective equipment and emergency procedures:** Isolate area. Keep unnecessary and unprotected personnel from entering the area. No smoking in area. Refer to Section 7, Handling, for additional precautionary measures. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

**6.2 Environmental precautions:** Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

**6.3 Methods and materials for containment and cleaning up:** Contain spilled material if possible. Small spills: Absorb with materials such as: Non-combustible material. Clay. Zorb-all®. Large spills: Dike area to contain spill. Collect in suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

## Section 7. Handling and Storage

**7.1 Precautions for safe handling****Handling**

**General Handling:** Do not swallow. Avoid contact with eyes, skin, and clothing. Use with adequate ventilation. Wash thoroughly after handling. Keep away from heat, sparks and flame. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

**Other Precautions:** Containers, even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld, or perform similar operations on or near empty containers. Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.

**7.2 Conditions for safe storage, including any incompatibilities****Storage**

Store in the following material(s): Carbon steel. Stainless steel. Phenolic lined steel drums. Do not store in: Aluminum. Copper. Galvanized iron. Galvanized steel. See Section 10 for more specific information.

**Storage Period:****Steel drums.**

24 Months

**Bulk**

6 Months

**7.3 Specific end uses**

See the technical data sheet on this product for further information.

|   |
|---|
| <b>Section 8. Exposure Controls / Personal Protection</b> |
|---|

**8.1 Control parameters****Exposure Limits**

| Component  | List     | Type | Value                             |
|--|----------|------|-----------------------------------|
| 2-Butoxyethanol; ethylene glycol monobutyl ether; butyl cellosolve | ACGIH    | TWA  | 20 ppm BEI                        |
|  | EU IOELV | TWA  | 98 mg/m <sup>3</sup> 20 ppm SKIN  |
|  | EU IOELV | STEL | 246 mg/m <sup>3</sup> 50 ppm SKIN |
|  | UK WEL   | TWA  | 123 mg/m <sup>3</sup> 25 ppm      |
|  | UK WEL   | STEL | 246 mg/m <sup>3</sup> 50 ppm      |

A BEI notation following the exposure guideline refers to a guidance value for assessing biological monitoring results as an indicator of the uptake of a substance from all routes of exposures.

A "skin" notation following the inhalation exposure guideline refers to the potential for dermal absorption of the material including mucous membranes and the eyes either by contact with vapors or by direct skin contact.

It is intended to alert the reader that inhalation may not be the only route of exposure and that measures to minimize dermal exposures should be considered.

**Derived No Effect Level (DNEL)****Workers**

| Potential Health Effects     | Possible route(s) of exposure: | Value           |
|------------------------------|--------------------------------|-----------------|
| Acute - systemic effects     | Skin contact                   | 89 mg/kg bw/day |
| Acute - systemic effects     | Inhalation                     | 135 ppm         |
| Acute - local effects        | Skin contact                   | Not available   |
| Acute - local effects        | Inhalation                     | 50 ppm          |
| Long-term - systemic effects | Skin contact                   | 75 mg/kg bw/day |
| Long-term - systemic effects | Inhalation                     | 20 ppm          |
| Long-term - local effects    | Skin contact                   | Not available   |
| Long-term - local effects    | Inhalation                     | Not available   |

**Consumers**

| Potential Health Effects     | Possible route(s) of exposure: | Value                 |
|------------------------------|--------------------------------|-----------------------|
| Acute - systemic effects     | Skin contact                   | 44.5 mg/kg bw/day     |
| Acute - systemic effects     | Inhalation                     | 426 mg/m <sup>3</sup> |
| Acute - systemic effects     | Ingestion                      | 13.4 mg/kg bw/day     |
| Acute - local effects        | Skin contact                   | Not available         |
| Acute - local effects        | Inhalation                     | 123 mg/m <sup>3</sup> |
| Long-term - systemic effects | Skin contact                   | 38 mg/kg bw/day       |
| Long-term - systemic effects | Inhalation                     | 49 mg/m <sup>3</sup>  |
| Long-term - systemic effects | Ingestion                      | 3.2 mg/kg bw/day      |
| Long-term - local effects    | Skin contact                   | Not available         |
| Long-term - local effects    | Inhalation                     | Not available         |

**Predicted No Effect Concentration (PNEC)**

| Compartment          | Value           | Remarks |
|----------------------|-----------------|---------|
| Fresh water          | 8.8 mg/l        |         |
| Marine water         | 0.88 mg/l       |         |
| STP                  | 463 mg/l        |         |
| Fresh water sediment | 34.6 mg/kg d.w. |         |
| Marine sediment      | 3.46 mg/kg d.w. |         |
| Soil                 | 2.8 mg/kg d.w.  |         |

**8.2 Exposure controls****Personal Protection**

**Eye/Face Protection:** Use chemical goggles. Chemical goggles should be consistent with EN 166 or equivalent. If exposure causes eye discomfort, use a full-face respirator.

**Skin Protection:** Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task.

**Hand protection:** Use chemical resistant gloves classified under Standard EN374: Protective gloves against chemicals and micro-organisms. Examples of preferred glove barrier materials include: Butyl rubber. Ethyl vinyl alcohol laminate ("EVAL"). Examples of acceptable glove barrier materials include: Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyvinyl chloride ("PVC" or "vinyl"). When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended. When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended. NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

**Respiratory Protection:** Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. For most conditions no respiratory protection should be needed; however, if discomfort is experienced, use an approved air-purifying respirator. Use the following CE approved air-purifying respirator: Organic vapor cartridge, type A (boiling point >65 °C)

**Ingestion:** Use good personal hygiene. Do not consume or store food in the work area. Wash hands before smoking or eating.

**Engineering Controls**

**Ventilation:** Use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be sufficient for most operations. Local exhaust ventilation may be necessary for some operations.

## Section 9. Physical and Chemical Properties

### 9.1 Information on basic physical and chemical properties

#### Appearance

|  |   |
|--|---|
| Physical State                                   | Liquid.   |
| Color  | Colorless   |
| Odor   | Mild  |
| Odor Threshold                                   | No test data available  |
| pH   | No test data available  |
| Melting Point                                    | Not applicable to liquids   |
| Freezing Point                                   | -75 °C <i>Literature</i>  |
| Boiling Point (760 mmHg)                         | 171 °C <i>Literature</i> .  |
| Flash Point - Closed Cup                         | 67 °C <i>Literature</i>   |
| Evaporation Rate (Butyl Acetate = 1)             | 0.06 <i>Literature</i>  |
| Flammability (solid, gas)                        | Not applicable to liquids   |
| Flammable Limits In Air                          | <b>Lower:</b> 1.3 %(V) <i>Literature</i><br><b>Upper:</b> 10.6 %(V) <i>Literature</i> |
| Vapor Pressure                                   | 0.117 kPa @ 20 °C <i>ASTM E1719</i>   |
| Vapor Density (air = 1)                          | No test data available  |
| Specific Gravity (H <sub>2</sub> O = 1)          | 0.9005 - 0.9040 20 °C/20 °C <i>Hydrometer</i>   |
| Solubility in water (by weight)                  | 100 % @ 20 °C <i>Literature</i>   |
| Partition coefficient, n-octanol/water (log Pow) | 0.81 <i>Measured</i>  |
| Autoignition Temperature                         | 230 °C <i>Literature</i>  |
| Decomposition Temperature                        | No test data available  |
| Dynamic Viscosity                                | 3.3 mPa.s @ 20 °C <i>Literature</i>   |
| Kinematic Viscosity                              | 3.7 mm <sup>2</sup> /s @ 20 °C <i>Literature</i>                                      |
| Explosive properties                             | no data available   |
| Oxidizing properties                             | no data available   |

### 9.2 Other information

|                          |   |
|--------------------------|---|
| Liquid Density           | 7.53 lb/gal @ 20 °C <i>Literature</i>             |
| Molecular Weight         | 118.2 g/mol <i>Literature</i>                     |
| Percent Volatiles        | no data available                                 |
| Surface tension          | 65 mN/m <i>Literature</i>                         |
| Henry's Law Constant (H) | 1.60E-06 atm*m <sup>3</sup> /mole <i>Measured</i> |

## Section 10. Stability and Reactivity

### 10.1 Reactivity

No dangerous reaction known under conditions of normal use.

### 10.2 Chemical stability

Thermally stable at typical use temperatures.

### 10.3 Possibility of hazardous reactions

Polymerization will not occur.

**10.4 Conditions to Avoid:** Do not distill to dryness. Product can oxidize at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems.

**10.5 Incompatible Materials:** Avoid contact with: Strong acids. Strong oxidizers.

### 10.6 Hazardous decomposition products

Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: Aldehydes. Ketones. Organic acids.

## Section 11. Toxicological Information

### 11.1 Information on toxicological effects

#### Acute Toxicity

##### Ingestion

Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. In animals, effects have been reported on the following organs: blood (hemolysis) and secondary effects on the kidney and liver. Human red blood cells have been shown to be significantly less sensitive to hemolysis than those of rodents and rabbits. Massive ingestion of ethylene glycol monobutyl ether (attempted suicides) may produce metabolic acidosis and subsequent secondary effects such as hemolysis, central nervous system and kidney effects.

LD50, rat 1,300 mg/kg

LD50, guinea pig 1,400 mg/kg

##### Aspiration hazard

Based on physical properties, not likely to be an aspiration hazard.

##### Dermal

Prolonged skin contact to animals which are less sensitive to hemolysis, as are humans, did not result in the absorption of harmful amounts.

LD50, guinea pig > 2,000 mg/kg

Humans and guinea pigs are resistant to blood effects that are seen for rodents and rabbits. For this reason, the guinea pig data is used as the basis for the acute toxicity classification as it is a better model to assess acute toxicity to humans.

##### Inhalation

Excessive exposure may cause irritation to upper respiratory tract (nose and throat). In humans, symptoms may include: Headache. In animals, effects have been reported on the following organs: blood (hemolysis) and secondary effects on the kidney and liver. Human red blood cells have been shown to be significantly less sensitive to hemolysis than those of rodents and rabbits.

LC0, 1 h, Vapor, guinea pig > 3.1 mg/l

No deaths occurred at this concentration.

##### Eye damage/eye irritation

May cause severe eye irritation. May cause moderate corneal injury. Effects may be slow to heal. Vapor may cause eye irritation experienced as mild discomfort and redness.

##### Skin corrosion/irritation

Brief contact may cause slight skin irritation with local redness. Repeated exposure may cause irritation, even a burn. May cause more severe response on covered skin (under clothing, gloves).

##### Sensitization

###### Skin

Did not cause allergic skin reactions when tested in humans. Did not cause allergic skin reactions when tested in guinea pigs.

###### Respiratory

No relevant data found.

##### Repeated Dose Toxicity

In animals, effects have been reported on the following organs: blood (hemolysis) and secondary effects on the kidney and liver. Human red blood cells have been shown to be significantly less sensitive to hemolysis than those of rodents and rabbits.

##### Chronic Toxicity and Carcinogenicity

In long-term animal studies with ethylene glycol butyl ether, small but statistically significant increases in tumors were observed in mice but not rats. The effects are not believed to be relevant to humans. If the material is handled in accordance with proper industrial handling procedures, exposures should not pose a carcinogenic risk to man.

##### Developmental Toxicity

Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Did not cause birth defects in laboratory animals.

##### Reproductive Toxicity



In laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals.

### Genetic Toxicology

In vitro genetic toxicity studies were predominantly negative. Animal genetic toxicity studies were negative.

## Section 12. Ecological Information

### 12.1 Toxicity

Material is not classified as dangerous to aquatic organisms (LC50/EC50/IC50/LL50/EL50 greater than 100 mg/L in most sensitive species).

#### Fish Acute & Prolonged Toxicity

LC50, *Oncorhynchus mykiss* (rainbow trout), static test, 96 h: 1,474 mg/l

#### Aquatic Invertebrate Acute Toxicity

EC50, *Daphnia magna* (Water flea), static test, 48 h, immobilization: 1,550 mg/l

#### Aquatic Plant Toxicity

EbC50, *Pseudokirchneriella subcapitata* (green algae), static test, biomass growth inhibition, 72 h: 911 mg/l

#### Toxicity to Micro-organisms

IC50; Bacteria: > 1,000 mg/l

#### Fish Chronic Toxicity Value (ChV)

*Danio rerio* (zebra fish), semi-static test, 21 d, NOEC:> 100 mg/l

#### Aquatic Invertebrates Chronic Toxicity Value

*Daphnia magna* (Water flea), semi-static test, 21 d, Other, NOEC: 100 mg/l

### 12.2 Persistence and Degradability

Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Material is ultimately biodegradable (reaches > 70% biodegradation in OECD test(s) for inherent biodegradability).

#### OECD Biodegradation Tests:

| Biodegradation | Exposure Time | Method         | 10 Day Window |
|----------------|---------------|----------------|---------------|
| 90.4 %         | 28 d          | OECD 301B Test | pass          |

### 12.3 Bioaccumulative potential

**Bioaccumulation:** Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

**Partition coefficient, n-octanol/water (log Pow):** 0.81 Measured

### 12.4 Mobility in soil

**Mobility in soil:** Potential for mobility in soil is high (Koc between 50 and 150).

**Partition coefficient, soil organic carbon/water (Koc):** 67 Estimated.

**Henry's Law Constant (H):** 1.60E-06 atm\*m<sup>3</sup>/mole Measured

### 12.5 Results of PBT and vPvB assessment

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

### 12.6 Other adverse effects

This substance is not in Annex I of Regulation (EC) No 1005/2009 on substances that deplete the ozone layer.

## Section 13. Disposal Considerations

### 13.1 Waste treatment methods

This product, when being disposed of in its unused and uncontaminated state should be treated as a hazardous waste according to EC Directive 2008/98/EC. Any disposal practices must be in

compliance with all national and provincial laws and any municipal or local by-laws governing hazardous waste. For used, contaminated and residual materials additional evaluations may be required. Do not dump into any sewers, on the ground, or into any body of water.

## Section 14. Transport Information

### ADR/RID

#### 14.1 UN number

Not applicable

#### 14.2 UN proper shipping name

Proper Shipping Name: NOT REGULATED

#### 14.3 Transport hazard class(es)

Not applicable

#### 14.4 Packing Group

Not applicable

#### 14.5 Environmental hazards

Not considered environmentally hazardous based on available data

#### 14.6 Special precautions for user

Special Provisions: no data available

Hazard identification No: no data available

### ADNR / ADN

#### 14.1 UN number

Not applicable

#### 14.2 UN proper shipping name

Proper Shipping Name: NOT REGULATED

#### 14.3 Transport hazard class(es)

Not applicable

#### 14.4 Packing Group

Not applicable

#### 14.5 Environmental hazards

Not considered environmentally hazardous based on available data

#### 14.6 Special precautions for user

no data available

### IMDG

#### 14.1 UN number

Not applicable

#### 14.2 UN proper shipping name

Proper Shipping Name: NOT REGULATED

#### 14.3 Transport hazard class(es)

Not applicable

#### 14.4 Packing Group

Not applicable

#### 14.5 Environmental hazards

Not considered environmentally hazardous based on available data

#### 14.6 Special precautions for user

EMS Number: Not applicable

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

Product Name: ETHYLENE GLYCOL MONOALKYL ETHERS

Ship Type: 3

Pollution Category: Y

### ICAO/IATA

#### 14.1 UN number

Not applicable

**14.2 UN proper shipping name**

Proper Shipping Name: NOT REGULATED

**14.3 Transport hazard class(es)**

Not applicable

**14.4 Packing Group**

Not applicable

**14.5 Environmental hazards**

Not considered environmentally hazardous based on available data

**14.6 Special precautions for user**

no data available

**Section 15. Regulatory Information****15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture****European Inventory of Existing Commercial Chemical Substances (EINECS)**

This product is on the EINECS inventory.

**15.2 Chemical Safety Assessment**

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

**Section 16. Other Information****Hazard statement in the composition section**

|      |                                |
|------|--------------------------------|
| H302 | Harmful if swallowed.          |
| H312 | Harmful in contact with skin.  |
| H315 | Causes skin irritation.        |
| H319 | Causes serious eye irritation. |
| H332 | Harmful if inhaled.            |

**Risk-phrases in the Composition section**

|           |   |
|-----------|---|
| R20/21/22 | Harmful by inhalation, in contact with skin and if swallowed. |
| R36/38    | Irritating to eyes and skin.                                  |

**Product Literature**

Additional information on this product may be obtained by calling your sales or customer service contact.

**Revision**

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Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

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| <b>Section 1</b>                                       | <b>Exposure Scenario: Worker</b>  |
| <b>Title</b>   | <b><i>Manufacture of substance, industrial</i></b>  |
| Sector of Use  | SU3   |
| Process Category                                       | <i>PROC1; PROC2; PROC3; PROC4; PROC8a; PROC8b; PROC15</i>   |
| Product Category                                       | <i>n/a</i>  |
| Article Category                                       | <i>n/a</i>  |
| Environmental Release Category                         | <i>ERC1</i>   |
| Specific Environmental Release Category                | <i>n/a</i>  |
| Processes, tasks, activities covered                   | <i>Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities</i> |
| <b>Section 2</b>                                       | <b>Operational conditions and risk management measures</b>  |
| <b>Product characteristics</b>                         |   |
| Physical form of product                               | <i>Liquid</i>   |
| Volatility   | <i>Liquid, vapour pressure &lt; 0.5 kPa at STP</i>  |
| Dustiness  | <i>n/a</i>  |
| Concentration in a preparation/product (wt.%)          | <i>≤ 100</i>  |
| Other product characteristics                          | <i>Readily biodegradable.</i>   |
| <b>Section 2.1</b>                                     | <b>Control of worker exposure</b>   |
| <b>Operational conditions</b>                          |   |
| Amounts used   | <i>n/a</i>  |
| Frequency and duration of use                          | <i>Covers daily exposures up to 8 hours (unless stated differently)</i>   |
| Human factors not influenced by risk management        | <i>n/a</i>  |
| Other Operational Conditions affecting worker exposure | <i>Assumes use at not more than 20°C above ambient temperature, unless stated differently<br/>Assumes a good basic standard of occupational hygiene is implemented</i>  |

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| <b>Risk Management Measures</b>  |   |
| <b>Contributing Scenarios</b>  |   |
| General exposures<br>Continuous process  | Handle substance within a closed system<br>Drain down and flush system prior to equipment break-in or maintenance ; Clear spills immediately.   |
| General exposures<br>Continuous process<br>with sample collection                    | Handle substance within a closed system; Wear suitable gloves tested to EN374.<br>Use suitable eye protection   |
| General exposures<br>Use in contained batch processes<br>with sample collection      | Handle substance within a closed system; Wear suitable gloves tested to EN374.<br>Use suitable eye protection   |
| Process sampling   | Handle substance within a closed system; Wear suitable gloves tested to EN374.<br>Use suitable eye protection   |
| Bulk transfers<br>internal   | Handle substance within a closed system<br>Clear transfer lines prior to de-coupling; Provide extract ventilation to points where emissions occur; Wear suitable gloves tested to EN374.<br>Use suitable eye protection                     |
| Equipment cleaning and<br>maintenance  | Drain down and flush system prior to equipment break-in or maintenance ; Provide a good standard of general ventilation (10 to 15 air changes per hour) ; Wear suitable gloves tested to EN374.<br>Use suitable eye protection              |
| Bulk transfers<br>transport  | Handle substance within a closed system<br>Clear transfer lines prior to de-coupling; Wear suitable gloves tested to EN374.<br>Use suitable eye protection  |
| Bulk product storage   | Transfer via enclosed lines<br>Avoid dip sampling. ; Store substance within a closed system<br>Ensure material transfers are under containment or extract ventilation; Wear suitable gloves tested to EN374.<br>Use suitable eye protection |
| Laboratory activities  | Wear suitable gloves tested to EN374.<br>Use suitable eye protection  |
| <b>Section 2.2</b>   | <b>Control of environmental exposure</b>  |
| <b>Operational conditions</b>  |   |
| Amounts used (kg/d)  | 150000  |
| Frequency of use   | Continuous release.   |
| Duration of use (Emission<br>Days/year)  | 300   |
| Environmental factors not<br>influenced by risk management                           | Local freshwater dilution factor: 10.<br>Local marine water dilution factor: 100.   |
| Other Operational Conditions of<br>use affecting environmental<br>exposure           | n/a   |
| <b>Risk Management Measures</b>  |   |
| Technical conditions and measures<br>at process level (source) to prevent<br>release | n/a   |

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| Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil | <i>Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of <math>\geq</math> (%): 87.4</i>   |
| Organisation measures to prevent/limit release from site   | <i>Prevent discharge of undissolved substance to waste water or recover from wastewater.</i>  |
| Conditions and measures related to municipal sewage treatment plant  | <i>Biological treatment - central biological waste water treatment.<br/>Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4<br/>Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 87.4<br/>Assumed domestic sewage treatment plant flow (m<sup>3</sup>/d): 2000</i>   |
| Conditions and measures related to external treatment of waste for disposal                                | <i>n/a</i>  |
| Conditions and measures related to external recovery of waste  | <i>n/a</i>  |
| Other environmental measures   | <i>Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases<br/>A leak prevention plan is needed to prevent low level continual releases<br/>Bund storage facilities to prevent soil and water pollution in the event of spillage<br/>All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments<br/>Dispose of waste or used sacks/containers according to local regulations.<br/>Dispose of waste product or used containers according to local regulations</i> |

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| <b>Section 3</b>       | <b>Exposure Estimation</b>   |
| <b>3.1 Health</b>      | <i>The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.</i>   |
| <b>3.2 Environment</b> | <i>For the environmental assessment measured data have been used.</i>  |
| <b>Section 4</b>       | <b>Guidance to check compliance with the Exposure Scenario</b>   |
| <b>4.1 Health</b>      | <i>Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.<br/>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.</i>  |
| <b>4.2 Environment</b> | <i>Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.<br/>Further details on scaling and control technologies are provided in SpERC factsheet (<a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a>).</i> |



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| <b>Section 1</b>                                     | <i>Exposure Scenario: Worker</i>  |
| <b>Title</b>   | <i>Formulation &amp; (re)packing of substances and mixtures, industrial</i>   |
| <b>Sector of Use</b>                                 | <i>SU3</i>  |
| <b>Process Category</b>                              | <i>PROC1; PROC2; PROC3; PROC4; PROC5; PROC8a; PROC8b; PROC9; PROC14; PROC15</i>   |
| <b>Product Category</b>                              | <i>n/a</i>  |
| <b>Article Category</b>                              | <i>n/a</i>  |
| <b>Environmental Release Category</b>                | <i>ERC2</i>   |
| <b>Specific Environmental Release Category</b>       | <i>ESVOC SpERC 2.2.v1</i>   |
| <b>Processes, tasks, activities covered</b>          | <i>Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tableting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities</i> |
| <b>Section 2</b>                                     | <i>Operational conditions and risk management measures</i>  |
| <b>Product characteristics</b>                       |   |
| <b>Physical form of product</b>                      | <i>Liquid</i>   |
| <b>Volatility</b>                                    | <i>Liquid, vapour pressure &lt; 0.5 kPa at STP</i>  |
| <b>Dustiness</b>                                     | <i>n/a</i>  |
| <b>Concentration in a preparation/product (wt.%)</b> | <i>≤ 100</i>  |
| <b>Other product characteristics</b>                 | <i>Readily biodegradable.</i>   |

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| <b>Section 2.1</b>   | <i>Control of worker exposure</i>  |
| <b>Operational conditions</b>  |  |
| <b>Amounts used</b>  | <i>n/a</i>   |
| <b>Frequency and duration of use</b>   | <i>Covers daily exposures up to 8 hours (unless stated differently)</i>  |
| <b>Human factors not influenced by risk management</b>                                   | <i>n/a</i>   |
| <b>Other Operational Conditions affecting worker exposure</b>                            | <i>Assumes use at not more than 20°C above ambient temperature, unless stated differently<br/>Assumes a good basic standard of occupational hygiene is implemented</i>   |
| <b>Risk Management Measures</b>  |  |
| <b>Contributing Scenarios</b>  |  |
| <b>General exposures<br/>Continuous process<br/>no sampling</b>                          | <i>Handle substance within a closed system</i>   |
| <b>General exposures<br/>Continuous process<br/>with sample collection</b>               | <i>Handle substance within a closed system; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>  |
| <b>General exposures<br/>Use in contained batch processes<br/>with sample collection</b> | <i>Handle substance within a closed system; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>  |
| <b>General exposures<br/>General exposures (open systems)</b>                            | <i>Handle substance within a closed system; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>  |
| <b>Process sampling</b>  | <i>Handle substance within a closed system; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>  |
| <b>Bulk transfers</b>  | <i>Handle substance within a closed system<br/>Clear transfer lines prior to de-coupling; Provide extract ventilation to points where emissions occur; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i> |
| <b>Mixing operations (open systems)</b>  | <i>Provide extract ventilation to points where emissions occur;<br/>Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>  |
| <b>Transfer from/pouring from containers<br/>Manual</b>                                  | <i>Use drum pumps or carefully pour from container; Provide extract ventilation to points where emissions occur; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>                                       |

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| <b>Equipment cleaning and maintenance</b>                                   | <i>Drain down and flush system prior to equipment break-in or maintenance ; Provide a good standard of general ventilation (10 to 15 air changes per hour) ; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>                  |
| <b>Drum/batch transfers</b>   | <i>Use drum pumps or carefully pour from container; Provide extract ventilation to points where emissions occur; Avoid spillage when withdrawing pump; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>                        |
| <b>Drum and small package filling</b>                                       | <i>Fill containers/cans at dedicated fill points supplied with local extract ventilation; Clear spills immediately. Put lids on containers immediately after use.; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>            |
| <b>Bulk product storage</b>   | <i>Transfer via enclosed lines<br/>Avoid dip sampling. ; Store substance within a closed system; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>  |
| <b>Laboratory activities</b>  | <i>Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>  |
| <b>Section 2.2</b>  | <i>Control of environmental exposure</i>  |
| <b>Operational conditions</b>   |   |
| <b>Amounts used (kg/d)</b>  | 85000   |
| <b>Frequency of use</b>   | <i>Continuous release.</i>  |
| <b>Duration of use (Emission Days/year)</b>                                 | 300   |
| <b>Environmental factors not influenced by risk management</b>              | <i>Local freshwater dilution factor: 10.<br/>Local marine water dilution factor: 100.</i>   |
| <b>Other Operational Conditions of use affecting environmental exposure</b> | <i>Release fraction to air from process (initial release prior to RMM): 0.01<br/>Release fraction to wastewater from process (initial release prior to RMM): 0.005<br/>Release fraction to soil from process (initial release prior to RMM): 0.0001</i> |

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| <b>Risk Management Measures</b>   |   |
| <b>Technical conditions and measures at process level (source) to prevent release</b>                             | <i>n/a</i>  |
| <b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b> | <i>Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of <math>\geq</math> (%): 87.4</i>   |
| <b>Organisation measures to prevent/limit release from site</b>   | <i>Prevent discharge of undissolved substance to waste water or recover from wastewater.</i>  |
| <b>Conditions and measures related to municipal sewage treatment plant</b>  | <i>Biological treatment - central biological waste water treatment.<br/>Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 87.4<br/>Assumed domestic sewage treatment plant flow (m<sup>3</sup>/d): 2000</i>   |
| <b>Conditions and measures related to external treatment of waste for disposal</b>                                | <i>n/a</i>  |
| <b>Conditions and measures related to external recovery of waste</b>  | <i>n/a</i>  |
| <b>Other environmental measures</b>   | <i>Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases<br/>A leak prevention plan is needed to prevent low level continual releases<br/>Bund storage facilities to prevent soil and water pollution in the event of spillage<br/>All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments<br/>Dispose of waste or used sacks/containers according to local regulations.<br/>Dispose of waste product or used containers according to local regulations</i> |

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| <b>Section 3</b>       | <i>Exposure Estimation</i>   |
| <b>3.1 Health</b>      | <i>The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.</i>   |
| <b>3.2 Environment</b> | <i>For the environmental assessment measured data have been used.</i>  |
| <b>Section 4</b>       | <i>Guidance to check compliance with the Exposure Scenario</i>   |
| <b>4.1 Health</b>      | <i>Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.<br/>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.</i>  |
| <b>4.2 Environment</b> | <i>Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.<br/>Further details on scaling and control technologies are provided in SpERC factsheet (<a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a>).</i> |

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| <b>Section 1</b>                                     | <i>Exposure Scenario: Worker</i>   |
| <b>Title</b>   | <i>Distribution of substance, industrial</i>   |
| <b>Sector of Use</b>                                 | <i>SU3</i>   |
| <b>Process Category</b>                              | <i>PROC1; PROC2; PROC3; PROC4; PROC8a; PROC8b; PROC9; PROC15</i>   |
| <b>Product Category</b>                              | <i>n/a</i>   |
| <b>Article Category</b>                              | <i>n/a</i>   |
| <b>Environmental Release Category</b>                | <i>ERC1; ERC2</i>  |
| <b>Specific Environmental Release Category</b>       | <i>ESVOC SpERC 1.1b.v1</i>   |
| <b>Processes, tasks, activities covered</b>          | <i>Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading distribution and associated laboratory activities</i> |
| <b>Section 2</b>                                     | <i>Operational conditions and risk management measures</i>   |
| <b>Product characteristics</b>                       |  |
| <b>Physical form of product</b>                      | <i>Liquid</i>  |
| <b>Volatility</b>                                    | <i>Liquid, vapour pressure &lt; 0.5 kPa at STP</i>   |
| <b>Dustiness</b>                                     | <i>n/a</i>   |
| <b>Concentration in a preparation/product (wt.%)</b> | <i>≤ 100</i>   |
| <b>Other product characteristics</b>                 | <i>Readily biodegradable.</i>  |

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| <b>Section 2.1</b>   | <i>Control of worker exposure</i>   |
| <b>Operational conditions</b>  |   |
| <b>Amounts used</b>  | <i>n/a</i>  |
| <b>Frequency and duration of use</b>   | <i>Covers daily exposures up to 8 hours (unless stated differently)</i>   |
| <b>Human factors not influenced by risk management</b>                       | <i>n/a</i>  |
| <b>Other Operational Conditions affecting worker exposure</b>                | <i>Assumes use at not more than 20°C above ambient temperature, unless stated differently<br/>Assumes a good basic standard of occupational hygiene is implemented</i>  |
| <b>Risk Management Measures</b>  |   |
| <b>Contributing Scenarios</b>  |   |
| <b>General exposures (closed systems)<br/>Continuous process<br/>Outdoor</b> | <i>Handle substance within a closed system; Avoid carrying out operation for more than 1 hour</i>   |
| <b>General exposures (closed systems)<br/>Continuous process<br/>Outdoor</b> | <i>Handle substance within a closed system; Avoid carrying out operation for more than 1 hour; Use suitable eye protection</i>  |
| <b>General exposures (closed systems)<br/>Batch process<br/>Outdoor</b>      | <i>Handle substance within a closed system; Avoid carrying out operation for more than 1 hour; Use suitable eye protection</i>  |
| <b>General exposures (open systems)<br/>Batch process</b>                    | <i>Clear transfer lines prior to de-coupling; Ensure material transfers are under containment or extract ventilation;<br/>Avoid carrying out operation for more than 1 hour; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>  |
| <b>Process sampling<br/>Outdoor</b>  | <i>Avoid dip sampling. ; Avoid carrying out operation for more than 15 minutes; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>   |
| <b>Laboratory activities</b>   | <i>Avoid carrying out operation for more than 1 hour; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>   |
| <b>bulk closed loading and unloading<br/>Outdoor</b>                         | <i>Clear transfer lines prior to de-coupling; Ensure material transfers are under containment or extract ventilation;<br/>Avoid carrying out operation for more than 1 hour; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>  |
| <b>bulk open loading<br/>Outdoor</b>   | <i>Clear transfer lines prior to de-coupling; Ensure material transfers are under containment or extract ventilation;<br/>Avoid carrying out operation for more than 4 hours; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i> |
| <b>Drum and small package filling<br/>Indoor<br/>Continuous process</b>      | <i>Fill containers/cans at dedicated fill points supplied with local extract ventilation; Clear spills immediately.; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>  |

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| <b>Equipment cleaning and maintenance</b>                                   | <i>Drain down and flush system prior to equipment break-in or maintenance<br/>Transfer via enclosed lines; Avoid carrying out operation for more than 1 hour<br/>Apply vessel entry procedures including use of forced supplied air. ; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i> |
| <b>Storage Outdoor</b>  | <i>Transfer via enclosed lines<br/>Avoid dip sampling. ; Store substance within a closed system; Use suitable eye protection</i>   |
| <b>Section 2.2</b>  | <i>Control of environmental exposure</i>   |
| <b>Operational conditions</b>   |  |
| <b>Amounts used (kg/d)</b>  | <i>85000</i>   |
| <b>Frequency of use</b>   | <i>Continuous release.</i>   |
| <b>Duration of use (Emission Days/year)</b>                                 | <i>300</i>   |
| <b>Environmental factors not influenced by risk management</b>              | <i>Local freshwater dilution factor: 10.<br/>Local marine water dilution factor: 100.</i>  |
| <b>Other Operational Conditions of use affecting environmental exposure</b> | <i>Release fraction to air from process (initial release prior to RMM): 0.0001<br/>Release fraction to wastewater from process (initial release prior to RMM): 0.00001<br/>Release fraction to soil from process (initial release prior to RMM): 0</i>   |



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| <b>Risk Management Measures</b>   |   |
| <b>Technical conditions and measures at process level (source) to prevent release</b>                             | <i>n/a</i>  |
| <b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b> | <i>Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of <math>\geq</math> (%): 87.4</i>   |
| <b>Organisation measures to prevent/limit release from site</b>   | <i>Prevent discharge of undissolved substance to waste water or recover from wastewater.</i>  |
| <b>Conditions and measures related to municipal sewage treatment plant</b>  | <i>Biological treatment - central biological waste water treatment.<br/>Estimated substance removal from wastewater via domestic sewage treatment (%): 87.4<br/>Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 87.4<br/>Assumed domestic sewage treatment plant flow (m<sup>3</sup>/d): 2000</i>   |
| <b>Conditions and measures related to external treatment of waste for disposal</b>                                | <i>n/a</i>  |
| <b>Conditions and measures related to external recovery of waste</b>  | <i>n/a</i>  |
| <b>Other environmental measures</b>   | <i>All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments<br/>Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases<br/>A leak prevention plan is needed to prevent low level continual releases<br/>Bund storage facilities to prevent soil and water pollution in the event of spillage<br/>Dispose of waste or used sacks/containers according to local regulations.<br/>Dispose of waste product or used containers according to local regulations</i> |

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| <b>Section 3</b>       | <i>Exposure Estimation</i>   |
| <b>3.1 Health</b>      | <i>The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.</i>   |
| <b>3.2 Environment</b> | <i>Used EUSES model.</i>   |
| <b>Section 4</b>       | <i>Guidance to check compliance with the Exposure Scenario</i>   |
| <b>4.1 Health</b>      | <i>Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.<br/>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.</i>  |
| <b>4.2 Environment</b> | <i>Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.<br/>Further details on scaling and control technologies are provided in SpERC factsheet (<a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a>).</i> |

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| <b>Section 1</b>                                     | <i>Exposure Scenario: Worker</i>  |
| <b>Title</b>   | <i>Uses in Coatings, industrial</i>   |
| <b>Sector of Use</b>                                 | <i>SU3</i>  |
| <b>Process Category</b>                              | <i>PROC1; PROC2; PROC3; PROC4; PROC5; PROC7; PROC8a; PROC8b; PROC9; PROC10; PROC13; PROC15</i>  |
| <b>Product Category</b>                              | <i>n/a</i>  |
| <b>Article Category</b>                              | <i>n/a</i>  |
| <b>Environmental Release Category</b>                | <i>ERC4</i>   |
| <b>Specific Environmental Release Category</b>       | <i>ESVOC SpERC 4.3a.v1</i>  |
| <b>Processes, tasks, activities covered</b>          | <i>Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, spreader, dip, flow, fluidised bed on production lines and film formation) and equipment cleaning, maintenance and associated laboratory activities.</i> |
| <b>Section 2</b>                                     | <i>Operational conditions and risk management measures</i>  |
| <b>Product characteristics</b>                       |   |
| <b>Physical form of product</b>                      | <i>Liquid</i>   |
| <b>Volatility</b>                                    | <i>Liquid, vapour pressure &lt; 0.5 kPa at STP</i>  |
| <b>Dustiness</b>                                     | <i>n/a</i>  |
| <b>Concentration in a preparation/product (wt.%)</b> | <i>≤ 100</i>  |
| <b>Other product characteristics</b>                 | <i>Readily biodegradable.</i>   |

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| <b>Section 2.1</b>   | <i>Control of worker exposure</i>   |
| <b>Operational conditions</b>  |   |
| <b>Amounts used</b>  | <i>n/a</i>  |
| <b>Frequency and duration of use</b>   | <i>Covers daily exposures up to 8 hours (unless stated differently)</i>   |
| <b>Human factors not influenced by risk management</b>   | <i>n/a</i>  |
| <b>Other Operational Conditions affecting worker exposure</b>                                      | <i>Assumes use at not more than 20°C above ambient temperature, unless stated differently<br/>Assumes a good basic standard of occupational hygiene is implemented</i>  |
| <b>Risk Management Measures</b>  |   |
| <b>Contributing Scenarios</b>  |   |
| <b>General exposures (closed systems)</b>  | <i>Handle substance within a closed system</i>  |
| <b>General exposures (closed systems) with sample collection<br/>Use in contained systems</b>      | <i>Handle substance within a closed system; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>   |
| <b>Film formation - force drying (50 - 100°C). Stoving (&gt;100°C).<br/>UV/EB radiation curing</b> | <i>Handle substance within a closed system; Ensure material transfers are under containment or extract ventilation;<br/>Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>   |
| <b>Mixing operations (closed systems)<br/>General exposures (closed systems)</b>                   | <i>Handle substance within a closed system; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>   |
| <b>Film formation - air drying</b>   | <i>Provide extract ventilation to points where emissions occur;<br/>Avoid manual contact with wet work pieces; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>  |
| <b>Preparation of material for application<br/>Mixing operations (open systems)</b>                | <i>Provide extract ventilation to points where emissions occur;<br/>Avoid manual contact with wet work pieces; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>  |
| <b>Spraying (automatic/robotic)</b>  | <i>Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings;<br/>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br/>Use suitable eye protection</i>                                    |
| <b>Manual Spraying</b>   | <i>Provide a good standard of general ventilation (10 to 15 air changes per hour) ; Wear a respirator conforming to EN140 with Type A filter or better.<br/>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br/>Use suitable eye protection</i> |
| <b>Material transfers</b>  | <i>Clear transfer lines prior to de-coupling; Provide extract ventilation to points where emissions occur; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>  |

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| <b>Material transfers</b>  | <i>Clear transfer lines prior to de-coupling; Provide extract ventilation to points where emissions occur; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>                                  |
| <b>Roller, spreader, flow application</b>  | <i>Provide enhanced general ventilation by mechanical means; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>  |
| <b>Dipping, immersion and pouring</b>  | <i>Provide enhanced general ventilation by mechanical means; Avoid manual contact with wet work pieces<br/>Clear up spills immediately and dispose of waste safely.<br/>or; Wear suitable gloves tested to EN374.</i> |
| <b>Laboratory activities</b>   | <i>Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>  |
| <b>Material transfers<br/>Drum/batch transfers<br/>Transfer from/pouring from<br/>containers</b> | <i>Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>  |
| <b>Section 2.2</b>   | <i>Control of environmental exposure</i>  |
| <b>Operational conditions</b>  |   |
| <b>Amounts used (kg/d)</b>   | <i>47000</i>  |
| <b>Frequency of use</b>  | <i>Continuous release.</i>  |
| <b>Duration of use (Emission<br/>Days/year)</b>  | <i>300</i>  |
| <b>Environmental factors not<br/>influenced by risk management</b>                               | <i>Local freshwater dilution factor: 10.<br/>Local marine water dilution factor: 100.</i>   |
| <b>Other Operational Conditions of<br/>use affecting environmental<br/>exposure</b>              | <i>n/a</i>  |

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| <b>Risk Management Measures</b>   |   |
| <b>Technical conditions and measures at process level (source) to prevent release</b>                             | <i>n/a</i>  |
| <b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b> | <i>Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of <math>\geq</math> (%): 87.4</i>   |
| <b>Organisation measures to prevent/limit release from site</b>   | <i>Prevent discharge of undissolved substance to waste water or recover from wastewater.</i>  |
| <b>Conditions and measures related to municipal sewage treatment plant</b>  | <i>Biological treatment - central biological waste water treatment.<br/>Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 87.4<br/>Assumed domestic sewage treatment plant flow (m<sup>3</sup>/d): 2000</i>   |
| <b>Conditions and measures related to external treatment of waste for disposal</b>                                | <i>n/a</i>  |
| <b>Conditions and measures related to external recovery of waste</b>  | <i>n/a</i>  |
| <b>Other environmental measures</b>   | <i>All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments<br/>Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases<br/>A leak prevention plan is needed to prevent low level continual releases<br/>Bund storage facilities to prevent soil and water pollution in the event of spillage<br/>Dispose of waste or used sacks/containers according to local regulations.<br/>Dispose of waste product or used containers according to local regulations</i> |

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| <b>Section 3</b>       | <i>Exposure Estimation</i>   |
| <b>3.1 Health</b>      | <i>The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.</i>   |
| <b>3.2 Environment</b> | <i>Used EUSES model.</i>   |
| <b>Section 4</b>       | <i>Guidance to check compliance with the Exposure Scenario</i>   |
| <b>4.1 Health</b>      | <i>Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.<br/>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.</i>  |
| <b>4.2 Environment</b> | <i>Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.<br/>Further details on scaling and control technologies are provided in SpERC factsheet (<a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a>).</i> |

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| <b>Section 1</b>                                     | <i>Exposure Scenario: Worker</i>  |
| <b>Title</b>   | <i>Uses in Coatings, professional</i>   |
| <b>Sector of Use</b>                                 | <i>SU22</i>   |
| <b>Process Category</b>                              | <i>PROC1; PROC2; PROC3; PROC4; PROC5; PROC8a; PROC8b; PROC10; PROC11; PROC13; PROC15; PROC19</i>  |
| <b>Product Category</b>                              | <i>n/a</i>  |
| <b>Article Category</b>                              | <i>n/a</i>  |
| <b>Environmental Release Category</b>                | <i>ERC8a; ERC8d</i>   |
| <b>Specific Environmental Release Category</b>       | <i>ESVOC SpERC 8.3b.v1</i>  |
| <b>Processes, tasks, activities covered</b>          | <i>Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, brush, spreader by hand or similar methods, and film formation), and equipment cleaning, maintenance and associated laboratory activities.</i> |
| <b>Section 2</b>                                     | <i>Operational conditions and risk management measures</i>  |
| <b>Product characteristics</b>                       |   |
| <b>Physical form of product</b>                      | <i>Liquid</i>   |
| <b>Volatility</b>                                    | <i>Liquid, vapour pressure &lt; 0.5 kPa at STP</i>  |
| <b>Dustiness</b>                                     | <i>n/a</i>  |
| <b>Concentration in a preparation/product (wt.%)</b> | <i>≤ 100</i>  |
| <b>Other product characteristics</b>                 | <i>Readily biodegradable.</i>   |



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| <b>Section 2.1</b>   | <i>Control of worker exposure</i>   |
| <b>Operational conditions</b>  |   |
| <b>Amounts used</b>  | <i>n/a</i>  |
| <b>Frequency and duration of use</b>                                   | <i>Covers daily exposures up to 8 hours (unless stated differently)</i>   |
| <b>Human factors not influenced by risk management</b>                 | <i>n/a</i>  |
| <b>Other Operational Conditions affecting worker exposure</b>          | <i>Assumes use at not more than 20°C above ambient temperature, unless stated differently<br/>Assumes a good basic standard of occupational hygiene is implemented</i>  |
| <b>Risk Management Measures</b>  |   |
| <b>Contributing Scenarios</b>  |   |
| <b>General exposures (closed systems)</b>                              | <i>Handle substance within a closed system</i>  |
| <b>Filling / preparation of equipment from drums or containers.</b>    | <i>Handle substance within a closed system<br/>Use drum pumps or carefully pour from container; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>   |
| <b>General exposures (closed systems)<br/>Use in contained systems</b> | <i>Handle substance within a closed system; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>   |
| <b>Preparation of material for application</b>                         | <i>Use drum pumps or carefully pour from container; Clear up spills immediately and dispose of waste safely.; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>   |
| <b>Film formation - air drying<br/>Outdoor</b>                         | <i>Provide enhanced general ventilation by mechanical means; Avoid manual contact with wet work pieces; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>   |
| <b>Film formation - air drying<br/>Indoor</b>                          | <i>Provide a good standard of general ventilation (10 to 15 air changes per hour)<br/>Provide extract ventilation to points where emissions occur; Avoid manual contact with wet work pieces; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i> |
| <b>Preparation of material for application<br/>Indoor</b>              | <i>Provide a good standard of general ventilation (10 to 15 air changes per hour) ; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>   |
| <b>Preparation of material for application<br/>Outdoor</b>             | <i>Ensure operation is undertaken outdoors or; Avoid carrying out operation for more than 4 hours; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>  |

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| <b>Material transfers<br/>Drum/batch transfers</b>                    | <i>Provide extract ventilation to points where emissions occur;<br/>Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>   |
| <b>Material transfers<br/>Drum/batch transfers</b>                    | <i>Use drum pumps or carefully pour from container; Provide extract ventilation to points where emissions occur; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>  |
| <b>Roller, spreader, flow application<br/>Indoor</b>                  | <i>Provide enhanced general ventilation by mechanical means; Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br/>Wear a respirator conforming to EN140 with Type A filter or better.<br/>Use suitable eye protection</i>                                      |
| <b>Roller, spreader, flow application<br/>Outdoor</b>                 | <i>Limit the substance content in the product to 25 % ; Ensure operation is undertaken outdoors ; Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br/>Use suitable eye protection</i>   |
| <b>Manual<br/>Spraying<br/>Indoor</b>                                 | <i>Carry out in a vented booth or extracted enclosure; Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br/>Use suitable eye protection</i>  |
| <b>Manual<br/>Spraying<br/>Outdoor</b>                                | <i>Limit the substance content in the product to 25 % ; Ensure operation is undertaken outdoors ; Wear a respirator conforming to EN140 with Type A filter or better.<br/>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br/>Use suitable eye protection</i> |
| <b>Dipping, immersion and pouring<br/>Indoor</b>                      | <i>Provide extract ventilation to points where emissions occur;<br/>Avoid manual contact with wet work pieces<br/>Clear up spills immediately and dispose of waste safely.;<br/>Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>   |
| <b>Dipping, immersion and pouring<br/>Outdoor</b>                     | <i>Ensure operation is undertaken outdoors ; Avoid manual contact with wet work pieces<br/>Clear up spills immediately and dispose of waste safely.;<br/>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br/>Use suitable eye protection</i>                  |
| <b>Laboratory activities</b>  | <i>Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>  |
| <b>Hand application - fingerpaints, pastels, adhesives<br/>Indoor</b> | <i>Ensure doors and windows are opened<br/>Avoid carrying out operation for more than 1 hour; Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br/>Use suitable eye protection</i>   |

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| <b>Hand application - fingerpaints, pastels, adhesives<br/>Outdoor</b>      | <i>Ensure operation is undertaken outdoors ; Avoid carrying out operation for more than 1 hour; Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.<br/>Use suitable eye protection</i>                |
| <b>Section 2.2</b>  | <i>Control of environmental exposure</i>   |
| <b>Operational conditions</b>   |  |
| <b>Amounts used (kg/d)</b>  | 14000  |
| <b>Frequency of use</b>   | <i>Continuous release.</i>   |
| <b>Duration of use (Emission Days/year)</b>                                 | 300  |
| <b>Environmental factors not influenced by risk management</b>              | <i>Local freshwater dilution factor: 10.<br/>Local marine water dilution factor: 100.</i>  |
| <b>Other Operational Conditions of use affecting environmental exposure</b> | <i>Release fraction to air from process (initial release prior to RMM): 0.98<br/>Release fraction to wastewater from process (initial release prior to RMM): 0.01<br/>Release fraction to soil from process (initial release prior to RMM): 0.01</i> |

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| <b>Risk Management Measures</b>   |   |
| <b>Technical conditions and measures at process level (source) to prevent release</b>                             | <i>n/a</i>  |
| <b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b> | <i>n/a</i>  |
| <b>Organisation measures to prevent/limit release from site</b>   | <i>n/a</i>  |
| <b>Conditions and measures related to municipal sewage treatment plant</b>  | <i>Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 87.4<br/>Biological treatment - central biological waste water treatment.<br/>Assumed domestic sewage treatment plant flow (m3/d): 2000</i>  |
| <b>Conditions and measures related to external treatment of waste for disposal</b>                                | <i>n/a</i>  |
| <b>Conditions and measures related to external recovery of waste</b>  | <i>n/a</i>  |
| <b>Other environmental measures</b>   | <i>Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases<br/>A leak prevention plan is needed to prevent low level continual releases<br/>Bund storage facilities to prevent soil and water pollution in the event of spillage<br/>Dispose of waste or used sacks/containers according to local regulations.<br/>Dispose of waste product or used containers according to local regulations</i> |

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| <b>Section 3</b>       | <i>Exposure Estimation</i>   |
| <b>3.1 Health</b>      | <i>The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.</i>   |
| <b>3.2 Environment</b> | <i>Used EUSES model.</i>   |
| <b>Section 4</b>       | <i>Guidance to check compliance with the Exposure Scenario</i>   |
| <b>4.1 Health</b>      | <i>Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.<br/>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.</i>  |
| <b>4.2 Environment</b> | <i>Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.<br/>Further details on scaling and control technologies are provided in SpERC factsheet (<a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a>).</i> |

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| <b>Section 1</b>                                     | <i>Exposure Scenario: Worker</i>   |
| <b>Title</b>   | <i>Use in Cleaning Agents, professional</i>  |
| <b>Sector of Use</b>                                 | <i>SU22</i>  |
| <b>Process Category</b>                              | <i>PROC1; PROC2; PROC3; PROC4; PROC8a; PROC8b; PROC10; PROC11; PROC13</i>  |
| <b>Product Category</b>                              | <i>n/a</i>   |
| <b>Article Category</b>                              | <i>n/a</i>   |
| <b>Environmental Release Category</b>                | <i>ERC8a; ERC8d</i>  |
| <b>Specific Environmental Release Category</b>       | <i>ESVOC SpERC 8.4b.v1</i>   |
| <b>Processes, tasks, activities covered</b>          | <i>Covers the use as a component of cleaning products including pouring/unloading from drums or containers; and exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping automated and by hand).</i> |
| <b>Section 2</b>                                     | <i>Operational conditions and risk management measures</i>   |
| <b>Product characteristics</b>                       |  |
| <b>Physical form of product</b>                      | <i>Liquid</i>  |
| <b>Volatility</b>                                    | <i>Liquid, vapour pressure &lt; 0.5 kPa at STP</i>   |
| <b>Dustiness</b>                                     | <i>n/a</i>   |
| <b>Concentration in a preparation/product (wt.%)</b> | <i>≤ 100</i>   |
| <b>Other product characteristics</b>                 | <i>Readily biodegradable.</i>  |

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| <b>Section 2.1</b>   | <i>Control of worker exposure</i>  |
| <b>Operational conditions</b>  |  |
| <b>Amounts used</b>  | <i>n/a</i>   |
| <b>Frequency and duration of use</b>   | <i>Covers daily exposures up to 8 hours (unless stated differently)</i>  |
| <b>Human factors not influenced by risk management</b>   | <i>n/a</i>   |
| <b>Other Operational Conditions affecting worker exposure</b>  | <i>Assumes use at not more than 20°C above ambient temperature, unless stated differently<br/>Assumes a good basic standard of occupational hygiene is implemented</i>   |
| <b>Risk Management Measures</b>  |  |
| <b>Contributing Scenarios</b>  |  |
| <b>Filling / preparation of equipment from drums or containers.</b>                                      | <i>Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>  |
| <b>Automated process with (semi) closed systems.<br/>Use in contained systems</b>                        | <i>No specific measures identified</i>   |
| <b>Semi Automated process. (e.g.: Semi automatic application of floor care and maintenance products)</b> | <i>Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>  |
| <b>Filling / preparation of equipment from drums or containers.</b>                                      | <i>Ensure operation is undertaken outdoors ; Avoid carrying out operation for more than 4 hours; Wear suitable gloves tested to EN374.</i>   |
| <b>Filling / preparation of equipment from drums or containers.</b>                                      | <i>Ensure operation is undertaken outdoors ; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>   |
| <b>Manual Surfaces Cleaning<br/>Dipping, immersion and pouring</b>                                       | <i>Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>  |
| <b>Cleaning with low-pressure washers<br/>Rolling, Brushing<br/>no spraying</b>                          | <i>Limit the substance content in the product to 25 % ;<br/>Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i> |
| <b>Cleaning with high pressure washers<br/>Spraying<br/>Indoor</b>                                       | <i>Limit the substance content in the product to 5 %; Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>       |

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| <b>Cleaning with high pressure washers<br/>Spraying<br/>Outdoor</b>                      | <i>Limit the substance content in the product to 5 % or; Ensure operation is undertaken outdoors ; Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.<br/>Use suitable eye protection</i>             |
| <b>Manual Surfaces<br/>Cleaning<br/>Spraying</b>   | <i>Limit the substance content in the product to 25 % ; Ensure doors and windows are opened ; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>   |
| <b>Ad hoc manual application via trigger sprays, dipping, etc.<br/>Rolling, Brushing</b> | <i>Limit the substance content in the product to 25 % ; Ensure doors and windows are opened ; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>   |
| <b>Application of cleaning products in closed systems<br/>Outdoor</b>                    | <i>Ensure operation is undertaken outdoors ; Wear suitable gloves tested to EN374.<br/>Use suitable eye protection</i>  |
| <b>Section 2.2</b>   | <i>Control of environmental exposure</i>  |
| <b>Operational conditions</b>  |   |
| <b>Amounts used (kg/d)</b>   | <i>10000</i>  |
| <b>Frequency of use</b>  | <i>Continuous release.</i>  |
| <b>Duration of use (Emission Days/year)</b>  | <i>300</i>  |
| <b>Environmental factors not influenced by risk management</b>                           | <i>Local freshwater dilution factor: 10.<br/>Local marine water dilution factor: 100.</i>   |
| <b>Other Operational Conditions of use affecting environmental exposure</b>              | <i>Release fraction to air from process (initial release prior to RMM): 0.02<br/>Release fraction to wastewater from process (initial release prior to RMM): 0.000001<br/>Release fraction to soil from process (initial release prior to RMM): 0</i> |



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| <b>Risk Management Measures</b>   |   |
| <b>Technical conditions and measures at process level (source) to prevent release</b>                             | <i>n/a</i>  |
| <b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b> | <i>n/a</i>  |
| <b>Organisation measures to prevent/limit release from site</b>   | <i>n/a</i>  |
| <b>Conditions and measures related to municipal sewage treatment plant</b>  | <i>Biological treatment - central biological waste water treatment.<br/>Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 87.4<br/>Assumed domestic sewage treatment plant flow (m3/d): 2000</i>  |
| <b>Conditions and measures related to external treatment of waste for disposal</b>                                | <i>n/a</i>  |
| <b>Conditions and measures related to external recovery of waste</b>  | <i>n/a</i>  |
| <b>Other environmental measures</b>   | <i>Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases<br/>A leak prevention plan is needed to prevent low level continual releases<br/>Bund storage facilities to prevent soil and water pollution in the event of spillage<br/>Dispose of waste or used sacks/containers according to local regulations.<br/>Dispose of waste product or used containers according to local regulations</i> |

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| <b>Section 3</b>       | <i>Exposure Estimation</i>   |
| <b>3.1 Health</b>      | <i>The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.</i>   |
| <b>3.2 Environment</b> | <i>Used EUSES model.</i>   |
| <b>Section 4</b>       | <i>Guidance to check compliance with the Exposure Scenario</i>   |
| <b>4.1 Health</b>      | <i>Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.<br/>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.</i>  |
| <b>4.2 Environment</b> | <i>Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.<br/>Further details on scaling and control technologies are provided in SpERC factsheet (<a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a>).</i> |

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| <b>Section 1</b>                              | <b>Exposure Scenario: Consumer</b>   |
| <b>Title</b>                                  | <b><i>Uses in Coatings, consumer</i></b>   |
| Sector of Use                                 | <i>SU21</i>  |
| Process Category                              | <i>n/a</i>   |
| Product Category                              | <i>PC9a</i>  |
| Article Category                              | <i>n/a</i>   |
| Environmental Release Category                | <i>ERC8a; ERC8d</i>  |
| Specific Environmental Release Category       | <i>n/a</i>   |
| Processes, tasks, activities covered          | <i>Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including product transfer and preparation, application by brush, spray by hand or similar methods) and equipment cleaning.</i> |
| <b>Section 2</b>                              | <b>Operational conditions and risk management measures</b>   |
| <b>Product characteristics</b>                |  |
| Physical form of product                      | <i>Liquid</i>  |
| Volatility                                    | <i>Liquid, vapour pressure &gt; 10 Pa at STP</i>   |
| Dustiness                                     | <i>n/a</i>   |
| Concentration in a preparation/product (wt.%) | <i>≤ 3</i>   |
| Other product characteristics                 | <i>Readily biodegradable.</i>  |
| <b>Section 2.1</b>                            | <b>Control of consumer exposure</b>  |
| <b>Operational conditions</b>                 |  |
| Amounts used                                  | <i>n/a</i>   |

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|---|---|
| Frequency and duration of use   | <i>n/a</i>  |
| Human factors not influenced by risk management                                     | <i>n/a</i>  |
| Other Operational Conditions affecting consumer exposure                            | <i>Covers concentrations up to (%): 3</i><br><i>For each use event, covers use amounts up to (grammes): 2760</i><br><i>Covers use up to (times/year): 4</i><br><i>Covers use at ambient temperatures.</i><br><i>Covers use in room size of (m3): 20</i> |
| <b>Risk Management Measures</b>   |   |
| <b>Product category/sub-category</b>  |   |
| PC9a - Coatings and paints, thinners, paint removers<br>Waterborne latex wall paint | <i>Avoid using without an operating fan and open windows.</i><br><i>No specific risk management measure identified beyond those operational conditions stated.</i>  |

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| <b>Section 2.2</b>   | <b>Control of environmental exposure</b>   |
| <b>Operational conditions</b>  |  |
| Amounts used (kg/d)  | <i>n/a</i>   |
| Frequency of use   | <i>Dispersive use.</i>   |
| Duration of use (Emission Days/year)   | <i>365</i>   |
| Environmental factors not influenced by risk management  | <i>n/a</i>   |
| Other Operational Conditions of use affecting environmental exposure                                       | <i>Release fraction to air from process (initial release prior to RMM): 1<br/>Release fraction to wastewater from process (initial release prior to RMM): 1</i>  |
| <b>Risk Management Measures</b>  |  |
| Technical conditions and measures at process level (source) to prevent release                             | <i>n/a</i>   |
| Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil | <i>n/a</i>   |
| Organisation measures to prevent/limit release from site   | <i>n/a</i>   |
| Conditions and measures related to municipal sewage treatment plant  | <i>Estimated substance removal from wastewater via domestic sewage treatment (%): 87<br/>Assumed domestic sewage treatment plant flow (m3/d): 2000</i>   |
| Conditions and measures related to external treatment of waste for disposal                                | <i>n/a</i>   |
| Conditions and measures related to external recovery of waste  | <i>n/a</i>   |
| Other environmental measures   | <i>n/a</i>   |
| <b>Section 3</b>   | <b>Exposure Estimation</b>   |
| <b>3.1 Health</b>  | <i>The ECETOC TRA tool has been used to estimate consumer exposures unless otherwise indicated.</i>  |
| <b>3.2 Environment</b>   | <i>Used EUSES model.</i>   |
| <b>Section 4</b>   | <b>Guidance to check compliance with the Exposure Scenario</b>   |
| <b>4.1 Health</b>  | <i>Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.<br/>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.</i>  |
| <b>4.2 Environment</b>   | <i>Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.<br/>Further details on scaling and control technologies are provided in SpERC factsheet (<a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a>).</i> |

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| <b>Section 1</b>                                     | <i>Exposure Scenario: Consumer</i>   |
| <b>Title</b>   | <i>Use in Cleaning Agents, consumer</i>  |
| <b>Sector of Use</b>                                 | <i>SU21</i>  |
| <b>Process Category</b>                              | <i>n/a</i>   |
| <b>Product Category</b>                              | <i>PC35</i>  |
| <b>Article Category</b>                              | <i>n/a</i>   |
| <b>Environmental Release Category</b>                | <i>ERC8a; ERC8d</i>  |
| <b>Specific Environmental Release Category</b>       | <i>ESVOC SpERC 8.4c.v1</i>   |
| <b>Processes, tasks, activities covered</b>          | <i>Covers general exposures to consumers arising from the use of household products sold as washing and cleaning products, aerosols, coatings, de-icers, lubricants and air care products.</i> |
| <b>Section 2</b>                                     | <i>Operational conditions and risk management measures</i>   |
| <b>Product characteristics</b>                       |  |
| <b>Physical form of product</b>                      | <i>Liquid</i>  |
| <b>Volatility</b>                                    | <i>Liquid, vapour pressure &gt; 10 Pa at STP</i>   |
| <b>Dustiness</b>                                     | <i>n/a</i>   |
| <b>Concentration in a preparation/product (wt.%)</b> | <i>≤ 7</i>   |
| <b>Other product characteristics</b>                 | <i>Readily biodegradable.</i>  |

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| <b>Section 2.1</b>  | <i>Control of consumer exposure</i>  |
| <b>Operational conditions</b>   |  |
| <b>Amounts used</b>   | <i>n/a</i>   |
| <b>Frequency and duration of use</b>  | <i>n/a</i>   |
| <b>Human factors not influenced by risk management</b>  | <i>n/a</i>   |
| <b>Other Operational Conditions affecting consumer exposure</b>   | <p><i>Covers concentrations up to (%): 7</i></p> <p><i>For each use event, covers use amounts up to (grammes): 35</i></p> <p><i>Covers exposure up to (hours/event): 0.167</i></p> <p><i>Covers use up to (times/day): 1</i></p> <p><i>Covers use at ambient temperatures.</i></p> <p><i>Covers use in room size of (m3): 20</i></p> |
| <b>Risk Management Measures</b>   |  |
| <b>Product category/sub-category</b>  |  |
| <b>PC35 - Washing and Cleaning Products (including solvent based products)</b><br><b>Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners)</b> | <i>No specific risk management measure identified beyond those operational conditions stated.</i>  |
| <b>PC35 - Washing and Cleaning Products (including solvent based products)</b><br><b>Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners)</b>   | <i>No specific risk management measure identified beyond those operational conditions stated.</i>  |

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| <b>Section 2.2</b>  | <i>Control of environmental exposure</i>  |
| <b>Operational conditions</b>   |   |
| <b>Amounts used (kg/d)</b>  | <i>n/a</i>  |
| <b>Frequency of use</b>   | <i>Dispersive use.</i>  |
| <b>Duration of use (Emission Days/year)</b>   | <i>365</i>  |
| <b>Environmental factors not influenced by risk management</b>  | <i>n/a</i>  |
| <b>Other Operational Conditions of use affecting environmental exposure</b>                                       | <i>n/a</i>  |
| <b>Risk Management Measures</b>   |   |
| <b>Technical conditions and measures at process level (source) to prevent release</b>                             | <i>n/a</i>  |
| <b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b> | <i>n/a</i>  |
| <b>Organisation measures to prevent/limit release from site</b>   | <i>n/a</i>  |
| <b>Conditions and measures related to municipal sewage treatment plant</b>  | <i>Estimated substance removal from wastewater via domestic sewage treatment (%): 87<br/>Assumed domestic sewage treatment plant flow (m<sup>3</sup>/d): 2000</i> |
| <b>Conditions and measures related to external treatment of waste for disposal</b>                                | <i>n/a</i>  |
| <b>Conditions and measures related to external recovery of waste</b>  | <i>n/a</i>  |
| <b>Other environmental measures</b>   | <i>n/a</i>  |

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| <b>Section 3</b>       | <i>Exposure Estimation</i>   |
| <b>3.1 Health</b>      | <i>The ECETOC TRA tool has been used to estimate consumer exposures unless otherwise indicated.</i>  |
| <b>3.2 Environment</b> | <i>Used EUSES model.</i>   |
| <b>Section 4</b>       | <i>Guidance to check compliance with the Exposure Scenario</i>   |
| <b>4.1 Health</b>      | <i>Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted.<br/>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.</i>  |
| <b>4.2 Environment</b> | <i>Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.<br/>Further details on scaling and control technologies are provided in SpERC factsheet (<a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a>).</i> |