



# SAFETY DATA SHEET

## INTERNATIONAL FLAVORS & FRAGRANCES

Product ISO E SUPER BHT

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### **1. Identification of the substance/mixture and of the company/undertaking**

#### **1.1 Product identifier**

Trade name : ISO E SUPER BHT  
Registration number : 01-2119489989-04-0000

Substance name : 1-(1,2,3,4,5,6,7,8-Octahydro-2,3,8,8-tetramethyl-2-naphthyl)ethan-1-one  
Substance No. : 915-730-3

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

Use of the Substance/Mixture : Ingredient used in Fragrance mixtures.

- 1) Compounding: combining different fragrance ingredients into a fragrance mixture;
- 2) Formulation: combining the fragrance mixture with other substances to make Fragranced products;
- 3) End use of Fragranced products by consumers, professionals or industry; main product categories: washing & cleaning, cosmetics, personal care, air care, biocidal products, and polishes & waxes.

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

Company : IFF (GREAT BRITAIN) LTD.  
DUDDERY HILL  
CB9 8LG HAVERHILL  
Telephone : +441440715000  
Telefax : +441440762199  
E-mail address : sds@iff.com  
Responsible/issuing person

#### **1.4 Emergency telephone number**

+44 1440 7 15000

### **2. Hazards identification**

#### **2.1 Classification of the substance or mixture**

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

Skin irritation, Category 2 H315: Causes skin irritation.  
Skin sensitization, Category 1 H317: May cause an allergic skin reaction.  
Chronic aquatic toxicity, Category 2 H411: Toxic to aquatic life with long lasting effects.

##### **Classification (67/548/EEC, 1999/45/EC)**

Sensitising R43: May cause sensitization by skin contact.  
Irritant R38: Irritating to skin.  
Dangerous for the environment R51/53: Toxic to aquatic organisms, may cause long-

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term adverse effects in the aquatic environment.

### 2.2 Label elements

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

Hazard pictograms :



Signal word : Warning

|                   |   |                      |   |
|-------------------|---|----------------------|---|
| Hazard statements | : | H315<br>H317<br>H411 | Causes skin irritation.<br>May cause an allergic skin reaction.<br>Toxic to aquatic life with long lasting effects. |
|-------------------|---|----------------------|---|

|                          |   |   |   |
|--------------------------|---|---|---|
| Precautionary statements | : | <b>Prevention:</b><br>P261<br><br>P273<br>P280<br><b>Response:</b><br>P333 + P313<br><br>P391<br><b>Disposal:</b><br>P501 | Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.<br>Avoid release to the environment.<br>Wear protective gloves.<br><br>If skin irritation or rash occurs: Get medical advice/ attention.<br>Collect spillage.<br><br>Dispose of contents/ container to an approved waste disposal plant. |
|--------------------------|---|---|---|

Hazardous components which must be listed on the label:

- 68155-66-8                      1-(1,2,3,4,5,6,7,8-Octahydro-2,3,8-tetramethyl-2-naphthyl)ethan-1-one

### 2.3 Other hazards

None reasonably foreseeable.

## 3. Composition/information on ingredients

### 3.1 Substances

|                                |   |   |
|--------------------------------|---|---|
| Chemical name of the substance | : | 1-(1,2,3,4,5,6,7,8-Octahydro-2,3,8-tetramethyl-2-naphthyl)ethan-1-one |
| Chemical characterization      | : | alicyclic ketones   |

|               |   |            |
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Molecular formula : C<sub>16</sub>H<sub>26</sub>O  
Molecular Weight : 234,2 g/mol  
CAS-No. : 68155-66-8, 54464-57-2, 68155-67-9  
EINECS-No. : 268-978-3, 259-174-3, 268-979-9  
EC-No. : 915-730-3  
REACH No. : 01-2119489989-04-0000

### Hazardous components

| Chemical Name   | CAS-No.<br>EC-No.                               | Classification                  | GHS Classification  | Concentration [%] |
|---|---|---------------------------------|---|-------------------|
| 1-(1,2,3,4,5,6,7,8-Octahydro-2,3,8,8-tetramethyl-2-naphthyl)ethan-1-one | 68155-66-8, 54464-57-2, 68155-67-9<br>915-730-3 | Xi; R38<br>Xi; R43<br>N; R51/53 | Skin Irrit.2; H315<br>Skin Sens.1; H317<br>Aquatic Chronic2; H411 | 50 - 100          |
| 2,6-di-tert-butyl-p-cresol  | 128-37-0<br>204-881-4                           | N; R50/53                       | Aquatic Chronic1; H410  | 0 - 0,25          |

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

### 3.2 Mixtures

Not applicable, product is a substance.

## 4. First aid measures

### 4.1 Description of first aid measures

- General advice : Take Risk and Safety phrases (section 15) into account.
- If inhaled : Remove from exposure site to fresh air and keep at rest. Obtain medical advice.
- In case of skin contact : Remove contaminated clothes. Wash thoroughly with water (and soap). Contact physician if symptoms persist.
- In case of eye contact : Flush immediately with water for at least 15 minutes. Contact physician if symptoms persist.
- If swallowed : Rinse mouth with water and obtain medical advice.

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

- Symptoms : No information available.
- Risks : No information available.

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

Treatment : No information available.

## 5. Firefighting measures

### 5.1 Extinguishing media

Suitable extinguishing media : Carbondioxide, dry chemical, foam.

Unsuitable extinguishing media : Do not use a direct waterjet on burning material.

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

Specific hazards during firefighting : Water may be ineffective.

### 5.3 Advice for firefighters

Further information : Standard procedure for chemical fires.

## 6. Accidental release measures

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

Personal precautions : Avoid inhalation and contact with skin and eyes. A self-contained breathing apparatus is recommended in case of a major spill.

### 6.2 Environmental precautions

Environmental precautions : Keep away from drains, surface- and groundwater and soil.

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

Methods for cleaning up : Clean up spillage promptly. Remove ignition sources. Provide adequate ventilation. Avoid excessive inhalation of vapours. Gross spillages should be contained by use of sand or inert powder and disposed of according to the local regulations.

### 6.4 Reference to other sections

Prevent spreading over a wide area (e.g. by containment or oil barriers).

## 7. Handling and storage

### 7.1 Precautions for safe handling

Advice on safe handling : Avoid excessive inhalation of concentrated vapors. Follow good manufacturing practices for housekeeping and personal hygiene. Wash any exposed skin immediately after any chemical contact, before breaks and meals, and at the end of each work period. Contaminated clothing and shoes should be thoroughly cleaned

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before re-use.

If appropriate, procedures used during the handling of this material should also be used when cleaning equipment or removing residual chemicals from tanks or other containers, especially when steam or hot water is used, as this may increase vapor concentrations in the workplace air. Where chemicals are openly handled, access should be restricted to properly trained employees.

Keep all heated processes at the lowest necessary temperature in order to minimize emissions of volatile chemicals into the air.

Advice on protection against fire and explosion : Keep away from ignition sources and naked flame.

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

Requirements for storage areas and containers : Store in a cool, dry, ventilated area away from heat sources. Keep containers upright and tightly closed when not in use.

### 7.3 Specific end uses

Specific use(s) : No information available.

## 8. Exposure controls/personal protection

### 8.1 Control parameters

Contains no substances with occupational exposure limit values.

DNEL : End Use: Workers  
Exposure routes: Skin contact  
Potential health effects: Acute effects, Local effects  
Exposure time: 8 h  
Value: 0,1011 mg/cm<sup>2</sup>

DNEL : End Use: Workers  
Exposure routes: Skin contact  
Potential health effects: Chronic effects  
Exposure time: 8 h  
Value: 1,73 mg/kg bw/day

DNEL : End Use: Workers  
Exposure routes: Inhalation  
Potential health effects: Chronic effects  
Exposure time: 8 h  
Value: 1,76 mg/m<sup>3</sup>

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|      |   |   |
|------|---|---|
| PNEC | : | Fresh water<br>Value: 0,0028 mg/l         |
| PNEC | : | Marine water<br>Value: 0,00028 mg/l       |
| PNEC | : | Fresh water sediment<br>Value: 3,73 mg/kg |
| PNEC | : | Marine sediment<br>Value: 0,75 mg/kg      |
| PNEC | : | Soil<br>Value: 0,705 mg/kg                |

### 8.2 Exposure controls

#### Engineering measures

Where appropriate, use closed systems to transfer and process this material.

If appropriate, isolate mixing rooms and other areas where this material is used or openly handled. Maintain these areas under negative air pressure relative to the rest of the plant.

#### Personal protective equipment

Respiratory protection : Use local exhaust ventilation around open tanks and other open sources of potential exposures in order to avoid excessive inhalation, including places where this material is openly weighed or measured. In addition, use general dilution ventilation of the work area to eliminate or reduce possible worker exposures. No respiratory protection is required during normal operations in a workplace where engineering controls such as adequate ventilation, etc. are sufficient.

If engineering controls and safe work practices are not sufficient, an approved, properly fitted respirator with organic vapor cartridges or canisters and particulate filters should be used:

- a) while engineering controls and appropriate safe work practices and/or procedures are being implemented; or
- b) during short term maintenance procedures when engineering controls are not in normal operation or are not sufficient; or
- c) if normal operational workplace vapor concentration in the air is increased due to heat ;
- d) during emergencies; or

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e)if engineering controls and operational practices are not sufficient to reduce airborne concentrations below an established occupational exposure limit.

- Hand protection : Avoid skin contact. Use chemically resistant gloves.
- Eye protection : Use tight-fitting goggles, face shield or safety glasses with side shields if eye contact might occur.
- Hygiene measures : To the extent deemed appropriate, implement pre-placement and regularly scheduled ascertainment of symptoms and spirometry testing of lung function for workers who are regularly exposed to this material.  
To the extent deemed appropriate, use an experienced air sampling expert to identify and measure volatile chemicals that could be present in the workplace air to determine potential exposures and to ensure the continuing effectiveness of engineering controls and operational practices to minimize exposure.

### Environmental exposure controls

- General advice : Keep away from drains, surface- and groundwater and soil.

## 9. Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

- Appearance : liquid at 20 °C (1.013 hPa)
- Colour : pale yellow
- Odour : conforms to standard
- Odour Threshold : not determined
- Flash point : 134 °C
- Lower explosion limit : not determined
- Upper explosion limit : not determined
- Flammability (solid, gas) : not determined
- Oxidizing properties : not determined
- Autoignition temperature : 260 °C at 1.013 hPa  
Method: Tested according to Annex V of Directive 67/548/EEC.
- pH : not determined
- Melting point : not determined
- Boiling point : 290,4 °C at 1.013 hPa  
Note: Calculated
- Vapour pressure : 0,00233 hPa at 23 °C  
Method: Purge & Trap

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Density : not determined  
Water solubility : 0,00268 g/l at 20 °C  
Method: OECD Test Guideline 105

Partition coefficient: n-  
octanol/water : log Pow: 5,650  
Solubility in other solvents : not determined  
Viscosity, dynamic : not determined  
Viscosity, kinematic : not determined  
Relative vapour density : not determined  
Evaporation rate : not determined

### 9.2 Other information

Refractive index : not determined  
Relative density : 0,961 - 0,967 at 20 °C  
Method: ISO 279

## 10. Stability and reactivity

### 10.1 Reactivity

No hazards to be specially mentioned.

### 10.2 Chemical stability

Stable under normal conditions.

### 10.3 Possibility of hazardous reactions

Hazardous reactions : Note: Presents no significant reactivity hazard, by itself or in contact with water. Avoid contact with strong acids, alkali or oxidizing agents.

### 10.4 Conditions to avoid

Conditions to avoid : Direct sources of heat.

### 10.5 Incompatible materials

Materials to avoid : Avoid contact with strong acids, alkali or oxidizing agents.

### 10.6 Hazardous decomposition products

Hazardous decomposition products : Carbon monoxide and unidentified organic compounds may be formed during combustion.

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### ***11. Toxicological information***

#### **11.1 Information on toxicological effects**

##### **Acute toxicity**

Acute oral toxicity : LD50: > 5.000 mg/kg  
Species: rat  
Method: OECD Test Guideline 401

Acute dermal toxicity : LD50: > 5.000 mg/kg  
Species: rat  
Method: OECD Test Guideline 402

##### **Skin corrosion/irritation**

Skin irritation : No information available.  
Skin irritation : Species: human  
Result: Skin irritation  
Method: OECD 439

##### **Serious eye damage/eye irritation**

No information available.  
Eye irritation : Result: No eye irritation  
Method: QSAR

##### **Respiratory or skin sensitization**

No information available.  
Sensitisation : LLNA  
Species: mouse  
Result: Causes sensitization.  
Method: OECD 429

##### **Germ cell mutagenicity**

No information available.  
Genotoxicity in vitro : Ames test  
Result: negative  
Method: Mutagenicity (Escherichia coli - reverse mutation assay)  
: Chromosome aberration test in vitro  
Human lymphocytes  
Result: negative  
Method: OECD 473  
Genotoxicity in vivo : in vivo assay

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Species: mouse  
Method: Mutagenicity (micronucleus test)  
Result: negative

: in vivo assay  
Species: rat  
Method: Mutagenicity (micronucleus test)  
Result: negative

### Carcinogenicity

No information available.

### Reproductive toxicity

No information available.

Teratogenicity

: Species: rat  
Application Route: Oral  
Number of exposures: 1x /day  
Method: OECD 414

### Target Organ Systemic Toxicant - Single exposure

No information available.

### Target Organ Systemic Toxicant - Repeated exposure

No information available.

: Species: rat, male and female  
Application Route: Oral  
Exposure time: 28-day ()  
Number of exposures: 1x /day  
NOEL: 150 mg/kg  
Method: OECD Test Guideline 407  
Repeated dose (28 days) toxicity (oral)

### Aspiration hazard

No information available.

## 12. Ecological information

### 12.1 Toxicity

Toxicity to fish : LC50: 1,3 mg/l  
Exposure time: 96 h

Species: Lepomis macrochirus (Bluegill sunfish)  
semi-static test Method: OECD Test Guideline 203

Toxicity to daphnia and other : EC50: 1,38 mg/l

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|  |  |
|--|--|
| aquatic invertebrates  | : Exposure time: 48 h<br>Species: Daphnia magna (Water flea)<br>semi-static test Method: OECD Test Guideline 202<br>Remarks:<br>IFF      |
| Toxicity to algae  | : EC50: 2,6 mg/l<br>Exposure time: 72 h<br>Species: Desmodesmus subspicatus (green algae)<br>static test Method: OECD Test Guideline 201 |
| Toxicity to bacteria   | : NOEC: > 100 mg/l<br>Exposure time: 42 h<br>static test<br>Method: OECD 301 F   |
| Toxicity to fish (Chronic toxicity)                                    | : NOEC: 0,16 mg/l<br>Exposure time: 30 d<br>Species: Danio rerio (zebra fish)<br>semi-static test<br>Method: OECD 210                    |
| Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) | : NOEC: 0,028 mg/l<br>Exposure time: 21 d<br>Species: Daphnia magna (Water flea)<br>Method: OECD 211                                     |

### 12.2 Persistence and degradability

No information available.

Biodegradability : Result: Not readily biodegradable.  
11 %  
Method: OECD 301 C

### 12.3 Bioaccumulative potential

No information available.

Bioaccumulation : Species: Lepomis macrochirus (Bluegill sunfish)  
Exposure time: 21 d  
Bioconcentration factor (BCF): 391  
Method: OECD 305

### 12.4 Mobility in soil

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### 12.5 Results of PBT and vPvB assessment

This substance is not considered to be persistent, bioaccumulating nor toxic (PBT)., This substance is not considered to be very persistent nor very bioaccumulating (vPvB).

### 12.6 Other adverse effects

No information available.

## 13. Disposal considerations

### 13.1 Waste treatment methods

- Product : Dispose of according to local regulations. Avoid disposing into drainage systems and into the environment.
- Contaminated packaging : Empty containers should be taken to an approved waste handling site for recycling or disposal.

## 14. Transport information

### ADR

- UN number : 3082
- Description of the goods : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (OCTAHYDRO TETRAMETHYL NAPHTHALENYL ETHANONE)
- Labels : 9
- Packing group : III
- Environmentally hazardous : yes

### IATA

- UN number : 3082
- Description of the goods : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (OCTAHYDRO TETRAMETHYL NAPHTHALENYL ETHANONE)
- Labels : 9
- Packing group : III
- Environmentally hazardous : yes

### IMDG

- UN number : 3082
- Description of the goods : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (OCTAHYDRO TETRAMETHYL NAPHTHALENYL ETHANONE)
- Labels : 9
- Packing group : III
- Marine pollutant : yes

**Special precautions for user** : No special precautions required.

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### 15. Regulatory information

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

##### Labelling — EU Directives 67/548/EEC or 1999/45/EC—

Symbol(s) : Xi Irritant  
N Dangerous for the environment

R-phrase(s) : R38 Irritating to skin.  
R43 May cause sensitization by skin contact.  
R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

S-phrase(s) : S24 Avoid contact with skin.  
S37 Wear suitable gloves.  
S61 Avoid release to the environment. Refer to special instructions/ Safety data sheets.

Water contaminating class : WGK 2 water endangering  
(Germany)

#### 15.2 Chemical Safety Assessment

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

### 16. Other information

#### Full text of R-phrases referred to under sections 2 and 3

R38 Irritating to skin.  
R43 May cause sensitization by skin contact.  
R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.  
R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

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

H315 Causes skin irritation.  
H317 May cause an allergic skin reaction.  
H410 Very toxic to aquatic life with long lasting effects.  
H411 Toxic to aquatic life with long lasting effects.

#### Further information

In December 2003, the National Institute for Occupational Safety and Health ("NIOSH") published an Alert on preventing lung disease in workers who use or make flavorings [NIOSH Publication Number 2004-110]. In August 2004 (Updated in 2012), the United States Flavor and Extract Manufacturers Association (FEMA)

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issued a report entitled "Respiratory Safety in the Flavor Manufacturing Workplace".

Both of these reports provide recommendations for reducing employee exposure and for medical surveillance in the workplace. The recommendations in these reports are generally applicable to the use of any chemical in the workplace and you are strongly urged to review both of these reports.

The report published by FEMA also contains a list of "high priority" chemicals. If any of these chemicals are present in this product at a concentration  $\geq 1.0\%$  due to an intentional addition by IFF, the chemical(s) will be identified in this safety data sheet.

According to Regulation (EC) No. 1907/2006 the information in this safety data sheet is based on the properties of the material known to IFF at the time the data sheet was issued. The safety data sheet is intended to provide information for a health and safety assessment of the material and the circumstances, under which it is packaged, stored or applied in the workplace. For such a safety assessment International Flavors & Fragrances holds no responsibility. This document is not intended for quality assurance purposes.

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### 1. Short title of Exposure Scenario: General exposures

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Main User Groups : **SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites

Sector of use : **SU 3, SU 10:** Industrial uses: Uses of substances as such or in preparations at industrial sites, Formulation

Process category : **PROC1:** Use in closed process, no likelihood of exposure  
**PROC2:** Use in closed, continuous process with occasional controlled exposure  
**PROC3:** Use in closed batch process (synthesis or formulation)  
**PROC5:** Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)  
**PROC8a:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities  
**PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities  
**PROC9:** Transfer of substance or preparation into small containers (dedicated filling line, including weighing)  
**PROC15:** Use as laboratory reagent

Environmental release category : **ERC2:** Formulation of preparations

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### 2.1 Contributing scenario controlling environmental exposure for: ERC2

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#### Product characteristics

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

#### Amount used

Daily amount per site : 252 kg (Large/medium site)  
Annual amount per site : 63.000 kg (Large/medium site)  
Daily amount per site : 30 kg (Small site)  
Annual amount per site : 7.550 kg (Small site)

#### Environment factors not influenced by risk management

Flow rate : 18.000 m<sup>3</sup>/d

#### Other given operational conditions affecting environmental exposure

Continuous exposure  
Number of emission days per year : 250

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### Technical conditions and measures / Organizational measures

Water : The residue present in mixing vessels before washing is minimized in order to reduce the loss of fragrance compound to waste water during cleaning of the vessels. (Effectiveness: )  
Release of substance from empty containers / packaging material and from contaminated material to water and soil is controlled, e. g. by:

- recycling
- dedicated use without cleaning
- specialized cleaning by contractors
- discharge of empty containers and containers containing residues as hazardous waste
- discharge of materials used to clean up spills as hazardous waste. (Effectiveness: )

Measures are taken to prevent emission to surface water in case of spills / incidents, e. g.:

- Closed sinks/ basins to prevent discharge to waste- and/or surface water (E11.01)
- Hard impervious surfaced areas (E11.02)
- Isolated drainage to prevent discharge to soil (E11.03)

(Effectiveness: )  
Release to water is 2%, when physical-chemical treatment is included and additional effectiveness of 70% can be assumed. (Applicable to Large/medium sites only). (Effectiveness: )

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

Type of Sewage Treatment Plant : Municipal sewage treatment plant  
Flow rate of sewage treatment plant : 2.000 m3/d  
effluent  
Effectiveness (of a measure) : 62,7 %  
Sludge Treatment : Disposal

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### 2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC15

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#### Product characteristics

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

#### Frequency and duration of use

Frequency of use : 8 hours/day

#### Human factors not influenced by risk management

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Exposed skin area : One side of one hand (240 cm<sup>2</sup>)(PROC1, PROC3, PROC15)  
 Exposed skin area : One side of two hands (480 cm<sup>2</sup>)(PROC2, PROC5, PROC8b)  
 Exposed skin area : Both sides of two hands (960 cm<sup>2</sup>)(PROC8a)

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Indoor

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

Assumes a good basic standard of occupational hygiene is implemented., Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted., Assumes use at not more than 20°C above ambient temperature.

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

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

**3. Exposure estimation and reference to its source**

**Environment**

| Contributing Scenario | Exposure Assessment Method | Specific conditions | Compartment          | Value type | Level of Exposure | Risk characterisation ratio (PEC/PNEC): |
|-----------------------|----------------------------|---------------------|----------------------|------------|-------------------|---|
| ERC2                  | EUSES                      | Large/medium site   | Fresh water          |            | 0,151kg/day       | 0,989                                   |
| ERC2                  | EUSES                      | Large/medium site   | Fresh water sediment |            | 0,151kg/day       | 0,938                                   |
| ERC2                  | EUSES                      | Large/medium site   | Marine water         |            | 0,151kg/day       | 1                                       |
| ERC2                  | EUSES                      | Large/medium site   | Marine sediment      |            | 0,151kg/day       | 0,471                                   |
| ERC2                  | EUSES                      | Large/medium site   | Air                  |            | 0,151kg/day       |   |
| ERC2                  | EUSES                      | Large/medium site   | Soil                 |            | 0,025kg/day       | 0,129                                   |
| ERC2                  | EUSES                      | Small site          | Fresh water          |            | 0,151kg/day       | 0,9                                     |
| ERC2                  | EUSES                      | Small site          | Fresh water sediment |            | 0,151kg/day       | 0,852                                   |
| ERC2                  | EUSES                      | Small site          | Marine water         |            | 0,151kg/day       | 1                                       |
| ERC2                  | EUSES                      | Small site          | Marine sediment      |            | 0,151kg/day       | 0,471                                   |
| ERC2                  | EUSES                      | Small site          | Air                  |            | 0,018kg/day       |   |
| ERC2                  | EUSES                      | Small site          | Soil                 |            | 0,003kg/day       | 0,129                                   |

**Workers**

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| Contributing Scenario | Exposure Assessment Method | Specific conditions                 | Value type                      | Level of Exposure        | Risk characterisation ratio (PEC/PNEC): |
|-----------------------|----------------------------|-------------------------------------|---------------------------------|--------------------------|---|
| PROC1                 | Advanced REACH tool        |                                     | Inhalation: Long term, Systemic | 0,098 mg/m <sup>3</sup>  | 0,056                                   |
| PROC1                 | Risk of derm               |                                     | Dermal: Acute, Local            | 3,18 µg/cm <sup>2</sup>  | 0,031                                   |
| PROC1                 | ECETOC TRA                 |                                     | Dermal: Long term, Systemic     | 0,343 mg/kg bw/day       | 0,198                                   |
| PROC2                 | Advanced REACH tool        |                                     | Inhalation: Long term, Systemic | 0,56 mg/m <sup>3</sup>   | 0,318                                   |
| PROC2                 | Risk of derm               |                                     | Dermal: Acute, Local            | 3,18 µg/cm <sup>2</sup>  | 0,031                                   |
| PROC2                 | ECETOC TRA                 |                                     | Dermal: Long term, Systemic     | 0,027 mg/kg bw/day       | 0,016                                   |
| PROC3                 | Advanced REACH tool        |                                     | Inhalation: Long term, Systemic | 0,55 mg/m <sup>3</sup>   | 0,312                                   |
| PROC3                 | Risk of derm               |                                     | Dermal: Acute, Local            | 0,064 µg/cm <sup>2</sup> | 0,0006                                  |
| PROC3                 | ECETOC TRA                 |                                     | Dermal: Long term, Systemic     | 0,007 mg/kg bw/day       | 0,004                                   |
| PROC5                 | Advanced REACH tool        | Mixing, Transfer and manual filling | Inhalation: Long term, Systemic | 0,63 mg/m <sup>3</sup>   | 0,358                                   |
| PROC5                 | Advanced REACH tool        | Weighing and mixing                 | Inhalation: Long term, Systemic | 0,18 mg/m <sup>3</sup>   | 0,102                                   |
| PROC5                 | Risk of derm               |                                     | Dermal: Acute, Local            | 1,9 µg/cm <sup>2</sup>   | 0,019                                   |
| PROC5                 | ECETOC TRA                 |                                     | Dermal: Long term, Systemic     | 0,274 mg/kg bw/day       | 0,158                                   |
| PROC8a                | Advanced REACH tool        | Discharging of vessels, pumping     | Inhalation: Long term, Systemic | 0,54 mg/m <sup>3</sup>   | 0,307                                   |
| PROC8a                | Advanced REACH tool        | Washing equipment                   | Inhalation: Long term, Systemic | 0,13 mg/m <sup>3</sup>   | 0,074                                   |
| PROC8a                | Risk of derm               | Discharging of vessels, pumping     | Dermal: Acute, Local            | 43 µg/cm <sup>2</sup>    | 0,425                                   |
| PROC8a                | Risk of derm               | Washing equipment                   | Dermal: Acute, Local            | 9,6 µg/cm <sup>2</sup>   | 0,095                                   |
| PROC8a                | ECETOC TRA                 | Discharging of vessels, pumping     | Dermal: Long term, Systemic     | 0,069 mg/kg bw/day       | 0,158                                   |
| PROC8a                | ECETOC TRA                 | Washing equipment                   | Dermal: Long term, Systemic     | 0,274 mg/kg bw/day       | 0,04                                    |
| PROC8b                | Advanced REACH tool        |                                     | Inhalation: Long term, Systemic | 0,18 mg/m <sup>3</sup>   | 0,102                                   |
| PROC8b                | Risk of derm               |                                     | Dermal: Acute, Local            | 15,5 µg/cm <sup>2</sup>  | 0,153                                   |
| PROC8b                | ECETOC TRA                 |                                     | Dermal: Long term, Systemic     | 0,317 mg/kg bw/day       | 0,079                                   |
| PROC15                | Advanced REACH tool        |                                     | Inhalation: Long term, Systemic | 0,057 mg/m <sup>3</sup>  | 0,032                                   |
| PROC15                | Risk of derm               |                                     | Dermal: Acute, Local            | 30 µg/cm <sup>2</sup>    | 0,0003                                  |
| PROC15                | ECETOC TRA                 |                                     | Dermal: Long term, Systemic     | 0,007 mg/kg bw/day       | 0,004                                   |

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

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As a downstream user, your main obligations under REACH are to:

1. Check if your use is covered by the exposure scenario(s). If this is not the case, you can communicate with your supplier with the aim of having your use covered by an exposure scenario or you may develop your own chemical safety report;

2.a. (Workers) Follow the instructions in this safety data sheet and the conditions of use indicated in the exposure scenario(s) in section 2.2. However, if you have another combination of operational conditions (OC's) and/or Risk Management Measures (RMM's), which allow you to achieve the same level of safety (RCRs <1), you can use scaling to demonstrate that you are in compliance. If scaling is not possible or still results in RCRs >1, then you should implement the OC's and RMM's recommended in this ES or contact your supplier in case you need further support;

2.b. (Environment) Follow the instructions in this safety data sheet and check if your daily and annual amounts used are below the default maximum values indicated in section 2.1. In case you are above the indicated values you can use scaling to demonstrate that you are in compliance, e.g. by replacing the default figure for the river and/or sewage treatment plant flow rates with the actual rates. If scaling is not possible or still results in RCRs >1, then you should contact your supplier for further support;

3. Contact your supplier if you have new information on the hazard of the substance or mixture or if you believe that the risk management measures are not appropriate;

4. Provide your own downstream users with information on hazards, safe conditions of use and appropriate risk management advice for your mixtures, if you are a formulator.

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