



SAFETY DATA SHEET

INTERNATIONAL FLAVORS & FRAGRANCES

Product BORNAFIX

Print Date 03.11.2017

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

1.1 Product identifier

Trade name : BORNAFIX
Registration number : 01-0000016310-85-0000
IFF Code : 00021067
Cust. Material : 00021067
MSDS Number : R00000213882
Substance name : 2-methyl-3-[(1,7,7-trimethylbicyclo-[2.2.1]hept-2-yl)oxy]-1-Propanol
Substance No. : 416-210-4

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

Use of the Substance/Mixture : GES1 Formulation of fragrance compounds (mixing of fragrance substances into fragrance compounds)
GES2 Formulation of fragranced end-products
GES3 Industrial end-use of washing and cleaning products (on request available)
GES4 Professional end-use of washing and cleaning products (on request available)
GES5 Professional end-use of polishes and wax blends (on request available)

1.3 Details of the supplier of the safety data sheet

Company : IFF Benicarló, S.L.
Avda. Felipe Klein 2
12580 BENICARLÓ
Telephone : +34964470212
Telefax : +34964473411
E-mail address : sds@iff.com
Responsible/issuing person

1.4 Emergency telephone number

+34 964 470 212

2. Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Eye irritation, Category 2 H319: Causes serious eye irritation.
Chronic aquatic toxicity, Category 2 H411: Toxic to aquatic life with long lasting effects.

2.2 Label elements

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Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms :



Signal word : Warning

Hazard statements : H319 Causes serious eye irritation.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statements : **Prevention:**
P264 Wash skin thoroughly after handling.
P273 Avoid release to the environment.
P280 Wear protective gloves/ eye protection/ face protection.

Response:
P337 + P313 If eye irritation persists: Get medical advice/ attention.

P391 Collect spillage.

Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Other hazards

None reasonably foreseeable.

3. Composition/information on ingredients

3.1 Substances

Chemical name of the substance : 2-methyl-3-[(1,7,7-trimethylbicyclo-[2.2.1]hept-2-yl)oxy]-1-Propanol
 Chemical characterization : alicyclic alcohols
 Molecular formula : C₁₄H₂₆O₂
 Molecular weight : 226,35 g/mol
 CAS-No. : 128119-70-0
 EINECS-No. : 416-210-4
 REACH No. : 01-0000016310-85-0000

Hazardous components

Chemical Name	CAS-No.	GHS Classification	Concentration
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	EC-No.		[%]
2-methyl-3-[(1,7,7-trimethylbicyclo-[2.2.1]hept-2-yl)oxy]-1-Propanol	128119-70-0 416-210-4	Eye Irrit.2; H319 Aquatic Chronic2; H411	50 - 100

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.

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

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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 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.

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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 use(s)

Specific use(s) : Industrial use, Professional use

8. Exposure controls/personal protection

8.1 Control parameters

Contains no substances with occupational exposure limit values.

DNEL

2-methyl-3-[(1,7,7-trimethylbicyclo-[2.2.1]hept-2-yl)oxy]-1-Propanol : End Use: Workers
Exposure routes: Inhalation
Potential health effects: Long-term systemic effects
Value: 6,83 mg/m³

End Use: Workers
Exposure routes: Skin contact
Potential health effects: Long-term systemic effects
Value: 1,94 mg/kg bw/day

End Use: General population
Exposure routes: Inhalation
Potential health effects: Long-term systemic effects
Value: 2 mg/m³

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End Use: General population
Exposure routes: Skin contact
Potential health effects: Long-term systemic effects
Value: 1,2 mg/kg bw/day

End Use: General population
Exposure routes: Ingestion
Potential health effects: Long-term systemic effects
Value: 1 mg/kg bw/day

PNEC

2-methyl-3-[(1,7,7-trimethylbicyclo-[2.2.1]hept-2-yl)oxy]-1-Propanol

: Fresh water
Value: 2,8 µg/l

Marine water
Value: 0,28 µg/l

Fresh water sediment
Value: 0,486 mg/kg dry weight (d.w.)

Marine sediment
Value: 0,0486 mg/kg dry weight (d.w.)

Sewage treatment plant
Value: 1,8 mg/l

Soil
Value: 0,0956 mg/kg dry weight (d.w.)

Secondary Poisoning
No potential to cause toxic effects if accumulated.

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 : Refer to attached exposure scenario in the Annex.

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Hand protection : Refer to attached exposure scenario in the Annex.

Eye protection : Refer to attached exposure scenario in the Annex.

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

Colour : colorless to 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) : The product is not flammable.
Method: Pyrophoric properties of solids and liquids

Oxidizing properties : not determined

Auto-ignition temperature : 241 °C at 1.013 hPa
Method: Tested according to Annex V of Directive 67/548/EEC.

pH : not determined

Melting point : -25 °C at 1.013 hPa
Method: OECD Test Guideline 102

Boiling point : 281 °C at 1.013 hPa
Method: OECD Test Guideline 103

Vapour pressure : 0,00665 hPa at 25 °C
Method: OECD Test Guideline 104

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Density : not determined
Water solubility : 0,0578 g/l at 20 °C
Method: OECD Test Guideline 105

Partition coefficient: n-octanol/water : log Pow: 3,86 at 19 °C
Method: OECD Test Guideline 107

Solubility in other solvents : not determined
Viscosity, dynamic : not determined
Viscosity, kinematic : not determined
Relative vapour density : not determined
Surface tension : 46,2 mN/m
at 20 °C
Method: OECD 115

Evaporation rate : not determined

9.2 Other information

Refractive index : not determined
Relative density : 0,9660 - 0,9720

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 : Carbon monoxide and unidentified organic compounds may be

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products formed during combustion.

11. Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Acute oral toxicity : LD50: > 2.000 mg/kg
Species: Rat
Method: OECD Test Guideline 401
Remarks: IFF

Acute dermal toxicity : LD50: > 2.000 mg/kg
Species: Rat
Method: OECD Test Guideline 402

Skin corrosion/irritation

Skin irritation : No information available.
Skin irritation : Species: Rabbit
Result: No skin irritation
Method: OECD Test Guideline 404
Exposure time: 4 h

Serious eye damage/eye irritation

No information available.
Eye irritation : Species: Rabbit
Result: Eye irritation
Method: OECD Test Guideline 405
Exposure time: 4 h
Test substance: (undiluted)

Respiratory or skin sensitisation

No information available.
Sensitisation : Maximisation Test (GPMT)
Species: Guinea pig
Result: Did not cause sensitisation on laboratory animals.
Method: OECD Test Guideline 406
Test substance: (undiluted)

: repeated insult patch test
Species: human
Result: Did not cause sensitisation on laboratory animals.

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Germ cell mutagenicity

No information available.

Genotoxicity in vitro : Ames test
Salmonella typhimurium
Result: negative
Method: OECD Test Guideline 471

: Chromosome aberration test in vitro
Human lymphocytes
Result: negative
Method: OECD Test Guideline 473

: Mouse lymphoma assay
mouse lymphoma cells
Method: OECD Test Guideline 476

Carcinogenicity

No information available.

Reproductive toxicity

No information available.

Target Organ Systemic Toxicant - Single exposure

No information available.

Target Organ Systemic Toxicant - Repeated exposure

No information available.

Aspiration hazard

No information available.

12. Ecological information

12.1 Toxicity

Toxicity to fish : LC50: 6,9 mg/l
Exposure time: 96 h
Species: Oncorhynchus mykiss (rainbow trout)
flow-through test Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : EC50: 2,8 mg/l
Exposure time: 48 h
Species: Daphnia magna (Water flea)
static test Method: OECD Test Guideline 202

Toxicity to algae : EC50: 11 mg/l

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Exposure time: 72 h
Species: Pseudokirchneriella subcapitata (aglae)
static test Method: OECD Test Guideline 201

: NOEC: 1,7 mg/l
Exposure time: 72 h
Species: Pseudokirchneriella subcapitata (aglae)
static test Method: OECD Test Guideline 201

12.2 Persistence and degradability

No information available.

Biodegradability : Closed Bottle test
Result: Not readily biodegradable.
2 %
Method: OECD Test Guideline 301D

12.3 Bioaccumulative potential

No information available.

12.4 Mobility in soil

Mobility : Remarks:
Adsorption to solid soil phase is possible.

12.5 Results of PBT and vPvB assessment

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

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

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ADR

UN number : 3082
Description of the goods : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
(2-METHYL-3-[(1,7,7-TRIMETHYLBICYCLO[2.2.1]HEPT-2-YL)OXY]-1-PROPANOL)
Labels : 9
Packing group : III
Environmentally hazardous : yes

IATA

UN number : 3082
Description of the goods : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
(2-METHYL-3-[(1,7,7-TRIMETHYLBICYCLO[2.2.1]HEPT-2-YL)OXY]-1-PROPANOL)
Labels : 9
Packing group : III
Environmentally hazardous : yes

IMDG

UN number : 3082
Description of the goods : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
(2-METHYL-3-[(1,7,7-TRIMETHYLBICYCLO[2.2.1]HEPT-2-YL)OXY]-1-PROPANOL)
Labels : 9
Packing group : III
Marine pollutant : yes

Special precautions for user : No special precautions required.

15. Regulatory information

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

Water contaminating class : WGK 2water endangering
(Germany)

15.2 Chemical Safety Assessment

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

16. Other information

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

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H319 Causes serious eye irritation.
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, the United States Flavor and Extract Manufacturers Association (FEMA) 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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ANNEX

INTERNATIONAL FLAVORS & FRAGRANCES

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INDEX

1. **GES1 Formulation of fragrance compounds (mixing of fragrance substances into fragrance compounds)**
2. **GES2 Formulation of fragranced end-products**

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1. Short title of Exposure Scenario: GES1 Formulation of fragrance compounds (mixing of fragrance substances into fragrance compounds)

- | | |
|--------------------------------|---|
| Main User Groups | : SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites |
| Process category | : PROC 8b (IFRA F-1): Material transfers from/to vessel/container at dedicated facility (IFRA F-1)
PROC 1 (IFRA F-2): Storage (IFRA F-2)
PROC 3 (IFRA F-3): Mixing operations (closed systems) in batch process including filling of equipment and sample collection (IFRA F-3)
PROC 5 (IFRA-F4): Mixing operations (open systems) in batch process including filling of equipment and sample collection (IFRA F-4)
PROC 15 (IFRA F-5): QC laboratory (IFRA F-5)
PROC 9 (IFRA F-6): Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (IFRA F-6)
PROC 8a (IFRA F-7): Equipment cleaning and maintenance (IFRA F-7) |
| Environmental release category | : spERC 2 IFRA 2.1a.v1: Formulation of fragrance compounds at large medium sites
spERC IFRA 2.1b.v1: Formulation of fragrance compounds at small sites |

2.1 Contributing scenario controlling environmental exposure for: spERC 2 IFRA 2.1a.v1, spERC IFRA 2.1b.v1

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 | : 15 kg (Large/medium site)
: 6 kg (Small site) |
| Annual amount per site | : 3800 kg (Large/medium site) |

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: 1500 kg (Small site)

Environment factors not influenced by risk management

Flow rate : 18.000 m3/d
 Remarks : Large/medium site, Small site

Other given operational conditions affecting environmental exposure

Continuous exposure
 Number of emission days per year : 250
 Emission or Release Factor: Water : 0,2 %
 Remarks : Large/medium site

Emission or Release Factor: Water : 0,5 %
 Remarks : Small site

Emission or Release Factor: Air : 0 %
 Emission or Release Factor: Soil : 0 %
 Remarks : Large/medium site, Small site

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) : 19 %
 Remarks : Large/medium site, Small site

Conditions and measures related to external treatment of waste for disposal

Disposal methods : Dispose of waste or used sacks/containers according to local regulations.
 Remarks : Large/medium site, Small site

2.2 Contributing scenario controlling worker exposure for: PROC 8b (IFRA F-1)

Product characteristics

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

Frequency and duration of use

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Remarks : Avoid carrying out activities involving exposure for more than 1 hour.

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor
Ventilation rate per hour : 3
Remarks : Assumes activities are at room temperature.
Outdoor / Indoor : Outdoor
Remarks : Assumes process temperature up to 40 °C

Technical conditions and measures

Provide a basic standard of general ventilation (1 to 3 air changes per hour), Advanced (industrial) exposure controles assumed., Use in semi-closed process with opportunity for exposure.

Organisational measures to prevent /limit releases, dispersion and exposure

Demonstrable and effective housekeeping practices are in place.

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

Use suitable eye protection.

2.3 Contributing scenario controlling worker exposure for: PROC 1 (IFRA F-2)

Product characteristics

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

Frequency and duration of use

Remarks : Avoid carrying out activities involving exposure for more than 1 hour.

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use
Remarks : Assumes process temperature up to 40 °C

Technical conditions and measures

Provide a basic standard of general ventilation (1 to 3 air changes per hour), Use in closed process, no likelihood of exposure., Advanced (industrial) exposure controles assumed.

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

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Use suitable eye protection.

2.4 Contributing scenario controlling worker exposure for: PROC 3 (IFRA F-3)

Product characteristics

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

Frequency and duration of use

Remarks : Avoid carrying out activities involving exposure for more than 4 hours.

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use
 Remarks : Assumes process temperature up to 40 °C

2.5 Contributing scenario controlling worker exposure for: PROC 5 (IFRA-F4)

Product characteristics

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

Frequency and duration of use

Remarks : Avoid carrying out activities involving exposure for more than 4 hours.

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use
 Ventilation rate per hour : 3
 Remarks : Assumes process temperature up to 40 °C

2.6 Contributing scenario controlling worker exposure for: PROC 15 (IFRA F-5)

Product characteristics

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

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Frequency and duration of use

Remarks : Avoid carrying out activities involving exposure for more than 15 minutes.

Other operational conditions affecting workers exposureOutdoor / Indoor : Indoor use
Remarks : Assumes process temperature up to 40 °C

2.7 Contributing scenario controlling worker exposure for: PROC 9 (IFRA F-6)

Product characteristics

Concentration of the Substance in Mixture/Article : Concentration of substance in mixture <= 4.45%

Frequency and duration of use

Remarks : Avoid carrying out activities involving exposure for more than 1 hour.

Other operational conditions affecting workers exposureOutdoor / Indoor : Indoor use
Remarks : Assumes process temperature up to 40 °C

2.8 Contributing scenario controlling worker exposure for: PROC 8a (IFRA F-7)

Product characteristics

Concentration of the Substance in Mixture/Article : Concentration of substance in mixture <= 4.45%

Frequency and duration of use

Remarks : Avoid carrying out activities involving exposure for more than 4 hours.

Other operational conditions affecting workers exposureOutdoor / Indoor : Indoor use
Remarks : Assumes process temperature up to 40 °C

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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):
spERC 2 IFRA 2.1a.v1	EUSES	Large/medium site	Fresh water		0,001mg/L	0,458
spERC 2 IFRA 2.1a.v1	EUSES	Large/medium site	Fresh water sediment		0,222mg/kg dw	0,458
spERC 2 IFRA 2.1a.v1	EUSES	Large/medium site	Marine water		0,1277µg/L	0,456
spERC 2 IFRA 2.1a.v1	EUSES	Large/medium site	Marine sediment		0,022mg/kg dw	0,456
spERC 2 IFRA 2.1a.v1	EUSES	Large/medium site	Sewage treatment plant		0,012mg/L	< 0,01
spERC 2 IFRA 2.1a.v1	EUSES	Large/medium site	Soil		0,094mg/kg dw	0,985
spERC IFRA 2.1b.v1	EUSES	Small site	Fresh water		0,001mg/L	0,456
spERC IFRA 2.1b.v1	EUSES	Small site	Fresh water sediment		0,222mg/kg dw	0,456
spERC IFRA 2.1b.v1	EUSES	Small site	Marine water		0,1271µg/L	0,454
spERC IFRA 2.1b.v1	EUSES	Small site	Marine sediment		0,022mg/kg dw	0,454
spERC IFRA 2.1b.v1	EUSES	Small site	Sewage treatment plant		0,12mg/L	< 0,01
spERC	EUSES	Small site	Soil		0,093mg/kg dw	0,973

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Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterisation ratio (PEC/PNEC):
PROC 8b (IFRA F-1)	ART 1.5	Indoor	Inhalation, systemic, long-term	0,096 mg/m ³	0,014
PROC 8b (IFRA F-1)	TRA Worker v3	Indoor	Dermal, systemic, long-term	0,686 mg/kg bw/day	0,361
PROC 8b (IFRA F-1)	Extended ECETOC TRA workers	Outdoor	Inhalation, systemic, long-term	0,294 mg/m ³	0,043
PROC 8b (IFRA F-1)	Extended ECETOC TRA workers	Outdoor	Dermal, systemic, long-term	0,061 mg/kg bw/day	0,032
PROC 1 (IFRA F-2)	TRA Worker v3		Inhalation, systemic, long-term	0,019 mg/m ³	< 0,01
PROC 1 (IFRA F-2)	TRA Worker v3		Dermal, systemic, long-term	0,034 mg/kg bw/day	0,018
PROC 3 (IFRA F-3)	TRA Worker v3		Inhalation, systemic, long-term	5,039 mg/m ³	0,746
PROC 3 (IFRA F-3)	TRA Worker v3		Dermal, systemic, long-term	0,069 mg/kg bw/day	0,036
PROC 5 (IFRA-F4)	ART 1.5		Inhalation, systemic, long-term	1,2 mg/m ³	0,176
PROC 5 (IFRA-F4)	TRA Worker v3		Dermal, systemic, long-term	1,371 mg/kg bw/day	0,722
PROC 15 (IFRA F-5)	TRA Worker v3		Inhalation, systemic, long-term	4,716 mg/m ³	0,69
PROC 15 (IFRA F-5)	TRA Worker v3		Dermal, systemic, long-term	0,34 mg/kg bw/day	0,179
PROC 9 (IFRA F-6)	Extended ECETOC TRA workers		Inhalation, systemic, long-term	0,42 mg/m ³	0,061
PROC 9 (IFRA F-6)	Extended ECETOC TRA workers		Dermal, systemic, long-term	0,031 mg/kg bw/day	0,016
PROC 8a (IFRA F-7)	Extended ECETOC TRA workers		Inhalation, systemic, long-term	2,518 mg/m ³	0,369
PROC 8a (IFRA F-7)	Extended ECETOC TRA workers		Dermal, systemic, long-term	0,061 mg/kg bw/day	0,032

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

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 (OCs) and/or risk management measures (RMMs) 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 OCs and RMMs recommended in this exposure scenario 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. Background information on PEC Regional freshwater is 5.368E-5 mg/L. 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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1. Short title of Exposure Scenario: GES2 Formulation of fragranced end-products

- Main User Groups : **SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites**
- Process category : **PROC 8b (AISE M-6): Material transfers from/to vessel/container at dedicated facility (AISE M-6)**
PROC 1 (AISE M-1): Storage (AISE M-1)
PROC 3 (AISE M-3): Mixing operations (closed systems) in batch process including filling of equipment and sample collection (AISE M-3)
PROC 5 (AISE M-5): Mixing operations (open systems) in batch process including filling of equipment and sample collection (AISE M-5)
PROC 15 (AISE M-9): QC Laboratory (AISE M-9)
PROC 9 (AISE M-7): Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (AISE M-7)
PROC 8a: Equipment cleaning and maintenance
PROC 14 (AISE M-8): Production of mixtures or articles by tableting, compression, extrusion or pelletisation (AISE M-8)
- Environmental release category : **AISE 2.1.a,g: spERC AISE Granular & Low Viscosity Liquids - large scale**
AISE 2.1.b,h: spERC AISE Granular & Low Viscosity Liquids - medium scale
AISE 2.1.c,i: spERC AISE Granular & Low Viscosity Liquids - small scale
AISE 2.1.j CE/AISE 2.3a CE 2.1.a: spERC AISE High Viscosity Liquids + CE/AISE Solid Products + CE Low Viscosity Liquids - large scale
AISE 2.1.k CE/AISE 2.3b CE 2.1.b: spERC AISE High Viscosity Liquids + CE/AISE Solid Products + CE Low Viscosity Liquids - medium scale
AISE 2.1.l CE/AISE 2.3c CE 2.1.c: spERC AISE High Viscosity Liquids + CE/AISE Solid Products + CE Low Viscosity Liquids - small scale
ERC 2: GES2H default - all scales
CE 2.2.a-c: spERC AISE & CE Fine Fragrances (cleaning with solvent) - all scales

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2.1 Contributing scenario controlling environmental exposure for: AISE 2.1.a,g, AISE 2.1.b,h, AISE 2.1.c,i, AISE 2.1.j CE/AISE 2.3a CE 2.1.a, AISE 2.1.k CE/AISE 2.3b CE 2.1.b, AISE 2.1.l CE/AISE 2.3c CE 2.1.c, CE 2.2.a-c, ERC 2

Amount used

Daily amount per site	: 76 kg (AISE 2.1.a,g)
	: 29 kg (AISE 2.1.b,h)
	: 12 kg (AISE 2.1.c,i)
	: 22 kg (AISE 2.1.j CE/AISE 2.3.a CE 2.1.a)
	: 8 kg (AISE 2.1.k CE/AISE 2.3.b CE 2.1.b)
	: 7 kg (AISE 2.1.l CE/AISE 2.3.c CE 2.1.c)
	: 32 kg (CE 2.2.a-c)
	: 1,5 kg (CE 2.1.d-j)
Annual amount per site	: 19000 kg (AISE 2.1.a,g)
	: 7200 kg (AISE 2.1.b,h)
	: 2900 kg (AISE 2.1.c,i)
	: 5500 kg (AISE 2.1.j CE/AISE 2.3.a CE 2.1.a)
	: 2000 kg (AISE 2.1.k CE/AISE 2.3.b CE 2.1.b)
	: 1800 kg (AISE 2.1.l CE/AISE 2.3.c CE 2.1.c)
	: 8000 kg (CE 2.2.a-c)
	: 380 kg (CE 2.1.d-j)

Environment factors not influenced by risk management

Flow rate	: 18.000 m3/d
Remarks	: Large/medium site, Small site

Other given operational conditions affecting environmental exposure

Continuous exposure	
Number of emission days per year	: 250
Emission or Release Factor: Air	: 0 %
Emission or Release Factor: Soil	: 0 %
Remarks	: Large/medium site, Small site
Emission or Release Factor: Water	: 0,01 %
Remarks	: AISE 2.1.a,g, AISE 2.1.b,h, AISE 2.1.j CE/AISE 2.3.a CE 2.1.a
Emission or Release Factor: Water	: 0,2 %

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Remarks : AISE 2.1.c,i, AISE 2.1.k CE/AISE 2.3.b CE 2.1.b

Emission or Release Factor: Water : 0,4 %
 Remarks : AISE 2.1.l CE/AISE 2.3.c CE 2.1.c

Emission or Release Factor: Water : 0 %
 Remarks : CE 2.2.a-c

Emission or Release Factor: Water : 2 %
 Remarks : CE 2.1.d-j

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) : 19 %
 Remarks : AISE 2.1.a,g, AISE 2.1.b,h, AISE 2.1.c,i, AISE 2.1.j CE/AISE 2.3.a
 CE 2.1.a, AISE 2.1.k CE/AISE 2.3.b CE 2.1.b, AISE 2.1.l CE/AISE
 2.3.c CE 2.1.c, CE 2.1.d-j
 Effectiveness (of a measure) : 100 %
 Remarks : CE 2.2.a-c

Conditions and measures related to external treatment of waste for disposal

Disposal methods : Dispose of waste or used sacks/containers according to local
 regulations.
 Remarks : Large/medium site, Small site

2.2 Contributing scenario controlling worker exposure for: PROC 8b (AISE M-6)

Product characteristics

Concentration of the Substance in Mixture/Article : Concentration of substance in mixture <= 4.45%

Frequency and duration of use

Remarks : Avoid carrying out activities involving exposure for more than 1
 hour.

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

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Remarks : Assumes process temperature up to 40 °C

Technical conditions and measures

Provide a basic standard of general ventilation (1 to 3 air changes per hour),. Use in semi-closed process with opportunity for exposure., Advanced (industrial) exposure controles assumed.

2.3 Contributing scenario controlling worker exposure for: PROC 1 (AISE M-1)

Product characteristics

Concentration of the Substance in Mixture/Article Concentration of substance in mixture <= 4.45%

Frequency and duration of use

Remarks : Avoid carrying out activities involving exposure for more than 1 hour.

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor
Remarks : Assumes process temperature up to 40 °C

Technical conditions and measures

Provide a basic standard of general ventilation (1 to 3 air changes per hour),. Use in closed process, no likelihood of exposure., Advanced (industrial) exposure controles assumed.

2.4 Contributing scenario controlling worker exposure for: PROC 3 (AISE M-3)

Product characteristics

Concentration of the Substance in Mixture/Article Concentration of substance in mixture <= 4.45%

Frequency and duration of use

Remarks : Avoid carrying out activities involving exposure for more than 4 hours.

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor
Remarks : Assumes process temperature up to 40 °C

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Technical conditions and measures

Provide a basic standard of general ventilation (1 to 3 air changes per hour), Use in closed batch process (synthesis or formulation), Advanced (industrial) exposure controles assumed.

2.5 Contributing scenario controlling worker exposure for: PROC 5 (AISE M-5)

Product characteristics

Concentration of the Substance in Mixture/Article Concentration of substance in mixture <= 4.45%

Frequency and duration of use

Remarks : Avoid carrying out activities involving exposure for more than 4 hours.

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor
Remarks : Assumes process temperature up to 40 °C

Technical conditions and measures

Provide a basic standard of general ventilation (1 to 3 air changes per hour), Advanced (industrial) exposure controles assumed.

2.6 Contributing scenario controlling worker exposure for: PROC 15 (AISE M-9)

Product characteristics

Concentration of the Substance in Mixture/Article Concentration of substance in mixture <= 4.45%

Frequency and duration of use

Remarks : Avoid carrying out activities involving exposure for more than 15 minutes.

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor
Remarks : Assumes process temperature up to 40 °C

Technical conditions and measures

Provide a basic standard of general ventilation (1 to 3 air changes per hour), Advanced (industrial) exposure

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controles assumed.

2.7 Contributing scenario controlling worker exposure for: PROC 9 (AISE M-7)

Product characteristics

Concentration of the Substance in Mixture/Article : Concentration of substance in mixture <= 4.45%

Frequency and duration of use

Remarks : Avoid carrying out activities involving exposure for more than 1 hour.

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor
Remarks : Assumes process temperature up to 40 °C

Technical conditions and measures

Provide a basic standard of general ventilation (1 to 3 air changes per hour), Use in semi-closed process with opportunity for exposure., Advanced (industrial) exposure controles assumed.

2.8 Contributing scenario controlling worker exposure for: PROC 8a

Product characteristics

Concentration of the Substance in Mixture/Article : Concentration of substance in mixture <= 4.45%

Frequency and duration of use

Remarks : Avoid carrying out activities involving exposure for more than 4 hours.

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor
Remarks : Assumes process temperature up to 40 °C

Technical conditions and measures

Provide a basic standard of general ventilation (1 to 3 air changes per hour), Advanced (industrial) exposure controles assumed.

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2.9 Contributing scenario controlling worker exposure for: PROC 14 (AISE M-8)

Product characteristics

Concentration of the Substance in Mixture/Article : Concentration of substance in mixture <= 4.45%

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor
Remarks : Assumes process temperature up to 40 °C

Technical conditions and measures

Provide a basic standard of general ventilation (1 to 3 air changes per hour)., Advanced (industrial) exposure controles assumed.

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):
AISE 2.1.a.g	EUSES	Large scale	Fresh water		0,3773µg/L	0,135
AISE 2.1.a.g	EUSES	Large scale	Fresh water sediment		0,065mg/kg dw	0,135
AISE 2.1.a.g	EUSES	Large scale	Marine water		0,03773µg/L	0,133
AISE 2.1.a.g	EUSES	Large scale	Marine sediment		0,006mg/kg dw	0,133
AISE 2.1.a.g	EUSES	Large scale	Sewage treatment plant		0,003mg/L	< 0,01
AISE 2.1.a.g	EUSES	Large scale	Soil		0,024mg/kg dw	0,247
AISE 2.1.b,h	EUSES	Medium scale	Fresh water		0,001mg/L	0,443
AISE 2.1.b,h	EUSES	Medium scale	Fresh water sediment		0,216mg/kg dw	0,444

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AISE 2.1.b,h	EUSES	Medium scale	Marine water	0,1237µg/L	0,442
AISE 2.1.b,h	EUSES	Medium scale	Marine sediment	0,021mg/kg dw	0,442
AISE 2.1.b,h	EUSES	Medium scale	Sewage treatment plant	0,012mg/L	< 0,01
AISE 2.1.b,h	EUSES	Medium scale	Soil	0,09mg/kg dw	0,941
AISE 2.1.c,i	EUSES	Small scale	Fresh water	0,9992µg/L	0,357
AISE 2.1.c,i	EUSES	Small scale	Fresh water sediment	0,174mg/kg dw	0,357
AISE 2.1.c,i	EUSES	Small scale	Marine water	0,09942µg/L	0,355
AISE 2.1.c,i	EUSES	Small scale	Marine sediment	0,017mg/kg dw	0,355
AISE 2.1.c,i	EUSES	Small scale	Sewage treatment plant	0,009mg/L	< 0,01
AISE 2.1.c,i	EUSES	Small scale	Soil	0,071mg/kg dw	0,747
AISE 2.1.j CE/AISE 2.3a CE 2.1.a	EUSES	Large scale	Fresh water	0,9589µg/L	0,342
AISE 2.1.j CE/AISE 2.3a CE 2.1.a	EUSES	Large scale	Fresh water sediment	0,166mg/kg dw	0,342
AISE 2.1.j CE/AISE 2.3a CE 2.1.a	EUSES	Large scale	Marine water	0,09538µg/L	0,341
AISE 2.1.j CE/AISE 2.3a CE 2.1.a	EUSES	Large scale	Marine sediment	0,017mg/kg dw	0,341
AISE 2.1.j CE/AISE 2.3a CE 2.1.a	EUSES	Large scale	Sewage treatment plant	0,009mg/L	< 0,01
AISE 2.1.j CE/AISE 2.3a CE 2.1.a	EUSES	Large scale	Soil	0,068mg/kg dw	0,714
AISE 2.1.k CE/AISE 2.3b CE 2.1.b	EUSES	Medium scale	Fresh water	0,7165µg/L	0,256
AISE 2.1.k	EUSES	Medium scale	Fresh water	0,124mg/kg dw	0,256

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CE/AISE 2.3b CE 2.1.b			sediment			
AISE 2.1.k CE/AISE 2.3b CE 2.1.b	EUSES	Medium scale	Marine water		0,07115µg/L	0,254
AISE 2.1.k CE/AISE 2.3b CE 2.1.b	EUSES	Medium scale	Marine sediment		0,012mg/kg dw	0,254
AISE 2.1.k CE/AISE 2.3b CE 2.1.b	EUSES	Medium scale	Sewage treatment plant		0,006mg/L	< 0,01
AISE 2.1.k CE/AISE 2.3b CE 2.1.b	EUSES	Medium scale	Soil		0,05mg/kg dw	0,52
AISE 2.1.l CE/AISE 2.3c CE 2.1.c	EUSES	Small scale	Fresh water		0,001µg/L	0,429
AISE 2.1.l CE/AISE 2.3c CE 2.1.c	EUSES	Small scale	Fresh water sediment		0,209mg/kg dw	0,429
AISE 2.1.l CE/AISE 2.3c CE 2.1.c	EUSES	Small scale	Marine water		0,01196µg/L	0,427
AISE 2.1.l CE/AISE 2.3c CE 2.1.c	EUSES	Small scale	Marine sediment		0,021mg/kg dw	0,427
AISE 2.1.l CE/AISE 2.3c CE 2.1.c	EUSES	Small scale	Sewage treatment plant		0,011mg/L	< 0,01
AISE 2.1.l CE/AISE 2.3c CE 2.1.c	EUSES	Small scale	Soil		0,087mg/kg dw	0,909
CE 2.2.a-c	EUSES	all scales	Fresh water		0,0703µg/L	0,025
CE 2.2.a-c	EUSES	all scales	Fresh water		0,012mg/kg dw	0,025

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			sediment			
CE 2.2.a-c	EUSES	all scales	Marine water		0,006526µg/L	0,023
CE 2.2.a-c	EUSES	all scales	Marine sediment		0,001µg/kg dw	0,023
CE 2.2.a-c	EUSES	all scales	Sewage treatment plant		0mg/L	< 0,01
CE 2.2.a-c	EUSES	all scales	Soil		0,03868µg/kg dw	< 0,01
ERC 2	EUSES	all scales	Fresh water		0,001µg/L	0,458
ERC 2	EUSES	all scales	Fresh water sediment		0,222mg/kg dw	0,458
ERC 2	EUSES	all scales	Marine water		0,01277µg/L	0,456
ERC 2	EUSES	all scales	Marine sediment		0,022mg/kg dw	0,456
ERC 2	EUSES	all scales	Sewage treatment plant		0,012mg/L	< 0,01
ERC 2	EUSES	all scales	Soil		0,093mg/kg dw	0,974

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterisation ratio (PEC/PNEC):
PROC 8b (AISE M-6)	Extended ECETOC TRA workers	Indoor	Inhalation, systemic, long-term	0,42 mg/m ³	0,061
PROC 8b (AISE M-6)	Extended ECETOC TRA workers	Indoor	Dermal, systemic, long-term	0,61 mg/kg bw/day	0,321
PROC 1 (AISE M-1)	Extended ECETOC TRA workers		Inhalation, systemic, long-term	0,0008 mg/m ³	< 0,01
PROC 1 (AISE M-1)	Extended ECETOC TRA workers		Dermal, systemic, long-term	0,002 mg/kg bw/day	< 0,01
PROC 3 (AISE M-3)	Extended ECETOC TRA workers		Inhalation, systemic, long-term	0,755 mg/m ³	0,111
PROC 3 (AISE M-3)	Extended ECETOC TRA workers		Dermal, systemic, long-term	0,031 mg/kg bw/day	0,016
PROC 5 (AISE M-5)	Extended ECETOC TRA workers		Inhalation, systemic, long-term	1,259 mg/m ³	0,184
PROC 5 (AISE M-5)	Extended ECETOC TRA workers		Dermal, systemic, long-term	0,61 mg/kg bw/day	0,321
PROC 15 (AISE M-9)	Extended ECETOC TRA workers		Inhalation, systemic, long-term	0,21 mg/m ³	0,031
PROC 15	Extended ECETOC		Dermal, systemic, long-term	0,015 mg/kg bw/day	< 0,01

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(AISE M-9)	TRA workers		term		
PROC 9 (AISE M-7)	Extended ECETOC TRA workers		Inhalation, systemic, long-term	0,42 mg/m ³	0,061
PROC 9 (AISE M-7)	Extended ECETOC TRA workers		Dermal, systemic, long- term	0,303 mg/kg bw/day	0,16
PROC 8a (IFRA F-7)	Extended ECETOC TRA workers		Inhalation, systemic, long-term	2,518 mg/m ³	0,369
PROC 8a (IFRA F-7)	Extended ECETOC TRA workers		Dermal, systemic, long- term	0,61 mg/kg bw/day	0,321
PROC 14 (AISE M-8)	Extended ECETOC TRA workers		Dermal, systemic, long- term	0,61 mg/kg bw/day	0,321
PROC 14 (AISE M-8)	Extended ECETOC TRA workers		Inhalation, systemic, long-term	2,518 mg/m ³	0,369

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

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 (OCs) and/or risk management measures (RMMs) 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 OCs and RMMs recommended in this exposure scenario 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. Background information on PEC Regional freshwater is 5.368E-5 mg/L. 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;

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INTERNATIONAL FLAVORS & FRAGRANCES

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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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