



SAFETY DATA SHEET

EUCALYPTUS MACULATA CITRIODORA, EXT

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

1.1. Product identifier

Product name	EUCALYPTUS MACULATA CITRIODORA, EXT
Product number	55441
Synonyms; trade names	ORGANIC EUCALYPTUS CITIODORA OIL
REACH registration number	01-2120741486-50-XXXX
CAS number	85203-56-1
EC number	286-249-8

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

Identified uses	Cosmetics Fragrance Flavouring Aromatherapy
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1.3. Details of the supplier of the safety data sheet

Supplier	Univar Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com
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1.4. Emergency telephone number

Emergency telephone	SGS - +32 (0)3 575 55 55 (24h)
Sds No.	55441

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (EC 1272/2008)

Physical hazards	Not Classified
Health hazards	Skin Irrit. 2 - H315 Eye Irrit. 2 - H319 Skin Sens. 1 - H317
Environmental hazards	Aquatic Chronic 2 - H411

2.2. Label elements

EC number	286-249-8
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Hazard pictograms



Signal word	Warning
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EUCALYPTUS MACULATA CITRIODORA, EXT

Hazard statements	H315 Causes skin irritation. H319 Causes serious eye irritation. H317 May cause an allergic skin reaction. H411 Toxic to aquatic life with long lasting effects.
Precautionary statements	P202 Do not handle until all safety precautions have been read and understood. P261 Avoid breathing vapour/ spray. P273 Avoid release to the environment. P302+P352 IF ON SKIN: Wash with plenty of water. P501 Dispose of contents/ container in accordance with national regulations.
Contains	CITRONELLAL, CITRONELLOL, EUCALYPTOL, (R)-P-MENTHA-1,8-DIENE, CARYOPHYLLENE, 2-PINENE, PIN-2-(10) ENE

2.3. Other hazards

This substance is not classified as PBT or vPvB according to current EU criteria.

SECTION 3: Composition/information on ingredients

3.1. Substances

CITRONELLAL			60-100%
CAS number: 106-23-0	EC number: 203-376-6		
Classification Skin Irrit. 2 - H315 Eye Irrit. 2 - H319 Skin Sens. 1 - H317			
ISOPULEGOL			5-10%
CAS number: 89-79-2	EC number: 201-940-6		
Classification Acute Tox. 4 - H302 Skin Irrit. 2 - H315 Eye Irrit. 2 - H319			
CITRONELLOL			5-10%
CAS number: 106-22-9	EC number: 203-375-0	REACH registration number: 01-2119453995-23-XXXX	
Classification Skin Irrit. 2 - H315 Eye Irrit. 2 - H319 Skin Sens. 1 - H317			
EUCALYPTOL			1-5%
CAS number: 470-82-6	EC number: 207-431-5	REACH registration number: 01-2119967772-24-XXXX	
Classification Flam. Liq. 3 - H226 Skin Sens. 1B - H317			

EUCALYPTUS MACULATA CITRIODORA, EXT

CITRONELLYL ACETATE			1-5%
CAS number: 150-84-5	EC number: 205-775-0	REACH registration number: 01-2119959860-27-XXXX	
Classification Skin Irrit. 2 - H315 Aquatic Chronic 2 - H411			

CARYOPHYLLENE			1-5%
CAS number: 87-44-5	EC number: 201-746-1	REACH registration number: 01-2120745237-53-XXXX	
Classification Skin Sens. 1 - H317 Asp. Tox. 1 - H304 Aquatic Chronic 4 - H413			

(R)-P-MENTHA-1,8-DIENE			1-5%
CAS number: 5989-27-5	EC number: 227-813-5	REACH registration number: 01-2119529223-47-XXXX	
M factor (Acute) = 1	M factor (Chronic) = 1		
Classification Flam. Liq. 3 - H226 Skin Irrit. 2 - H315 Skin Sens. 1 - H317 Asp. Tox. 1 - H304 Aquatic Acute 1 - H400 Aquatic Chronic 1 - H410			

2-PINENE			1-5%
CAS number: 80-56-8	EC number: 201-291-9		
M factor (Acute) = 1	M factor (Chronic) = 1		
Classification Flam. Liq. 3 - H226 Acute Tox. 4 - H302 Skin Irrit. 2 - H315 Skin Sens. 1 - H317 Asp. Tox. 1 - H304 Aquatic Acute 1 - H400 Aquatic Chronic 1 - H410			

EUCALYPTUS MACULATA CITRIODORA, EXT

PIN-2-(10) ENE		1-5%
CAS number: 127-91-3	EC number: 204-872-5	
M factor (Acute) = 1	M factor (Chronic) = 1	
Classification		
Flam. Liq. 3 - H226		
Skin Irrit. 2 - H315		
Skin Sens. 1B - H317		
Asp. Tox. 1 - H304		
Aquatic Acute 1 - H400		
Aquatic Chronic 1 - H410		

The full text for all hazard statements is displayed in Section 16.

Product name	EUCALYPTUS MACULATA CITRIODORA, EXT
REACH registration number	01-2120741486-50-XXXX
CAS number	85203-56-1
EC number	286-249-8
Composition comments	The data shown are in accordance with the latest EC Directives.

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation	Move affected person to fresh air and keep warm and at rest in a position comfortable for breathing. Get medical attention if symptoms are severe or persist.
Ingestion	Move affected person to fresh air and keep warm and at rest in a position comfortable for breathing. Rinse mouth thoroughly with water. Give a few small glasses of water or milk to drink. Get medical attention if symptoms are severe or persist.
Skin contact	Take off immediately all contaminated clothing. Wash skin thoroughly with soap and water. Continue to rinse. Get medical attention if symptoms are severe or persist.
Eye contact	Rinse immediately with plenty of water. Remove any contact lenses and open eyelids wide apart. Continue to rinse for at least 15 minutes. Get medical attention if symptoms are severe or persist.

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

Skin contact	Causes skin irritation. May cause an allergic skin reaction.
Eye contact	Causes serious eye irritation.

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

Notes for the doctor	Treat symptomatically. Contact specialist immediately poison treatment if large quantities have been ingested or inhaled
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SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	Extinguish with alcohol-resistant foam, carbon dioxide, dry powder or water fog.
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.

5.2. Special hazards arising from the substance or mixture

EUCALYPTUS MACULATA CITRIODORA, EXT

Hazardous combustion products	Thermal decomposition or combustion may liberate carbon oxides and other toxic gases or vapours.
<u>5.3. Advice for firefighters</u>	
Protective actions during firefighting	Cool containers exposed to heat with water spray and remove them from the fire area if it can be done without risk.
Special protective equipment for firefighters	Wear positive-pressure self-contained breathing apparatus (SCBA) and appropriate protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions	Follow precautions for safe handling described in this safety data sheet. Avoid inhalation of vapours and contact with skin and eyes. Provide adequate ventilation.
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6.2. Environmental precautions

Environmental precautions	Avoid the spillage or runoff entering drains, sewers or watercourses. Spillages or uncontrolled discharges into watercourses must be reported immediately to the Environmental Agency or other appropriate regulatory body.
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6.3. Methods and material for containment and cleaning up

Methods for cleaning up	Absorb spillage with inert, damp, non-combustible material. Flush contaminated area with plenty of water. Collect and place in suitable waste disposal containers and seal securely. Provide adequate ventilation.
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6.4. Reference to other sections

Reference to other sections	Wear protective clothing as described in Section 8 of this safety data sheet. Collect and dispose of spillage as indicated in Section 13.
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SECTION 7: Handling and storage

7.1. Precautions for safe handling

Usage precautions	Wear protective clothing as described in Section 8 of this safety data sheet. Avoid inhalation of vapours and contact with skin and eyes. In case of insufficient ventilation, wear suitable respiratory equipment. Provide adequate ventilation.
Advice on general occupational hygiene	Do not eat, drink or smoke when using this product. Wash hands and any other contaminated areas of the body with soap and water before leaving the work site.

7.2. Conditions for safe storage, including any incompatibilities

Storage precautions	Store in tightly-closed, original container in a dry, cool and well-ventilated place. Avoid exposure to high temperatures or direct sunlight.
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7.3. Specific end use(s)

Specific end use(s)	The identified uses for this product are detailed in Section 1.2.
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SECTION 8: Exposure controls/Personal protection

8.1. Control parameters

DNEL	Workers - Inhalation; Long term systemic effects: 7.5 mg/m ³ General population - Inhalation; Long term systemic effects: 2.22 mg/m ³ Workers - Dermal; Long term systemic effects: 13.33 mg/kg/day General population - Dermal; Long term systemic effects: 8 mg/kg General population - Oral; Long term systemic effects: 1.28 mg/kg/day
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EUCALYPTUS MACULATA CITRIODORA, EXT**PNEC**

Fresh water; 43.3 µg/l
 marine water; 4.3 µg/l
 STP; 10 mg/l
 Sediment (Freshwater); 367 µg/kg
 Sediment (Marinewater); 36.7 µg/kg

CITRONELLAL (CAS: 106-23-0)**DNEL**

Workers - Dermal; Long term systemic effects: 1.7 mg/kg
 Workers - Dermal; Long term local effects: 0.14 mg/cm²
 Workers - Inhalation; Long term systemic effects: 9 mg/m³
 Consumer - Dermal; Long term systemic effects: 1 mg/kg
 Consumer - Dermal; Short term local effects: 0.14 mg/cm²
 Consumer - Inhalation; Long term systemic effects: 2.7 mg/m³
 Consumer - Oral; Long term systemic effects: 0.6 mg/kg

PNEC

Fresh water; 0.00868 mg/l
 marine water; 0.00087 mg/l
 Soil; 0.0267 mg/l
 STP; 4 mg/l

CITRONELLOL (CAS: 106-22-9)**DNEL**

Workers - Dermal; Long term systemic effects: 45.8 mg/kg/day
 Workers - Inhalation; Long term systemic effects: 161.6 mg/m³
 Workers - Dermal; Long term local effects: 29.5 mg/cm²
 Consumer - Dermal; Long term systemic effects: 27.5 mg/kg/day
 Consumer - Inhalation; Long term systemic effects: 47.8 mg/m³
 Consumer - Oral; Long term systemic effects: 13.8 mg/kg/day
 Consumer - Dermal; Long term local effects: 29.5 mg/cm²

PNEC

- Fresh water; 0.0024 mg/l
 - marine water; 0.00024 mg/l
 - STP; 580 mg/l
 - Sediment (Freshwater); 0.0256 mg/l
 - Sediment (Marinewater); 0.00256 mg/l
 - Soil; 0.00371 mg/l

EUCALYPTOL (CAS: 470-82-6)**DNEL**

Workers - Dermal; Long term systemic effects: 2 mg/kg
 Workers - Inhalation; Long term systemic effects: 7.05 mg/kg
 Consumer - Dermal; Long term systemic effects: 1 mg/kg/day
 Consumer - Inhalation; Long term systemic effects: 1.74 mg/m³

PNEC

STP; 10 mg/l
 Soil; 0.2 mg/kg
 Fresh water; 0.057 mg/l
 marine water; 0.0057 mg/l
 Sediment (Freshwater); 0.06732 mg/kg
 Sediment (Marinewater); 0.00673 mg/kg

CITRONELLYL ACETATE (CAS: 150-84-5)

EUCALYPTUS MACULATA CITRIODORA, EXT

DNEL

Workers - Inhalation; Long term systemic effects: 17 mg/m³
 Workers - Dermal; Long term systemic effects: 4.8 mg/kg
 Consumer - Inhalation; Long term systemic effects: 4.2 mg/m³
 Consumer - Dermal; Long term systemic effects: 2.4 mg/kg
 Consumer - Oral; Long term systemic effects: 2.4 mg/kg

PNEC

- Fresh water; 0.00348 mg/l
- marine water; 0.000348 mg/l
- STP; 10 mg/l
- Sediment (Freshwater); 0.851 mg/kg
- Sediment (Marinewater); 0.0851 mg/kg
- Soil; 0.168 mg/kg

(R)-P-MENTHA-1,8-DIENE (CAS: 5989-27-5)

DNEL

Workers - Inhalation; Long term systemic effects: 66.7 mg/m³
 Workers - Dermal; Long term systemic effects: 9.5 mg/kg/day
 Consumer - Inhalation; Long term systemic effects: 16.6 mg/m³
 Consumer - Dermal; Long term systemic effects: 4.8 mg/kg/day
 Consumer - Oral; Long term systemic effects: 4.8 mg/kg/day

PNEC

Fresh water; 14 µg/l
 marine water; 1.4 µg/l
 STP; 1.8 mg/l
 Sediment (Freshwater); 3.85 mg/kg
 Sediment (Marinewater); 0.385 mg/kg
 Soil; 0.763 mg/kg

8.2. Exposure controls

Protective equipment



Eye/face protection

Eyewear complying with an approved standard should be worn if a risk assessment indicates eye contact is possible. Tight-fitting safety glasses. Personal protective equipment for eye and face protection should comply with European Standard EN166.

Hand protection

The most suitable glove should be chosen in consultation with the glove supplier/manufacturer, who can provide information about the breakthrough time of the glove material. Chemical-resistant, impervious gloves complying with an approved standard should be worn if a risk assessment indicates skin contact is possible. To protect hands from chemicals, gloves should comply with European Standard EN374.

Other skin and body protection

Wear appropriate clothing to prevent any possibility of skin contact.

Hygiene measures

Wash at the end of each work shift and before eating, smoking and using the toilet. Wash hands and any other contaminated areas of the body with soap and water before leaving the work site.

Respiratory protection

Respiratory protection complying with an approved standard should be worn if a risk assessment indicates inhalation of contaminants is possible. If ventilation is inadequate, suitable respiratory protection must be worn. EN 136/140/141/145/143/149

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

EUCALYPTUS MACULATA CITRIODORA, EXT

Appearance	Liquid.
Colour	Colourless. or Light (or pale). Green.
Odour	Characteristic.
Odour threshold	No information available.
pH	No information available.
Melting point	-20°C
Initial boiling point and range	93°C @ 101.3 kPa
Flash point	73.7°C
Evaporation rate	No information available.
Evaporation factor	No information available.
Flammability (solid, gas)	No information available.
Upper/lower flammability or explosive limits	No information available.
Other flammability	No information available.
Vapour pressure	47.5 Pa @ 25°C
Vapour density	No information available.
Relative density	0.858 - 0.877 @ 20°C
Bulk density	No information available.
Solubility(ies)	Soluble in water.
Partition coefficient	log Pow: 2.06 –6.30
Auto-ignition temperature	225°C
Decomposition Temperature	No information available.
Viscosity	No information available.
Explosive properties	Not considered to be explosive.
Explosive under the influence of a flame	No information available.
Oxidising properties	Does not meet the criteria for classification as oxidising.
<u>9.2. Other information</u>	
Refractive index	1.450 - 1.468
Particle size	No information available.
Molecular weight	No information available.
Volatility	No information available.
Saturation concentration	No information available.
Critical temperature	No information available.
Volatile organic compound	No information available.

SECTION 10: Stability and reactivity

EUCALYPTUS MACULATA CITRIODORA, EXT

10.1. Reactivity

Reactivity No test data specifically related to reactivity available for this product or its ingredients.

10.2. Chemical stability

Stability Stable at normal ambient temperatures and when used as recommended.

10.3. Possibility of hazardous reactions

Possibility of hazardous reactions Under normal conditions of storage and use, no hazardous reactions will occur.

10.4. Conditions to avoid

Conditions to avoid Avoid exposure to high temperatures or direct sunlight.

10.5. Incompatible materials

Materials to avoid Oxidising agents.

10.6. Hazardous decomposition products

Hazardous decomposition products Does not decompose when used and stored as recommended. Thermal decomposition or combustion may liberate carbon oxides and other toxic gases or vapours.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity - oral

ATE oral (mg/kg) 10,435.17

Skin corrosion/irritation

Skin corrosion/irritation Causes skin irritation.

Serious eye damage/irritation

Serious eye damage/irritation Causes serious eye irritation.

Respiratory sensitisation

Respiratory sensitisation No information available.

Skin sensitisation

Skin sensitisation May cause an allergic skin reaction.

Germ cell mutagenicity

Genotoxicity - in vitro No information available.

Carcinogenicity

Carcinogenicity No information available.

Reproductive toxicity

Reproductive toxicity - fertility No information available.

Reproductive toxicity - development No information available.

Specific target organ toxicity - single exposure

STOT - single exposure No information available.

Specific target organ toxicity - repeated exposure

STOT - repeated exposure No information available.

Aspiration hazard

EUCALYPTUS MACULATA CITRIODORA, EXT

Aspiration hazard	No information available.
Inhalation	Gas or vapour in high concentrations may irritate the respiratory system.
Ingestion	Ingestion may cause severe irritation of the mouth, the oesophagus and the gastrointestinal tract.
Skin contact	Causes skin irritation. May cause an allergic skin reaction.
Eye contact	Causes serious eye irritation.

Toxicological information on ingredients.

CITRONELLAL

Acute toxicity - oral

Notes (oral LD₅₀) LD₅₀ 2420 mg/kg, Oral, Rat

Acute toxicity - inhalation

Notes (inhalation LC₅₀) LD₅₀ > 2500 mg/kg, Dermal, Rabbit

Skin corrosion/irritation

Skin corrosion/irritation Causes skin irritation.
Irritating to skin. Rabbit

Serious eye damage/irritation

Serious eye damage/irritation Causes serious eye irritation.
Irritating to eyes. Rabbit

Skin sensitisation

Skin sensitisation May cause an allergic skin reaction. Guinea pig maximization test (GPMT) - Guinea pig: Sensitising.

Germ cell mutagenicity

Genotoxicity - in vitro Bacterial reverse mutation test: Negative.

ISOPULEGOL

Acute toxicity - oral

Acute toxicity oral (LD₅₀ mg/kg) 940.0

Species Rat

Notes (oral LD₅₀) LD₅₀ 940 mg/kg, Oral, Rat

ATE oral (mg/kg) 940.0

Acute toxicity - dermal

Notes (dermal LD₅₀) LD₅₀ 3000 mg/kg, Dermal, Rabbit

CITRONELLOL

Acute toxicity - oral

Acute toxicity oral (LD₅₀ mg/kg) 3,450.0

Species Rat

EUCALYPTUS MACULATA CITRIODORA, EXT

Notes (oral LD₅₀) LD₅₀ 3450 mg/kg, Oral, Rat

ATE oral (mg/kg) 3,450.0

Acute toxicity - dermal

Acute toxicity dermal (LD₅₀ mg/kg) 2,650.0

Species Rabbit

Notes (dermal LD₅₀) LD₅₀ 2650 mg/kg, Dermal, Rabbit

ATE dermal (mg/kg) 2,650.0

Skin corrosion/irritation

Skin corrosion/irritation Irritating to skin. Rabbit

Serious eye damage/irritation

Serious eye damage/irritation Irritating to eyes. Rabbit

Skin sensitisation

Skin sensitisation - Rabbit: Sensitising.

EUCALYPTOL**Acute toxicity - oral**

Acute toxicity oral (LD₅₀ mg/kg) 2,480.0

Species Rat

Notes (oral LD₅₀) LD₅₀ 2480 mg/kg, Oral, Rat

ATE oral (mg/kg) 2,480.0

Acute toxicity - dermal

Notes (dermal LD₅₀) LD₅₀ >5000 mg/kg, Dermal, Rabbit

Skin corrosion/irritation

Skin corrosion/irritation No information available.

Serious eye damage/irritation

Serious eye damage/irritation No information available.

Respiratory sensitisation

Respiratory sensitisation No information available.

Skin sensitisation

Skin sensitisation May cause an allergic skin reaction.

Germ cell mutagenicity

Genotoxicity - in vitro No information available.

Carcinogenicity

Carcinogenicity No information available.

EUCALYPTUS MACULATA CITRIODORA, EXT

Reproductive toxicity

Reproductive toxicity - fertility No information available.

Reproductive toxicity - development No information available.

Specific target organ toxicity - single exposure

STOT - single exposure No information available.

Specific target organ toxicity - repeated exposure

STOT - repeated exposure No information available.

Aspiration hazard

Aspiration hazard No information available.

Inhalation Gas or vapour in high concentrations may irritate the respiratory system.

Ingestion Ingestion may cause severe irritation of the mouth, the oesophagus and the gastrointestinal tract.

Skin contact May cause an allergic skin reaction.

Eye contact May cause temporary eye irritation.

CITRONELLYL ACETATE

Acute toxicity - oral

Acute toxicity oral (LD₅₀ mg/kg) 6,800.0

Species Rat

Notes (oral LD₅₀) LD₅₀ 6800 mg/kg, Oral, Rat

ATE oral (mg/kg) 6,800.0

Acute toxicity - dermal

Notes (dermal LD₅₀) LD₅₀ 2000 mg/kg, Dermal, Rabbit

Skin corrosion/irritation

Skin corrosion/irritation Irritating to skin. Rabbit

Skin sensitisation

Skin sensitisation Guinea pig maximization test (GPMT) - Guinea pig: Not sensitising.

CARYOPHYLLENE

Skin sensitisation

Skin sensitisation May cause an allergic skin reaction.

Germ cell mutagenicity

Genotoxicity - in vitro Bacterial reverse mutation test: Negative.

Aspiration hazard

Aspiration hazard May be fatal if swallowed and enters airways.

EUCALYPTUS MACULATA CITRIODORA, EXT

(R)-P-MENTHA-1,8-DIENE

Acute toxicity - oral

Notes (oral LD₅₀) LD₅₀ 4400 mg/kg, Oral, Rat

Acute toxicity - dermal

Notes (dermal LD₅₀) LD₅₀ 5000 mg/kg, Dermal, Rabbit

Skin corrosion/irritation

Animal data No information available.

Serious eye damage/irritation

Serious eye damage/irritation No information available.

Respiratory sensitisation

Respiratory sensitisation No information available.

Skin sensitisation

Skin sensitisation No information available.

Germ cell mutagenicity

Genotoxicity - in vitro No information available.

Carcinogenicity

IARC carcinogenicity IARC Group 3 Not classifiable as to its carcinogenicity to humans.

Reproductive toxicity

Reproductive toxicity - fertility No information available.

Specific target organ toxicity - single exposure

STOT - single exposure No information available.

Specific target organ toxicity - repeated exposure

STOT - repeated exposure No information available.

Aspiration hazard

Aspiration hazard May be fatal if swallowed and enters airways. Entry into the lungs following ingestion or vomiting may cause chemical pneumonitis.

Inhalation May cause respiratory system irritation.

Ingestion Harmful: possible risk of irreversible effects if swallowed.

Skin contact Irritating to skin. May cause sensitisation by skin contact.

Eye contact May cause temporary eye irritation.

2-PINENE

Acute toxicity - oral

Acute toxicity oral (LD₅₀ mg/kg) 500.0

Species Rat

EUCALYPTUS MACULATA CITRIODORA, EXT

Notes (oral LD₅₀) LD₅₀ 3700 mg/kg, Oral, Rat

ATE oral (mg/kg) 500.0

Acute toxicity - dermal

Acute toxicity dermal (LD₅₀ mg/kg) 5,000.0

Species Rat

Notes (dermal LD₅₀) LD₅₀ 5000 mg/kg, Dermal, Rat

ATE dermal (mg/kg) 5,000.0

Inhalation May cause respiratory system irritation.

Ingestion Harmful: may cause lung damage if swallowed.

Skin contact May cause sensitisation by skin contact.

Eye contact Irritating to eyes.

PIN-2-(10) ENE

Acute toxicity - oral

Acute toxicity oral (LD₅₀ mg/kg) 5,000.0

Species Rat

Notes (oral LD₅₀) LD₅₀ 5000 mg/kg, Oral, Rat

ATE oral (mg/kg) 5,000.0

Acute toxicity - dermal

Acute toxicity dermal (LD₅₀ mg/kg) 5,000.0

Species Rabbit

Notes (dermal LD₅₀) LD₅₀ 5000 mg/kg, Dermal, Rabbit

ATE dermal (mg/kg) 5,000.0

Aspiration hazard

Aspiration hazard May be fatal if swallowed and enters airways. Entry into the lungs following ingestion or vomiting may cause chemical pneumonitis.

Inhalation Irritating to respiratory system.

Ingestion Gastrointestinal symptoms, including upset stomach.

Skin contact Irritating to skin.

Eye contact Irritating to eyes.

SECTION 12: Ecological information

Ecotoxicity Toxic to aquatic life with long lasting effects.

EUCALYPTUS MACULATA CITRIODORA, EXT

Ecological information on ingredients.

EUCALYPTOL

Ecotoxicity The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

CARYOPHYLLENE

Ecotoxicity May cause long lasting harmful effects to aquatic life.

(R)-P-MENTHA-1,8-DIENE

Ecotoxicity Very toxic to aquatic life with long lasting effects.

2-PINENE

Ecotoxicity The product contains a substance which is toxic to aquatic organisms and which may cause long-term adverse effects in the aquatic environment.

PIN-2-(10) ENE

Ecotoxicity Very toxic to aquatic life with long lasting effects.

12.1. Toxicity

Toxicity Toxic to aquatic life.

Ecological information on ingredients.

CITRONELLAL

Acute aquatic toxicity

Acute toxicity - fish	LC ₅₀ , 96 hour: 22 mg/l, Fish
Acute toxicity - aquatic invertebrates	EC ₅₀ , 48 hour: 8.7 mg/l, Daphnia magna
Acute toxicity - aquatic plants	IC ₅₀ , 72 hour: 13.33 mg/l, Algae

CITRONELLOL

Acute aquatic toxicity

Acute toxicity - fish	LC ₅₀ , 96 hours: 14.6 mg/l,
Acute toxicity - aquatic invertebrates	EC ₅₀ , 48 hours: 17.5 mg/l, Daphnia magna
Acute toxicity - aquatic plants	IC ₅₀ , 72 hours: 2.4 mg/l, Algae

EUCALYPTOL

Toxicity Not considered toxic to fish.

Acute aquatic toxicity

Acute toxicity - fish	LC ₅₀ , 96 hours: 102 mg/l, Fish
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EUCALYPTUS MACULATA CITRIODORA, EXT**CITRONELLYL ACETATE****Acute aquatic toxicity**

Acute toxicity - fish LC₅₀, 96 hour: 6.1 mg/l, Fish
OECD 203

CARYOPHYLLENE

Toxicity May cause long lasting harmful effects to aquatic life.

(R)-P-MENTHA-1,8-DIENE**Acute aquatic toxicity**

LE(C)₅₀ 0.1 < L(E)C₅₀ ≤ 1

M factor (Acute) 1

Acute toxicity - fish LC₅₀, 96 hours: 0.8 mg/l, Pimephales promelas (Fat-head Minnow)

Acute toxicity - aquatic invertebrates EC₅₀, 48 hours: 69.6 mg/l, Daphnia magna

Chronic aquatic toxicity

M factor (Chronic) 1

2-PINENE**Acute aquatic toxicity**

LE(C)₅₀ 0.1 < L(E)C₅₀ ≤ 1

M factor (Acute) 1

Acute toxicity - aquatic invertebrates LC₅₀, 48 hour: 6.74 mg/l, Daphnia magna

Chronic aquatic toxicity

NOEC 0.01 < NOEC ≤ 0.1

Degradability Non-rapidly degradable

M factor (Chronic) 1

PIN-2-(10) ENE**Acute aquatic toxicity**

LE(C)₅₀ 0.1 < L(E)C₅₀ ≤ 1

M factor (Acute) 1

Acute toxicity - aquatic invertebrates LC₅₀, 48 hour: 2.2 mg/l, Daphnia magna

Chronic aquatic toxicity

M factor (Chronic) 1

12.2. Persistence and degradability

Persistence and degradability The substance is readily biodegradable.

Ecological information on ingredients.

EUCALYPTUS MACULATA CITRIODORA, EXT**CITRONELLAL**

Persistence and degradability	The product is readily biodegradable.
Biodegradation	- Degradation 82%: 28 day OCED 301B

CITRONELLOL

Persistence and degradability	The substance is readily biodegradable.
Biodegradation	- Degradation 80 - 90%: 28 days OECD 301F

EUCALYPTOL

Persistence and degradability	The substance is readily biodegradable.
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CITRONELLYL ACETATE

Persistence and degradability	The product is readily biodegradable.
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(R)-P-MENTHA-1,8-DIENE

Persistence and degradability	Not readily biodegradable.
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2-PINENE

Persistence and degradability	The product is readily biodegradable.
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PIN-2-(10) ENE

Persistence and degradability	The product is readily biodegradable.
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12.3. Bioaccumulative potential

Bioaccumulative potential	No data available on bioaccumulation.
Partition coefficient	log Pow: 2.06 –6.30

Ecological information on ingredients.**CITRONELLAL**

Bioaccumulative potential	Bioaccumulation is unlikely.
Partition coefficient	log Pow: 3.62

CITRONELLOL

Bioaccumulative potential	Bioaccumulation is unlikely.
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EUCALYPTUS MACULATA CITRIODORA, EXT

Partition coefficient log Pow: 3.41

EUCALYPTOL

Bioaccumulative potential No data available on bioaccumulation.

Partition coefficient log Pow: 2.97

CITRONELLYL ACETATE

Bioaccumulative potential Potentially bioaccumulating.

Partition coefficient log Pow: 4.9

CARYOPHYLLENE

Bioaccumulative potential Potentially bioaccumulating.

Partition coefficient log Pow: 6.23

(R)-P-MENTHA-1,8-DIENE

Bioaccumulative potential Potentially bioaccumulating.

Partition coefficient log Pow: 4.38

12.4. Mobility in soil

Mobility Soluble in water.

Ecological information on ingredients.**EUCALYPTOL**

Mobility The product is insoluble in water.

(R)-P-MENTHA-1,8-DIENE

Mobility The product is insoluble in water.

2-PINENE

Mobility The product is insoluble in water.

PIN-2-(10) ENE

Mobility The product is insoluble in water.

12.5. Results of PBT and vPvB assessment

Results of PBT and vPvB assessment This substance is not classified as PBT or vPvB according to current EU criteria.

Ecological information on ingredients.**EUCALYPTOL**

Results of PBT and vPvB assessment This product does not contain any substances classified as PBT or vPvB.

EUCALYPTUS MACULATA CITRIODORA, EXT**(R)-P-MENTHA-1,8-DIENE**

Results of PBT and vPvB assessment This substance is not classified as PBT or vPvB according to current EU criteria.

12.6. Other adverse effects

Other adverse effects None known.

Ecological information on ingredients.**EUCALYPTOL**

Other adverse effects None known.

(R)-P-MENTHA-1,8-DIENE

Other adverse effects Not determined.

SECTION 13: Disposal considerations**13.1. Waste treatment methods**

General information Do not puncture or incinerate, even when empty. Empty containers or liners may retain some product residues and hence be potentially hazardous.

Disposal methods Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Disposal Authority.

SECTION 14: Transport information

General Wear protective clothing as described in Section 8 of this safety data sheet.

14.1. UN number

UN No. (ADR/RID) 3082

UN No. (IMDG) 3082

UN No. (ICAO) 3082

UN No. (ADN) 3082

14.2. UN proper shipping name

Proper shipping name (ADR/RID) ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (CONTAINS CITRONELLYL ACETATE, (R)-P-MENTHA-1,8-DIENE)

Proper shipping name (IMDG) ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (CONTAINS CITRONELLYL ACETATE, (R)-P-MENTHA-1,8-DIENE)

Proper shipping name (ICAO) ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (CONTAINS CITRONELLYL ACETATE, (R)-P-MENTHA-1,8-DIENE)

Proper shipping name (ADN) ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (CONTAINS CITRONELLYL ACETATE, (R)-P-MENTHA-1,8-DIENE)

14.3. Transport hazard class(es)

ADR/RID class 9

ADR/RID classification code M6

ADR/RID label 9

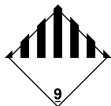
IMDG class 9

EUCALYPTUS MACULATA CITRIODORA, EXT

ICAO class/division 9

ADN class 9

Transport labels



14.4. Packing group

ADR/RID packing group III

IMDG packing group III

ICAO packing group III

ADN packing group III

14.5. Environmental hazards

Environmentally hazardous substance/marine pollutant



14.6. Special precautions for user

EmS F-A, S-F

ADR transport category 3

Emergency Action Code •3Z

Hazard Identification Number (ADR/RID) 90

Tunnel restriction code (-)

14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code

Transport in bulk according to Not applicable.

Annex II of MARPOL 73/78
and the IBC Code

SECTION 15: Regulatory information

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

EU legislation Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (as amended).
Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (as amended).
Commission Regulation (EU) No 2015/830 of 28 May 2015.
This product may impact SEVESO storage regulations.

Seveso Directive - Control of major accident hazards E2

15.2. Chemical safety assessment

A chemical safety assessment has been carried out.

EUCALYPTUS MACULATA CITRIODORA, EXT

SECTION 16: Other information

Abbreviations and acronyms used in the safety data sheet

ATE: Acute Toxicity Estimate.
 ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road.
 ADN: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways.
 CAS: Chemical Abstracts Service.
 DNEL: Derived No Effect Level.
 IATA: International Air Transport Association.
 IMDG: International Maritime Dangerous Goods.
 Kow: Octanol-water partition coefficient.
 LC₅₀: Lethal Concentration to 50 % of a test population.
 LD₅₀: Lethal Dose to 50% of a test population (Median Lethal Dose).
 PBT: Persistent, Bioaccumulative and Toxic substance.
 PNEC: Predicted No Effect Concentration.
 REACH: Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006.
 RID: European Agreement concerning the International Carriage of Dangerous Goods by Rail.
 vPvB: Very Persistent and Very Bioaccumulative.
 IARC: International Agency for Research on Cancer.
 MARPOL 73/78: International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978.
 cATpE: Converted Acute Toxicity Point Estimate.
 BCF: Bioconcentration Factor.
 BOD: Biochemical Oxygen Demand.
 EC₅₀: 50% of maximal Effective Concentration.
 LOAEC: Lowest Observed Adverse Effect Concentration.
 LOAEL: Lowest Observed Adverse Effect Level.
 NOAEC: No Observed Adverse Effect Concentration.
 NOAEL: No Observed Adverse Effect Level.
 NOEC: No Observed Effect Concentration.
 LOEC: Lowest Observed Effect Concentration.
 DMEL: Derived Minimal Effect Level.
 EL50: Exposure Limit 50
 hPa: Hectopascal
 LL50: Lethal Loading fifty
 OECD: Organisation for Economic Co-operation and Development
 POW: Octanol-water partition coefficient
 SCBA: self-contained breathing apparatus
 STP: Sewage Treatment Plant
 VOC: Volatile Organic Compounds

Classification abbreviations and acronyms

Acute Tox. = Acute toxicity
 Aquatic Acute = Hazardous to the aquatic environment (acute)
 Aquatic Chronic = Hazardous to the aquatic environment (chronic)

Key literature references and sources for data

Supplier's information.

Classification procedures according to Regulation (EC) 1272/2008

Skin Irrit. 2 - H315: On basis of test data. Skin Sens. 1 - H317: On basis of test data. Eye Irrit. 2 - H319: On basis of test data. Aquatic Chronic 2 - H411: On basis of test data.

Revision comments

NOTE: Lines within the margin indicate significant changes from the previous revision.

EUCALYPTUS MACULATA CITRIODORA, EXT

Revision date	09/12/2020
Version number	2.000
Supersedes date	22/08/2018
SDS number	55441
SDS status	Approved.
Hazard statements in full	H226 Flammable liquid and vapour. H302 Harmful if swallowed. H304 May be fatal if swallowed and enters airways. H315 Causes skin irritation. H317 May cause an allergic skin reaction. H319 Causes serious eye irritation. H400 Very toxic to aquatic life. H410 Very toxic to aquatic life with long lasting effects. H411 Toxic to aquatic life with long lasting effects. H413 May cause long lasting harmful effects to aquatic life.
Signature	Jitendra Panchal

This information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is, to the best of the company's knowledge and belief, accurate and reliable as of the date indicated. However, no warranty, guarantee or representation is made to its accuracy, reliability or completeness. It is the user's responsibility to satisfy himself as to the suitability of such information for his own particular use.



Exposure scenario Manufacture of substance

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title	Manufacture of substance
Process scope	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.
Main sector	SU3 Industrial uses
<u>Environment</u>	
Environmental release category	ERC1 Manufacture of the substance
<u>Worker</u>	
Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC15 Use as laboratory reagent.

2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Physical state	Liquid
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Manufacture of substance

Vapour pressure Vapour pressure 0.5 - 10 kPa at STP.

Concentration details Covers concentrations up to 100 %.

Amounts used

Annual amount used in the EU: 5400 tonnes
 Fraction of EU tonnage used in region: 1
 Regional use tonnage: 5400 tonnes/year
 Fraction of Regional tonnage used locally: 1
 Maximum daily site tonnage: 14795 kg/day

Annual site tonnage: 5400 tonnes

Frequency and duration of use

Continuous release.
 Emission days: 365 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air Emission factor to air: 5%

Emission factor - water Release fraction to wastewater from process (initial release prior to RMM): 6%

Emission factor - soil Release fraction to soil from process (initial release prior to RMM): 0.01%

Environmental factors not influenced by risk management measures

Dilution Receiving surface water flow: 18000 m³/day
 Local freshwater dilution factor: 10
 Local marine water dilution factor: 100

Risk management measures

STP type Municipal STP.

STP details Assumed domestic sewage treatment plant flow: 2000 m³/day
 Estimated substance removal from wastewater via domestic sewage treatment: 99.8%

Conditions and measures related to external treatment of waste for disposal

Waste treatment External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Recovery method External recovery and recycling of waste should comply with applicable local and/or national regulations.

2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state Liquid

Vapour pressure Vapour pressure 0.5 - 10 kPa at STP.

Frequency and duration of use

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

Other given operational conditions affecting workers exposure

Temperature Assumes activities and processes are carried out at a temperature of <100°C.

Ventilation rate Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Manufacture of substance

Technical conditions and measures at process level (source) to prevent release

Technical protective measures PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises Ensure containment of the emission source.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures PROC15 Use as laboratory reagent. PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities Equipment cleaning and maintenance Avoid carrying out operation for more than 1 hour.
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities Product sampling Avoid carrying out operation for more than 15 minutes.

Risk management measures

Use suitable eye protection and gloves.

3. Exposure estimation (Environment 1)

Assessment method Used ECETOC TRA model.

Environmental exposure Fresh water: Exposure 0.00247 mg/l, PNEC 0.0054 mg/l, RCR 0.457
freshwater sediment: Exposure 0.605 mg/kg, PNEC 1.322 mg/kg, RCR 0.458
Marine water: Exposure 0.000245 mg/l, PNEC 0.00054 mg/l, RCR 0.454
marine sediment: Exposure 0.06 mg/kg, PNEC 0.1322 mg/kg, RCR 0.455
Soil: Exposure 0.248 mg/kg, PNEC 0.262 mg/kg, RCR 0.947
STP: Exposure 0.0236 mg/l, PNEC 1.8 mg/l, RCR 0.0131

4. Guidance to check compliance with the exposure scenario (Environment 1)

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

3. Exposure estimation (Health 1)

Assessment method Used ECETOC TRA model.

Manufacture of substance

Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113

Worker - inhalation: Exposure 0.01 mg/m³, DNEL 33.3 mg/m³, RCR 0.0003

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 1.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0511

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113

Worker - inhalation: Exposure 1.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0511

PROC4 Chemical production where opportunity for exposure arises

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 3.4 mg/m³, DNEL 33.3 mg/m³, RCR 0.102

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

PROC15 Use as laboratory reagent.

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



Exposure scenario Use as an intermediate

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title	Use as an intermediate
Process scope	Use of substance as an intermediate (not related to Strictly Controlled Conditions). Includes recycling/recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).
Main sector	SU3 Industrial uses
Sector of use	SU8 Manufacture of bulk, large-scale chemicals (including petroleum products) SU9 Manufacture of fine chemicals

Environment

Environmental release category	ERC6a Use of intermediate
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Worker

Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC15 Use as laboratory reagent.
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2. Conditions of use affecting exposure (Industrial - Environment 1)

Use as an intermediate

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.
Concentration details	Covers concentrations up to 100 %.

Amounts used

Annual amount used in the EU: 800 tonnes
 Fraction of EU tonnage used in region: 1
 Regional use tonnage: 800 tonnes/year
 Fraction of Regional tonnage used locally: 1
 Maximum daily site tonnage: 2192 kg/day
 Annual site tonnage: 800 tonnes

Frequency and duration of use

Continuous release.
 Emission days: 365 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Emission factor to air: 5%
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 2%
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0.1%

Environmental factors not influenced by risk management measures

Dilution	Receiving surface water flow: 18000 m ³ /day Local freshwater dilution factor: 10 Local marine water dilution factor: 100
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Risk management measures

STP type	Municipal STP.
STP details	Assumed domestic sewage treatment plant flow: 2000 m ³ /day Estimated substance removal from wastewater via domestic sewage treatment: 99.8%

Conditions and measures related to external treatment of waste for disposal

Waste treatment	Hazardous waste incineration. Efficiency of at least 90% External treatment and disposal of waste should comply with applicable local and/or national regulations.
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Conditions and measures related to external recovery of waste

Recovery method	External recovery and recycling of waste should comply with applicable local and/or national regulations.
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2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.

Frequency and duration of use

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

Other given operational conditions affecting workers exposure

Use as an intermediate

Temperature Assumes activities and processes are carried out at a temperature of <100°C.

Ventilation rate Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Technical conditions and measures at process level (source) to prevent release

Technical protective measures PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises Ensure containment of the emission source.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures PROC15 Use as laboratory reagent. PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities Equipment cleaning and maintenance Avoid carrying out operation for more than 1 hour.
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities Product sampling Avoid carrying out operation for more than 15 minutes.

Risk management measures

Use suitable eye protection and gloves.

3. Exposure estimation (Environment 1)

Assessment method Used ECETOC TRA model.

Environmental exposure Fresh water: Exposure 0.00244 mg/l, PNEC 0.0054 mg/l, RCR 0.452
freshwater sediment: Exposure 0.597 mg/kg, PNEC 1.322 mg/kg, RCR 0.453
Marine water: Exposure 0.000242 mg/l, PNEC 0.00054 mg/l, RCR 0.448
marine sediment: Exposure 0.593 mg/kg, PNEC 0.1322 mg/kg, RCR 0.449
Soil: Exposure 0.229 mg/kg, PNEC 0.262 mg/kg, RCR 0.873
STP: Exposure 0.0233 mg/l, PNEC 1.8 mg/l, RCR 0.013

4. Guidance to check compliance with the exposure scenario (Environment 1)

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

3. Exposure estimation (Health 1)

Assessment method Used ECETOC TRA model.

Use as an intermediate

Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113

Worker - inhalation: Exposure 0.01 mg/m³, DNEL 33.3 mg/m³, RCR 0.0003

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 17 mg/m³, DNEL 33.3 mg/m³, RCR 0.511

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113

Worker - inhalation: Exposure 17 mg/m³, DNEL 33.3 mg/m³, RCR 0.511

PROC4 Chemical production where opportunity for exposure arises

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 3.4 mg/m³, DNEL 33.3 mg/m³, RCR 0.102

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

PROC15 Use as laboratory reagent.

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



Exposure scenario

Use as monomer

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title	Use as monomer
Process scope	Manufacture of polymers from monomers in continuous and batch processes. Includes production, recycling and recovery, degassing, discharging, reactor maintenance and immediate polymer product formation (i.e. compounding, pelletisation, product off-gassing).
Main sector	SU3 Industrial uses
Sector of use	SU8 Manufacture of bulk, large-scale chemicals (including petroleum products) SU9 Manufacture of fine chemicals

Environment

Environmental release category	ERC6c Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article)
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Worker

Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC15 Use as laboratory reagent.
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2. Conditions of use affecting exposure (Industrial - Environment 1)

Use as monomer

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.
Concentration details	Covers concentrations up to 100 %.

Amounts used

Annual amount used in the EU: 5000 tonnes
 Fraction of EU tonnage used in region: 1
 Regional use tonnage: 5000 tonnes/year
 Fraction of Regional tonnage used locally: 1
 Maximum daily site tonnage: 13699 kg/day
 Annual site tonnage: 5000 tonnes

Frequency and duration of use

Continuous release.
 Emission days: 365 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Emission factor to air: 5%
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 5%
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0%

Environmental factors not influenced by risk management measures

Dilution	Receiving surface water flow: 18000 m ³ /day Local freshwater dilution factor: 10 Local marine water dilution factor: 100
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Risk management measures

STP type	Municipal STP.
STP details	Assumed domestic sewage treatment plant flow: 2000 m ³ /day Estimated substance removal from wastewater via domestic sewage treatment: 99.8%

Conditions and measures related to external treatment of waste for disposal

Waste treatment	Hazardous waste incineration. Efficiency of at least 90% External treatment and disposal of waste should comply with applicable local and/or national regulations.
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Conditions and measures related to external recovery of waste

Recovery method	External recovery and recycling of waste should comply with applicable local and/or national regulations.
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2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.

Frequency and duration of use

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

Other given operational conditions affecting workers exposure

Use as monomer

Temperature Assumes activities and processes are carried out at a temperature of <100°C.

Ventilation rate Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Technical conditions and measures at process level (source) to prevent release

Technical protective measures PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises Ensure containment of the emission source.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures PROC15 Use as laboratory reagent. PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities Equipment cleaning and maintenance Avoid carrying out operation for more than 1 hour.
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities Product sampling Avoid carrying out operation for more than 15 minutes.

Risk management measures

Use suitable eye protection and gloves.

3. Exposure estimation (Environment 1)

Assessment method Used ECETOC TRA model.

Environmental exposure Fresh water: Exposure 0.00244 mg/l, PNEC 0.0054 mg/l, RCR 0.452
freshwater sediment: Exposure 0.597 mg/kg, PNEC 1.322 mg/kg, RCR 0.453
Marine water: Exposure 0.000242 mg/l, PNEC 0.00054 mg/l, RCR 0.448
marine sediment: Exposure 0.593 mg/kg, PNEC 0.1322 mg/kg, RCR 0.449
Soil: Exposure 0.229 mg/kg, PNEC 0.262 mg/kg, RCR 0.873
STP: Exposure 0.0233 mg/l, PNEC 1.8 mg/l, RCR 0.013

4. Guidance to check compliance with the exposure scenario (Environment 1)

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

3. Exposure estimation (Health 1)

Assessment method Used ECETOC TRA model.

Use as monomer

Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113

Worker - inhalation: Exposure 0.01 mg/m³, DNEL 33.3 mg/m³, RCR 0.0003

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 17 mg/m³, DNEL 33.3 mg/m³, RCR 0.511

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113

Worker - inhalation: Exposure 17 mg/m³, DNEL 33.3 mg/m³, RCR 0.511

PROC4 Chemical production where opportunity for exposure arises

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 3.4 mg/m³, DNEL 33.3 mg/m³, RCR 0.102

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

PROC15 Use as laboratory reagent.

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



Exposure scenario

Distribution of substance

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title	Distribution of substance
Process scope	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.
Main sector	SU3 Industrial uses
<u>Environment</u>	
Environmental release category	ERC2 Formulation into mixture
<u>Worker</u>	
Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises PROC5 Mixing or blending in batch processes PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing) PROC15 Use as laboratory reagent.

2. Conditions of use affecting exposure (Industrial - Environment 1)

Distribution of substance

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.
Concentration details	Covers concentrations up to 100 %.

Amounts used

Annual amount used in the EU: 3600 tonnes
 Fraction of EU tonnage used in region: 1
 Regional use tonnage: 3600 tonnes/year
 Fraction of Regional tonnage used locally: 1
 Maximum daily site tonnage: 9638 kg/day
 Annual site tonnage: 3600 tonnes

Frequency and duration of use

Continuous release.
 Emission days: 365 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Emission factor to air: 2.5%
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 2%
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0.01%

Environmental factors not influenced by risk management measures

Dilution	Receiving surface water flow: 18000 m ³ /day Local freshwater dilution factor: 10 Local marine water dilution factor: 100
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Risk management measures

STP type	Municipal STP.
STP details	Assumed domestic sewage treatment plant flow: 2000 m ³ /day Estimated substance removal from wastewater via domestic sewage treatment: 99.8%

Conditions and measures related to external treatment of waste for disposal

Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
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Conditions and measures related to external recovery of waste

Recovery method	External recovery and recycling of waste should comply with applicable local and/or national regulations.
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2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.

Frequency and duration of use

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

Other given operational conditions affecting workers exposure

Temperature	Assumes activities and processes are carried out at a temperature of <100°C.
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Distribution of substance

Ventilation rate Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Technical conditions and measures at process level (source) to prevent release

Technical protective measures Drain or remove substance from equipment prior to break-in or maintenance.
Disposal of wastes Limit the substance content in the product to 1%.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures Avoid carrying out activities involving exposure for more than 1 hour.
Product sampling Avoid carrying out operation for more than 15 minutes.

Risk management measures

Use suitable eye protection and gloves.
Transfer from/pouring from containers
Manual
Wear chemically-resistant gloves (tested to EN374) in combination with 'basic' employee training.

3. Exposure estimation (Environment 1)

Assessment method Used ECETOC TRA model.

Environmental exposure Fresh water: Exposure 0.00263 mg/l, PNEC 0.0054 mg/l, RCR 0.486
freshwater sediment: Exposure 0.643 mg/kg, PNEC 1.322 mg/kg, RCR 0.487
Marine water: Exposure 0.000261 mg/l, PNEC 0.00054 mg/l, RCR 0.483
marine sediment: Exposure 0.0639 mg/kg, PNEC 0.1322 mg/kg, RCR 0.484
Soil: Exposure 0.250 mg/kg, PNEC 0.262 mg/kg, RCR 0.955
STP: Exposure 0.00252 mg/l, PNEC 1.8 mg/l, RCR 0.013

4. Guidance to check compliance with the exposure scenario (Environment 1)

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

3. Exposure estimation (Health 1)

Assessment method Used ECETOC TRA model.

Distribution of substance

Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
 Worker - dermal: Exposure 0.028 mg/cm², DNEL 0.222 mg/cm², RCR 0.126
 Worker - inhalation: Exposure 0.007 mg/m³, DNEL 33.3 mg/m³, RCR 0.00021
 PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
 Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113
 Worker - inhalation: Exposure 0.21 mg/m³, DNEL 33.3 mg/m³, RCR 0.006
 PROC4 Chemical production where opportunity for exposure arises
 Worker - dermal: Exposure 0.05 mg/cm², DNEL 0.222 mg/cm², RCR 0.225
 Worker - inhalation: Exposure 0.35 mg/m³, DNEL 33.3 mg/m³, RCR 0.0105
 PROC5 Mixing or blending in batch processes
 Worker - dermal: Exposure 0.112 mg/cm², DNEL 0.222 mg/cm², RCR 0.504
 Worker - inhalation: Exposure 3.5 mg/m³, DNEL 33.3 mg/m³, RCR 0.105
 PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
 Worker - dermal: Exposure 0.0448 mg/cm², DNEL 0.222 mg/cm², RCR 0.202
 Worker - inhalation: Exposure 0.28 mg/m³, DNEL 33.3 mg/m³, RCR 0.0084
 PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
 Worker - dermal: Exposure 0.112 mg/cm², DNEL 0.222 mg/cm², RCR 0.504
 Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210
 PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
 Worker - dermal: Exposure 0.112 mg/cm², DNEL 0.222 mg/cm², RCR 0.504
 Worker - inhalation: Exposure 3.5 mg/m³, DNEL 33.3 mg/m³, RCR 0.105
 PROC15 Use as laboratory reagent.
 Worker - dermal: Exposure 0.028 mg/cm², DNEL 0.222 mg/cm², RCR 0.126
 Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



Exposure scenario

Formulation & (re)packing of substances and mixtures

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title	Formulation & (re)packing of substances and mixtures
Process scope	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.
Main sector	SU3 Industrial uses
<u>Environment</u>	
Environmental release category	ERC2 Formulation into mixture
<u>Worker</u>	
Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises PROC5 Mixing or blending in batch processes PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC15 Use as laboratory reagent.

2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Physical state	Liquid
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Formulation & (re)packing of substances and mixtures

Vapour pressure Vapour pressure 0.5 - 10 kPa at STP.

Concentration details Covers concentrations up to 100 %.

Amounts used

Annual amount used in the EU: 3600 tonnes
 Fraction of EU tonnage used in region: 1
 Regional use tonnage: 3600 tonnes/year
 Fraction of Regional tonnage used locally: 1
 Maximum daily site tonnage: 9638 kg/day
 Annual site tonnage: 3600 tonnes

Frequency and duration of use

Continuous release.
 Emission days: 365 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air Emission factor to air: 2.5%

Emission factor - water Release fraction to wastewater from process (initial release prior to RMM): 2%

Emission factor - soil Release fraction to soil from process (initial release prior to RMM): 0.01%

Environmental factors not influenced by risk management measures

Dilution Receiving surface water flow: 18000 m³/day
 Local freshwater dilution factor: 10
 Local marine water dilution factor: 100

Risk management measures

STP type Municipal STP.

STP details Assumed domestic sewage treatment plant flow: 2000 m³/day
 Estimated substance removal from wastewater via domestic sewage treatment: 99.8%

Conditions and measures related to external treatment of waste for disposal

Waste treatment External treatment and disposal of waste should comply with applicable local and/or national regulations.
 Aerobic biological treatment Efficiency of at least 96%

Disposal method Hazardous waste incineration. Efficiency of at least 90%

Conditions and measures related to external recovery of waste

Recovery method External recovery and recycling of waste should comply with applicable local and/or national regulations.

2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state Liquid

Vapour pressure Vapour pressure 0.5 - 10 kPa at STP.

Frequency and duration of use

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

Other given operational conditions affecting workers exposure

Temperature Assumes activities and processes are carried out at a temperature of <100°C.

Formulation & (re)packing of substances and mixtures

Ventilation rate Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Technical conditions and measures at process level (source) to prevent release

Technical protective measures Drain or remove substance from equipment prior to break-in or maintenance.
Disposal of wastes Limit the substance content in the product to 1%.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures Avoid carrying out activities involving exposure for more than 1 hour.
Product sampling Avoid carrying out operation for more than 15 minutes.

Risk management measures

Use suitable eye protection and gloves.
PROC5 Mixing or blending in batch processes
Mixing operations (open systems)
Wear chemically-resistant gloves (tested to EN374) in combination with 'basic' employee training.

3. Exposure estimation (Environment 1)

Assessment method Used ECETOC TRA model.

Environmental exposure Fresh water: Exposure 0.00263 mg/l, PNEC 0.0054 mg/l, RCR 0.486
freshwater sediment: Exposure 0.643 mg/kg, PNEC 1.322 mg/kg, RCR 0.487
Marine water: Exposure 0.000261 mg/l, PNEC 0.00054 mg/l, RCR 0.483
marine sediment: Exposure 0.0639 mg/kg, PNEC 0.1322 mg/kg, RCR 0.484
Soil: Exposure 0.250 mg/kg, PNEC 0.262 mg/kg, RCR 0.955
STP: Exposure 0.00252 mg/l, PNEC 1.8 mg/l, RCR 0.013

4. Guidance to check compliance with the exposure scenario (Environment 1)

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

3. Exposure estimation (Health 1)

Assessment method Used ECETOC TRA model.

Formulation & (re)packing of substances and mixtures

Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.112

Worker - inhalation: Exposure 0.01 mg/m³, DNEL 33.3 mg/m³, RCR 0.0003

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113

Worker - inhalation: Exposure 2 mg/m³, DNEL 33.3 mg/m³, RCR 0.0600

PROC4 Chemical production where opportunity for exposure arises

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 3.5 mg/m³, DNEL 33.3 mg/m³, RCR 0.105

PROC5 Mixing or blending in batch processes

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 3.5 mg/m³, DNEL 33.3 mg/m³, RCR 0.105

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

PROC15 Use as laboratory reagent.

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.1113

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



Exposure scenario

Manufacture of coatings, adhesives and inks

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title Manufacture of coatings, adhesives and inks

Process scope Industrial manufacture of coatings and inks

Main sector SU3 Industrial uses

Environment

Environmental release category ERC2 Formulation into mixture

Worker

Process category

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

PROC4 Chemical production where opportunity for exposure arises

PROC5 Mixing or blending in batch processes

PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

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

PROC15 Use as laboratory reagent.

2. Conditions of use affecting exposure (Industrial - Environment 1)

Manufacture of coatings, adhesives and inks

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.
Concentration details	Covers concentrations up to 100 %.

Amounts used

Annual amount used in the EU: 3114 tonnes
 Fraction of EU tonnage used in region: 1
 Regional use tonnage: 500 tonnes/year
 Fraction of Regional tonnage used locally: 1
 Maximum daily site tonnage: 2222 kg/day
 Annual site tonnage: 500 tonnes

Frequency and duration of use

Continuous release.
 Emission days: 225 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Emission factor to air: 0.3%
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 0%
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0%

Environmental factors not influenced by risk management measures

Dilution	Receiving surface water flow: 18000 m ³ /day Local freshwater dilution factor: 10 Local marine water dilution factor: 100
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Risk management measures

STP type	Municipal STP.
STP details	Assumed domestic sewage treatment plant flow: 2000 m ³ /day Estimated substance removal from wastewater via domestic sewage treatment: 99.9%

Conditions and measures related to external treatment of waste for disposal

Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations. Aerobic biological treatment Efficiency of at least 96%
Disposal method	Hazardous waste incineration. Efficiency of at least 90%

Conditions and measures related to external recovery of waste

Recovery method	External recovery and recycling of waste should comply with applicable local and/or national regulations.
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2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.

Frequency and duration of use

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

Manufacture of coatings, adhesives and inks

Other given operational conditions affecting workers exposure

Ventilation rate Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Technical conditions and measures at process level (source) to prevent release

Technical protective measures Store substance within a closed system. Drain or remove substance from equipment prior to break-in or maintenance. Provide extract ventilation to points where emissions occur.
Disposal of wastes Limit the substance content in the product to 1%.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures Disposal of wastes Equipment cleaning and maintenance Avoid carrying out operation for more than 15 minutes.

Risk management measures

Use suitable eye protection and gloves.
PROC5 Mixing or blending in batch processes
Mixing operations (open systems)
Wear chemically-resistant gloves (tested to EN374) in combination with 'basic' employee training.

3. Exposure estimation (Environment 1)

Assessment method Used ECETOC TRA model.

Environmental exposure Fresh water: Exposure 0.000122 mg/l, PNEC 0.0054 mg/l, RCR 0.0226
freshwater sediment: Exposure 0.0299 mg/kg, PNEC 1.322 mg/kg, RCR 0.0226
Marine water: Exposure 0.000102 mg/l, PNEC 0.00054 mg/l, RCR 0.189
marine sediment: Exposure 0.00251 mg/kg, PNEC 0.1322 mg/kg, RCR 0.0189
Soil: Exposure 0.000210 mg/kg, PNEC 0.262 mg/kg, RCR 0.000844
STP: Exposure <0.0000001 mg/l, PNEC 1.8 mg/l, RCR <0.0001

4. Guidance to check compliance with the exposure scenario (Environment 1)

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

3. Exposure estimation (Health 1)

Assessment method Used ECETOC TRA model.

Manufacture of coatings, adhesives and inks

Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Worker - dermal: Exposure 0.0025 mg/cm², DNEL 0.222 mg/cm², RCR 0.0112

Worker - inhalation: Exposure 0.01 mg/m³, DNEL 33.3 mg/m³, RCR 0.0003

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Worker - dermal: Exposure 0.0025 mg/cm², DNEL 0.222 mg/cm², RCR 0.0113

Worker - inhalation: Exposure 2.5 mg/m³, DNEL 33.3 mg/m³, RCR 0.0751

PROC4 Chemical production where opportunity for exposure arises

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 2 mg/m³, DNEL 33.3 mg/m³, RCR 0.0601

PROC5 Mixing or blending in batch processes

Worker - dermal: Exposure 0.005 mg/cm², DNEL 0.222 mg/cm², RCR 0.0225

Worker - inhalation: Exposure 5 mg/m³, DNEL 33.3 mg/m³, RCR 0.150

PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 11 mg/m³, DNEL 33.3 mg/m³, RCR 0.330

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

Worker - dermal: Exposure 0.01 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 11 mg/m³, DNEL 33.3 mg/m³, RCR 0.330

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



Exposure scenario
Use of coatings and adhesives - Industrial

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title	Use of coatings and adhesives - Industrial
Process scope	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.
Main sector	SU3 Industrial uses
<u>Environment</u>	
Environmental release category	ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
SPERC	ESVOC SPERC 4.3a.v1
<u>Worker</u>	

Use of coatings and adhesives - Industrial

Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises PROC5 Mixing or blending in batch processes PROC7 Industrial spraying PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC10 Roller application or brushing PROC13 Treatment of articles by dipping and pouring. PROC15 Use as laboratory reagent.
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2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.
Concentration details	Covers concentrations up to 100 %.

Amounts used

Annual amount used in the EU: 569 tonnes
 Fraction of EU tonnage used in region: 1
 Regional use tonnage: 300 tonnes/year
 Fraction of Regional tonnage used locally: 0.02
 Maximum daily site tonnage: 20 kg/day
 Annual site tonnage: 6 tonnes

Frequency and duration of use

Continuous release.
 Emission days: 220 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Emission factor to air: 9.8%
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 2%
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0%

Environmental factors not influenced by risk management measures

Dilution	Receiving surface water flow: 18000 m³/day Local freshwater dilution factor: 10 Local marine water dilution factor: 100
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Risk management measures

STP type	Municipal STP.
STP details	Assumed domestic sewage treatment plant flow: 2000 m³/day Estimated substance removal from wastewater via domestic sewage treatment: 95.7%

Conditions and measures related to external treatment of waste for disposal

Use of coatings and adhesives - Industrial

Waste treatment External treatment and disposal of waste should comply with applicable local and/or national regulations.
Aerobic biological treatment Efficiency of at least 96%

Disposal method Hazardous waste incineration. Efficiency of at least 90%

Conditions and measures related to external recovery of waste

Recovery method External recovery and recycling of waste should comply with applicable local and/or national regulations.

2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state Liquid

Vapour pressure Vapour pressure 0.5 - 10 kPa at STP.

Concentration details Concentration of substance in product: 25%

Frequency and duration of use

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

Other given operational conditions affecting workers exposure

Temperature Assumes activities and processes are carried out at a temperature of <100°C.

Ventilation rate Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Technical conditions and measures at process level (source) to prevent release

Technical protective measures Indoor use. Provide extract ventilation to points where emissions occur.
Storage of waste prior to disposal Provide a good standard of controlled ventilation (10 to 15 air changes per hour).
Transfer of process wastes to storage containers Provide extract ventilation to material transfer points and other openings.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures Disposal of wastes Avoid carrying out operation for more than 15 minutes.

Risk management measures

Wear suitable gloves (tested to EN374) and eye protection.

3. Exposure estimation (Environment 1)

Assessment method Used ECETOC TRA model.

Environmental exposure Fresh water: Exposure 0.000124 mg/l, PNEC 0.0054 mg/l, RCR 0.0230
freshwater sediment: Exposure 0.643 mg/kg, PNEC 1.322 mg/kg, RCR 0.487
Marine water: Exposure 0.000261 mg/l, PNEC 0.00054 mg/l, RCR 0.483
marine sediment: Exposure 0.0389 mg/kg, PNEC 0.1322 mg/kg, RCR 0.294
Soil: Exposure 0.146 mg/kg, PNEC 0.262 mg/kg, RCR 0.557
STP: Exposure 0.350 mg/l, PNEC 1.8 mg/l, RCR 0.194

4. Guidance to check compliance with the exposure scenario (Environment 1)

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Use of coatings and adhesives - Industrial

3. Exposure estimation (Health 1)

Assessment method	Used ECETOC TRA model.
Exposure	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Worker - dermal: Exposure 0.0003 mg/cm², DNEL 0.222 mg/cm², RCR 0.00135 Worker - inhalation: Exposure 0.006 mg/m³, DNEL 33.3 mg/m³, RCR 0.00018 PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions Worker - dermal: Exposure 0.0012 mg/cm², DNEL 0.222 mg/cm², RCR 0.005 Worker - inhalation: Exposure 0.06 mg/m³, DNEL 33.3 mg/m³, RCR 0.0018 PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions Elevated temperature Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450 Worker - inhalation: Exposure 27 mg/m³, DNEL 33.3 mg/m³, RCR 0.811 PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition Worker - dermal: Exposure 0.003 mg/cm², DNEL 0.222 mg/cm², RCR 0.0135 Worker - inhalation: Exposure 1.26 mg/m³, DNEL 33.3 mg/m³, RCR 0.038 PROC4 Chemical production where opportunity for exposure arises Worker - dermal: Exposure 0.0012 mg/cm², DNEL 0.222 mg/cm², RCR 0.005 Worker - inhalation: Exposure 0.06 mg/m³, DNEL 33.3 mg/m³, RCR 0.0018 PROC5 Mixing or blending in batch processes Worker - dermal: Exposure 0.12 mg/cm², DNEL 0.222 mg/cm², RCR 0.54 Worker - inhalation: Exposure 2.10 mg/m³, DNEL 33.3 mg/m³, RCR 0.063 PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities Worker - dermal: Exposure 0.06 mg/cm², DNEL 0.222 mg/cm², RCR 0.270 Worker - inhalation: Exposure 2.1 mg/m³, DNEL 33.3 mg/m³, RCR 0.063 PROC10 Roller application or brushing Worker - dermal: Exposure 0.012 mg/cm², DNEL 0.222 mg/cm², RCR 0.054 Worker - inhalation: Exposure 0.6 mg/m³, DNEL 33.3 mg/m³, RCR 0.018 PROC15 Use as laboratory reagent. Worker - dermal: Exposure 0.003 mg/cm², DNEL 0.222 mg/cm², RCR 0.0135 Worker - inhalation: Exposure 0.3 mg/m³, DNEL 33.3 mg/m³, RCR 0.009

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



Exposure scenario

Use as a chemical stripper - Industrial

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title	Use as a chemical stripper - Industrial
Main sector	SU3 Industrial uses

Environment

Environmental release category	ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
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SPERC	ESVOC SPERC 4.3a.v1
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Worker

Process category	PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC21 Low energy manipulation and handling of substances bound in/on materials or articles PROC24 High (mechanical) energy work-up of substances bound in/on materials and/or articles
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2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.
Concentration details	Covers concentrations up to 100 %.

Amounts used

Use as a chemical stripper - Industrial

Annual amount used in the EU: 569 tonnes
 Fraction of EU tonnage used in region: 1
 Regional use tonnage: 300 tonnes/year
 Fraction of Regional tonnage used locally: 0.02
 Maximum daily site tonnage: 20 kg/day
 Annual site tonnage: 6 tonnes

Frequency and duration of use

Continuous release.
 Emission days: 220 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air Emission factor to air: 9.8%
Emission factor - water Release fraction to wastewater from process (initial release prior to RMM): 2%
Emission factor - soil Release fraction to soil from process (initial release prior to RMM): 0%

Environmental factors not influenced by risk management measures

Dilution Receiving surface water flow: 18000 m³/day
 Local freshwater dilution factor: 10
 Local marine water dilution factor: 100

Risk management measures

STP type Municipal STP.
STP details Assumed domestic sewage treatment plant flow: 2000 m³/day
 Estimated substance removal from wastewater via domestic sewage treatment: 95.7%

Conditions and measures related to external treatment of waste for disposal

Waste treatment External treatment and disposal of waste should comply with applicable local and/or national regulations.
 Aerobic biological treatment Efficiency of at least 96%
Disposal method Hazardous waste incineration. Efficiency of at least 90%

Conditions and measures related to external recovery of waste

Recovery method External recovery and recycling of waste should comply with applicable local and/or national regulations.

2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state Liquid
Vapour pressure Vapour pressure 0.5 - 10 kPa at STP.
Concentration details Concentration of substance in product: 25%

Frequency and duration of use

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

Other given operational conditions affecting workers exposure

Temperature Assumes activities are at ambient temperature (unless stated differently).
Ventilation rate Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). , or:
 Ensure operation is undertaken outdoors.

Technical conditions and measures at process level (source) to prevent release

Use as a chemical stripper - Industrial

Technical protective measures Provide extract ventilation to points where emissions occur.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures Avoid carrying out activities involving exposure for more than 1 hour.

Risk management measures

Wear suitable gloves (tested to EN374) and eye protection.

3. Exposure estimation (Environment 1)

Assessment method	Used ECETOC TRA model.
Environmental exposure	Fresh water: Exposure 0.000124 mg/l, PNEC 0.0054 mg/l, RCR 0.0230 freshwater sediment: Exposure 0.0305 mg/kg, PNEC 1.322 mg/kg, RCR 0.0231 Marine water: Exposure 0.000132 mg/l, PNEC 0.00054 mg/l, RCR 0.244 marine sediment: Exposure 0.0389 mg/kg, PNEC 0.1322 mg/kg, RCR 0.294 Soil: Exposure 0.146 mg/kg, PNEC 0.262 mg/kg, RCR 0.557 STP: Exposure 0.350 mg/l, PNEC 1.8 mg/l, RCR 0.194

4. Guidance to check compliance with the exposure scenario (Environment 1)

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

3. Exposure estimation (Health 1)

Assessment method	Used ECETOC TRA model.
Exposure	PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities Worker - dermal: Exposure 0.12 mg/cm², DNEL 0.222 mg/cm², RCR 0.54 Worker - inhalation: Exposure 4.2 mg/m³, DNEL 33.3 mg/m³, RCR 0.126 PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities Worker - dermal: Exposure 0.006 mg/cm², DNEL 0.222 mg/cm², RCR 0.0270 Worker - inhalation: Exposure 0.09 mg/m³, DNEL 33.3 mg/m³, RCR 0.0027 PROC21 Low energy manipulation and handling of substances bound in/on materials or articles Worker - dermal: Exposure 0.00248 mg/cm², DNEL 0.222 mg/cm², RCR 0.0112 Worker - inhalation: Exposure 0.6 mg/m³, DNEL 33.3 mg/m³, RCR 0.018 PROC24 High (mechanical) energy work-up of substances bound in/on materials and/or articles Worker - dermal: Exposure 0.00248 mg/cm², DNEL 0.222 mg/cm², RCR 0.0112 Worker - inhalation: Exposure 1.2 mg/m³, DNEL 33.3 mg/m³, RCR 0.036

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



Exposure scenario

Formulation of adhesives and sealants

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title	Formulation of adhesives and sealants
Process scope	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.
Main sector	SU3 Industrial uses
Sector of use	SU10 Formulation [mixing] of preparations and/or re-packaging
<u>Environment</u>	
Environmental release category	ERC2 Formulation into mixture
SPERC	FEICA SPERC 2.1b.v1
<u>Worker</u>	

Formulation of adhesives and sealants

Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
	PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
	PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
	PROC4 Chemical production where opportunity for exposure arises
	PROC5 Mixing or blending in batch processes
	PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
	PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
	PROC14 Tableting, compression, extrusion, pelletisation, granulation
	PROC15 Use as laboratory reagent.

2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.
Concentration details	Covers concentrations up to 100 %.

Amounts used

Annual amount used in the EU: 1800 tonnes
 Fraction of EU tonnage used in region: 1
 Regional use tonnage: 600 tonnes/year
 Fraction of Regional tonnage used locally: 1
 Maximum daily site tonnage: 2730 kg/day
 Annual site tonnage: 600 tonnes

Frequency and duration of use

Continuous release.
 Emission days: 220 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Emission factor to air: 0.6%
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 0%
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0%

Environmental factors not influenced by risk management measures

Dilution	Receiving surface water flow: 18000 m ³ /day Local freshwater dilution factor: 10 Local marine water dilution factor: 100
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Risk management measures

STP type	Municipal STP.
STP details	Assumed domestic sewage treatment plant flow: 2000 m ³ /day Estimated substance removal from wastewater via domestic sewage treatment: 95.7%

Conditions and measures related to external treatment of waste for disposal

Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
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Conditions and measures related to external recovery of waste

Formulation of adhesives and sealants

Recovery method	External recovery and recycling of waste should comply with applicable local and/or national regulations.
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2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.
Concentration details	Covers concentrations up to 100 %.

Frequency and duration of use

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

Other given operational conditions affecting workers exposure

Temperature	Assumes activities are at ambient temperature (unless stated differently).
Ventilation rate	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Technical conditions and measures at process level (source) to prevent release

Technical protective measures	Provide extract ventilation to points where emissions occur. Disposal of wastes Limit the substance content in the product to 1%.
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Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures	Disposal of wastes Avoid carrying out operation for more than 15 minutes.
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Risk management measures

Use suitable eye protection and gloves.
PROC4 Chemical production where opportunity for exposure arises
PROC5 Mixing or blending in batch processes
Wear a respirator conforming to EN140 with Type A/P2 filter or better.

3. Exposure estimation (Environment 1)

Assessment method	Used ECETOC TRA model.
Environmental exposure	Fresh water: Exposure 0.000122 mg/l, PNEC 0.0054 mg/l, RCR 0.0226 freshwater sediment: Exposure 0.0299 mg/kg, PNEC 1.322 mg/kg, RCR 0.0226 Marine water: Exposure 0.0000102 mg/l, PNEC 0.00054 mg/l, RCR 0.0189 marine sediment: Exposure 0.00251 mg/kg, PNEC 0.1322 mg/kg, RCR 0.0189 Soil: Exposure 0.000252 mg/kg, PNEC 0.262 mg/kg, RCR 0.000962 STP: Exposure <0.0000001 mg/l, PNEC 1.8 mg/l, RCR <0.0000001

4. Guidance to check compliance with the exposure scenario (Environment 1)

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

3. Exposure estimation (Health 1)

Assessment method	Used ECETOC TRA model.
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Formulation of adhesives and sealants

Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.112

Worker - inhalation: Exposure 0.01 mg/m³, DNEL 33.3 mg/m³, RCR 0.0003

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113

Worker - inhalation: Exposure 2 mg/m³, DNEL 33.3 mg/m³, RCR 0.0600

PROC4 Chemical production where opportunity for exposure arises

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 3.5 mg/m³, DNEL 33.3 mg/m³, RCR 0.105

PROC5 Mixing or blending in batch processes

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 3.5 mg/m³, DNEL 33.3 mg/m³, RCR 0.105

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

PROC15 Use as laboratory reagent.

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.1113

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



Exposure scenario
Use in adhesives and sealants - Industrial

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title	Use in adhesives and sealants - Industrial
Process scope	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.
Main sector	SU3 Industrial uses
<u>Environment</u>	
Environmental release category	ERC5 Use at industrial site leading to inclusion into/onto article
SPERC	FEICA SPERC 5.2a.v1
<u>Worker</u>	

Use in adhesives and sealants - Industrial

Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises PROC5 Mixing or blending in batch processes PROC7 Industrial spraying PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC10 Roller application or brushing PROC13 Treatment of articles by dipping and pouring. PROC14 Tableting, compression, extrusion, pelletisation, granulation PROC15 Use as laboratory reagent.
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2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.
Concentration details	Covers concentrations up to 100 %.

Amounts used

Annual amount used in the EU: 1200 tonnes
 Fraction of EU tonnage used in region: 1
 Regional use tonnage: 300 tonnes/year
 Fraction of Regional tonnage used locally: 1
 Maximum daily site tonnage: 1360 kg/day
 Annual site tonnage: 300 tonnes

Frequency and duration of use

Continuous release.
 Emission days: 220 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Emission factor to air: 20%
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 0%
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0%

Environmental factors not influenced by risk management measures

Dilution	Receiving surface water flow: 18000 m³/day Local freshwater dilution factor: 10 Local marine water dilution factor: 100
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Risk management measures

STP type	Municipal STP.
STP details	Assumed domestic sewage treatment plant flow: 2000 m³/day Estimated substance removal from wastewater via domestic sewage treatment: 95.7%

Conditions and measures related to external treatment of waste for disposal

Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
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Use in adhesives and sealants - Industrial

Conditions and measures related to external recovery of waste

Recovery method External recovery and recycling of waste should comply with applicable local and/or national regulations.

2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state Liquid

Vapour pressure Vapour pressure 0.5 - 10 kPa at STP.

Concentration details Covers concentrations up to 100 %. Maximum concentration after dilution for use: 25 %

Frequency and duration of use

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

Other given operational conditions affecting workers exposure

Temperature Assumes activities are at ambient temperature (unless stated differently).

Ventilation rate Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Technical conditions and measures at process level (source) to prevent release

Technical protective measures Provide extract ventilation to points where emissions occur. Drain or remove substance from equipment prior to break-in or maintenance. Fill containers/cans at dedicated fill points supplied with local extract ventilation.

PROC15 Use as laboratory reagent. Handle in a fume cupboard or under extract ventilation.

Disposal of wastes Limit the substance content in the product to 1%.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures Disposal of wastes Avoid carrying out operation for more than 15 minutes.

Risk management measures

Wear suitable gloves (tested to EN374) and eye protection.

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

PROC4 Chemical production where opportunity for exposure arises

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

PROC14 Tableting, compression, extrusion, pelletisation, granulation

Wear a respirator conforming to EN140 with Type A/P2 filter or better.

3. Exposure estimation (Environment 1)

Assessment method Used ECETOC TRA model.

Environmental exposure

Fresh water: Exposure 0.000122 mg/l, PNEC 0.0054 mg/l, RCR 0.0226

freshwater sediment: Exposure 0.0299 mg/kg, PNEC 1.322 mg/kg, RCR 0.0226

Marine water: Exposure 0.0000102 mg/l, PNEC 0.00054 mg/l, RCR 0.0189

marine sediment: Exposure 0.00251 mg/kg, PNEC 0.1322 mg/kg, RCR 0.0189

Soil: Exposure 0.000189 mg/kg, PNEC 0.262 mg/kg, RCR 0.000721

STP: Exposure <0.0000001 mg/l, PNEC 1.8 mg/l, RCR <0.0000001

4. Guidance to check compliance with the exposure scenario (Environment 1)

Use in adhesives and sealants - Industrial

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

3. Exposure estimation (Health 1)

Assessment method

Used ECETOC TRA model.

Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113

Worker - inhalation: Exposure 0.01 mg/m³, DNEL 33.3 mg/m³, RCR 0.000300

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113

Worker - inhalation: Exposure 4.44 mg/m³, DNEL 33.3 mg/m³, RCR 0.133

PROC4 Chemical production where opportunity for exposure arises

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 7.9 mg/m³, DNEL 33.3 mg/m³, RCR 0.237

PROC5 Mixing or blending in batch processes

Worker - dermal: Exposure 0.12 mg/cm², DNEL 0.222 mg/cm², RCR 0.54

Worker - inhalation: Exposure 2.10 mg/m³, DNEL 33.3 mg/m³, RCR 0.063

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

PROC15 Use as laboratory reagent.

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113

Worker - inhalation: Exposure 0.3 mg/m³, DNEL 33.3 mg/m³, RCR 0.009

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



Exposure scenario
Use of coatings and adhesives - Professional

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title	Use of coatings and adhesives - Professional
Process scope	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.
Main sector	SU22 Professional uses
<u>Environment</u>	
Environmental release category	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) ERC8d Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
SPERC	CEPE SPERC 8a.n.v1
<u>Worker</u>	

Use of coatings and adhesives - Professional

Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises PROC5 Mixing or blending in batch processes PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC10 Roller application or brushing PROC11 Non industrial spraying PROC13 Treatment of articles by dipping and pouring. PROC15 Use as laboratory reagent. PROC19 Manual activities involving hand contact
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2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.
Concentration details	Covers concentrations up to 100 %.

Amounts used

Annual amount used in the EU: 600 tonnes
 Fraction of EU tonnage used in region: 0.1
 Regional use tonnage: 30 tonnes/year
 Fraction of Regional tonnage used locally: 0.02
 Maximum daily site tonnage: 0.164 kg/day
 Annual site tonnage: 0.06 tonnes

Frequency and duration of use

Continuous release.
 Emission days: 365 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Emission factor to air: 98%
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 2%
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0%

Environmental factors not influenced by risk management measures

Dilution	Receiving surface water flow: 18000 m³/day Local freshwater dilution factor: 10 Local marine water dilution factor: 100
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Risk management measures

STP type	Municipal STP.
STP details	Assumed domestic sewage treatment plant flow: 2000 m³/day Estimated substance removal from wastewater via domestic sewage treatment: 97.4%

Conditions and measures related to external treatment of waste for disposal

Use of coatings and adhesives - Professional

Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations. Aerobic biological treatment Efficiency of at least 96%
Disposal method	Hazardous waste incineration. Efficiency of at least 90%
<u>Conditions and measures related to external recovery of waste</u>	
Recovery method	External recovery and recycling of waste should comply with applicable local and/or national regulations.

2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.
Concentration details	Concentration of substance in product: 25%

Frequency and duration of use

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

Other given operational conditions affecting workers exposure

Temperature	Assumes activities are at ambient temperature (unless stated differently).
Ventilation rate	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Technical conditions and measures at process level (source) to prevent release

Technical protective measures	Provide extract ventilation to points where emissions occur. , or: Ensure operation is undertaken outdoors. Disposal of wastes Avoid carrying out activities involving exposure for more than 15 minutes.
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Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures	Disposal of wastes Avoid carrying out operation for more than 15 minutes.
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Risk management measures

Wear suitable gloves (tested to EN374) and eye protection.

3. Exposure estimation (Environment 1)

Assessment method	Used ECETOC TRA model.
Environmental exposure	Fresh water: Exposure 0.000122 mg/l, PNEC 0.0054 mg/l, RCR 0.0226 freshwater sediment: Exposure 0.00298 mg/kg, PNEC 1.322 mg/kg, RCR 0.00225 Marine water: Exposure 0.0000103 mg/l, PNEC 0.00054 mg/l, RCR 0.0191 marine sediment: Exposure 0.00253 mg/kg, PNEC 0.1322 mg/kg, RCR 0.0191 Soil: Exposure 0.000678 mg/kg, PNEC 0.262 mg/kg, RCR 0.00259 STP: Exposure 0.00164 mg/l, PNEC 1.8 mg/l, RCR 0.000911

4. Guidance to check compliance with the exposure scenario (Environment 1)

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

3. Exposure estimation (Health 1)

Use of coatings and adhesives - Professional

Assessment method

Used ECETOC TRA model.

Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113

Worker - inhalation: Exposure 0.01 mg/m³, DNEL 33.3 mg/m³, RCR 0.0003

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113

Worker - inhalation: Exposure 2 mg/m³, DNEL 33.3 mg/m³, RCR 0.0601

PROC4 Chemical production where opportunity for exposure arises

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 3.5 mg/m³, DNEL 33.3 mg/m³, RCR 0.105

PROC5 Mixing or blending in batch processes

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 3.5 mg/m³, DNEL 33.3 mg/m³, RCR 0.105

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.210

PROC15 Use as laboratory reagent.

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.210

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



Exposure scenario

Use as a chemical stripper - Professional

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title	Use as a chemical stripper - Professional
Main sector	SU22 Professional uses

Environment

Environmental release category	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) ERC8d Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
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SPERC	ESVOC SPERC 6.1a.v1
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Worker

Process category	PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC21 Low energy manipulation and handling of substances bound in/on materials or articles PROC24 High (mechanical) energy work-up of substances bound in/on materials and/or articles
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2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.

Use as a chemical stripper - Professional

Concentration details Covers concentrations up to 100 %.

Amounts used

Annual amount used in the EU: 300 tonnes
 Fraction of EU tonnage used in region: 0.1
 Regional use tonnage: 30 tonnes/year
 Fraction of Regional tonnage used locally: 0.00075
 Annual site tonnage: 0.0225 tonnes

Frequency and duration of use

Continuous release.
 Emission days: 300 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air Emission factor to air: 98%
Emission factor - water Release fraction to wastewater from process (initial release prior to RMM): 1%
Emission factor - soil Release fraction to soil from process (initial release prior to RMM): 1%

Environmental factors not influenced by risk management measures

Dilution Receiving surface water flow: 18000 m³/day
 Local freshwater dilution factor: 10
 Local marine water dilution factor: 100

Risk management measures

STP type Municipal STP.
STP details Assumed domestic sewage treatment plant flow: 2000 m³/day
 Estimated substance removal from wastewater via domestic sewage treatment: 95.7%

Conditions and measures related to external treatment of waste for disposal

Waste treatment External treatment and disposal of waste should comply with applicable local and/or national regulations.
 Aerobic biological treatment Efficiency of at least 96%
Disposal method Hazardous waste incineration. Efficiency of at least 90%

Conditions and measures related to external recovery of waste

Recovery method External recovery and recycling of waste should comply with applicable local and/or national regulations.

2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state Liquid
Vapour pressure Vapour pressure 0.5 - 10 kPa at STP.
Concentration details Concentration of substance in product: 25%

Frequency and duration of use

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

Other given operational conditions affecting workers exposure

Temperature Assumes activities are at ambient temperature (unless stated differently).

Use as a chemical stripper - Professional

Ventilation rate Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). , or:
Ensure operation is undertaken outdoors.

Technical conditions and measures at process level (source) to prevent release

Technical protective measures Provide extract ventilation to points where emissions occur.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures Avoid carrying out activities involving exposure for more than 1 hour.

Risk management measures

Wear suitable gloves (tested to EN374) and eye protection.

3. Exposure estimation (Environment 1)

Assessment method Used ECETOC TRA model.

Environmental exposure

Fresh water: Exposure 0.000116 mg/l, PNEC 0.0054 mg/l, RCR 0.0215
freshwater sediment: Exposure 0.0283 mg/kg, PNEC 1.322 mg/kg, RCR 0.0214
Marine water: Exposure 0.0000097 mg/l, PNEC 0.00054 mg/l, RCR 0.0180
marine sediment: Exposure 0.0389 mg/kg, PNEC 0.1322 mg/kg, RCR 0.294
Soil: Exposure 0.0000849 mg/kg, PNEC 0.262 mg/kg, RCR 0.000324
STP: Exposure 0.000205 mg/l, PNEC 1.8 mg/l, RCR 0.000114

4. Guidance to check compliance with the exposure scenario (Environment 1)

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

3. Exposure estimation (Health 1)

Assessment method Used ECETOC TRA model.

Exposure

PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
Worker - dermal: Exposure 0.12 mg/cm², DNEL 0.222 mg/cm², RCR 0.54
Worker - inhalation: Exposure 11 mg/m³, DNEL 33.3 mg/m³, RCR 0.330
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
Worker - dermal: Exposure 0.006 mg/cm², DNEL 0.222 mg/cm², RCR 0.0270
Worker - inhalation: Exposure 0.6 mg/m³, DNEL 33.3 mg/m³, RCR 0.0180
PROC21 Low energy manipulation and handling of substances bound in/on materials or articles
Worker - dermal: Exposure 0.00248 mg/cm², DNEL 0.222 mg/cm², RCR 0.0112
Worker - inhalation: Exposure 2.4 mg/m³, DNEL 33.3 mg/m³, RCR 0.0721
PROC24 High (mechanical) energy work-up of substances bound in/on materials and/or articles
Worker - dermal: Exposure 0.00248 mg/cm², DNEL 0.222 mg/cm², RCR 0.0112
Worker - inhalation: Exposure 12 mg/m³, DNEL 33.3 mg/m³, RCR 0.36

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



Exposure scenario

Use of coatings and adhesives - Consumer

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title	Use of coatings and adhesives - Consumer
Product category	PC9a Coatings and paints, thinners, paint removers. PC9b Fillers, putties, plasters, modelling clay. PC9c Finger paints. PC18 Ink and toners.
Main sector	SU21 Consumer uses
<u>Environment</u>	
Environmental release category	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) ERC8d Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
SPERC	ESVOC SPERC 8.3c.v1

2. Conditions of use affecting exposure (Workers - Health 1)

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures	Disposal of wastes Avoid carrying out operation for more than 15 minutes.
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2. Conditions of use affecting exposure (Non-industrial - Environment 1)

Product characteristics

Substance is a unique structure. Non-hydrophobic. Readily biodegradable.

Amounts used

Use of coatings and adhesives - Consumer

Annual amount used in the EU: 300 tonnes
 Fraction of EU tonnage used in region: 0.1
 Regional use tonnage: 30 tonnes/year
 Fraction of Regional tonnage used locally: 0.002
 Annual site tonnage: 0.06 tonnes

Frequency and duration of use

Dispersive use.
 Emission days: 365 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Release fraction to air from process (initial release prior to RMM): 98.5%
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 1%
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0.5%

Environmental factors not influenced by risk management measures

Dilution	Receiving surface water flow: 18000 m ³ /day Local freshwater dilution factor: 10 Local marine water dilution factor: 100
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Risk management measures

Technical measures	Prevent environmental discharge consistent with regulatory requirements.
STP type	Municipal STP.
STP details	Assumed domestic sewage treatment plant flow: 2000 m ³ /day Removal efficiency (total): 95.7%

Conditions and measures related to external treatment of waste for disposal

Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
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Conditions and measures related to external recovery of waste

Recovery method	External recovery and recycling of waste should comply with applicable local and/or national regulations.
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2. Conditions of use affecting exposure (Non-industrial - Health 1)

Product characteristics

Physical state	Liquid
Concentration details	PC9a_2 Solvent-rich, high-solid, water-borne paint PC9a_4 Removers (paint-, glue-, wallpaper-, sealant-remover) PC9b_1 Fillers and putty Covers concentrations up to 1.1 %. PC9a_3 Aerosol spray can Covers concentrations up to 50 %. PC9b_2 Plasters and floor equalisers Covers concentrations up to 0.4 %. PC9b_3 Modelling clay PC18 Ink and toners. Covers concentrations up to 1 %. PC9c Finger paints. Covers concentrations up to 0.8 %.

Amounts used

Use of coatings and adhesives - Consumer

PC9a_2 Solvent-rich, high-solid, water-borne paint
 Amount per use: 744 g
 PC9a_3 Aerosol spray can
 Amount per use: 215 g
 PC9a_4 Removers (paint-, glue-, wallpaper-, sealant-remover)
 Amount per use: 491 g
 PC9b_1 Fillers and putty
 Amount per use: 85 g
 PC9b_2 Plasters and floor equalisers
 Amount per use: 13800 g
 PC9b_3 Modelling clay
 Amount per use: 1 g
 PC9c Finger paints
 Amount per use: 1.35 g
 PC18 Ink and toners.
 Amount per use: 40 g

Frequency and duration of use

PC9a_2 Solvent-rich, high-solid, water-borne paint
 Covers use up to 6 days/year.
 PC9a_3 Aerosol spray can
 Covers use up to 2 days/year.
 PC9a_4 Removers (paint-, glue-, wallpaper-, sealant-remover)
 Covers use up to 3 days/year.
 PC9b_1 Fillers and putty
 PC9b_2 Plasters and floor equalisers
 Covers use up to 12 days/year.
 PC9b_3 Modelling clay
 PC9c Finger paints.
 PC18 Ink and toners.
 Covers use up to 365 days/year.

PC9a_2 Solvent-rich, high-solid, water-borne paint PC18 Ink and toners. Application duration: 2.20 hours
 PC9a_3 Aerosol spray can Application duration: 0.30 hours
 PC9a_4 Removers (paint-, glue-, wallpaper-, sealant-remover) PC9b_2 Plasters and floor equalisers Application duration: 2.00 hours
 PC9b_1 Fillers and putty Application duration: 4.00 hours

Human factors not influenced by risk management

Potentially exposed body parts PC9a_2 Solvent-rich, high-solid, water-borne paint Covers skin contact area up to 428.75 cm².
 PC9a_4 Removers (paint-, glue-, wallpaper-, sealant-remover) PC9b_2 Plasters and floor equalisers Covers skin contact area up to 857.50 cm².
 PC9b_1 Fillers and putty Covers skin contact area up to 35.70 cm².
 PC9b_3 Modelling clay Covers skin contact area up to 254.40 cm².
 PC18 Ink and toners. Covers skin contact area up to 71.40 cm².

Other given operational conditions affecting Non-industrial exposure

Room size PC9a_2 Solvent-rich, high-solid, water-borne paint PC9a_4 Removers (paint-, glue-, wallpaper-, sealant-remover) PC9b_1 Fillers and putty PC9b_2 Plasters and floor equalisers PC18 Ink and toners. Covers use in room size of 20 m³.
 PC9a_3 Aerosol spray can Covers use in room size of 34 m³.

Other given operational conditions affecting Non-industrial exposure

No specific risk management measure identified beyond those operational conditions stated.

Use of coatings and adhesives - Consumer

3. Exposure estimation (Environment 1)

Assessment method	Used ECETOC TRA model.
Environmental exposure	Fresh water: Exposure 0.000116 mg/l, PNEC 0.0054 mg/l, RCR 0.0215 freshwater sediment: Exposure 0.00283 mg/kg, PNEC 1.322 mg/kg, RCR 0.00214 Marine water: Exposure 0.0000097 mg/l, PNEC 0.00054 mg/l, RCR 0.0179 marine sediment: Exposure 0.00238 mg/kg, PNEC 0.1322 mg/kg, RCR 0.0180 Soil: Exposure 0.000085 mg/kg, PNEC 0.262 mg/kg, RCR 0.000324 STP: Exposure 0.000205 mg/l, PNEC 1.8 mg/l, RCR 0.000114

4. Guidance to check compliance with the exposure scenario (Environment 1)

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

3. Exposure estimation (Health 1)

Assessment method	Used ECETOC TRA model.
Exposure	PC9a_2 Solvent-rich, high-solid, water-borne paint Consumer - dermal: Exposure 0.0928 mg/kg/day, DNEL 4.8 mg/kg/day, RCR 0.0193 Consumer - inhalation: Exposure 0.333 mg/m³, DNEL 16.6 mg/m³, RCR 0.0201 PC9a_3 Aerosol spray can Consumer - inhalation: Exposure 0.159 mg/m³, DNEL 16.6 mg/m³, RCR 0.00958 PC9a_4 Removers (paint-, glue-, wallpaper-, sealant-remover) Consumer - dermal: Exposure 0.0928 mg/kg/day, DNEL 4.8 mg/kg/day, RCR 0.0193 Consumer - inhalation: Exposure 0.105 mg/m³, DNEL 16.6 mg/m³, RCR 0.00633 PC9b_1 Fillers and putty Consumer - dermal: Exposure 0.0928 mg/kg/day, DNEL 4.8 mg/kg/day, RCR 0.0193 Consumer - inhalation: Exposure 2.95 mg/m³, DNEL 16.6 mg/m³, RCR 0.178 PC9b_2 Plasters and floor equalisers Consumer - dermal: Exposure 0.0338 mg/kg/day, DNEL 4.8 mg/kg/day, RCR 0.00704 Consumer - inhalation: Exposure 4.42 mg/m³, DNEL 16.6 mg/m³, RCR 0.266 PC9b_3 Modelling clay Consumer - dermal: Exposure 0.0844 mg/kg/day, DNEL 4.8 mg/kg/day, RCR 0.0176 Consumer - oral, long-term - systemic: Exposure 1 mg/kg/day, DNEL 4.8 mg/kg/day, RCR 0.225 PC9c Finger paints Consumer - dermal: Exposure 0.0675 mg/kg/day, DNEL 4.8 mg/kg/day, RCR 0.0141 Consumer - oral, long-term - systemic: Exposure 1.08 mg/kg/day, DNEL 4.8 mg/kg/day, RCR 0.225 PC18 Ink and toners. Consumer - dermal: Exposure 0.0844 mg/kg/day, DNEL 4.8 mg/kg/day, RCR 0.0176 Consumer - inhalation: Exposure 1.02 mg/m³, DNEL 16.6 mg/m³, RCR 0.0614

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



Exposure scenario

Use as a chemical stripper - Consumer

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title	Use as a chemical stripper - Consumer
Product category	PC9a Coatings and paints, thinners, paint removers.
Main sector	SU21 Consumer uses
<u>Environment</u>	
Environmental release category	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) ERC8d Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
SPERC	ESVOC SPERC 8.3c.v1

2. Conditions of use affecting exposure (Workers - Health 1)

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures	Disposal of wastes Avoid carrying out operation for more than 15 minutes.
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2. Conditions of use affecting exposure (Non-industrial - Environment 1)

Product characteristics

Substance is a unique structure. Non-hydrophobic. Readily biodegradable.

Amounts used

Use as a chemical stripper - Consumer

Annual amount used in the EU: 2700 tonnes
 Fraction of EU tonnage used in region: 0.1
 Regional use tonnage: 30 tonnes/year
 Fraction of Regional tonnage used locally: 0.005
 Annual site tonnage: 0.015 tonnes
 Maximum daily site tonnage: 0.0411 kg/day

Frequency and duration of use

Dispersive use.
 Emission days: 365 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Release fraction to air from process (initial release prior to RMM): 98.5%
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 1%
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0.5%

Environmental factors not influenced by risk management measures

Dilution	Receiving surface water flow: 18000 m ³ /day Local freshwater dilution factor: 10 Local marine water dilution factor: 100
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Risk management measures

Technical measures	Prevent environmental discharge consistent with regulatory requirements.
STP type	Municipal STP.
STP details	Assumed domestic sewage treatment plant flow: 2000 m ³ /day Removal efficiency (total): 97.4%

Conditions and measures related to external treatment of waste for disposal

Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
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Conditions and measures related to external recovery of waste

Recovery method	External recovery and recycling of waste should comply with applicable local and/or national regulations.
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2. Conditions of use affecting exposure (Non-industrial - Health 1)

Product characteristics

Physical state	Liquid
Concentration details	Covers concentrations up to 1 %.

Amounts used

Amount per use: 3.75 kg

Frequency and duration of use

Covers use up to 2 days/year.
 Application duration: 2.20 hours

Human factors not influenced by risk management

Potentially exposed body parts	Covers skin contact area up to 857.50 cm ² .
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Use as a chemical stripper - Consumer

Other given operational conditions affecting Non-industrial exposure

Room size Covers use in room size of 20 m³.

Other given operational conditions affecting Non-industrial exposure

No specific risk management measure identified beyond those operational conditions stated.

3. Exposure estimation (Environment 1)

Assessment method	Used ECETOC TRA model.
Environmental exposure	Fresh water: Exposure 0.000116 mg/l, PNEC 0.0054 mg/l, RCR 0.0215 freshwater sediment: Exposure 0.00283 mg/kg, PNEC 1.322 mg/kg, RCR 0.00214 Marine water: Exposure 0.0000097 mg/l, PNEC 0.00054 mg/l, RCR 0.0179 marine sediment: Exposure 0.00238 mg/kg, PNEC 0.1322 mg/kg, RCR 0.0180 Soil: Exposure 0.000085 mg/kg, PNEC 0.262 mg/kg, RCR 0.000324 STP: Exposure 0.000205 mg/l, PNEC 1.8 mg/l, RCR 0.000114

4. Guidance to check compliance with the exposure scenario (Environment 1)

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

3. Exposure estimation (Health 1)

Assessment method	Used ECETOC TRA model.
Exposure	Consumer - dermal: Exposure 0.0844 mg/kg/day, DNEL 4.8 mg/kg/day, RCR 0.0176 Consumer - inhalation: Exposure 1.39 mg/m³, DNEL 16.6 mg/m³, RCR 0.0837

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



Exposure scenario

Use in adhesives and sealants - Consumer

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title	Use in adhesives and sealants - Consumer
Product category	PC1 Adhesives, sealants.
Main sector	SU21 Consumer uses
<u>Environment</u>	
Environmental release category	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) ERC8f Widespread use leading to inclusion into/onto article (outdoor)
SPERC	FEICA SPERC 8c.2a.v1

2. Conditions of use affecting exposure (Workers - Health 1)

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures	Disposal of wastes Avoid carrying out operation for more than 15 minutes.
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2. Conditions of use affecting exposure (Non-industrial - Environment 1)

Product characteristics

Substance is a unique structure. Non-hydrophobic. Readily biodegradable.

Amounts used

Use in adhesives and sealants - Consumer

Annual amount used in the EU: 1800 tonnes
 Fraction of EU tonnage used in region: 0.1
 Regional use tonnage: 30 tonnes/year
 Fraction of Regional tonnage used locally: 0.002
 Annual site tonnage: 0.06 tonnes
 Maximum daily site tonnage: 0.164 kg/day

Frequency and duration of use

Dispersive use.
 Emission days: 365 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Release fraction to air from process (initial release prior to RMM): 98.5%
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 0.01%
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0%

Environmental factors not influenced by risk management measures

Dilution	Receiving surface water flow: 18000 m ³ /day Local freshwater dilution factor: 10 Local marine water dilution factor: 100
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Risk management measures

Technical measures	Prevent environmental discharge consistent with regulatory requirements.
STP type	Municipal STP.
STP details	Assumed domestic sewage treatment plant flow: 2000 m ³ /day Removal efficiency (total): 95.7%

Conditions and measures related to external treatment of waste for disposal

Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
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Conditions and measures related to external recovery of waste

Recovery method	External recovery and recycling of waste should comply with applicable local and/or national regulations.
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2. Conditions of use affecting exposure (Non-industrial - Health 1)

Product characteristics

Physical state	Liquid
Concentration details	Covers concentrations up to 1 %.

Amounts used

Amount per use: 15 kg

Frequency and duration of use

Covers use up to 1 days/year.
 Application duration: 6 hours

Human factors not influenced by risk management

Potentially exposed body parts	Covers skin contact area up to 428.80 cm ² .
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Use in adhesives and sealants - Consumer

Other given operational conditions affecting Non-industrial exposure

Room size Covers use in room size of 20 m³.

Other given operational conditions affecting Non-industrial exposure

No specific risk management measure identified beyond those operational conditions stated.

3. Exposure estimation (Environment 1)

Assessment method	Used ECETOC TRA model.
Environmental exposure	Fresh water: Exposure 0.000117 mg/l, PNEC 0.0054 mg/l, RCR 0.0217 freshwater sediment: Exposure 0.00286 mg/kg, PNEC 1.322 mg/kg, RCR 0.00216 Marine water: Exposure 0.0000099 mg/l, PNEC 0.00054 mg/l, RCR 0.0183 marine sediment: Exposure 0.00242 mg/kg, PNEC 0.1322 mg/kg, RCR 0.0183 Soil: Exposure 0.000339 mg/kg, PNEC 0.262 mg/kg, RCR 0.00129 STP: Exposure 0.000822 mg/l, PNEC 1.8 mg/l, RCR 0.000457

4. Guidance to check compliance with the exposure scenario (Environment 1)

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

3. Exposure estimation (Health 1)

Assessment method	Used ECETOC TRA model.
Exposure	Consumer - dermal: Exposure 0.0844 mg/kg/day, DNEL 4.8 mg/kg/day, RCR 0.0176 Consumer - inhalation: Exposure 1.39 mg/m³, DNEL 16.6 mg/m³, RCR 0.0837

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



Exposure scenario Formulation of solvents

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title	Formulation of solvents
Process scope	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.
Main sector	SU3 Industrial uses
Sector of use	SU10 Formulation [mixing] of preparations and/or re-packaging
<u>Environment</u>	
Environmental release category	ERC2 Formulation into mixture
SPERC	ESVOC SPERC 4.3a.v1
<u>Worker</u>	

Formulation of solvents

Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises PROC5 Mixing or blending in batch processes PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC14 Tableting, compression, extrusion, pelletisation, granulation PROC15 Use as laboratory reagent.
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2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.
Concentration details	Covers concentrations up to 100 %.

Amounts used

Annual amount used in the EU: 300 tonnes
 Fraction of EU tonnage used in region: 1
 Regional use tonnage: 300 tonnes/year
 Fraction of Regional tonnage used locally: 0.01
 Maximum daily site tonnage: 10 kg/day
 Annual site tonnage: 3 tonnes

Frequency and duration of use

Continuous release.
 Emission days: 300 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Release fraction to air from process (initial release prior to RMM): 1%
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 0.02%
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0.01%

Environmental factors not influenced by risk management measures

Dilution	Receiving surface water flow: 18000 m³/day Local freshwater dilution factor: 10 Local marine water dilution factor: 100
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Risk management measures

STP type	Municipal STP.
STP details	Assumed domestic sewage treatment plant flow: 2000 m³/day Estimated substance removal from wastewater via domestic sewage treatment: 95.7%

Conditions and measures related to external treatment of waste for disposal

Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
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Conditions and measures related to external recovery of waste

Formulation of solvents

Recovery method	External recovery and recycling of waste should comply with applicable local and/or national regulations.
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2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.
Concentration details	Covers concentrations up to 100 %.

Frequency and duration of use

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

Other given operational conditions affecting workers exposure

Temperature	Assumes activities are at ambient temperature (unless stated differently).
Ventilation rate	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Technical conditions and measures at process level (source) to prevent release

Technical protective measures	Provide extract ventilation to points where emissions occur. PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing) Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Disposal of wastes Limit the substance content in the product to 1%.
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Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures	Bulk transfers Avoid carrying out activities involving exposure for more than 1 hour.
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Risk management measures

Use suitable eye protection and gloves.
PROC4 Chemical production where opportunity for exposure arises
PROC5 Mixing or blending in batch processes
Wear a respirator conforming to EN140 with Type A/P2 filter or better.

3. Exposure estimation (Environment 1)

Assessment method	Used ECETOC TRA model.
Environmental exposure	Fresh water: Exposure 0.00161 mg/l, PNEC 0.0054 mg/l, RCR 0.298 freshwater sediment: Exposure 0.394 mg/kg, PNEC 1.322 mg/kg, RCR 0.298 Marine water: Exposure 0.000159 mg/l, PNEC 0.00054 mg/l, RCR 0.294 marine sediment: Exposure 0.0389 mg/kg, PNEC 0.1322 mg/kg, RCR 0.294 Soil: Exposure 0.146 mg/kg, PNEC 0.262 mg/kg, RCR 0.557 STP: Exposure 0.0149 mg/l, PNEC 1.8 mg/l, RCR 0.00828

4. Guidance to check compliance with the exposure scenario (Environment 1)

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

3. Exposure estimation (Health 1)

Assessment method	Used ECETOC TRA model.
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Formulation of solvents

Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
 Worker - dermal: Exposure 0.028 mg/cm², DNEL 0.222 mg/cm², RCR 0.126
 Worker - inhalation: Exposure 0.007 mg/m³, DNEL 33.3 mg/m³, RCR 0.0002
 PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
 Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450
 Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210
 PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
 Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113
 Worker - inhalation: Exposure 17 mg/m³, DNEL 33.3 mg/m³, RCR 0.511
 PROC4 Chemical production where opportunity for exposure arises
 Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450
 Worker - inhalation: Exposure 3.5 mg/m³, DNEL 33.3 mg/m³, RCR 0.105
 PROC5 Mixing or blending in batch processes
 Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450
 Worker - inhalation: Exposure 3.5 mg/m³, DNEL 33.3 mg/m³, RCR 0.105
 PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
 Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450
 Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210
 PROC15 Use as laboratory reagent.
 Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.1113
 Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210
 PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
 Worker - dermal: Exposure 0.05 mg/kg/day, DNEL 0.222 mg/kg/day, RCR 0.225
 Worker - inhalation: Exposure 0.5 ppm, DNEL 33.3 ppm, RCR 0.0150
 PROC14 Tabletting, compression, extrusion, pelletisation, granulation
 Worker - dermal: Exposure 0.025 mg/kg/day, DNEL 0.222 mg/kg/day, RCR 0.0113
 Worker - inhalation: Exposure 0.5 ppm, DNEL 33.3 ppm, RCR 0.0150

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



Exposure scenario

Use as a solvent - Industrial

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title	Use as a solvent - Industrial
Process scope	Solvent-based process.
Main sector	SU3 Industrial uses

Environment

Environmental release category	ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article) ERC7 Use of functional fluid at industrial site
SPERC	ESVOC SPERC 4.3a.v1

Worker

Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises PROC5 Mixing or blending in batch processes PROC7 Industrial spraying PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC10 Roller application or brushing PROC13 Treatment of articles by dipping and pouring. PROC15 Use as laboratory reagent.
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Use as a solvent - Industrial

2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.
Concentration details	Covers concentrations up to 100 %.

Amounts used

Annual amount used in the EU: 3305.9 tonnes
 Fraction of EU tonnage used in region: 1
 Regional use tonnage: 300 tonnes/year
 Fraction of Regional tonnage used locally: 0.02
 Maximum daily site tonnage: 20 kg/day
 Annual site tonnage: 6 tonnes

Frequency and duration of use

Continuous release.
 Emission days: 300 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Emission factor to air: 9.8%
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 0.07%
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0%

Environmental factors not influenced by risk management measures

Dilution	Receiving surface water flow: 18000 m ³ /day Local freshwater dilution factor: 10 Local marine water dilution factor: 100
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Risk management measures

STP type	Municipal STP.
STP details	Assumed domestic sewage treatment plant flow: 2000 m ³ /day Estimated substance removal from wastewater via domestic sewage treatment: 95.7%

Conditions and measures related to external treatment of waste for disposal

Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
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Conditions and measures related to external recovery of waste

Recovery method	External recovery and recycling of waste should comply with applicable local and/or national regulations.
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2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.
Concentration details	Covers concentrations up to 100 %.

Frequency and duration of use

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

Use as a solvent - Industrial

Other given operational conditions affecting workers exposure

Temperature	Assumes activities and processes are carried out at a temperature of <100°C.
Ventilation rate	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Technical conditions and measures at process level (source) to prevent release

Technical protective measures	Indoor use. Provide extract ventilation to points where emissions occur. Storage of waste prior to disposal Provide a good standard of controlled ventilation (10 to 15 air changes per hour). Transfer of process wastes to storage containers Provide extract ventilation to material transfer points and other openings.
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Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures	Disposal of wastes Avoid carrying out operation for more than 15 minutes. Bulk transfers Avoid carrying out activities involving exposure for more than 1 hour.
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Risk management measures

Wear suitable gloves (tested to EN374) and eye protection.

3. Exposure estimation (Environment 1)

Assessment method	Used ECETOC TRA model.
Environmental exposure	Fresh water: Exposure 0.00161 mg/l, PNEC 0.0054 mg/l, RCR 0.298 freshwater sediment: Exposure 0.394 mg/kg, PNEC 1.322 mg/kg, RCR 0.298 Marine water: Exposure 0.000159 mg/l, PNEC 0.00054 mg/l, RCR 0.294 marine sediment: Exposure 0.0389 mg/kg, PNEC 0.1322 mg/kg, RCR 0.294 Soil: Exposure 0.146 mg/kg, PNEC 0.262 mg/kg, RCR 0.557 STP: Exposure 0.350 mg/l, PNEC 1.8 mg/l, RCR 0.194

4. Guidance to check compliance with the exposure scenario (Environment 1)

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

3. Exposure estimation (Health 1)

Assessment method	Used ECETOC TRA model.
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Use as a solvent - Industrial

Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113

Worker - inhalation: Exposure 0.01 mg/m³, DNEL 33.3 mg/m³, RCR 0.0003

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113

Worker - inhalation: Exposure 17 mg/m³, DNEL 33.3 mg/m³, RCR 0.511

PROC4 Chemical production where opportunity for exposure arises

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 3.5 mg/m³, DNEL 33.3 mg/m³, RCR 0.105

PROC5 Mixing or blending in batch processes

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 3.5 mg/m³, DNEL 33.3 mg/m³, RCR 0.105

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

PROC15 Use as laboratory reagent.

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



Exposure scenario

Use as a solvent - Professional

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title	Use as a solvent - Professional
Process scope	Solvent-based process.
Main sector	SU22 Professional uses

Environment

Environmental release category	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) ERC8d Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) ERC9a Widespread use of functional fluid (indoor) ERC9b Widespread use of functional fluid (outdoor)
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SPERC	ESVOC SPERC 8.17.v1
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Worker

Use as a solvent - Professional

Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4 Chemical production where opportunity for exposure arises PROC5 Mixing or blending in batch processes PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC10 Roller application or brushing PROC11 Non industrial spraying PROC13 Treatment of articles by dipping and pouring. PROC15 Use as laboratory reagent.
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2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.
Concentration details	Covers concentrations up to 100 %.

Amounts used

Annual amount used in the EU: 4500 tonnes
 Fraction of EU tonnage used in region: 0.1
 Regional use tonnage: 30 tonnes/year
 Fraction of Regional tonnage used locally: 0.0005
 Maximum daily site tonnage: 0.0411 kg/day
 Annual site tonnage: 0.0015 tonnes

Frequency and duration of use

Dispersive use.
 Emission days: 365 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Emission factor to air: 50%
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 50%
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0%

Environmental factors not influenced by risk management measures

Dilution	Receiving surface water flow: 18000 m³/day Local freshwater dilution factor: 10 Local marine water dilution factor: 100
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Risk management measures

STP type	Municipal STP.
STP details	Assumed domestic sewage treatment plant flow: 2000 m³/day Estimated substance removal from wastewater via domestic sewage treatment: 95.7%

Conditions and measures related to external treatment of waste for disposal

Use as a solvent - Professional

Waste treatment External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Recovery method External recovery and recycling of waste should comply with applicable local and/or national regulations.

2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state Liquid

Vapour pressure Vapour pressure 0.5 - 10 kPa at STP.

Concentration details Covers concentrations up to 100 %.

Frequency and duration of use

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

Other given operational conditions affecting workers exposure

Temperature Assumes activities are at ambient temperature (unless stated differently).

Ventilation rate Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Technical conditions and measures at process level (source) to prevent release

Technical protective measures Provide extract ventilation to points where emissions occur. , or: Ensure operation is undertaken outdoors.

PROC11 Non industrial spraying Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.

PROC15 Use as laboratory reagent. Handle in a fume cupboard or under extract ventilation.

Disposal of wastes Avoid carrying out activities involving exposure for more than 15 minutes.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures Disposal of wastes Avoid carrying out operation for more than 15 minutes.

Risk management measures

Wear suitable gloves (tested to EN374) and eye protection.

3. Exposure estimation (Environment 1)

Assessment method Used ECETOC TRA model.

Environmental exposure Fresh water: Exposure 0.000157 mg/l, PNEC 0.0054 mg/l, RCR 0.0291
freshwater sediment: Exposure 0.0385 mg/kg, PNEC 1.322 mg/kg, RCR 0.00291
Marine water: Exposure 0.0000139 mg/l, PNEC 0.00054 mg/l, RCR 0.0257
marine sediment: Exposure 0.00253 mg/kg, PNEC 0.1322 mg/kg, RCR 0.0191
Soil: Exposure 0.00424 mg/kg, PNEC 0.262 mg/kg, RCR 0.0162
STP: Exposure 0.000438 mg/l, PNEC 1.8 mg/l, RCR 0.000243

4. Guidance to check compliance with the exposure scenario (Environment 1)

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

3. Exposure estimation (Health 1)

Use as a solvent - Professional

Assessment method

Used ECETOC TRA model.

Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113

Worker - inhalation: Exposure 0.01 mg/m³, DNEL 33.3 mg/m³, RCR 0.0003

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 12 mg/m³, DNEL 33.3 mg/m³, RCR 0.360

PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113

Worker - inhalation: Exposure 17 mg/m³, DNEL 33.3 mg/m³, RCR 0.511

PROC4 Chemical production where opportunity for exposure arises

Worker - dermal: Exposure 0.05 mg/cm², DNEL 0.222 mg/cm², RCR 0.225

Worker - inhalation: Exposure 3.4 mg/m³, DNEL 33.3 mg/m³, RCR 0.102

PROC5 Mixing or blending in batch processes

Worker - dermal: Exposure 0.005 mg/cm², DNEL 0.222 mg/cm², RCR 0.0225

Worker - inhalation: Exposure 10 mg/m³, DNEL 33.3 mg/m³, RCR 0.300

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450

Worker - inhalation: Exposure 11 mg/m³, DNEL 33.3 mg/m³, RCR 0.330

PROC15 Use as laboratory reagent.

Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.210

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



Exposure scenario

Use as a solvent - Consumer

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title	Use as a solvent - Consumer
Product category	PC15 Non-metal-surface treatment products.
Main sector	SU21 Consumer uses
<u>Environment</u>	
Environmental release category	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) ERC8d Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) ERC9a Widespread use of functional fluid (indoor) ERC9b Widespread use of functional fluid (outdoor)
SPERC	ESVOC SPERC 8.3c.v1

2. Conditions of use affecting exposure (Workers - Health 1)

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures	Disposal of wastes Avoid carrying out operation for more than 15 minutes.
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2. Conditions of use affecting exposure (Non-industrial - Environment 1)

Product characteristics

Substance is a unique structure. Non-hydrophobic. Readily biodegradable.

Amounts used

Use as a solvent - Consumer

Annual amount used in the EU: 2700 tonnes
 Fraction of EU tonnage used in region: 0.1
 Regional use tonnage: 300 tonnes/year
 Fraction of Regional tonnage used locally: 0.0005
 Annual site tonnage: 0.0411 tonnes
 Maximum daily site tonnage: 0.015 kg/day

Frequency and duration of use

Dispersive use.
 Emission days: 365 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Release fraction to air from process (initial release prior to RMM): 98.5%
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 1%
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0.5%

Environmental factors not influenced by risk management measures

Dilution	Receiving surface water flow: 18000 m ³ /day Local freshwater dilution factor: 10 Local marine water dilution factor: 100
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Risk management measures

Technical measures	Prevent environmental discharge consistent with regulatory requirements.
STP type	Municipal STP.
STP details	Assumed domestic sewage treatment plant flow: 2000 m ³ /day Removal efficiency (total): 95.7%

Conditions and measures related to external treatment of waste for disposal

Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
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Conditions and measures related to external recovery of waste

Recovery method	External recovery and recycling of waste should comply with applicable local and/or national regulations.
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2. Conditions of use affecting exposure (Non-industrial - Health 1)

Product characteristics

Physical state	Liquid
Concentration details	Covers concentrations up to 1 %.

Amounts used

Amount per use: 3.75 kg

Frequency and duration of use

Covers use up to 1 days/year.
 Application duration: 2.2 hours

Human factors not influenced by risk management

Potentially exposed body parts	Covers skin contact area up to 857.50 cm ² .
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Use as a solvent - Consumer

Other given operational conditions affecting Non-industrial exposure

Room size Covers use in room size of 20 m³.

Other given operational conditions affecting Non-industrial exposure

No specific risk management measure identified beyond those operational conditions stated.

3. Exposure estimation (Environment 1)

Assessment method	Used ECETOC TRA model.
Environmental exposure	Fresh water: Exposure 0.000114 mg/l, PNEC 0.0054 mg/l, RCR 0.0211 freshwater sediment: Exposure 0.00280 mg/kg, PNEC 1.322 mg/kg, RCR 0.00212 Marine water: Exposure 0.0000096 mg/l, PNEC 0.00054 mg/l, RCR 0.0178 marine sediment: Exposure 0.00242 mg/kg, PNEC 0.1322 mg/kg, RCR 0.0183 Soil: Exposure 0.0000849 mg/kg, PNEC 0.262 mg/kg, RCR 0.000324 STP: Exposure 0.000205 mg/l, PNEC 1.8 mg/l, RCR 0.000114

4. Guidance to check compliance with the exposure scenario (Environment 1)

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

3. Exposure estimation (Health 1)

Assessment method	Used ECETOC TRA model.
Exposure	Consumer - dermal: Exposure 0.0844 mg/kg/day, DNEL 4.8 mg/kg/day, RCR 0.0176 Consumer - inhalation: Exposure 0.0697 mg/m³, DNEL 16.6 mg/m³, RCR 0.00420

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



Exposure scenario

Use in compounding of fragrances

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title	Use in compounding of fragrances
Process scope	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.
Main sector	SU3 Industrial uses
Sector of use	SU10 Formulation [mixing] of preparations and/or re-packaging
<u>Environment</u>	
Environmental release category	ERC2 Formulation into mixture
<u>Worker</u>	
Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC5 Mixing or blending in batch processes PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing) PROC15 Use as laboratory reagent.

Use in compounding of fragrances

2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.
Concentration details	Covers concentrations up to 100 %.

Amounts used

Annual amount used in the EU: 630 tonnes
 Fraction of EU tonnage used in region: 1
 Regional use tonnage: 630 tonnes/year
 Fraction of Regional tonnage used locally: 1
 Maximum daily site tonnage: 900 kg/day
 Annual site tonnage: 225 tonnes

Frequency and duration of use

Continuous release.
 Emission days: 250 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Emission factor to air: 2.5%
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 2%
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0.01%

Environmental factors not influenced by risk management measures

Dilution	Receiving surface water flow: 18000 m ³ /day Local freshwater dilution factor: 10 Local marine water dilution factor: 100
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Risk management measures

STP type	Municipal STP.
STP details	Assumed domestic sewage treatment plant flow: 2000 m ³ /day Estimated substance removal from wastewater via domestic sewage treatment: 95.7%

Conditions and measures related to external treatment of waste for disposal

Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
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Conditions and measures related to external recovery of waste

Recovery method	External recovery and recycling of waste should comply with applicable local and/or national regulations.
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2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.
Concentration details	Covers concentrations up to 100 %.

Frequency and duration of use

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

Use in compounding of fragrances

Other given operational conditions affecting workers exposure

Temperature	Assumes activities are at ambient temperature (unless stated differently).
Ventilation rate	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Technical conditions and measures at process level (source) to prevent release

Technical protective measures	Provide extract ventilation to points where emissions occur.
	Small package filling PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing) Limit the substance content in the product to 25%.
	Equipment cleaning and maintenance Limit the substance content in the product to 5%.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures	Avoid carrying out activities involving exposure for more than 1 hour.
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Risk management measures

Use suitable eye protection and gloves.
Gloves should comply with the requirements of EN 374.

3. Exposure estimation (Environment 1)

Assessment method	Used ECETOC TRA model.
Environmental exposure	Fresh water: Exposure 0.000191 mg/l, PNEC 0.0054 mg/l, RCR 0.0354 freshwater sediment: Exposure 0.0468 mg/kg, PNEC 1.322 mg/kg, RCR 0.0354 Marine water: Exposure 0.0000173 mg/l, PNEC 0.00054 mg/l, RCR 0.0320 marine sediment: Exposure 0.00423 mg/kg, PNEC 0.1322 mg/kg, RCR 0.0320 Soil: Exposure 0.00743 mg/kg, PNEC 0.262 mg/kg, RCR 0.0284 STP: Exposure 0.000767 mg/l, PNEC 1.8 mg/l, RCR 0.000426

4. Guidance to check compliance with the exposure scenario (Environment 1)

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

3. Exposure estimation (Health 1)

Assessment method	Used ECETOC TRA model.
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Use in compounding of fragrances

Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
 Worker - dermal: Exposure 0.0214 mg/cm², DNEL 0.222 mg/cm², RCR 0.0964
 Worker - inhalation: Exposure 0.01 mg/m³, DNEL 33.3 mg/m³, RCR 0.0003
 PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
 Worker - dermal: Exposure 0.0214 mg/cm², DNEL 0.222 mg/cm², RCR 0.0964
 Worker - inhalation: Exposure 1.26 mg/m³, DNEL 33.3 mg/m³, RCR 0.0378
 PROC5 Mixing or blending in batch processes
 Worker - dermal: Exposure 0.171 mg/cm², DNEL 0.222 mg/cm², RCR 0.770
 Worker - inhalation: Exposure 3.5 mg/m³, DNEL 33.3 mg/m³, RCR 0.105
 PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
 Worker - dermal: Exposure 0.171 mg/cm², DNEL 0.222 mg/cm², RCR 0.770
 Worker - inhalation: Exposure 1.4 mg/m³, DNEL 33.3 mg/m³, RCR 0.0420
 PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
 Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450
 Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210
 PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
 Worker - dermal: Exposure 0.0514 mg/cm², DNEL 0.222 mg/cm², RCR 0.232
 Worker - inhalation: Exposure 2.10 mg/m³, DNEL 33.3 mg/m³, RCR 0.0631
 PROC15 Use as laboratory reagent.
 Worker - dermal: Exposure 0.129 mg/cm², DNEL 0.222 mg/cm², RCR 0.581
 Worker - inhalation: Exposure 0.420 mg/m³, DNEL 33.3 mg/m³, RCR 0.0126

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



Exposure scenario
Formulation of fragrances - Industrial

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title	Formulation of fragrances - Industrial
Process scope	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.
Main sector	SU3 Industrial uses
Sector of use	SU10 Formulation [mixing] of preparations and/or re-packaging

Environment

Environmental release category	ERC2 Formulation into mixture
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Worker

Formulation of fragrances - Industrial

Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
	PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
	PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
	PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
	PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
	PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
	PROC13 Treatment of articles by dipping and pouring.
	PROC14 Tableting, compression, extrusion, pelletisation, granulation
	PROC15 Use as laboratory reagent.

2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.
Concentration details	Covers concentrations up to 100 %.

Amounts used

Annual amount used in the EU: 630 tonnes
 Fraction of EU tonnage used in region: 1
 Regional use tonnage: 630 tonnes/year
 Fraction of Regional tonnage used locally: 0.3571
 Maximum daily site tonnage: 900 kg/day
 Annual site tonnage: 225 tonnes

Frequency and duration of use

Continuous release.
 Emission days: 250 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Emission factor to air: 2.5%
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 2%
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0.01%

Environmental factors not influenced by risk management measures

Dilution	Receiving surface water flow: 18000 m ³ /day Local freshwater dilution factor: 10 Local marine water dilution factor: 100
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Risk management measures

STP type	Municipal STP.
STP details	Assumed domestic sewage treatment plant flow: 2000 m ³ /day Estimated substance removal from wastewater via domestic sewage treatment: 95.7%

Conditions and measures related to external treatment of waste for disposal

Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
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Formulation of fragrances - Industrial

Conditions and measures related to external recovery of waste

Recovery method External recovery and recycling of waste should comply with applicable local and/or national regulations.

2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state Liquid

Vapour pressure Vapour pressure 0.5 - 10 kPa at STP.

Concentration details Concentration of substance in product: 25%

Frequency and duration of use

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

Other given operational conditions affecting workers exposure

Temperature Assumes activities are at ambient temperature (unless stated differently).

Ventilation rate Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Technical conditions and measures at process level (source) to prevent release

Technical protective measures Store substance within a closed system. Drain or remove substance from equipment prior to break-in or maintenance.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures Avoid carrying out activities involving exposure for more than 1 hour.

Risk management measures

Use suitable eye protection and gloves.
Gloves should comply with the requirements of EN 374.

3. Exposure estimation (Environment 1)

Assessment method Used ECETOC TRA model.

Environmental exposure Fresh water: Exposure 0.000191 mg/l, PNEC 0.0054 mg/l, RCR 0.0354
freshwater sediment: Exposure 0.0468 mg/kg, PNEC 1.322 mg/kg, RCR 0.0354
Marine water: Exposure 0.0000173 mg/l, PNEC 0.00054 mg/l, RCR 0.0320
marine sediment: Exposure 0.00423 mg/kg, PNEC 0.1322 mg/kg, RCR 0.0320
Soil: Exposure 0.00743 mg/kg, PNEC 0.262 mg/kg, RCR 0.0284
STP: Exposure 0.18 mg/l, PNEC 1.8 mg/l, RCR 0.1

4. Guidance to check compliance with the exposure scenario (Environment 1)

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

3. Exposure estimation (Health 1)

Assessment method Used ECETOC TRA model.

Formulation of fragrances - Industrial

Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
 Worker - dermal: Exposure 0.0129 mg/cm², DNEL 0.222 mg/cm², RCR 0.0581
 Worker - inhalation: Exposure 0.006 mg/m³, DNEL 33.3 mg/m³, RCR 0.000180
 PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
 Worker - dermal: Exposure 0.0514 mg/cm², DNEL 0.222 mg/cm², RCR 0.232
 Worker - inhalation: Exposure 0.252 mg/m³, DNEL 33.3 mg/m³, RCR 0.00757
 PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
 Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113
 Worker - inhalation: Exposure 2 mg/m³, DNEL 33.3 mg/m³, RCR 0.0600
 PROC5 Mixing or blending in batch processes
 Worker - dermal: Exposure 0.103 mg/cm², DNEL 0.222 mg/cm², RCR 0.464
 Worker - inhalation: Exposure 1.26 mg/m³, DNEL 33.3 mg/m³, RCR 0.0378
 PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
 Worker - dermal: Exposure 0.1 mg/cm², DNEL 0.222 mg/cm², RCR 0.450
 Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210
 PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
 Worker - dermal: Exposure 0.0429 mg/cm², DNEL 0.222 mg/cm², RCR 0.193
 Worker - inhalation: Exposure 0.35 mg/m³, DNEL 33.3 mg/m³, RCR 0.0105
 PROC15 Use as laboratory reagent.
 Worker - dermal: Exposure 0.0129 mg/cm², DNEL 0.222 mg/cm², RCR 0.0581
 Worker - inhalation: Exposure 0.42 mg/m³, DNEL 33.3 mg/m³, RCR 0.0126
 PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
 Worker - dermal: Exposure 0.103 mg/cm², DNEL 0.222 mg/cm², RCR 0.464
 Worker - inhalation: Exposure 0.84 mg/m³, DNEL 33.3 mg/m³, RCR 0.0252
 PROC13 Treatment of articles by dipping and pouring.
 Worker - dermal: Exposure 0.0857 mg/cm², DNEL 0.222 mg/cm², RCR 0.386
 Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210
 PROC14 Tableting, compression, extrusion, pelletisation, granulation
 Worker - dermal: Exposure 0.0214 mg/cm², DNEL 0.222 mg/cm², RCR 0.0964
 Worker - inhalation: Exposure 0.07 mg/m³, DNEL 33.3 mg/m³, RCR 0.00210

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



Exposure scenario
Use of fragrances - Industrial

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title	Use of fragrances - Industrial
Process scope	Covers the use as a component of cleaning products, including transfer from storage, 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), related equipment cleaning and maintenance.
Main sector	SU3 Industrial uses
Sector of use	SU10 Formulation [mixing] of preparations and/or re-packaging
<u>Environment</u>	
Environmental release category	ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
SPERC	AISE SPERC 4.1.v
<u>Worker</u>	

Use of fragrances - Industrial

Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC4 Chemical production where opportunity for exposure arises PROC5 Mixing or blending in batch processes PROC7 Industrial spraying PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC10 Roller application or brushing PROC15 Use as laboratory reagent. PROC19 Manual activities involving hand contact
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2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.
Concentration details	Covers concentrations up to 100 %.

Amounts used

Annual amount used in the EU: 27.5 tonnes
 Fraction of EU tonnage used in region: 0.1
 Regional use tonnage: 2.75 tonnes/year
 Fraction of Regional tonnage used locally: 0.4
 Maximum daily site tonnage: 50 kg/day
 Annual site tonnage: 11 tonnes

Frequency and duration of use

Continuous release.
 Emission days: 220 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Emission factor to air: 0%
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 1%
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0%

Environmental factors not influenced by risk management measures

Dilution	Receiving surface water flow: 18000 m³/day Local freshwater dilution factor: 10 Local marine water dilution factor: 100
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Risk management measures

STP type	Municipal STP.
STP details	Assumed domestic sewage treatment plant flow: 2000 m³/day Estimated substance removal from wastewater via domestic sewage treatment: 95.7%

Conditions and measures related to external treatment of waste for disposal

Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
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Conditions and measures related to external recovery of waste

Use of fragrances - Industrial

Recovery method	External recovery and recycling of waste should comply with applicable local and/or national regulations.
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2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.
Concentration details	Concentration of substance in product: 1%

Frequency and duration of use

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

Other given operational conditions affecting workers exposure

Temperature	Assumes activities and processes are carried out at a temperature of <100°C.
Ventilation rate	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Technical conditions and measures at process level (source) to prevent release

Technical protective measures	PROC7 Industrial spraying Provide a good standard of controlled ventilation (10 to 15 air changes per hour). , or: Ensure operation is undertaken outdoors.
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Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures	PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities Avoid carrying out operation for more than 15 minutes. PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities Avoid carrying out activities involving exposure for more than 1 hour. PROC10 Roller application or brushing Avoid carrying out activities involving exposure for more than 4 hours.
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Risk management measures

Wear suitable gloves (tested to EN374) and eye protection.

3. Exposure estimation (Environment 1)

Assessment method	Used ECETOC TRA model.
Environmental exposure	Fresh water: Exposure 0.00277 mg/l, PNEC 0.0054 mg/l, RCR 0.513 freshwater sediment: Exposure 0.678 mg/kg, PNEC 1.322 mg/kg, RCR 0.513 Marine water: Exposure 0.000275 mg/l, PNEC 0.00054 mg/l, RCR 0.509 marine sediment: Exposure 0.0389 mg/kg, PNEC 0.1322 mg/kg, RCR 0.294 Soil: Exposure 0.0621 mg/kg, PNEC 0.262 mg/kg, RCR 0.237 STP: Exposure 0.625 mg/l, PNEC 1.8 mg/l, RCR 0.347

4. Guidance to check compliance with the exposure scenario (Environment 1)

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

3. Exposure estimation (Health 1)

Use of fragrances - Industrial

Assessment method

Used ECETOC TRA model.

Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Worker - dermal: Exposure 0.02143 mg/cm², DNEL 0.222 mg/cm², RCR 0.0965

Worker - inhalation: Exposure 0.001 mg/m³, DNEL 33.3 mg/m³, RCR 0.00003

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Worker - dermal: Exposure 0.00857 mg/cm², DNEL 0.222 mg/cm², RCR 0.0386

Worker - inhalation: Exposure 0.07 mg/m³, DNEL 33.3 mg/m³, RCR 0.00210

PROC4 Chemical production where opportunity for exposure arises

Worker - dermal: Exposure 0.0429 mg/cm², DNEL 0.222 mg/cm², RCR 0.193

Worker - inhalation: Exposure 0.35 mg/m³, DNEL 33.3 mg/m³, RCR 0.0105

PROC5 Mixing or blending in batch processes

Worker - dermal: Exposure 0.0857 mg/cm², DNEL 0.222 mg/cm², RCR 0.386

Worker - inhalation: Exposure 0.35 mg/m³, DNEL 33.3 mg/m³, RCR 0.0105

PROC7 Industrial spraying

Worker - dermal: Exposure 0.0536 mg/cm², DNEL 0.222 mg/cm², RCR 0.241

Worker - inhalation: Exposure 4 mg/m³, DNEL 33.3 mg/m³, RCR 0.120

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

Worker - dermal: Exposure 0.140 mg/cm², DNEL 0.222 mg/cm², RCR 0.631

Worker - inhalation: Exposure 0.0857 mg/m³, DNEL 33.3 mg/m³, RCR 0.00257

PROC15 Use as laboratory reagent.

Worker - dermal: Exposure 0.00214 mg/cm², DNEL 0.222 mg/cm², RCR 0.00964

Worker - inhalation: Exposure 0.35 mg/m³, DNEL 33.3 mg/m³, RCR 0.0105

PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

Worker - dermal: Exposure 0.0857 mg/cm², DNEL 0.222 mg/cm², RCR 0.386

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

PROC10 Roller application or brushing

Worker - dermal: Exposure 0.171 mg/cm², DNEL 0.222 mg/cm², RCR 0.770

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

PROC19 Manual activities involving hand contact

Worker - dermal: Exposure 0.177 mg/cm², DNEL 0.222 mg/cm², RCR 0.797

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



Exposure scenario

Formulation of fragrances - Professional

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title	Formulation of fragrances - Professional
Process scope	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.
Main sector	SU22 Professional uses
Sector of use	SU10 Formulation [mixing] of preparations and/or re-packaging
<u>Environment</u>	
Environmental release category	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
SPERC	COLIPA SPERC 8a.1.a.v1
<u>Worker</u>	

Formulation of fragrances - Professional

Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
	PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
	PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
	PROC5 Mixing or blending in batch processes
	PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
	PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
	PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
	PROC13 Treatment of articles by dipping and pouring.
	PROC14 Tableting, compression, extrusion, pelletisation, granulation
	PROC15 Use as laboratory reagent.

2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.
Concentration details	Covers concentrations up to 100 %.

Amounts used

Annual amount used in the EU: 7404 tonnes
 Fraction of EU tonnage used in region: 0.1
 Regional use tonnage: 40 tonnes/year
 Fraction of Regional tonnage used locally: 0.0050
 Maximum daily site tonnage: 10 kg/day
 Annual site tonnage: 0.2 tonnes

Frequency and duration of use

Continuous release.
 Emission days: 20 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Emission factor to air: 0%
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 2%
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0%

Environmental factors not influenced by risk management measures

Dilution	Receiving surface water flow: 18000 m ³ /day
	Local freshwater dilution factor: 10
	Local marine water dilution factor: 100

Risk management measures

STP type	Municipal STP.
STP details	Assumed domestic sewage treatment plant flow: 2000 m ³ /day
	Estimated substance removal from wastewater via domestic sewage treatment: 95.7%

Conditions and measures related to external treatment of waste for disposal

Formulation of fragrances - Professional

Waste treatment External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Recovery method External recovery and recycling of waste should comply with applicable local and/or national regulations.

2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state Liquid

Vapour pressure Vapour pressure 0.5 - 10 kPa at STP.

Concentration details Concentration of substance in product: 25%

Frequency and duration of use

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

Other given operational conditions affecting workers exposure

Temperature Assumes activities are at ambient temperature (unless stated differently).

Ventilation rate Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Technical conditions and measures at process level (source) to prevent release

Technical protective measures Store substance within a closed system. Drain or remove substance from equipment prior to break-in or maintenance.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures Avoid carrying out activities involving exposure for more than 1 hour.
PROC13 Treatment of articles by dipping and pouring. Avoid carrying out operation for more than 15 minutes.

Risk management measures

Use suitable eye protection and gloves.
Gloves should comply with the requirements of EN 374.

3. Exposure estimation (Environment 1)

Assessment method Used ECETOC TRA model.

Environmental exposure Fresh water: Exposure 0.000165 mg/l, PNEC 0.0054 mg/l, RCR 0.0305
freshwater sediment: Exposure 0.0403 mg/kg, PNEC 1.322 mg/kg, RCR 0.0304
Marine water: Exposure 0.0000145 mg/l, PNEC 0.00054 mg/l, RCR 0.0269
marine sediment: Exposure 0.00354 mg/kg, PNEC 0.1322 mg/kg, RCR 0.0268
Soil: Exposure 0.00412 mg/kg, PNEC 0.262 mg/kg, RCR 0.00157
STP: Exposure 0.01 mg/l, PNEC 1.8 mg/l, RCR 0.00556

4. Guidance to check compliance with the exposure scenario (Environment 1)

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

3. Exposure estimation (Health 1)

Formulation of fragrances - Professional

Assessment method

Used ECETOC TRA model.

Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
 Worker - dermal: Exposure 0.000429 mg/cm², DNEL 0.222 mg/cm², RCR 0.00193
 Worker - inhalation: Exposure 0.001 mg/m³, DNEL 33.3 mg/m³, RCR 0.00003
 PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
 Worker - dermal: Exposure 0.0514 mg/cm², DNEL 0.222 mg/cm², RCR 0.232
 Worker - inhalation: Exposure 0.126 mg/m³, DNEL 33.3 mg/m³, RCR 0.00378
 PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
 Worker - dermal: Exposure 0.025 mg/cm², DNEL 0.222 mg/cm², RCR 0.113
 Worker - inhalation: Exposure 2 mg/m³, DNEL 33.3 mg/m³, RCR 0.0600
 PROC5 Mixing or blending in batch processes
 Worker - dermal: Exposure 0.103 mg/cm², DNEL 0.222 mg/cm², RCR 0.464
 Worker - inhalation: Exposure 2.52 mg/m³, DNEL 33.3 mg/m³, RCR 0.0757
 PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
 Worker - dermal: Exposure 0.0857 mg/cm², DNEL 0.222 mg/cm², RCR 0.386
 Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210
 PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
 Worker - dermal: Exposure 0.0429 mg/cm², DNEL 0.222 mg/cm², RCR 0.193
 Worker - inhalation: Exposure 0.35 mg/m³, DNEL 33.3 mg/m³, RCR 0.0105
 PROC15 Use as laboratory reagent.
 Worker - dermal: Exposure 0.0129 mg/cm², DNEL 0.222 mg/cm², RCR 0.0581
 Worker - inhalation: Exposure 0.42 mg/m³, DNEL 33.3 mg/m³, RCR 0.0126
 PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
 Worker - dermal: Exposure 0.175 mg/cm², DNEL 0.222 mg/cm², RCR 0.788
 Worker - inhalation: Exposure 0.35 mg/m³, DNEL 33.3 mg/m³, RCR 0.0105
 PROC13 Treatment of articles by dipping and pouring.
 Worker - dermal: Exposure 0.0857 mg/cm², DNEL 0.222 mg/cm², RCR 0.386
 Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210
 PROC14 Tableting, compression, extrusion, pelletisation, granulation
 Worker - dermal: Exposure 0.0214 mg/cm², DNEL 0.222 mg/cm², RCR 0.0964
 Worker - inhalation: Exposure 0.07 mg/m³, DNEL 33.3 mg/m³, RCR 0.00210

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



Exposure scenario

Use of fragrances - Professional

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title	Use of fragrances - Professional
Process scope	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).
Main sector	SU22 Professional uses
<u>Environment</u>	
Environmental release category	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) ERC8d Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
SPERC	COLIPA SPERC 8a.1.a.v1
<u>Worker</u>	

Use of fragrances - Professional

Process category	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC4 Chemical production where opportunity for exposure arises PROC5 Mixing or blending in batch processes PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC10 Roller application or brushing PROC11 Non industrial spraying PROC15 Use as laboratory reagent. PROC19 Manual activities involving hand contact
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2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.
Concentration details	Covers concentrations up to 100 %.

Amounts used

Annual amount used in the EU: 1550 tonnes
 Fraction of EU tonnage used in region: 0.053
 Regional use tonnage: 10.6 tonnes/year
 Fraction of Regional tonnage used locally: 0.00075
 Maximum daily site tonnage: 0.0218 kg/day
 Annual site tonnage: 0.008 tonnes

Frequency and duration of use

Continuous release.
 Emission days: 365 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Emission factor to air: 0%
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 100%
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0%

Environmental factors not influenced by risk management measures

Dilution	Receiving surface water flow: 18000 m³/day Local freshwater dilution factor: 10 Local marine water dilution factor: 100
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Risk management measures

STP type	Municipal STP.
STP details	Assumed domestic sewage treatment plant flow: 2000 m³/day Estimated substance removal from wastewater via domestic sewage treatment: 95.7%

Conditions and measures related to external treatment of waste for disposal

Waste treatment	External treatment and disposal of waste should comply with applicable local and/or national regulations.
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Conditions and measures related to external recovery of waste

Use of fragrances - Professional

Recovery method	External recovery and recycling of waste should comply with applicable local and/or national regulations.
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2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state	Liquid
Vapour pressure	Vapour pressure 0.5 - 10 kPa at STP.
Concentration details	Concentration of substance in product: 25%

Frequency and duration of use

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

Other given operational conditions affecting workers exposure

Temperature	Assumes activities are at ambient temperature (unless stated differently).
Ventilation rate	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Technical conditions and measures at process level (source) to prevent release

Technical protective measures	PROC13 Treatment of articles by dipping and pouring. PROC14 Tableting, compression, extrusion, pelletisation, granulation Limit the substance content in the product to 1%.
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Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures	Avoid carrying out activities involving exposure for more than 1 hour. Unless otherwise stated. Filling/preparation of equipment from drums or containers. Avoid carrying out operation for more than 4 hours. PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition Avoid carrying out operation for more than 4 hours.
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Risk management measures

Wear suitable gloves (tested to EN374) and eye protection.

3. Exposure estimation (Environment 1)

Assessment method	Used ECETOC TRA model.
Environmental exposure	Fresh water: Exposure 0.000161 mg/l, PNEC 0.0054 mg/l, RCR 0.0298 freshwater sediment: Exposure 0.0392 mg/kg, PNEC 1.322 mg/kg, RCR 0.0296 Marine water: Exposure 0.000143 mg/l, PNEC 0.00054 mg/l, RCR 0.265 marine sediment: Exposure 0.00349 mg/kg, PNEC 0.1322 mg/kg, RCR 0.0264 Soil: Exposure 0.00449 mg/kg, PNEC 0.262 mg/kg, RCR 0.0171 STP: Exposure 0.000464 mg/l, PNEC 1.8 mg/l, RCR 0.000258

4. Guidance to check compliance with the exposure scenario (Environment 1)

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

3. Exposure estimation (Health 1)

Use of fragrances - Professional

Assessment method

Used ECETOC TRA model.

Exposure

PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Worker - dermal: Exposure 0.02143 mg/cm², DNEL 0.222 mg/cm², RCR 0.0965

Worker - inhalation: Exposure 0.001 mg/m³, DNEL 33.3 mg/m³, RCR 0.00003

PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Worker - dermal: Exposure 0.00857 mg/cm², DNEL 0.222 mg/cm², RCR 0.0386

Worker - inhalation: Exposure 0.07 mg/m³, DNEL 33.3 mg/m³, RCR 0.00210

PROC4 Chemical production where opportunity for exposure arises

Worker - dermal: Exposure 0.0429 mg/cm², DNEL 0.222 mg/cm², RCR 0.193

Worker - inhalation: Exposure 0.35 mg/m³, DNEL 33.3 mg/m³, RCR 0.0105

PROC5 Mixing or blending in batch processes

Worker - dermal: Exposure 0.0857 mg/cm², DNEL 0.222 mg/cm², RCR 0.386

Worker - inhalation: Exposure 0.35 mg/m³, DNEL 33.3 mg/m³, RCR 0.0105

PROC11 Non industrial spraying

Worker - dermal: Exposure 0.134 mg/cm², DNEL 0.222 mg/cm², RCR 0.604

Worker - inhalation: Exposure 0.0640 mg/m³, DNEL 33.3 mg/m³, RCR 0.00192

PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities

Worker - dermal: Exposure 0.140 mg/cm², DNEL 0.222 mg/cm², RCR 0.631

Worker - inhalation: Exposure 0.0857 mg/m³, DNEL 33.3 mg/m³, RCR 0.00257

PROC15 Use as laboratory reagent.

Worker - dermal: Exposure 0.00214 mg/cm², DNEL 0.222 mg/cm², RCR 0.00964

Worker - inhalation: Exposure 0.35 mg/m³, DNEL 33.3 mg/m³, RCR 0.0105

PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

Worker - dermal: Exposure 0.0857 mg/cm², DNEL 0.222 mg/cm², RCR 0.386

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

PROC10 Roller application or brushing

Worker - dermal: Exposure 0.171 mg/cm², DNEL 0.222 mg/cm², RCR 0.770

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

PROC19 Manual activities involving hand contact

Worker - dermal: Exposure 0.177 mg/cm², DNEL 0.222 mg/cm², RCR 0.797

Worker - inhalation: Exposure 0.7 mg/m³, DNEL 33.3 mg/m³, RCR 0.0210

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.



Exposure scenario

Use of fragrances - Consumer

Identification

Product name	(R)-P-MENTHA-1,8-DIENE
REACH registration number	01-2119529223-47-XXXX
CAS number	5989-27-5
EC number	227-813-5
EU index number	601-029-00-7
Supplier	Univar Solutions UK Ltd Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 SDS.EMEA@univarsolutions.com

1. Title of exposure scenario

Main title	Use of fragrances - Consumer
Process scope	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.
Product category	PC1 Adhesives, sealants. PC3 Air care products. PC8 Biocidal products PC9a Coatings and paints, thinners, paint removers. PC9b Fillers, putties, plasters, modelling clay. PC9c Finger paints. PC13 Fuels. PC18 Ink and toners. PC28 Perfumes, fragrances. PC31 Polishes and wax blends. PC34 Textile dyes and impregnating products PC35 Washing and cleaning products PC39 Cosmetics, personal care.
Article category	AC31 Scented clothes AC34 Scented toys AC35 Scented paper articles
Main sector	SU21 Consumer uses

Environment

Use of fragrances - Consumer

Environmental release category	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
	ERC8b Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
	ERC10b Widespread use of articles with high or intended release (outdoor)
	ERC11b Widespread use of articles with high or intended release (indoor)

SPERC	ESVOC SPERC 8.3c.v1
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2. Conditions of use affecting exposure (Workers - Health 1)

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures	Disposal of wastes Avoid carrying out operation for more than 15 minutes.
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2. Conditions of use affecting exposure (Non-industrial - Environment 1)

Product characteristics

Substance is a unique structure. Non-hydrophobic. Readily biodegradable.

Amounts used

Annual amount used in the EU: 2100 tonnes
 Fraction of EU tonnage used in region: 0.1
 Regional use tonnage: 15 tonnes/year
 Fraction of Regional tonnage used locally: 0.062
 Annual site tonnage: 0.023 tonnes

Frequency and duration of use

Dispersive use.
 Emission days: 365 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Release fraction to air from process (initial release prior to RMM): 100%
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 100%
Emission factor - soil	ERC8d Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
	Release fraction to soil from wide dispersive use (regional only): 20%
	ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
	ERC10b Widespread use of articles with high or intended release (outdoor)
	Release fraction to soil from wide dispersive use (regional only): 100%
	ERC11b Widespread use of articles with high or intended release (indoor)
	Release fraction to soil from wide dispersive use (regional only): 0%

Environmental factors not influenced by risk management measures

Dilution	Receiving surface water flow: 18000 m ³ /day
	Local freshwater dilution factor: 10
	Local marine water dilution factor: 100

Risk management measures

Technical measures	Prevent environmental discharge consistent with regulatory requirements.
STP type	Municipal STP.
STP details	Assumed domestic sewage treatment plant flow: 2000 m ³ /day
	Removal efficiency (total): 95.7%

Conditions and measures related to external treatment of waste for disposal

Use of fragrances - Consumer

Waste treatment External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Recovery method External recovery and recycling of waste should comply with applicable local and/or national regulations.

2. Conditions of use affecting exposure (Non-industrial - Health 1)

Product characteristics

Physical state Liquid

Concentration details Concentration of substance in product: 20%

Frequency and duration of use

Covers use up to 365 days/year.

Other given operational conditions affecting Non-industrial exposure

Setting Indoor/outdoor use.

Temperature Assumes activities are at ambient temperature (unless stated differently).

Other given operational conditions affecting Non-industrial exposure

No specific risk management measure identified beyond those operational conditions stated.

3. Exposure estimation (Environment 1)

Assessment method Used ECETOC TRA model.

Environmental exposure Fresh water: Exposure 0.000119 mg/l, PNEC 0.0054 mg/l, RCR 0.0220
freshwater sediment: Exposure 0.0290 mg/kg, PNEC 1.322 mg/kg, RCR 0.0219
Marine water: Exposure 0.0000101 mg/l, PNEC 0.00054 mg/l, RCR 0.0187
marine sediment: Exposure 0.00246 mg/kg, PNEC 0.1322 mg/kg, RCR 0.0186
Soil: Exposure 0.000509 mg/kg, PNEC 0.262 mg/kg, RCR 0.00194
STP: Exposure 0.0000350 mg/l, PNEC 1.8 mg/l, RCR 0.0000194

4. Guidance to check compliance with the exposure scenario (Environment 1)

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. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

3. Exposure estimation (Health 1)

Assessment method Used ART model.

Exposure Consumer - combined, long-term - systemic: Exposure 0.03 mg/kg/day, DNEL 0.066 mg/kg/day, RCR 0.454

Worst case assumption

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Use of fragrances - Consumer