

# SAFETY DATA SHEET

According to EC No 1907/2006 as amended as at the date of this SDS

## Isopentane Sustainable

Version	Revision Date:	SDS Number:	Date of last issue: -
1.0	12.03.2025	800010067584	Print Date 19.03.2025

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

#### 1.1 Product identifier

Trade name	: Isopentane Sustainable
Product code	: Q1120
Registration number EU	: 01-2119475602-38-0002
Synonyms	: 2-methyl butane, Ethyl dimethyl methane
CAS-No.	: 78-78-4

EC-No.	: 201-142-8
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#### 1.2 Relevant identified uses of the substance or mixture and uses advised against

Use of the Sub- stance/Mixture	: Blowing agent Please refer to section 16 and/or the annexes for the registered uses under REACH.
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Uses advised against	: This product must not be used in applications other than the above without first seeking the advice of the supplier.
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This product must not be used in applications other than those listed in Section 1 without first seeking the advice of the supplier.

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

Manufacturer/Supplier	: <b>Shell Chemicals Europe B.V.</b> PO Box 2334 3000 CH Rotterdam Netherlands
Telephone	: +31 (0)10 441 5137 / +31 (0)10 441 5191
Telefax	: +31 (0)20 716 8316/ +31 (0)20 713 9230
Contact for Safety Data Sheet	: sccmsds@shell.com

#### 1.4 Emergency telephone number

+44 (0) 1235 239 670 (This telephone number is available 24 hours per day, 7 days per week)

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### SECTION 2: Hazards identification

#### 2.1 Classification of the substance or mixture

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

Flammable liquids, Category 1	H224: Extremely flammable liquid and vapour.
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Aspiration hazard, Category 1	H304: May be fatal if swallowed and enters airways.
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Specific target organ toxicity - single exposure, Category 3

H336: May cause drowsiness or dizziness.

Long-term (chronic) aquatic hazard, Category 2

H411: Toxic to aquatic life with long lasting effects.

### 2.2 Label elements

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

Hazard pictograms :



Signal word : Danger

Hazard statements :

PHYSICAL HAZARDS:  
H224 Extremely flammable liquid and vapour.  
HEALTH HAZARDS:  
H304 May be fatal if swallowed and enters airways.  
H336 May cause drowsiness or dizziness.  
ENVIRONMENTAL HAZARDS:  
H411 Toxic to aquatic life with long lasting effects.

Supplemental Hazard Statements : EUH066 Repeated exposure may cause skin dryness or cracking.

Precautionary statements : **Prevention:**  
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.  
P243 Take action to prevent static discharges.  
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.  
P273 Avoid release to the environment.

#### **Response:**

P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.

P331 Do NOT induce vomiting.

#### **Storage:**

No precautionary phrases.

#### **Disposal:**

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

### 2.3 Other hazards

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

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

In use, may form flammable/explosive vapour-air mixture.

This material is a static accumulator.

Even with proper grounding and bonding, this material can still accumulate an electrostatic charge.

If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur.

### SECTION 3: Composition/information on ingredients

#### 3.1 Substances

##### Components

Chemical name	CAS-No. EC-No. Index-No. Registration number	Classification	Concentration (% w/w)
isopentane	78-78-4 201-142-8 601-085-00-2 01-2119475602-38	Flam. Liq. 1; H224 Asp. Tox. 1; H304 STOT SE 3; H336 Aquatic Chronic 2; H411	<= 100

### SECTION 4: First aid measures

#### 4.1 Description of first aid measures

- General advice : Not expected to be a health hazard when used under normal conditions.
- Protection of first-aiders : When administering first aid, ensure that you are wearing the appropriate personal protective equipment according to the incident, injury and surroundings.
- If inhaled : Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.
- In case of skin contact : Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available.  
If persistent irritation occurs, obtain medical attention.
- In case of eye contact : Flush eye with copious quantities of water.  
Remove contact lenses, if present and easy to do. Continue

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rinsing.  
If persistent irritation occurs, obtain medical attention.

If swallowed : Call emergency number for your location / facility.  
If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38.3°C), shortness of breath, chest congestion or continued coughing or wheezing.

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

Symptoms : Breathing of high vapour concentrations may cause central nervous system (CNS) depression resulting in dizziness, light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness and death.  
Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters.  
Eye irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blurred vision.  
If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever.  
If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38.3°C), shortness of breath, chest congestion or continued coughing or wheezing.  
Defatting dermatitis signs and symptoms may include a burning sensation and/or a dried/cracked appearance.

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

Treatment : Call a doctor or poison control center for guidance.  
Potential for chemical pneumonitis.  
Treat symptomatically.

## SECTION 5: Firefighting measures

### 5.1 Extinguishing media

Suitable extinguishing media : Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.

Unsuitable extinguishing media : Do not use water in a jet.

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

Specific hazards during fire-fighting : Clear fire area of all non-emergency personnel.  
Hazardous combustion products may include:  
A complex mixture of airborne solid and liquid particulates and

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gases (smoke).  
Carbon monoxide.  
Unidentified organic and inorganic compounds.  
Flammable vapours may be present even at temperatures below the flash point.  
The vapour is heavier than air, spreads along the ground and distant ignition is possible.  
Will float and can be reignited on surface water.

### 5.3 Advice for firefighters

- Special protective equipment for firefighters : Proper protective equipment including chemical resistant gloves are to be worn; chemical resistant suit is indicated if large contact with spilled product is expected. Self-Contained Breathing Apparatus must be worn when approaching a fire in a confined space. Select fire fighter's clothing approved to relevant Standards (e.g. Europe: EN469).
- Specific extinguishing methods : Standard procedure for chemical fires.
- Further information : Keep adjacent containers cool by spraying with water.

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## SECTION 6: Accidental release measures

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

- Personal precautions :  
Observe all relevant local and international regulations.  
Notify authorities if any exposure to the general public or the environment occurs or is likely to occur.  
Local authorities should be advised if significant spillages cannot be contained.  
6.1.1 For non emergency personnel:  
Avoid contact with skin, eyes and clothing.  
Isolate hazard area and deny entry to unnecessary or unprotected personnel.  
Do not breathe fumes, vapour.  
Do not operate electrical equipment.  
6.1.2 For emergency responders:  
Avoid contact with skin, eyes and clothing.  
Isolate hazard area and deny entry to unnecessary or unprotected personnel.  
Do not breathe fumes, vapour.  
Do not operate electrical equipment.

### 6.2 Environmental precautions

- Environmental precautions : Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by

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using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Monitor area with combustible gas indicator.

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

Methods for cleaning up : For small liquid spills (< 1 drum), transfer by mechanical means to a labeled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.

For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely

Ventilate contaminated area thoroughly.  
If contamination of site occurs remediation may require specialist advice.

### 6.4 Reference to other sections

For guidance on selection of personal protective equipment see Section 8 of this Safety Data Sheet.,  
For guidance on disposal of spilled material see Section 13 of this Safety Data Sheet.

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## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

Technical measures : Avoid breathing of or direct contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Section 8 of this Safety Data Sheet.

Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.

Ensure that all local regulations regarding handling and storage facilities are followed.

Advice on safe handling : Avoid inhaling vapour and/or mists.

Avoid contact with skin, eyes and clothing.

Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks.

Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols.

Bulk storage tanks should be diked (bunded).

When using do not eat or drink.

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The vapour is heavier than air, spreads along the ground and distant ignition is possible.

Product Transfer : Even with proper grounding and bonding, this material can still accumulate an electrostatic charge. If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur. Be aware of handling operations that may give rise to additional hazards that result from the accumulation of static charges. These include but are not limited to pumping (especially turbulent flow), mixing, filtering, splash filling, cleaning and filling of tanks and containers, sampling, switch loading, gauging, vacuum truck operations, and mechanical movements. These activities may lead to static discharge e.g. spark formation. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge ( $\leq 1$  m/s until fill pipe submerged to twice its diameter, then  $\leq 7$  m/s). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations.

Refer to guidance under Handling section.

Hygiene measures : Wash hands before eating, drinking, smoking and using the toilet. Launder contaminated clothing before re-use. Do not ingest. If swallowed, then seek immediate medical assistance.

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

Requirements for storage areas and containers : Refer to section 15 for any additional specific legislation covering the packaging and storage of this product.

Further information on storage stability : Storage Temperature:  
Ambient.

Bulk storage tanks should be diked (bunded).  
Locate tanks away from heat and other sources of ignition.  
Cleaning, inspection and maintenance of storage tanks is a specialist operation, which requires the implementation of strict procedures and precautions.  
Must be stored in a diked (bunded) well-ventilated area, away from sunlight, ignition sources and other sources of heat.  
Keep away from aerosols, flammables, oxidizing agents, corrosives and from other flammable products which are not harmful or toxic to man or to the environment.  
Electrostatic charges will be generated during pumping.  
Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment to reduce the risk.  
The vapours in the head space of the storage vessel may lie in the flammable/explosive range and hence may be flammable.

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- Packaging material : Suitable material: For containers, or container linings use mild steel, stainless steel., For container paints, use epoxy paint, zinc silicate paint.  
Unsuitable material: Avoid prolonged contact with natural, butyl or nitrile rubbers.
- Container Advice : Do not cut, drill, grind, weld or perform similar operations on or near containers.

### 7.3 Specific end use(s)

- Specific use(s) : Please refer to section 16 and/or the annexes for the registered uses under REACH.

See additional references that provide safe handling practices for liquids that are determined to be static accumulators: American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practices on Static Electricity).  
IEC/TS 60079-32-1: Electrostatic hazards, guidance

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

#### Occupational Exposure Limits

Components	CAS-No.	Value type (Form of exposure)	Control parameters	Basis
isopentane	78-78-4	TWA	600 ppm 1,800 mg/m <sup>3</sup>	GB EH40
isopentane		TWA	1,000 ppm 3,000 mg/m <sup>3</sup>	2006/15/EC
Further information: Indicative				
isopentane		TWA	1,000 ppm	ACGIH

#### Biological occupational exposure limits

No biological limit allocated.

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

Substance name	End Use	Exposure routes	Potential health effects	Value
isopentane	Workers	Dermal	Long-term systemic effects	432 mg/kg bw/day
isopentane	Workers	Inhalation	Long-term systemic effects	3000 mg/m <sup>3</sup>
isopentane	Consumers	Dermal	Long-term systemic effects	214 mg/kg bw/day
isopentane	Consumers	Inhalation	Long-term systemic effects	643 mg/m <sup>3</sup>
isopentane	Consumers	Oral	Long-term systemic	214 mg/kg



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			effects	bw/day
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### Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006:

Substance name	Environmental Compartment	Value
isopentane	Water	0.25 mg/l
isopentane	Sediment	1.10 mg/kg
isopentane	Soil	0.55 mg/kg
isopentane	Sewage treatment plant	3.9 mg/l

## 8.2 Exposure controls

### Engineering measures

Read in conjunction with the Exposure Scenario for your specific use contained in the Annex.  
Use sealed systems as far as possible.

Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits.

Local exhaust ventilation is recommended.

Eye washes and showers for emergency use.

Firewater monitors and deluge systems are recommended.

Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include:

### General Information

Always observe good personal hygiene measures, such as washing hands after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

Define procedures for safe handling and maintenance of controls.

Educate and train workers in the hazards and control measures relevant to normal activities associated with this product.

Ensure appropriate selection, testing and maintenance of equipment used to control exposure, e.g. personal protective equipment, local exhaust ventilation.

Drain down system prior to equipment break-in or maintenance.

Retain drain downs in sealed storage pending disposal or for subsequent recycle.

### Personal protective equipment

Read in conjunction with the Exposure Scenario for your specific use contained in the Annex.  
The provided information is made in consideration of the PPE directive (Council Directive 89/686/EEC) and the CEN European Committee for Standardisation (CEN) standards.

Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

Eye protection : Wear goggles for use against liquids and gas.  
Approved to EU Standard EN166.

Hand protection

Remarks : Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374,

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US: F739) made from the following materials may provide suitable chemical protection. Longer term protection: Nitrile rubber gloves. Incidental contact/Splash protection: PVC or neoprene rubber gloves. For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same but recognize that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time maybe acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material. Glove thickness should be typically greater than 0.35 mm depending on the glove make and model. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.

Skin and body protection : Skin protection is not required under normal conditions of use.  
For prolonged or repeated exposures use impervious clothing over parts of the body subject to exposure.

If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to relevant Standard, and provide employee skin care programmes.  
Protective clothing approved to EU Standard EN14605.

Wear antistatic and flame-retardant clothing, if a local risk assessment deems it so.

Respiratory protection : If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus.  
Where air-filtering respirators are suitable, select an appropriate combination of mask and filter.  
If air-filtering respirators are suitable for conditions of use: Select a filter suitable for organic gases and vapours [Type AX boiling point < 65°C (149°F)] meeting EN14387.

Thermal hazards : Not applicable

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### SECTION 9: Physical and chemical properties

#### 9.1 Information on basic physical and chemical properties

Physical state	: Liquid.
Colour	: colourless
Odour	: Paraffinic
Odour Threshold	: Data not available
Pour point	: -150 °C
Melting / freezing point	-160.5 °C
Boiling point/boiling range	: Typical 28 - 32 °C
Flammability	
Flammability (solid, gas)	: Not applicable
Lower explosion limit and upper explosion limit / flammability limit	
Upper explosion limit / Upper flammability limit	: 7.6 %(V)
Lower explosion limit / Lower flammability limit	: 1.3 %(V)
Flash point	: Typical -57 °C Method: IP 170
Auto-ignition temperature	: 468 °C Method: ASTM E-659
Decomposition temperature	
Decomposition temperature	: Data not available
pH	: Not applicable
Viscosity	
Viscosity, dynamic	: Data not available
Viscosity, kinematic	: Typical 0.56 mm <sup>2</sup> /s (0 °C) Method: ASTM D445  Typical 0.32 mm <sup>2</sup> /s (25 °C) Method: ASTM D445

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Solubility(ies)  
Water solubility : Data not available

Partition coefficient: n-octanol/water : log Pow: 3.4

Vapour pressure : Typical 36 kPa (0 °C)  
Typical 77 kPa (20 °C)  
Typical 207 kPa (50 °C)

Relative density : Data not available

Density : Typical 624 kg/m<sup>3</sup> (15 °C)  
Method: ASTM D4052

Relative vapour density : 2.4

Particle characteristics  
Particle size : Data not available

### 9.2 Other information

Explosive properties : Not classified

Oxidizing properties : Data not available

Evaporation rate : 1  
Method: DIN 53170, di-ethyl ether=1  
12  
Method: ASTM D 3539, nBuAc=1

Conductivity : 0.25 pS/m at 20 °C  
Method: ASTM D-4308  
Low conductivity: < 100 pS/m

The conductivity of this material makes it a static accumulator. A liquid is typically considered nonconductive if its conductivity is below 100 pS/m and is considered semi-conductive if its conductivity is below 10,000 pS/m. Whether a liquid is nonconductive or semi-conductive, the precautions are the same. A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid

Surface tension : Data not available

Molecular weight : 72 g/mol

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### SECTION 10: Stability and reactivity

#### 10.1 Reactivity

The product does not pose any further reactivity hazards in addition to those listed in the following sub-paragraph.

#### 10.2 Chemical stability

No hazardous reaction is expected when handled and stored according to provisions  
Stable under normal conditions of use.

#### 10.3 Possibility of hazardous reactions

Hazardous reactions : Reacts with strong oxidising agents.

#### 10.4 Conditions to avoid

Conditions to avoid : Avoid heat, sparks, open flames and other ignition sources.

In certain circumstances product can ignite due to static electricity.

#### 10.5 Incompatible materials

Materials to avoid : Strong oxidising agents.

#### 10.6 Hazardous decomposition products

Hazardous decomposition products are not expected to form during normal storage.  
Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases including carbon monoxide, carbon dioxide, sulphur oxides and unidentified organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.

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### SECTION 11: Toxicological information

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

Information on likely routes of exposure : Exposure may occur via inhalation, ingestion, skin absorption, skin or eye contact, and accidental ingestion.

##### Acute toxicity

##### Components:

##### isopentane:

Acute oral toxicity : LD 50 (Rat, male and female): > 5,000 mg/kg  
Method: OECD Test Guideline 401  
Remarks: Based on available data, the classification criteria are not met.

Acute inhalation toxicity : LD50 (Rat, male and female): > 20 mg/l  
Exposure time: 4 h

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Test atmosphere: vapour  
Method: OECD Test Guideline 403  
Remarks: Based on available data, the classification criteria are not met.

### Skin corrosion/irritation

#### Components:

##### isopentane:

Species	:	Rabbit
Method	:	Test(s) equivalent or similar to OECD Test Guideline 404
Remarks	:	Slightly irritating. Insufficient to classify.

### Serious eye damage/eye irritation

#### Components:

##### isopentane:

Species	:	Rabbit
Method	:	Test(s) equivalent or similar to OECD Test Guideline 405
Remarks	:	Slightly irritating. Insufficient to classify.

### Respiratory or skin sensitisation

#### Components:

##### isopentane:

Species	:	Guinea pig
Method	:	Test(s) equivalent or similar to OECD Test Guideline 406
Remarks	:	Based on available data, the classification criteria are not met.

### Germ cell mutagenicity

#### Components:

##### isopentane:

Genotoxicity in vitro	:	Method: Test(s) equivalent or similar to OECD Guideline 471 Remarks: Based on available data, the classification criteria are not met.
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Method: Directive 67/548/EEC, Annex V, B.10.  
Remarks: Based on available data, the classification criteria are not met.

Genotoxicity in vivo	:	Species: Rat Method: Directive 67/548/EEC, Annex V, B.12. Remarks: Based on available data, the classification criteria are not met.
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Germ cell mutagenicity- Assessment : This product does not meet the criteria for classification in categories 1A/1B.

### Carcinogenicity

#### Components:

##### isopentane:

Carcinogenicity - Assessment : This product does not meet the criteria for classification in categories 1A/1B.

Material	GHS/CLP Carcinogenicity Classification
isopentane	No carcinogenicity classification.

### Reproductive toxicity

#### Components:

##### isopentane:

Effects on fertility : Species: Rat  
Sex: male and female  
Application Route: Inhalation  
  
Method: Equivalent or similar to OECD Test Guideline 416  
Remarks: Based on available data, the classification criteria are not met.

Reproductive toxicity - Assessment : This product does not meet the criteria for classification in categories 1A/1B.

### STOT - single exposure

#### Components:

##### isopentane:

Exposure routes : Inhalation  
Target Organs : Central nervous system  
Remarks : May cause drowsiness or dizziness.

### STOT - repeated exposure

#### Components:

##### isopentane:

Remarks : Based on available data, the classification criteria are not met.  
Low systemic toxicity on repeated exposure.

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## Isopentane Sustainable

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### Repeated dose toxicity

#### Components:

##### isopentane:

Species	:	Rat, male and female
Application Route	:	Inhalation
Test atmosphere	:	Gas
Method	:	Test(s) equivalent or similar to OECD Test Guideline 413
Target Organs	:	No specific target organs noted

### Aspiration toxicity

#### Components:

##### isopentane:

Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal.

## 11.2 Information on other hazards

### Endocrine disrupting properties

#### Product:

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

#### Product:

Remarks	:	Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).
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#### Components:

##### isopentane:

Remarks	:	Classifications by other authorities under varying regulatory frameworks may exist.
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## SECTION 12: Ecological information

### 12.1 Toxicity

#### Components:

##### isopentane:



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Toxicity to fish	: LC50 (Oncorhynchus mykiss (rainbow trout)): 4.26 mg/l Exposure time: 96 h Method: Information given is based on data obtained from similar substances. Remarks: Toxic LL/EL/IL50 > 1 <= 10 mg/l
Toxicity to daphnia and other aquatic invertebrates	: EC50 (Daphnia magna (Water flea)): 4.2 mg/l Exposure time: 48 h Method: Test(s) equivalent or similar to OECD Guideline 301 F Remarks: Toxic LL/EL/IL50 > 1 <= 10 mg/l
Toxicity to algae/aquatic plants	: EL50 (Selenastrum capricornutum (green algae)): 25.12 mg/l Exposure time: 72 h Method: Based on quantitative structure-activity relationship (QSAR) modelling Remarks: Harmful LL/EL/IL50 >10 <= 100 mg/l
Toxicity to microorganisms	: EL50 (Tetrahymena pyriformis): 130.9 mg/l Exposure time: 48 h Method: Based on quantitative structure-activity relationship (QSAR) modelling Remarks: Practically non toxic: LL/EL/IL50 > 100 mg/l
Toxicity to fish (Chronic toxicity)	: NOELR: 7.618 mg/l Exposure time: 28 d Species: Oncorhynchus mykiss (rainbow trout) Method: Based on quantitative structure-activity relationship (QSAR) modelling Remarks: NOEC/NOEL > 1.0 - <= 10 mg/l
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	: NOELR: 13.29 mg/l Exposure time: 21 d Species: Daphnia magna (Water flea) Method: Based on quantitative structure-activity relationship (QSAR) modelling Remarks: NOEC/NOEL > 10 - <=100 mg/l

### 12.2 Persistence and degradability

#### Components:

##### **isopentane:**

Biodegradability	: Biodegradation: 71 % Exposure time: 28 d Method: Test(s) equivalent or similar to OECD Guideline 301 F Remarks: Readily biodegradable.
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Oxidises rapidly by photo-chemical reactions in air.

### 12.3 Bioaccumulative potential

#### Components:

##### **isopentane:**

Bioaccumulation	:	Species: Pimephales promelas (fathead minnow) Bioconcentration factor (BCF): 171 Method: Information given is based on data obtained from similar substances. Remarks: Does not bioaccumulate significantly.
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### 12.4 Mobility in soil

#### Components:

##### **isopentane:**

Mobility	:	Remarks: Floats on water., If the product enters soil, one or more constituents will or may be mobile and may contaminate groundwater.
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### 12.5 Results of PBT and vPvB assessment

#### Components:

##### **isopentane:**

Assessment	:	The substance does not fulfill all screening criteria for persistence, bioaccumulation and toxicity and hence is not considered to be PBT or vPvB..
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### 12.6 Endocrine disrupting properties

#### Product:

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

#### Product:

Additional ecological information	:	Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).
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#### Components:

##### **isopentane:**

Additional ecological information	:	In view of the high rate of loss from solution, the product is unlikely to pose a significant hazard to aquatic life.
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Does not have ozone depletion potential.

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### SECTION 13: Disposal considerations

#### 13.1 Waste treatment methods

- |                        |  |
|------------------------|--|
| Product                | : Recover or recycle if possible.<br>It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations.<br>Waste product should not be allowed to contaminate soil or ground water, or be disposed of into the environment.<br>Do not dispose into the environment, in drains or in water courses.<br>Do not dispose of tank water bottoms by allowing them to drain into the ground. This will result in soil and groundwater contamination.<br>Waste arising from a spillage or tank cleaning should be disposed of in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.<br><br>Waste, spills or used product is dangerous waste.<br><br>Disposal should be in accordance with applicable regional, national, and local laws and regulations.<br>Local regulations may be more stringent than regional or national requirements and must be complied with.<br><br>MARPOL - see International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) which provides technical aspects at controlling pollutions from ships. |
| Contaminated packaging | : Drain container thoroughly.<br>After draining, vent in a safe place away from sparks and fire. Residues may cause an explosion hazard. Do not puncture, cut or weld uncleaned drums.<br>Send to drum recoverer or metal reclaimer.<br>Comply with any local recovery or waste disposal regulations.  |
| Local legislation      |  |
| Remarks                | : Hazardous Waste (England and Wales) Regulations 2005.<br><br>Hazardous Waste (England and Wales) Regulations 2005.   |

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### SECTION 14: Transport information

#### 14.1 UN number or ID number

ADR	:	1265
RID	:	1265
IMDG	:	1265
IATA	:	1265

#### 14.2 UN proper shipping name

ADR	:	PENTANES
RID	:	PENTANES
IMDG	:	PENTANES
IATA	:	PENTANES

#### 14.3 Transport hazard class(es)

ADR	:	3
RID	:	3
IMDG	:	3
IATA	:	3

#### 14.4 Packing group

ADR		
Packing group	:	I
Classification Code	:	F1
Hazard Identification Number	:	33
Labels	:	3

RID		
Packing group	:	I
Classification Code	:	F1
Hazard Identification Number	:	33
Labels	:	3

IMDG		
Packing group	:	I
Labels	:	3

IATA		
Packing group	:	I
Labels	:	3

#### 14.5 Environmental hazards

ADR		
Environmentally hazardous	:	no

RID		
Environmentally hazardous	:	no

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### IMDG

Marine pollutant : no

### 14.6 Special precautions for user

Remarks : Special Precautions: Refer to Section 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.

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

Pollution category	: Not applicable
Ship type	: Not applicable
Product name	: Not applicable

## SECTION 15: Regulatory information

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

REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles (Annex XVII) : Conditions of restriction for the following entries should be considered: Number on list 40, 3

REACH - List of substances subject to authorisation (Annex XIV) : Product is not subject to Authorisation under REACH.

REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59). : This product does not contain substances of very high concern (Regulation (EC) No 1907/2006 (REACH), Article 57).

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances. P5a FLAMMABLE LIQUIDS

#### Other regulations:

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

Environmental Protection Act 1990 (as amended). Health and Safety at Work etc. Act 1974. Consumers Protection Act 1987. Pollution Prevention and Control Act 1999. Environment Act 1995. Factories Act 1961. The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment (Amendment) Regulations 2011. Chemicals (Hazard Information and Packaging for Supply) Regulations 2009. Control of Substances Hazardous to Health Regulations 2002 (as amended). Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations 1997. Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (as amended). Personal Protective Equipment Regulations 2002. Personal Protective Equipment at Work Regulations 1992. Hazardous Waste (England and Wales) Regulations 2005(as

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amended). Control of Major Accident Hazards Regulations 1999 (as amended). Renewable Transport Fuel Obligations Order 2007 (as amended). Energy Act 2011. Environmental Permitting (England and Wales) Regulations 2010 (as amended). Waste (England and Wales) Regulations 2011 (as amended). Planning (Hazardous Substances) Act 1990 and associated regulations. The Environmental Protection (Controls on Ozone-Depleting Substances) Regulations 2011.

Product is subject to the Control of Major Accident Hazards Regulations 2015 (2015 No. 483) based on Seveso III directive (2012/18/EU).

### The components of this product are reported in the following inventories:

AIIC	: Listed
DSL	: Listed
IECSC	: Listed
ENCS	: Listed
KECI	: Listed
NZIoC	: Listed
PICCS	: Listed
TSCA	: Listed
TCSI	: Listed

### 15.2 Chemical safety assessment

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

## SECTION 16: Other information

### Full text of other abbreviations

2006/15/EC	: Europe. Indicative occupational exposure limit values
ACGIH	: USA. ACGIH Threshold Limit Values (TLV)
GB EH40	: UK. EH40 WEL - Workplace Exposure Limits
2006/15/EC / TWA	: Limit Value - eight hours
ACGIH / TWA	: 8-hour, time-weighted average
GB EH40 / TWA	: Long-term exposure limit (8-hour TWA reference period)

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergen-

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cy Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - Substance of Very High Concern; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

### Further information

Training advice : Provide adequate information, instruction and training for operators.

Other information : For Industry guidance and tools on REACH please visit the CEFIC website at <http://cefic.org/Industry-support>.  
The substance does not fulfill all screening criteria for persistence, bioaccumulation and toxicity and hence is not considered to be PBT or vPvB.

A vertical bar (|) in the left margin indicates an amendment from the previous version.

This product is classified as H304 (May be fatal if swallowed and enters airways). The risk relates to potential for aspiration. The risk arising from aspiration hazard is solely related to the physico-chemical properties of the substance. The risk can therefore be controlled by implementing risk management measures tailored to this specific hazard and included within Section 8 of the SDS. An exposure scenario is not presented.

Sources of key data used to compile the Safety Data Sheet : The quoted data are from, but not limited to, one or more sources of information (e.g. toxicological data from Shell Health Services, material suppliers' data, CONCAWE, EU IUCLID data base, EC 1272 regulation, etc).

**Classification of the mixture:**

**Classification procedure:**

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Flam. Liq. 1	H224	On basis of test data.
Asp. Tox. 1	H304	Expert judgement and weight of evidence determination.
STOT SE 3	H336	Expert judgement and weight of evidence determination.
Aquatic Chronic 2	H411	Expert judgement and weight of evidence determination.

### Identified Uses according to the Use Descriptor System

#### Uses - Worker

Title : Manufacture of substance  
- Industrial

#### Uses - Worker

Title : Distribution of substance  
- Industrial

#### Uses - Worker

Title : Formulation & (re)packing of substances and mixtures  
- Industrial

#### Uses - Worker

Title : Uses in Coatings  
- Industrial

#### Uses - Worker

Title : Blowing agents  
- Industrial

#### Uses - Worker

Title : Functional Fluids  
- Industrial

#### Uses - Worker

Title : Functional Fluids  
- Professional

#### Uses - Worker

Title : Use in laboratories  
- Industrial

#### Uses - Worker

Title : Use in laboratories



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- Professional

### Uses - Worker

Title : Use as a fuel  
- Industrial

### Uses - Worker

Title : Use as a fuel  
- Professional

### Identified Uses according to the Use Descriptor System

#### Uses - Consumer

Title : Other Consumer Uses  
- Consumer

#### Uses - Consumer

Title : Use as a fuel  
- Consumer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

GB / EN

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### Exposure Scenario - Worker

<b>300000000627</b>	
<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Manufacture of substance- Industrial
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 3, SU8, SU9 <b>Process Categories:</b> PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b, PROC 15 <b>Environmental Release Categories:</b> ERC1, ERC4, ESVOC SpERC 1.1.v1
<b>Scope of process</b>	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.

<b>SECTION 2</b>	<b>OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES</b>
<b>Section 2.1</b>	<b>Control of Worker Exposure</b>
<b>Product Characteristics</b>	
Physical form of product	Liquid, vapour pressure > 10 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/product up to 100% (unless stated differently).,
<b>Frequency and Duration of Use</b>	
Covers daily exposures up to 8 hours (unless stated differently).	
<b>Other Operational Conditions affecting Exposure</b>	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented.	
<b>Contributing Scenarios</b>	<b>Risk Management Measures</b>
General exposures (closed systems)PROC1PROC2PROC3	No other specific measures identified.
General exposures (open systems)PROC4	No other specific measures identified.
Process samplingPROC8b	No other specific measures identified.
Laboratory activitiesPROC15	No other specific measures identified.
Bulk transfers(open systems)PROC8b	No other specific measures identified.
Bulk transfers(closed systems)PROC8b	No other specific measures identified.
Equipment cleaning and maintenancePROC8a	No other specific measures identified.
Storage.PROC1PROC2	Store substance within a closed system.
<b>Section 2.2</b>	<b>Control of Environmental Exposure</b>

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Substance is isomeric mixture.	
Predominantly hydrophobic.	
Readily biodegradable.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tonnes/year):	3.7E+04
Fraction of Regional tonnage used locally:	1
Annual site tonnage (tonnes/year):	3.7E+04
Maximum daily site tonnage (kg/day):	1.2E+05
<b>Frequency and Duration of Use</b>	
Continuous release.	
Emission Days (days/year):	300
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (initial release prior to RMM):	5.0E-02
Release fraction to wastewater from process (initial release prior to RMM):	3.0E-04
Release fraction to soil from process (initial release prior to RMM):	1.0E-04
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process re-release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Risk from environmental exposure is driven by freshwater sediment.	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	90
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	40.4
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	0
<b>Organisational measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	97.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	97.1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	2.5E+06
Assumed domestic sewage treatment plant flow (m3/d)	1.0E+04
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
During manufacturing no waste of the substance is generated.	

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<b>Conditions and measures related to external recovery of waste</b>
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During manufacturing no waste of the substance is generated.
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<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
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<b>Section 3.1 - Health</b>
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The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.
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<b>Section 3.2 -Environment</b>
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The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.
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<b>SECTION 4</b>	<b>GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO</b>
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<b>Section 4.1 - Health</b>
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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.
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<b>Section 4.2 -Environment</b>
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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.
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Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
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Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
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Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org">http://cefic.org</a> ).
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### Exposure Scenario - Worker

<b>300000000630</b>	
<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Distribution of substance- Industrial
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 3, SU8, SU9 <b>Process Categories:</b> PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b, PROC 9, PROC 15 <b>Environmental Release Categories:</b> ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC7, ESVOC SpERC 1.1b.v1
<b>Scope of process</b>	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.

SECTION 2		OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES	
Section 2.1		Control of Worker Exposure	
Product Characteristics			
Physical form of product		Liquid, vapour pressure > 10 kPa at STP	
Concentration of the Substance in Mixture/Article		Covers use of substance/product up to 100% (unless stated differently).,	
Frequency and Duration of Use			
Covers daily exposures up to 8 hours (unless stated differently).			
Other Operational Conditions affecting Exposure			
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented.			
Contributing Scenarios		Risk Management Measures	
General exposures (closed systems)PROC1PROC2PROC3		No other specific measures identified.	
General exposures (open systems)PROC4		No other specific measures identified.	
Process samplingPROC3		No other specific measures identified.	
Laboratory activitiesPROC15		No other specific measures identified.	
Bulk transfers(closed systems)PROC8b		No other specific measures identified.	
Bulk transfers(open systems)PROC8b		No other specific measures identified.	
Drum and small package fillingPROC9		No other specific measures identified.	
Equipment cleaning and maintenancePROC8a		No other specific measures identified.	
Storage.PROC1PROC2		Store substance within a closed system.	

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<b>Section 2.2</b>	<b>Control of Environmental Exposure</b>
Substance is isomeric mixture.	
Predominantly hydrophobic.	
Readily biodegradable.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tonnes/year):	1.1E+04
Fraction of Regional tonnage used locally:	2.0E-03
Annual site tonnage (tonnes/year):	23
Maximum daily site tonnage (kg/day):	1.1E+03
<b>Frequency and Duration of Use</b>	
Continuous release.	
Emission Days (days/year):	20
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (initial release prior to RMM):	1.0E-03
Release fraction to wastewater from process (initial release prior to RMM):	1.0E-05
Release fraction to soil from process (initial release prior to RMM):	1.0E-05
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process re-release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Risk from environmental exposure is driven by freshwater sediment.	
No wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	90
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	0
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	0
<b>Organisational measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	97.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	97.1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	1.5E+07
Assumed domestic sewage treatment plant flow (m3/d)	2.0E+03
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
<b>Conditions and measures related to external recovery of waste</b>	

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External recovery and recycling of waste should comply with applicable local and/or regional regulations.

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
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**Section 3.1 - Health**

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Section 3.2 -Environment**

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

<b>SECTION 4</b>	<b>GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO</b>
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**Section 4.1 - Health**

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.

**Section 4.2 -Environment**

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 wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org>).

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### Exposure Scenario - Worker

<b>300000000631</b>	
<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Formulation & (re)packing of substances and mixtures- Industrial
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 3, SU 10 <b>Process Categories:</b> PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 8a, PROC 8b, PROC 9, PROC 14, PROC 15 <b>Environmental Release Categories:</b> ERC2, ESVOC SpERC 2.2.v1
<b>Scope of process</b>	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.

SECTION 2		OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES	
Section 2.1		Control of Worker Exposure	
Product Characteristics			
Physical form of product		Liquid, vapour pressure > 10 kPa at STP	
Concentration of the Substance in Mixture/Article		Covers use of substance/product up to 100% (unless stated differently).,	
Frequency and Duration of Use			
Covers daily exposures up to 8 hours (unless stated differently).			
Other Operational Conditions affecting Exposure			
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented.			
Contributing Scenarios		Risk Management Measures	
General exposures (closed systems)PROC1PROC2PROC3		No other specific measures identified.	
General exposures (open systems)PROC4		No other specific measures identified.	
Batch processes at elevated temperaturesOperation is carried out at elevated temperature (> 20°C above ambient temperature).PROC3		Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).	
Process samplingPROC3		No other specific measures identified.	
Laboratory activitiesPROC15		No other specific measures identified.	
Bulk transfersDedicated facilityPROC8b		No other specific measures identified.	
Mixing operations (open sys-		No other specific measures identified.	



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tems)PROC5	
ManualTransfer from/pouring from containersPROC8a	No other specific measures identified.
Drum/batch transfersPROC8b	No other specific measures identified.
Production or preparation or articles by tableting, compression, extrusion or pelletisationPROC14	No other specific measures identified.
Drum and small package fillingPROC9	No other specific measures identified.
Equipment cleaning and maintenancePROC8a	No other specific measures identified.
Storage.PROC1PROC2	Store substance within a closed system.

<b>Section 2.2</b>	<b>Control of Environmental Exposure</b>
Substance is isomeric mixture.	
Predominantly hydrophobic.	
Readily biodegradable.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tonnes/year):	1.1E+04
Fraction of Regional tonnage used locally:	1
Annual site tonnage (tonnes/year):	1.1E+04
Maximum daily site tonnage (kg/day):	3.7E+04
<b>Frequency and Duration of Use</b>	
Continuous release.	
Emission Days (days/year):	300
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (after typical onsite RMMs consistent with EU Solvent Emissions Directive requirements):	2.5E-02
Release fraction to wastewater from process (initial release prior to RMM):	2.0E-04
Release fraction to soil from process (initial release prior to RMM):	1.0E-04
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Risk from environmental exposure is driven by freshwater sediment.	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	41.2
If discharging to domestic sewage treatment plant, no secondary	0

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wastewater treatment required.	
<b>Organisational measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	97.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	97.1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	7.5E+05
Assumed domestic sewage treatment plant flow (m3/d)	2.0E+03
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
<b>Conditions and measures related to external recovery of waste</b>	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

<b>Section 3.2 -Environment</b>	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	

<b>SECTION 4</b>	<b>GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO</b>
<b>Section 4.1 - Health</b>	
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.	

<b>Section 4.2 -Environment</b>	
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 wastewater can be achieved using onsite/offsite technologies, either alone or in combination.	
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.	

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Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org">http://cefic.org</a> ).
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### Exposure Scenario - Worker

<b>300000000634</b>	
<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Uses in Coatings- Industrial
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 3 <b>Process Categories:</b> PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 7, PROC 8a, PROC 8b, PROC 9, PROC 10, PROC 13, PROC 14, PROC 15 <b>Environmental Release Categories:</b> ERC4, ESVOC SpERC 4.3a.v1
<b>Scope of process</b>	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.

SECTION 2	OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES	
Section 2.1	Control of Worker Exposure	
Product Characteristics		
Physical form of product	Liquid, vapour pressure > 10 kPa at STP	
Concentration of the Substance in Mixture/Article	Covers use of substance/product up to 100% (unless stated differently).,	
Frequency and Duration of Use		
Covers daily exposures up to 8 hours (unless stated differently).		
Other Operational Conditions affecting Exposure		
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented.		
Contributing Scenarios	Risk Management Measures	
General exposures (closed systems)PROC1	No other specific measures identified.	
General exposures (closed systems)with sample collectionUse in contained systemsPROC2	No other specific measures identified.	
Film formation - force drying, stoving and other technologies.Operation is carried out at elevated temperature (> 20°C above ambient temperature).PROC2	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).	
Mixing operations (closed systems)General expo-	No other specific measures identified.	

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tures (closed systems)PROC3	
Film formation - air dryingPROC4	No other specific measures identified.
Preparation of material for applicationMixing operations (open systems)PROC5	No other specific measures identified.
Spraying (automatic/robotic)PROC7	No other specific measures identified.
ManualSprayingPROC7	No other specific measures identified.
Material transfer-sPROC8aPROC8b	No other specific measures identified.
Roller, spreader, flow applicationPROC10	No other specific measures identified.
Dipping, immersion and pouringPROC13	No other specific measures identified.
Laboratory activitiesPROC15	No other specific measures identified.
Material transfersDrum/batch transfersTransfer from/pouring from containersPROC9	No other specific measures identified.
Production or preparation or articles by tableting, compression, extrusion or pelletisationPROC14	No specific measures identified.
Equipment cleaning and maintenancePROC8a	No other specific measures identified.
Storage.PROC1	Store substance within a closed system.
<b>Section 2.2</b>	<b>Control of Environmental Exposure</b>
Substance is isomeric mixture.	
Predominantly hydrophobic.	
Readily biodegradable.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tonnes/year):	0.6
Fraction of Regional tonnage used locally:	1
Annual site tonnage (tonnes/year):	0.6
Maximum daily site tonnage (kg/day):	30
<b>Frequency and Duration of Use</b>	
Continuous release.	
Emission Days (days/year):	20
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (initial release prior to RMM):	0.98
Release fraction to wastewater from process (initial release prior to	7.0E-04

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RMM):	
Release fraction to soil from process (initial release prior to RMM):	0
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process re-release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Risk from environmental exposure is driven by freshwater sediment.	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
No wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	90
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	0
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	0
<b>Organisational measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	97.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	97.1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	2.1E+05
Assumed domestic sewage treatment plant flow (m3/d)	2.0E+03
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
<b>Conditions and measures related to external recovery of waste</b>	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

<b>Section 3.2 -Environment</b>	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	

<b>SECTION 4</b>	<b>GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO</b>
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### Section 4.1 - Health

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.

### Section 4.2 -Environment

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 wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org>).

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### Exposure Scenario - Worker

<b>300000000635</b>	
<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Blowing agents- Industrial
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 3 <b>Process Categories:</b> PROC 1, PROC 2, PROC 3, PROC 8b, PROC 9, PROC 12 <b>Environmental Release Categories:</b> ERC4, ESVOC SpERC 4.9.v1
<b>Scope of process</b>	Use as a blowing agent for rigid and flexible foams, including material transfers, mixing and injection, curing, cutting, storage and packing.

SECTION 2	OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES	
Section 2.1	Control of Worker Exposure	
Product Characteristics		
Physical form of product	Liquid, vapour pressure > 10 kPa at STP	
Concentration of the Substance in Mixture/Article	Covers use of substance/product up to 100% (unless stated differently).,	
Frequency and Duration of Use		
Covers daily exposures up to 8 hours (unless stated differently).		
Other Operational Conditions affecting Exposure		
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented.		
Contributing Scenarios	Risk Management Measures	
Bulk transfersPROC8b	No other specific measures identified.	
Mixing operations (closed systems)PROC1	No other specific measures identified.	
Extrusion and expansion of polymer massPROC12	No other specific measures identified.	
Cutting and shavingPROC12	No other specific measures identified.	
Collection and re-processing of shavings, cuttings, etc.PROC12	No other specific measures identified.	
Product packagingPROC12	No other specific measures identified.	
Storage.PROC2	No other specific measures identified.	
Mixing operations (closed systems)Operation is carried out at elevated temperature (> 20°C above	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).	



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ambient temperature).PROC3	
Intermediate polymer storageOperation is carried out at elevated temperature (> 20°C above ambient temperature).PROC3	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).
Centrifuging including dischargingOperation is carried out at elevated temperature (> 20°C above ambient temperature).PROC3	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).
Drying and storagePROC12	No other specific measures identified.
Semi-bulk packagingPROC8b	No other specific measures identified.
Treatment by heatingOperation is carried out at elevated temperature (> 20°C above ambient temperature).PROC12	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).
Article formation in mouldOperation is carried out at elevated temperature (> 20°C above ambient temperature).PROC12	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).
Cutting by heated wire-ManualPROC12	No other specific measures identified.
Mixing operations (closed systems)PROC3	No other specific measures identified.
Drum and small package fillingFilling/ preparation of equipment from drums or containers.PROC9	No other specific measures identified.
FoamingPROC12	No other specific measures identified.
Compression	No other specific measures identified.
<b>Section 2.2</b>	<b>Control of Environmental Exposure</b>
Substance is isomeric mixture.	
Predominantly hydrophobic.	
Readily biodegradable.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tonnes/year):	960
Fraction of Regional tonnage used locally:	1
Annual site tonnage (tonnes/year):	960
Maximum daily site tonnage (kg/day):	4.8E+04
<b>Frequency and Duration of Use</b>	
Continuous release.	

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Emission Days (days/year):	20
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (initial release prior to RMM):	1
Release fraction to wastewater from process (initial release prior to RMM):	3.0E-05
Release fraction to soil from process (initial release prior to RMM):	0
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process re-release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Risk from environmental exposure is driven by freshwater sediment.	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
No wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	0
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	0
<b>Organisational measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	97.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	97.1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	5.0E+06
Assumed domestic sewage treatment plant flow (m3/d)	2.0E+03
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
<b>Conditions and measures related to external recovery of waste</b>	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

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### Section 3.2 -Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### SECTION 4

### GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO

#### Section 4.1 - Health

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.

#### Section 4.2 -Environment

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 wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org>).

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### Exposure Scenario - Worker

<b>300000000636</b>	
<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Functional Fluids- Industrial
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 3 <b>Process Categories:</b> PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b, PROC 9 <b>Environmental Release Categories:</b> ERC7, ESVOC SpERC 7.13a.v1
<b>Scope of process</b>	Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in industrial equipment including maintenance and related material transfers.

SECTION 2		OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES	
Section 2.1		Control of Worker Exposure	
Product Characteristics			
Physical form of product		Liquid, vapour pressure > 10 kPa at STP	
Concentration of the Sub- stance in Mixture/Article		Covers use of substance/product up to 100% (unless stated differently).,	
Frequency and Duration of Use			
Covers daily exposures up to 8 hours (unless stated differently).			
Other Operational Conditions affecting Exposure			
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented.			
Contributing Scenarios		Risk Management Measures	
Bulk transfers(closed sys- tems)PROC1PROC2		No other specific measures identified.	
Drum/batch transfersPROC8b		No other specific measures identified.	
Filling of arti- cles/equipment(closed sys- tems)PROC9		No other specific measures identified.	
Filling/ preparation of equipment from drums or contain- ers.PROC8a		No other specific measures identified.	
General exposures (closed systems)PROC1PROC2PROC3		No other specific measures identified.	
General exposures (open sys- tems)PROC4		No other specific measures identified.	
General exposures (open sys- tems)elevated temperature- PROC4		Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).	
Remanufacture of reject arti- clesPROC9		No other specific measures identified.	

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Equipment maintenance-PROC8a	No other specific measures identified.
Storage.PROC1PROC2	Store substance within a closed system.
<b>Section 2.2</b>	<b>Control of Environmental Exposure</b>
Substance is isomeric mixture.	
Predominantly hydrophobic.	
Readily biodegradable.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tonnes/year):	46
Fraction of Regional tonnage used locally:	0.22
Annual site tonnage (tonnes/year):	10
Maximum daily site tonnage (kg/day):	500
<b>Frequency and Duration of Use</b>	
Continuous release.	
Emission Days (days/year):	20
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (initial release prior to RMM):	1.0E-02
Release fraction to wastewater from process (initial release prior to RMM):	3.0E-05
Release fraction to soil from process (initial release prior to RMM):	1.0E-03
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process re-lease estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Risk from environmental exposure is driven by freshwater.	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
No wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	0
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	0
<b>Organisational measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	97.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	97.1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	5.0E+06

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Assumed domestic sewage treatment plant flow (m3/d)	2.0E+03
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
<b>Conditions and measures related to external recovery of waste</b>	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

<b>Section 3.2 -Environment</b>	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	

<b>SECTION 4</b>	<b>GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO</b>
<b>Section 4.1 - Health</b>	
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.	

<b>Section 4.2 -Environment</b>	
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 wastewater can be achieved using onsite/offsite technologies, either alone or in combination.	
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.	
Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org">http://cefic.org</a> ).	

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### Exposure Scenario - Worker

<b>300000000637</b>	
<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Functional Fluids- Professional
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 22 <b>Process Categories:</b> PROC 1, PROC 2, PROC 3, PROC 8a, PROC 9, PROC 20 <b>Environmental Release Categories:</b> ERC9a, ERC9b, ESVOC SpERC 9.13b.v1
<b>Scope of process</b>	Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in professional equipment including maintenance and related material transfers.

SECTION 2		OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES	
Section 2.1		Control of Worker Exposure	
Product Characteristics			
Physical form of product		Liquid, vapour pressure > 10 kPa at STP	
Concentration of the Sub- stance in Mixture/Article		Covers use of substance/product up to 100% (unless stated differently).,	
Frequency and Duration of Use			
Covers daily exposures up to 8 hours (unless stated differently).			
Other Operational Conditions affecting Exposure			
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented.			
Contributing Scenarios		Risk Management Measures	
Drum/batch transfersNon-dedicated facilityPROC8a		No other specific measures identified.	
Transfer from/pouring from containersPROC9		No other specific measures identified.	
Filling/ preparation of equipment from drums or contain-ers.PROC9		No other specific measures identified.	
General exposures (closed systems)PROC1PROC2PROC3		No other specific measures identified.	
Operation of equipment contain- ing engine oils and simi- lar.(closed systems)PROC20		No other specific measures identified.	
Operation of equipment contain- ing engine oils and simi- lar.(closed systems)elevated temperaturePROC20		Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).	
Remanufacture of reject arti- clesPROC9		No other specific measures identified.	
Equipment maintenance-		No other specific measures identified.	

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PROC8a	
Storage.PROC1PROC2	Store substance within a closed system.
<b>Section 2.2</b>	<b>Control of Environmental Exposure</b>
Substance is isomeric mixture.	
Predominantly hydrophobic.	
Readily biodegradable.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tonnes/year):	23
Fraction of Regional tonnage used locally:	5.0E-04
Annual site tonnage (tonnes/year):	1.1E-02
Maximum daily site tonnage (kg/day):	3.1E-02
<b>Frequency and Duration of Use</b>	
Continuous release.	
Emission Days (days/year):	365
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (initial release prior to RMM):	5.0E-02
Release fraction to wastewater from process (initial release prior to RMM):	2.5E-02
Release fraction to soil from process (initial release prior to RMM):	2.5E-02
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process re-release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Risk from environmental exposure is driven by freshwater.	
No wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	0
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	0
<b>Organisational measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	97.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	97.1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	2.1E+03
Assumed domestic sewage treatment plant flow (m3/d)	2.0E+03
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
External treatment and disposal of waste should comply with applicable local and/or regional	



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regulations.

### Conditions and measures related to external recovery of waste

External recovery and recycling of waste should comply with applicable local and/or regional regulations.

## SECTION 3

### EXPOSURE ESTIMATION

#### Section 3.1 - Health

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

#### Section 3.2 -Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

## SECTION 4

### GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO

#### Section 4.1 - Health

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.

#### Section 4.2 -Environment

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 wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org>).

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### Exposure Scenario - Worker

<b>300000000638</b>	
<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Use in laboratories- Industrial
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 3 <b>Process Categories:</b> PROC 10, PROC 15 <b>Environmental Release Categories:</b> ERC2, ERC4
<b>Scope of process</b>	Use of the substance within laboratory settings, including material transfers and equipment cleaning.

SECTION 2		OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES	
Section 2.1		Control of Worker Exposure	
Product Characteristics			
Physical form of product		Liquid, vapour pressure > 10 kPa at STP	
Concentration of the Substance in Mixture/Article		Covers use of substance/product up to 100% (unless stated differently).,	
Frequency and Duration of Use			
Covers daily exposures up to 8 hours (unless stated differently).			
Other Operational Conditions affecting Exposure			
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented.			
Contributing Scenarios		Risk Management Measures	
Laboratory activitiesPROC15		No other specific measures identified.	
CleaningPROC10		No other specific measures identified.	
Section 2.2		Control of Environmental Exposure	
Substance is isomeric mixture.			
Predominantly hydrophobic.			
Readily biodegradable.			
Amounts Used			
Fraction of EU tonnage used in region:		0.1	
Regional use tonnage (tonnes/year):		5	
Fraction of Regional tonnage used locally:		0.4	
Annual site tonnage (tonnes/year):		2	
Maximum daily site tonnage (kg/day):		100	
Frequency and Duration of Use			
Continuous release.			
Emission Days (days/year):		20	
Environmental factors not influenced by risk management			
Local freshwater dilution factor:		10	
Local marine water dilution factor:		100	
Other Operational Conditions affecting Environmental Exposure			

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Release fraction to air from process (initial release prior to RMM):	2.5E-02
Release fraction to wastewater from process (initial release prior to RMM):	2.0E-02
Release fraction to soil from process (initial release prior to RMM):	1.0E-04
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Risk from environmental exposure is driven by freshwater sediment.	
No wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	0
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	0
<b>Organisational measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	97.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	97.1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	7.5E+03
Assumed domestic sewage treatment plant flow (m3/d)	2.0E+03
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
<b>Conditions and measures related to external recovery of waste</b>	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

<b>Section 3.2 -Environment</b>	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	

<b>SECTION 4</b>	<b>GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO</b>
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### Section 4.1 - Health

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.

### Section 4.2 -Environment

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 wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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### Exposure Scenario - Worker

<b>300000000639</b>	
<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Use in laboratories- Professional
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 22 <b>Process Categories:</b> PROC 10, PROC 15 <b>Environmental Release Categories:</b> ERC8a, ESVOC SpERC 8.17.v1
<b>Scope of process</b>	Use of small quantities within laboratory settings, including material transfers and equipment cleaning.

SECTION 2		OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES	
Section 2.1		Control of Worker Exposure	
Product Characteristics			
Physical form of product		Liquid, vapour pressure > 10 kPa at STP	
Concentration of the Substance in Mixture/Article		Covers use of substance/product up to 100% (unless stated differently).,	
Frequency and Duration of Use			
Covers daily exposures up to 8 hours (unless stated differently).			
Other Operational Conditions affecting Exposure			
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented.			
Contributing Scenarios		Risk Management Measures	
Laboratory activitiesPROC15		No other specific measures identified.	
CleaningPROC10		No other specific measures identified.	
Section 2.2		Control of Environmental Exposure	
Substance is isomeric mixture.			
Predominantly hydrophobic.			
Readily biodegradable.			
Amounts Used			
Fraction of EU tonnage used in region:		0.1	
Regional use tonnage (tonnes/year):		0.5	
Fraction of Regional tonnage used locally:		5.0E-04	
Annual site tonnage (tonnes/year):		2.5E-04	
Maximum daily site tonnage (kg/day):		6.9E-04	
Frequency and Duration of Use			
Continuous release.			
Emission Days (days/year):		365	
Environmental factors not influenced by risk management			
Local freshwater dilution factor:		10	
Local marine water dilution factor:		100	

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<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (initial release prior to RMM):	0.5
Release fraction to wastewater from process (initial release prior to RMM):	0.5
Release fraction to soil from process (initial release prior to RMM):	0
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process re-release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Risk from environmental exposure is driven by freshwater.	
No wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	0
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	0
<b>Organisational measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils.	
Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	97.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	97.1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	56
Assumed domestic sewage treatment plant flow (m3/d)	2.0E+03
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
<b>Conditions and measures related to external recovery of waste</b>	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

<b>Section 3.2 -Environment</b>	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	

<b>SECTION 4</b>	<b>GUIDANCE TO CHECK COMPLIANCE WITH THE</b>
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EXPOSURE SCENARIO
<b>Section 4.1 - Health</b>
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.
<b>Section 4.2 -Environment</b>
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 wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org">http://cefic.org</a> ).

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### Exposure Scenario - Worker

<b>300000010165</b>	
<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Use as a fuel- Industrial
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 3 <b>Process Categories:</b> PROC 1, PROC 2, PROC 3, PROC 8a, PROC 8b, PROC 16 <b>Environmental Release Categories:</b> ERC7, ESVOC SpERC 7.12a.v1
<b>Scope of process</b>	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.

SECTION 2		OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES	
Section 2.1		Control of Worker Exposure	
Product Characteristics			
Physical form of product		Liquid, vapour pressure > 10 kPa at STP	
Concentration of the Sub-stance in Mixture/Article		Covers use of substance/product up to 100% (unless stated differently).,	
Frequency and Duration of Use			
Covers daily exposures up to 8 hours (unless stated differently).			
Other Operational Conditions affecting Exposure			
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented.			
Contributing Scenarios		Risk Management Measures	
General exposures (closed systems)PROC1PROC2PROC3		No other specific measures identified.	
Equipment cleaning and maintenancePROC8a		No other specific measures identified.	
Bulk transfers(closed sys-tems)PROC8b		No other specific measures identified.	
Drum/batch transfersPROC8b		No other specific measures identified.	
Use as a fuel(closed sys-tems)PROC16		No other specific measures identified.	
Storage.PROC1PROC2		Store substance within a closed system.	
Section 2.2		Control of Environmental Exposure	
Substance is complex UVCB.			
Predominantly hydrophobic.			
Amounts Used			
Fraction of EU tonnage used in region:		0.1	
Regional use tonnage (tonnes/year):		5.0E+01	
Fraction of Regional tonnage used locally:		1	



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Annual site tonnage (tonnes/year):	5.0E+01
Maximum daily site tonnage (kg/day):	2.5E+03
<b>Frequency and Duration of Use</b>	
Continuous release.	
Emission Days (days/year):	20
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (initial release prior to RMM):	1.0E-02
Release fraction to wastewater from process (initial release prior to RMM):	1.0E-05
Release fraction to soil from process (initial release prior to RMM):	0
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process re-release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Risk from environmental exposure is driven by freshwater sediment.	
No wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	95
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0
<b>Organisational measures to prevent/limit release from site</b>	
Prevent discharge of undissolved substance to or recover from onsite wastewater. Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	96
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	96
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	1.2E+05
Assumed domestic sewage treatment plant flow (m3/d)	2,000
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
Combustion emissions limited by required exhaust emission controls. Waste combustion emissions considered in regional exposure assessment.	
<b>Conditions and measures related to external recovery of waste</b>	
This substance is consumed during use and no waste of substance is generated.	

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

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### Section 3.2 -Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### SECTION 4

### GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO

#### Section 4.1 - Health

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.

#### Section 4.2 -Environment

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 wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

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### Exposure Scenario - Worker

<b>300000010166</b>	
<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Use as a fuel- Professional
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 22 <b>Process Categories:</b> PROC 1, PROC 2, PROC 3, PROC 8a, PROC 8b, PROC 16 <b>Environmental Release Categories:</b> ERC9a, ERC9b, ESVOC SpERC 9.12b.v1
<b>Scope of process</b>	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.

SECTION 2		OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES	
Section 2.1		Control of Worker Exposure	
Product Characteristics			
Physical form of product		Liquid, vapour pressure > 10 kPa at STP	
Concentration of the Sub-stance in Mixture/Article		Covers use of substance/product up to 100% (unless stated differently).,	
Frequency and Duration of Use			
Covers daily exposures up to 8 hours (unless stated differently).			
Other Operational Conditions affecting Exposure			
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented.			
Contributing Scenarios		Risk Management Measures	
General exposures (closed systems)PROC1PROC2PROC3		No other specific measures identified.	
Equipment cleaning and maintenancePROC8a		No other specific measures identified.	
Bulk transfersDedicated facilityPROC8b		No other specific measures identified.	
Drum/batch transfersDedicated facilityPROC8b		No other specific measures identified.	
Refueling.Dedicated facilityPROC8b		No other specific measures identified.	
Use as a fuel(closed sys-tems)PROC16		No other specific measures identified.	
Storage.PROC1		Store substance within a closed system.	
Section 2.2		Control of Environmental Exposure	
Substance is complex UVCB.			
Amounts Used			
Fraction of EU tonnage used in region:		0.1	
Regional use tonnage (tonnes/year):		2.1E+04	

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Fraction of Regional tonnage used locally:	1
Annual site tonnage (tonnes/year):	1.1E+01
Maximum daily site tonnage (kg/day):	2.9E+01
<b>Frequency and Duration of Use</b>	
Continuous release.Emission Days (days/year):	365
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (initial release prior to RMM):	1.0E-02
Release fraction to wastewater from process (initial release prior to RMM):	1.0E-05
Release fraction to soil from process (initial release prior to RMM):	1.0E-05
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process re-release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Risk from environmental exposure is driven by freshwater sediment.	
No wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	
Not applicable.	
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0
<b>Organisational measures to prevent/limit release from site</b>	
Prevent discharge of undissolved substance to or recover from onsite wastewater. Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	96
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	96
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	7.8E+05
Assumed domestic sewage treatment plant flow (m3/d)	2,000
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
Combustion emissions limited by required exhaust emission controls. Waste combustion emissions considered in regional exposure assessment.	
<b>Conditions and measures related to external recovery of waste</b>	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

### SECTION 3

### EXPOSURE ESTIMATION

#### Section 3.1 - Health

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise

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indicated.

### Section 3.2 -Environment

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

### SECTION 4

### GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO

#### Section 4.1 - Health

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.

#### Section 4.2 -Environment

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 wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

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### Exposure Scenario - Consumer

<b>300000001180</b>	
<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Other Consumer Uses - Consumer
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 21 <b>Product Categories:</b> PC28, PC39 <b>Environmental Release Categories:</b> ERC8a, ERC8d, ESVOC SpERC 8.16.v1
<b>Scope of process</b>	Consumer uses e.g. as a carrier in cosmetics/personal care products, perfumes and fragrances. Note: For cosmetic and personal care products, risk assessment only required for the environment under REACH as human health is covered by alternative legislation.

<b>SECTION 2</b>	<b>OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES</b>
<b>Additional Information</b>	No exposure assessment presented for human health.
<b>Section 2.1</b>	<b>Control of Consumer Exposure</b>
<b>Product Characteristics</b>	
<b>Product Categories</b>	<b>OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES</b>

<b>Section 2.2</b>	<b>Control of Environmental Exposure</b>
Substance is complex UVCB.	
Predominantly hydrophobic.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tonnes/year):	5.0E+00
Fraction of Regional tonnage used locally:	0.0005
Annual site tonnage (tonnes/year):	2.5E-03
Maximum daily site tonnage (kg/day):	6.8E-03
<b>Frequency and Duration of Use</b>	
Continuous release.	
Emission Days (days/year):	365
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from wide dispersive use (regional only):	0.95
Release fraction to wastewater from wide dispersive use:	0.025
Release fraction to soil from wide dispersive use (regional only):	0.025
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Risk from environmental exposure is driven by freshwater sediment.	
Estimated substance removal from wastewater via domestic sewage treatment (%)	96.0

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Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	1.9E+02
Assumed domestic sewage treatment plant flow (m3/d)	2,000
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
During manufacturing no waste of the substance is generated.	
<b>Conditions and measures related to external recovery of waste</b>	
During manufacturing no waste of the substance is generated.	

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
No exposure assessment presented for human health.	

<b>Section 3.2 -Environment</b>	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	

<b>SECTION 4</b>	<b>GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO</b>
<b>Section 4.1 - Health</b>	
No exposure assessment presented for human health.	

<b>Section 4.2 -Environment</b>	
Not applicable for wide dispersive uses.	

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### Exposure Scenario - Consumer

<b>300000010167</b>	
<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Use as a fuel - Consumer
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 21 <b>Product Categories:</b> PC13 <b>Environmental Release Categories:</b> ERC9a, ERC9b, ESVOC SpERC 9.12c.v1
<b>Scope of process</b>	Covers consumer uses in liquid fuels.

<b>SECTION 2</b>	<b>OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES</b>
<b>Section 2.1</b>	<b>Control of Consumer Exposure</b>
<b>Product Characteristics</b>	
Physical form of product	Liquid, vapour pressure > 10 kPa at STP
Concentration of the Sub-stance in Mixture/Article	Unless stated otherwise.
	Covers concentration up to (%): 100 %
<b>Amounts Used</b>	
Unless stated otherwise.	
for each use event, covers amount up to (g):	37,500
covers skin contact area (cm2):	420
<b>Frequency and Duration of Use</b>	
Unless stated otherwise.	
Covers use up to (days/year):	365
covers use up to (times/day of use):	1
Exposure (hours/event):	2
<b>Other Operational Conditions affecting Exposure</b>	
Unless stated otherwise. Covers use at ambient temperatures. Covers use in room size of 20m3 Covers use under typical household ventilation.	
<b>Product Categories</b>	<b>OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES</b>
Fuels Liquid: Automotive Refuelling.	Covers concentrations up to 100 %
	covers use up to 52 day/year
	covers use up to 1 times/day of use
	covers skin contact area up to (cm2): 210.00 cm2
	For each use event, covers amount up to 37,500 g
	Covers outdoor use.
	Covers use in room size of 100 m3
	Covers exposure up to 0.05 hours/event
Fuels Liquid Scooter Refuelling.	Covers concentrations up to 100 %



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	covers use up to 52 day/year
	covers use up to 1 times/day of use
	covers skin contact area up to (cm2): 210.00 cm2
	For each use event, covers amount up to 3,750 g
	Covers outdoor use.
	Covers use in room size of 100 m3
	Covers exposure up to 0.03 hours/event
Fuels Liquid, Garden Equipment - Use.	Covers concentrations up to 100 %
	covers use up to 26 day/year
	covers use up to 1 times/day of use
	For each use event, covers amount up to 750 g
	Covers outdoor use.
	Covers use in room size of 100 m3
	Covers exposure up to 2.00 hours/event
Fuels Liquid: Garden Equipment - Refuelling.	Covers concentrations up to 100 %
	covers use up to 26 day/year
	covers use up to 1 times/day of use
	covers skin contact area up to (cm2): 420.00 cm2
	For each use event, covers amount up to 750 g
	Covers use in a one car garage (34 m3) under typical ventilation.
	Covers use in room size of 34 m3
	Covers exposure up to 0.03 hours/event
Fuels Liquid: Home space heater fuel.	Covers concentrations up to 100 %
	covers use up to 365 day/year
	covers use up to 1 times/day of use
	covers skin contact area up to (cm2): 210.00 cm2
	For each use event, covers amount up to 3,000 g
	Covers use under typical household ventilation.
	Covers use in room size of 20 m3
	Covers exposure up to 0.03 hours/event
Fuels Liquid: Lamp oil.	Covers concentrations up to 100 %
	covers use up to 52 day/year
	Covers use up to 1 times/day of use
	covers skin contact area up to (cm2): 210.00 cm2
	For each use event, covers amount up to 100 g
	Covers use under typical household ventilation.
	Covers use in room size of 20 m3
	Covers exposure up to 0.01 hours/event

Section 2.2	Control of Environmental Exposure
Substance is complex UVCB.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	0.1
Regional use tonnage (tonnes/year):	1.0E+02
Fraction of Regional tonnage used locally:	0.0005
Annual site tonnage (tonnes/year):	5.2E-02

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Maximum daily site tonnage (kg/day):	1.4E-01
<b>Frequency and Duration of Use</b>	
Continuous release.	
Emission Days (days/year):	365
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (initial release prior to RMM):	2.0E-02
Release fraction to wastewater from process (initial release prior to RMM):	1E-05
Release fraction to soil from process (initial release prior to RMM):	1E-05
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	96
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	7.1E+03
Assumed domestic sewage treatment plant flow (m3/d)	2,000
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
Combustion emissions limited by required exhaust emission controls. Waste combustion emissions considered in regional exposure assessment.	
<b>Conditions and measures related to external recovery of waste</b>	
This substance is consumed during use and no waste of substance is generated.	

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
The ECETOC TRA tool has been used to estimate consumer exposures unless otherwise indicated.	

<b>Section 3.2 -Environment</b>	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	

<b>SECTION 4</b>	<b>GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO</b>
<b>Section 4.1 - Health</b>	
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.	

<b>Section 4.2 -Environment</b>	
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. Further details on scaling and control technologies are provided in SpERC factsheet	

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