

# Material Safety Data Sheet

According to Regulation (EC) n. 1907/2006 and subsequent amendments thereto

## Hi PERFORM 100 OCTANE

Q8 Quaser s.r.l.



### SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

#### 1.1 Product identifier

<i>Product name:</i>	Hi Perform 100 Octane
<i>Synonym:</i>	High Performance Gasoline
<i>CAS Number:</i>	not applicable (mixture)
<i>EC Number:</i>	not applicable (mixture)
<i>Index Number:</i>	not applicable (mixture)
<i>REACH Registration Number:</i>	not applicable (mixture)

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

**COMMON USE:** use as a fuel and other industrial uses

**IDENTIFIED USES IN THE CHEMICAL SAFETY REPORT:** description of Identified Uses:

**Life cycle:**

**Formulation or re-packing:** Formulation & (re)packing of substances and mixtures

**Uses at industrial sites:** Distribution of substance, Use as a fuel

**Widespread uses by professional workers:** Use as a fuel

**Consumer uses:** Use as a fuel

**USES ADVISED AGAINST:**

**General use by professional operators and consumers:** The Professional and or Consumer Uses of Naphtha substances in coatings and cleaning agents are advised against. While these uses have previously been supported, in 2011 ECHA's Committee for Risk Assessment (RAC) issued an Opinion stating that certain petroleum substances in the Naphtha and Kerosine categories presented a hazard of chronic toxicity to the central nervous system. The Opinion proposed more stringent exposure limits which are incompatible with the chemical safety assessments performed for these uses of Naphtha substances. As other Naphtha substances can have composition ranges significantly overlapping those of the substances specified in the Opinion, the advice is applied to all Naphtha substances. Therefore, for reasons of protection of human health, these uses are no longer supported in the registration dossier.

See Annex for a complete list of uses and use descriptors, for which an ES is provided.

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

<i>Company name:</i>	Q8 Quaser s.r.l.
<i>Address:</i>	Via dell'Oceano Indiano, 13
<i>City / Nation:</i>	00144 – Roma (Italia)
<i>Telephone:</i>	+39 06-520881
<i>Competent Technician E-mail:</i>	<a href="mailto:schede@q8.it">schede@q8.it</a>

#### 1.4 Emergency telephone number

Italy: Centro Antiveleni Ospedale Niguarda (Milano), +39 02.66101029

Foreign countries: Contact the closest Poisons Information Centre

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### SECTION 2: HAZARDS IDENTIFICATION

**Physico-chemical hazards:** the mixture is extremely flammable.

**Human health hazard:** this product may causes skin irritation. Vapours may cause drowsiness and dizziness. Because of its low viscosity, the product may be aspirated into the lungs or directly after ingestion or later in the case of spontaneous or induced vomiting, in such cases there may be aspiration pneumonia. May cause cancer and genetic defects. Suspected of damaging fertility or the unborn child.

**Environmental hazard:** Toxic to aquatic life with long lasting effects.

#### 2.1 Classification of the substance or mixture

Flam. Liq. 1:	H224
Asp. Tox. 1:	H304
Skin Irrit. 2:	H315
STOT SE 3:	H336
Muta. 1B:	H340
Carc. 1B:	H350
Repr. 2:	H361
Aquatic Chronic 2:	H411

For full text of H-phrases see Section 16.

#### 2.2 Label elements

**Hazard pictogram(s):**



**Signal word:** DANGER

**Hazard statement(s):**

- H224 - Extremely flammable liquid and vapour
- H304 - May be fatal if swallowed and enters airways
- H315 - Causes skin irritation
- H336 - May cause drowsiness or dizziness
- H340 - May cause genetic defects
- H350 - May cause cancer
- H361 - Suspected of damaging fertility or the unborn child
- H411 - Toxic to aquatic life with long lasting effects

**Precautionary statement(s):**

*Prevention:*

- P201 - Obtain special instructions before use
- P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
- P273 - Avoid release to the environment

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P280 - Wear protective gloves/protective clothing/eye protection/face protection

*Response:*

P301+310 - IF SWALLOWED: Immediately call a POISON CENTER

P331 - Do NOT induce vomiting

*Storage:*

P403+233 - Store in a well-ventilated place. Keep container tightly closed

*Disposal:*

P501 - Dispose of contents/container in accordance with local / regional / national / international regulation

**Other Information:** Note P (full text given in Section 16)

### 2.3 Other hazards

Vapors may form explosive mixtures with air. The vapour product is heavier than air and in the event of a leak, vapour may accumulate in confined spaces and low lying areas where it may easily be accidentally ignited. In some circumstances, the product can accumulate static electricity in significant amounts, with the risk of shocks that may cause fire or explosions.

The product does not meet the criteria for classification as PBT or vPvB required by Annex XIII of REACH.

## SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

### 3.1 Substances

Not applicable.

### 3.2 Mixtures

Component	Identifier	Concentration	Classification accordig to Reg. (CE) 1272/2008
<b>1. UVCB Substance: LOW BOILING POINT NAPHTHA (PETROLEUM)</b> <i>("A complex combination of hydrocarbons consisting primarily of paraffins, cycloparaffins, aromatic and olefinic hydrocarbons having carbon numbers predominantly greater than C3-C12 and boiling in the range of 30°C to 260°C")</i>	CAS Number: 86290-81-5 EINECS Number: 289-220-8 INDEX Number: 649-378-00-4 Registration Number: 01-2119471335-39-XXXX	> 85% v/v	Flam. Liq. 1: H224 Asp. Tox. 1: H304 Skin Irrit. 2: H315 STOT SE 3: H336 Muta. 1B: H340 Carc. 1B: H350 Repr. 2: H361 Aquatic Chronic 2: H411

Note: the product "Low boiling point Naphtha (petroleum)" is classified as the worst case (content of all individual compounds exceeding the limits of specific classification):

Benzene  $\geq 0.1\%$ , Toluene  $\geq 3\%$ , n-Hexane  $\geq 3\%$ , Flashpoint  $< 23^\circ\text{C}$  e initial boiling point  $\leq 35^\circ\text{C}$ .

Depending on the characteristics and origin of the components, some of the following chemical compounds can be identified in the chemical composition on the finished product. These compounds are not deliberately added.

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a) Benzene	CAS Number: 71-43-2 EINECS Number: 200-753-7 INDEX Number: 601-020-00-8	> 0,1% p/p	Flam. Liq. 2: H225 Carc. 1A: H350 Muta. 1B: H340 STOT RE 1: H372 Asp. Tox. 1: H304 Eye Irrit. 2: H319 Skin Irrit. 2: H315
b) Toluene	CAS Number: 108-88-3 EINECS Number: 203-625-9 INDEX Number: 601-021-00-3	> 3% p/p	Flam. Liq. 2: H225 Repr. 2: H361d STOT RE 2: H373 Asp. Tox. 1: H304 STOT SE 3: H336 Skin Irrit. 2: H315
c) n-Hexane	CAS Number: 110-54-3 EINECS Number: 203-777-6 INDEX Number: 601-037-00-0	> 3% p/p	Flam. Liq. 2: H225 Repr. 2: H361f Asp. Tox. 1: H304 Skin Irrit. 2: H315 STOT RE 2: H373 STOT SE 3: H336 Aquatic Chronic 2: H411
<b>2. OXYGENATED COMPONENTS</b>		< 15% v/v compressivi	
a) MTBE (methyl <i>tert</i> -butyl ether)	CAS Number: 1634-04-4 EINECS Number: 216-653-1 INDEX Number: 603-181-00-X Registration Number: 01-2119452786-27--XXXX		Flam. Liq. 2: H225 Skin Irrit. 2: H315
b) ETBE (ethyl <i>tert</i> -butyl ether)	CAS Number: 637-92-3 EINECS Number: 211-309-7 Registration Number: 01-2119557841-33-XXXX		Flam. Liq. 2: H225 STOT SE 3: H336
c) TAME ( <i>tert</i> -amyl methyl ether)	CAS Number: 994-05-8 EINECS Number: 213-611-4 INDEX Number: 603-213-00-2 Registration Number: 01-2119453236-41-XXXX		STOT SE 3: H336 Acute Tox. 4: H302 Flam. Liq. 2: H225
<b>3. ETHANOL</b>	CAS Number: 64-17-5 EINECS Number: 200-578-6 INDEX Number: 603-002-00-5 Registration Number:	0 – 5% v/v	Flam. Liq. 2: H225

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	01-21194-5761043-XXXX		
<b>4. N-METHYLANILINE</b>	CAS Number: 100-61-8 EINECS Number: 202-870-9 INDEX Number: 612-015-00-5 Registration Number: 01-2119822538-34-XXXX	< 1 % v/v	Acute Tox. 3: H301 Acute Tox. 3: H311 Acute Tox. 3: H331 STOT RE 2: H373 Aquatic Acute 1: H400 Aquatic Chronic 1: H410

For full text of H-phrases see Section 16.

### SECTION 4: FIRST AID MEASURES

#### 4.1 Description of first aid measures

- Eye contact:** Rinse cautiously with water for several minutes, remove contact lenses, if present and easy to do so. Seek medical attention if skin irritation, swelling or redness develops and persist.
- Skin contact:** Remove contaminated clothing, contaminated footwear and dispose of safely. If irritation, blurred vision or swelling occurs and persists, obtain medical advice from a specialist.  
For minor thermal burns, cool the burn. Hold the burned area under cold running water for at least five minutes, or until the pain subsides. Body hypothermia must be avoided.  
When using high-pressure equipment, injection of product can occur. If high-pressure injuries occur, immediately seek professional medical attention. Do not wait for symptoms to develop.
- Swallowing /aspiration:** Do not induce vomiting as there is high risk of aspiration. Do not give anything by mouth to an unconscious person.  
If vomiting occurs, the head should be kept low so that the vomit does not enter the lungs (aspiration).
- Inhalation:** If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing  
If casualty is unconscious and not breathing, ensure that there is no obstruction to breathing and give artificial respiration by trained personnel. If necessary, give external cardiac massage and obtain medical advice.  
If breathing, If the casualty is conscious, place in the recovery position. Administer oxygen if necessary.

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

May cause skin irritation, slight eye irritation. Inhalation of vapours may cause headache, nausea, vomiting and an altered state of consciousness. In case of ingestion few or no symptoms expected. If any, nausea and diarrhoea might occur.

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

In case of ingestion, always assume that aspiration has occurred. Send the casualty immediately to hospital. Do not wait for symptoms to develop.

### SECTION 5: FIREFIGHTING MEASURE

#### 5.1 Extinguishing media

**Suitable extinguishing media:** Small fires: Sand or earth, carbon dioxide, foam, dry chemical powder.

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Large fires: Foam, water fog (trained personnel only). Other inert gases (subject to regulations).

**Unsuitable extinguishing media:** Do not use direct water jets on the burning product; they could cause splattering and spread the fire. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

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

Incomplete combustion is likely to give rise to a complex mixture of airborne solid and liquid particulates, gases, including CO (carbon monoxide), SO<sub>x</sub> (sulphur oxides), H<sub>2</sub>SO<sub>4</sub> (sulfuric acid) unidentified organic and inorganic compounds.

### 5.3 Advice for firefighters

In case of a large fire or in confined or poorly ventilated spaces, wear full fire resistant protective clothing and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

## SECTION 6: ACCIDENTAL RELEASE MEASURES

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

#### For non emergency personnel

Stop or contain leak at the source, if safe to do so. Avoid direct contact with released material. Stay upwind. In case of large spillages, alert occupants in downwind areas. Keep non-involved personnel away from the area of spillage. Alert emergency personnel. Except in case of small spillages, the feasibility of any actions should always be assessed and advised, if possible, by a trained, competent person in charge of managing the emergency. Eliminate all ignition sources if safe to do so (e.g. electricity, sparks, fires, flares). If required, notify relevant authorities according to all applicable regulations.

#### For emergency personnel

**Small spillages:** normal antistatic working clothes are usually adequate.

**Large spillages:** full body suit of chemically resistant and antistatic material. Use gloves that are resistant to hydrocarbons, especially aromatic carbons. Gloves made of PVA are not water-resistant, and are not suitable for emergency use. Work helmet. Antistatic non-skid safety shoes or boots, resistant to chemicals. Goggles and /or face shield, if splashes or contact with eyes is possible or anticipated. Respiratory protection: A half or full-face respirator with filter(s) for organic vapours, a Self Contained Breathing Apparatus (SCBA) can be used according to the extent of spill and predictable amount of exposure. If the situation cannot be completely assessed, or if an oxygen deficiency is possible, only SCBA's should be used.

### 6.2 Environmental precautions

Prevent product from entering sewers, rivers or other bodies of water.

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

**Spillages to the ground:** If necessary dike the product with dry earth, sand or similar non-combustible materials. Large spillages may be cautiously covered with foam, if available, to limit fire risk. Do not use direct jets. When inside buildings or confined spaces, ensure adequate ventilation. Absorb spilled product with suitable non-combustible materials. If it is necessary to store any contaminated materials for safe disposal, only suitable containers (airtight, labelled, sealed, waterproof, earthed and bonded) should be used. In case of soil contamination, remove contaminated soil and treat in accordance with local regulations.

**Spillages to the water:** In case of small spillages in closed waters (i.e. ports), contain product with floating barriers or other equipment. Collect spilled product by absorbing with specific floating absorbents. Large spillages: if possible, large spillages in open waters should be contained with floating barriers

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or other mechanical means only if strictly necessary and the explosion or fire risk cannot be completely assessed, let the product vaporize and disperse naturally. The use of dispersants should be advised by an expert, and, if required, approved by local authorities. If possible, collect the product and contaminated materials with mechanical means, and store/dispose of according to relevant regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however, local conditions (wind, air temperature, wave/current direction and speed) may significantly influence the choice of appropriate actions.

### 6.4 Reference to other sections

For more information on personal protective equipment, refer to "SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION".

## SECTION 7: HANDLING AND STORAGE

### 7.1 Precautions for safe handling

#### 7.1.1 Protective measures

Obtain special instructions before use. Risk of explosive mixtures of vapour and air. Ensure that all relevant regulations regarding explosive atmospheres, and handling and storage facilities of flammable products, are followed.

Take precautionary measures against static electricity. Ground/bond containers, tanks and transfer/receiving equipment. The vapour is heavier than air. Beware of accumulation in pits and confined spaces. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only bottom loading of tankers, in compliance with European legislation. Do not use compressed air for filling, discharging, or handling operations. Avoid contact with skin and eyes. Do not ingest. Do not breathe vapours.

Use and store only outdoors or in a well-ventilated area. Avoid contact with the product. Use adequate personal protective equipment as needed.

Avoid release to the environment.

For more information regarding protective equipment and operational conditions see attached Exposure Scenarios.

#### 7.1.2 Advice on general occupational hygiene

Do not breathe dusts/vapours/aerosols. Avoid contact with skin. Keep away from food and beverages. Do not eat, drink or smoke when using this product the hands thoroughly after handling. Do not reuse contaminated clothing.

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

Storage area layout, tank design, equipment and operating procedures must comply with the relevant European, national or local legislation. Storage installations should be designed with adequate bunds so as to prevent ground and water pollution in case of leaks or spills. Cleaning, inspection and maintenance of internal structure of storage tanks must be done only by properly equipped and qualified personnel as defined by national, local or company regulations. After cleaning of tanks and before entering storage tanks and commencing any operation in a confined area, check the atmosphere for oxygen content, and flammability. Store separately from oxidising agents. Store in a well-ventilated place. Store separately from oxidising agents.

Recommended materials: recommended materials for containers, or container linings use mild steel, stainless steel. Some synthetic materials may be unsuitable for containers or container linings depending on the material specification and intended use. Compatibility should be checked with the manufacturer.

If the product is supplied in containers: keep only in the original container or in a suitable container for this kind of product. Store in a well-ventilated place.

Keep containers tightly closed and properly labelled. Protect from the sunlight

Light hydrocarbon vapours can build up in the headspace of containers. These can cause flammability / explosion hazards. Open slowly in order to control possible pressure release. Empty containers may contain combustible product residues. Do not weld, solder, drill, cut or incinerate empty containers, unless they have been properly cleaned.

### 7.3 Specific end use(s)

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See attached Exposure Scenarios

### SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

#### 8.1 Control parameters

Occupational exposure limit values:

Component	Occupational exposure limit values	Reference
GASOLINE	TLV®-TWA: 300 ppm TLV®-STEL: 500 ppm	ACGIH 2019
ETHYL TERT-BUTYL ETHER (ETBE)	TLV®-TWA: 25 ppm	ACGIH 2019
METHYL TERT-BUTYL ETHER (MTBE)	TLV®-TWA: 50 ppm	ACGIH 2019
TERT-AMYL METHYL ETHER (TAME)	TLV®-TWA: 20 ppm	ACGIH 2019
ETHANOL	TLV®-STEL: 1000 ppm	ACGIH 2019
BENZENE	Limit Values (8 ore): 1 ppmv 3,25 mg/m <sup>3</sup>	D.Lgs 81/08 e s.m.i. Note: Skin
	TLV®-TWA: 0,5 ppm TLV®-STEL: 2,5 ppm	ACGIH 2019
N-HEXANE	Limit Values (8 ore): 20 ppmv 72 mg/m <sup>3</sup>	D.Lgs 81/08 e s.m.i.
	TLV®-TWA: 50 ppm	ACGIH 2019
TOLUENE	Limit Values (8 ore): 50 ppmv 192 mg/m <sup>3</sup>	D.Lgs 81/08 e s.m.i. Note: Skin
	TLV®-TWA: 20 ppm	ACGIH 2019

Occupational exposure limit values (atmospheric contaminants): No data available

Monitoring procedures: refer to relevant legislation and in any case to the good industrial health practices in the work place.

Biological Exposure Indices (BEI):



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Component	Biological Exposure Indices	Reference
<b>BENZENE</b>	S-phenylmercapturic acid in urine: 25 µg/g creatinine Trans, trans muconic acid in urine: 500 µg/g creatinine	ACGIH 2019
<b>N-HEXANE</b>	2,5 hexanedion in urine: 0,4 mg/l	ACGIH 2019
<b>TOLUENE</b>	toluene in blood: 0,02 mg/l; toluene in urine: 0,03 mg/l o-Cresol in urine: 0,3 mg/g creatinine	ACGIH 2019

### DNEL (Derived No Effect Level) / DMEL (Derived Minimum Effect Level):

Exposure Route	DNEL Workers				DNEL General Population			
	Long-term, local effects	Long-term, systemic effects (b)	Acute, local effects	Acute, systemic effects	Long-term, local effects	Long-term, systemic effects (b)	Acute, local effects	Acute, systemic effects
<b>oral</b>	n.a.	n.a.	n.a.	n.a.	n.a.	Note (e)(f)	n.a.	n.a.
<b>dermal</b>	Note (d)	Note (c)(a)	Note (d)	Note (c)(a)	Note (d)	Note (e)(c)	Note (d)	Note (e)(c)
<b>inhalation</b>	837.5 mg/m <sup>3</sup> /8h	Note (c)(a)	1066.67 mg/m <sup>3</sup> /15 min	1286.4 mg/m <sup>3</sup> /15 min (a)	178.57 mg/m <sup>3</sup> /24h	Note (e)(c)	640 mg/m <sup>3</sup> /15 min	1152 mg/m <sup>3</sup> /15min (e)

Note a: Additional consideration should be given to an inhalation DMEL-worker for benzene of 1 ppm if benzene air concentrations are sufficiently high. A dermal reference value for workers of 23.4 mg of benzene/kg/day [1% absorption of benzene from benzene-containing petroleum naphtha streams via the skin] should be considered if dermal exposure is expected.

Note b: Long-term systemic effects include non-reproductive effects and developmental/reproductive effects. Lowest DNEL is shown

Note c: No hazard identified for this route (data available)

Note d: The data do not allow setting a DNEL

Note e: Additional consideration should be given to an inhalation DMEL-general population for benzene of 1 ppb if benzene air concentrations are sufficiently high. Using this air concentration reference value for benzene in air of 1 ppb (3.5 microgram/m<sup>3</sup>) and assuming a default inhalation rate of 20 m<sup>3</sup>/day and a body weight of 70 kg yields a reference value for indirect exposure of 1.0 microgram benzene/kg/d. The ratio of benzene to total gasoline vapor utilized was 0.01. Thus, the resulting reference value utilized for indirect exposure of man via the environment is 100 micrograms total naphtha hydrocarbon containing benzene /kg/d (see CSR Section 10). A dermal reference value for general population of 23.4 micrograms of benzene/kg/day [1% absorption of benzene from benzene-containing petroleum naphtha streams via the

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skin], should be considered if dermal exposure is expected. An oral reference value for general population, of 0.234 micrograms of benzene/kg/day, from benzene-containing petroleum naphtha streams in the environment should be considered if exposure via the oral route is expected (this is not expected).

Note f: A DNEL for long-term oral exposures of the general population was not calculated for the reasons given below. The hazard from long-term oral exposures of the general population may be more dependent on the presence of benzene or toluene in gasoline; appropriate measures should be taken based on the levels of those substances.

- Dermal or inhalation repeat-dose studies with gasoline or naphtha streams did not result in adverse systemic effects with doses at or above the limit dose.
- Aside from potential neuromuscular effects from very high doses, acute exposures to gasoline and naphtha streams also have not resulted in significant adverse systemic effects.
- Data on oral exposures were not available (possibly because it was not considered to be a relevant route).

### PNEC(S) (Predicted No Effect Concentration):

PNEC(S) Water, soil and Sediment: Substance is a hydrocarbon UVCB: The hydrocarbon block method is used for environmental risk assessment (see REACH guidance, R7, app.13-1). A PNEC cannot be derived for UVCBs, therefore, the risk assessment on the library of representative constituents uses HC5 from the Target Lipid Model (TLM). Following Final Decisions issued by ECHA, a review of the TLM has been conducted that led to a revised TLM-model and the new results are used in this dossier. For full details refer to the following Appendixes attached in IUCLID Section 13: PETRORISK – ProductLibrary tab, PAH Phototoxicity, PNEC HC5, TLM Validation, PETROTOX Verification and NOS Heterocyclics.

## 8.2 Exposure controls

### 8.2.1 Appropriate engineering controls

Minimize exposure dusts/vapours/aerosols Before entering storage tanks and commencing any operation in a confined area, check the atmosphere for oxygen content, and flammability.

### 8.2.2 Individual protection measures

**Eye/face protection:** In the absence of containment systems and if splashing is likely, full head and face protection (protective shield and/or safety goggles) should be used (EN 166).

**Skin protection:**

**i) Hand protection:** In the absence of containment systems and in case of possible contact with the skin, use gloves with hydrocarbon-resistant high cuffs, felt-lined, and insulated if necessary. Supposedly adequate materials: nitrile, PVC or PVA (polyvinyl alcohol) with an index of protection against chemical agents at least equal to 5 (breakthrough time > 240 minutes). Neoprene or natural rubber (latex) do not have adequate characteristics of strength. Use gloves in accordance with the conditions and limits set by the manufacturer. In the case, refer to UNI EN 374. Gloves must be periodically inspected and changed in case of wear, perforations or contaminations.

**ii) Other:** In case of contamination of the clothes, clean and replace them immediately.

**Respiratory protection:** In confined spaces: Use approved devices for respiratory protection: wear full masks with cartridge filter type AX (brown for organic vapors with a low boiling point). If exposure levels cannot be determined or estimated with adequate confidence, or an oxygen deficiency is possible, only SCBA's should be used (EN 529).

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In the open spaces: Use approved devices for respiratory protection: masks with cartridge filter type AX (brown for organic vapors with a low boiling point).

### Thermal hazards:

See previous *Skin protection*.



### 8.2.3 Controlli dell'esposizione ambientale

Avoid release to the environment. Storage installations should be designed with adequate bunds so as to prevent ground and water pollution in case of leaks or spills.

For details, see the attached Exposure Scenarios.

### 8.3 Other information

For more information on personal protective equipment and operating conditions, refer to attached Exposure Scenarios.

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

### 9.1 Information on basic physical and chemical properties

a) Appearance	Clear and bright liquid (es. automotive use Italy) Clear purple liquid (es. agricultural use Italy)
b) Odour	Petroleum odor
c) Odour threshold	No data available
d) pH	Not applicable
e) Melting point/freezing point	< - 60°C
f) Initial boiling point and boiling range	25-260°C (range)
g) Flash point	< - 40°C
h) Evaporation rate	Not applicable
i) Flammability (solid, gas)	Not applicable
j) Upper/lower flammability or explosive limits	LEL 1,4%; UEL 7,6%
k) Vapour pressure	4-140 kPa a 37,8°C
l) Vapour density	Not applicable
m) Density	720-780 kg/m <sup>3</sup> @ 15°C
n) Solubility(ies)	Not applicable: substance is a hydrocarbon UVCB
o) Partition coefficient: n-octanol/water	Not applicable: substance is a hydrocarbon UVCB
p) Auto-ignition temperature	> 280°C
q) Decomposition temperature	Not applicable
r) Viscosity	< 1 mm <sup>2</sup> /s @ 37,8°C
s) Explosive properties	Non explosive, based on structural and oxygen balance considerations (Ref. Column 2 of REACH Annex VII)
t) Oxidising properties	Non oxidising, substance is extremely flammable (Ref. Column 2 of REACH Annex VII)

Please note that the information above are the main component of the mixture (hydrocarbon UVCB CAS 86290-81-5)

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### 9.2 Other information

The methods of analysis for the characteristics, which correspond to those recognized nationally and internationally, are set mostly in the technical specifications of the product.

## SECTION 10: STABILITY AND REACTIVITY

### 10.1 Reactivity

The mixture does not present additional dangers of reactivity than those reported in the next subtitle.

### 10.2 Chemical stability

This substance is stable in relation to its intrinsic properties.

### 10.3 Possibility of hazardous reactions

Contact with strong oxidizers (peroxides, chromates, etc.) may cause a fire hazard. A mixture with nitrates or other strong oxidisers (e.g. chlorates, perchlorates, liquid oxygen) may create an explosive mass (Sensitivity to heat, friction or shock cannot be assessed in advance).

### 10.4 Conditions to avoid

Store separately from oxidising agents.

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking

Avoid Static Electricity.

### 10.5 Incompatible materials

Strong oxidizing agents.

### 10.6 Hazardous decomposition products

The mixture does not decompose when used for its intended uses.

## SECTION 11: TOXICOLOGICAL INFORMATION

### 11.1 Information on toxicological effects

Please note that the information below are the main component of the mixture (hydrocarbon UVCB CAS 86290-81-5)

#### *Toxicokinetics, metabolism and distribution*

There are no experimental studies of the toxicokinetics of gasoline per se, but there have been numerous toxicokinetic studies of the major gasoline constituents. The principal route of exposure for most individuals is inhalation. It has been shown that absorption of inhaled constituents increases with increasing molecular weight, with n-paraffins being more highly absorbed than iso-paraffins and aromatics being more highly absorbed than the corresponding paraffins. The low molecular weight constituents (butanes and pentanes) are poorly absorbed and predominantly exhaled unchanged. The metabolism of absorbed molecules is similar normally to the corresponding alcohols, and excretion in the urine becoming increasingly important. The absorption through the skin of components in vapor phase is small and is around 1% of total absorption by inhalation. Also skin absorption of liquid components is very low because of the quick evaporation.

Most components are absorbed from the gastrointestinal tract.

#### a) Acute toxicity

Although the product is hazardous in case of aspiration into the lungs and produce severe CNS depression in prolonged exposure, in studies on acute toxicity of naphtha for oral, dermal and inhalation, no effects were observed under the conditions defined by the test protocols according to the regulation on hazardous substances.

Based on available data, the classification criteria are not met.

The following is a summary of the more representative study of the registration dossier.

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Method	Results	Remarks	Reference
<b>Oral</b>			
RAT Oral (gavage) OECD Guideline 401	LD50 >5000 mg/kg (M/F)	Key Study, Reliable without restriction CAS 86290-81-5	UBTL Inc (1986a)
<b>Inhalation</b>			
RAT Inhalation: vapour OECD Guideline 403	LC50 >5610 mg/m3 (M/F)	Key Study, Reliable without restriction CAS 86290-81-5	UBTL Inc (1992g)
<b>Dermal</b>			
RABBIT OECD Guideline 402	LD50 >2000 mg/kg (M/F)	Key Study, Reliable without restriction CAS 86290-81-5	UBTL Inc (1986d)

### (b) Skin corrosion/irritation

The potential for skin corrosion/irritation of samples belonging to this category of product has been tested in a large number of studies on rabbits in general. The conclusions of these studies indicate that the Gasoline is irritating to the skin, without evidence of deep lesions (corrosion).

These results lead to classification Skin Irrit. 2, H315 (Causes skin irritation).

The following is a summary of the more representative study of the registration dossier.

Method	Results	Remarks	Reference
RABBIT Coverage: semioclusive 24/48/72 h OECD Guideline 404	Irritating Mean erythema score: 2,56	Key Study, Reliable without restriction CAS 86290-81-5	American Petroleum Institute (API) 1995

### (c) Serious eye damage/irritation

There was very little evidence of eye damage / irritation when these materials were instilled into rabbit eyes. There is some evidence of eye irritation associated with vapor exposure at levels equal to and greater than 200 ppm, but the effects were mild, and the dose-response information was not conclusive.

Based on available data, the classification criteria are not met.

The following is a summary of the more representative study of the registration dossier.

Method	Results	Remarks	Reference
RABBIT 24/48/72 h average OECD Guideline 405	Not irritating Mean Conjunctivae score: 0,06	Key Study, Reliable without restriction CAS 86290-81-5	UBTL Inc (1985a)

### (d) Respiratory or skin sensitization

*Respiratory system:*

This endpoint is not a REACH requirement. Products in the category of naphtha do not cause respiratory sensitization, it is not necessary no classification of the substance

*Skin sensitisation:*

Several studies of skin sensitization have been conducted on oil (Annex V method B.6 (skin sensitization), Buehler method).

Based on available data, the classification criteria are not met.

The following is a summary of the more representative study of the registration dossier.

Method	Results	Remarks	Reference
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GUINEA PIG Buehler test OECD Guideline 406	Not sensitizing	Key Study, Reliable without restriction CAS 86290-81-5	UBTL Inc (1986m)
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### (e) Germ cell mutagenicity

The mutagenic potential of the fuel oil has been extensively studied in several in vivo and in vitro assays. Most of studies have not shown consistent evidence of mutagenic activity.

he classification as a mutagen is given by virtue of the presence of benzene in C > 0.1% w/w: Muta 1B, H340 (May cause genetic defects).

The following is a summary of the more representative study of the registration dossier.

Method	Results	Remarks	Reference
<i>In vitro</i> gene mutation in Salmonella thyphimurium OECD Guideline 471	Negative	Key Study, Reliable with restriction CAS 86290-81-5	American Petroleum Institute (API) 1977
<i>In vitro</i> gene mutation OECD Guideline 476	Negative	Key Study, Reliable without restriction CAS 86290-81-5	American Petroleum Institute (API) 1977
<i>In vivo</i> chromosome aberration RAT OECD Guideline 475	Negative	Key Study, Reliable without restriction CAS 86290-81-5	American Petroleum Institute (API) 1977
<i>In vivo</i> chromosome aberration	Negative	Key Study, Reliable without restriction Gasoline Vapour Condensate	Huntingdon Life Sciences (2005)

### (f) Carcinogenicity

Most animal studies with the product sprayed showed a higher incidence of cancer in the liver. The constituents that are the most potent inducers of tumors of this type are high molecular weight isoparaffins which are present in wholly vaporized gasoline but not gasoline vapor. Workers are normally exposed to the most volatile components.

The data do not support classification of gasoline per se for carcinogenic potential, although there is a regulatory requirement to classify as carcinogenic gasoline and naphtha streams containing > 0.1% w/w benzene. These results lead to classification Carc. 1B, H350 (May cause cancer).

The following is a summary of the more representative study of the registration dossier.

Method	Results	Remarks	Reference
<b>Skin</b>			
MOUSE Exposure: 102 weeks (3 times per week) OECD Guideline 451	NOAEL (carcinogenicity): 0,05ml male Neoplastic effects observed in any test group: no effects	Key Study, Reliable without restriction CAS 86290-81-5	American Petroleum Institute (1983b)

NOTE: Oral carcinogenicity is not a REACH requirement.

### (g) Reproductive toxicity

*Effects on fertility:*

Most studies have not shown consistent evidence of effects on fertility.

The classification is given by virtue of the presence of *n*-hexanein C >3% w/w: Repr. 2, H361f (Suspected of damaging fertility).

The following is a summary of the more representative study of the registration dossier.

Method	Results	Remarks	Reference
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RAT Doses: 5090, 12490, 24690 mg/m <sup>3</sup> Inhalation: vapour OECD Guideline 421	NOAEL: 24700 mg/m <sup>3</sup> (M/F)	Key Study, Reliable without restriction CAS 64741-66-8	Bui Q.Q., Burnett D.M., Breglia R.J., Koschier F.J., Lapadula E.S. (1998)
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### Effects on fertility/ Developmental toxicity:

Most of the studies have not revealed evidence of developmental toxicity.

The classification is given by virtue of the presence of toluene in C >3% w/w: Repr. 2, H361d (Suspected of damaging the unborn child).

The following is a summary of the more representative study of the registration dossier.

Method	Results	Remarks	Reference
RAT Doses: 2653, 7960, 23900 mg/m <sup>3</sup> Inhalation: vapour OECD Guideline 414 (Prenatal developmental toxicity study)	NOAEL: 23900 mg/m <sup>3</sup> No adverse effects	Key Study, Reliable without restriction Gasoline Vapour Condensate	L.Roberts, R White, Q. Bui. W.Daughtrey, F.Koschier, S.Rodney (2001)

### (h) STOT-single exposure

This product is classified as STOT SE3 3, H336 (May cause drowsiness or dizziness).

### (i) STOT-repeated exposure

**Oral:** data not available from the registration dossier.

**Inhalation:** repeated exposure of rats by inhalation to unleaded gasoline and naphtha blending stocks produced very minor effects and only at the highest levels tested (20,000 – 30,000 mg/m<sup>3</sup>). The various reported changes at the highest levels included body weight effects, organ weight changes, variations in hematologic parameters

**Skin:** the dermal studies indicate that gasoline has a very low potential for systemic toxicity as a consequence of dermal administration

Based on available data, the classification criteria are not met.

The following is a summary of the more representative study of the registration dossier.

Method	Results	Remarks	Reference
<b>Oral</b>			
RAT Subacute (gavage) Dose 1: 500 mg/kg/day Dose 2: 2000 mg/kg/day  28 days/once per day, 5 days per week	NOAEL < 500mg/kg (male): induced renal nephropathy in male rat; these effects are not considered biologically relevant to humans	Supporting study Reliable with restriction CAS 64741-63-5	Halder CA et al. 1985
<b>Inhalation</b>			
RAT Systemic Effect (M/F) Inhalation: vapour Repeated Dose for 28 days OECD Guideline 412	NOAEC: 9840 mg/m <sup>3</sup> (M/F) induced renal nephropathy in male rat; these effects are not considered biologically relevant to humans	Key Study, Reliable without restriction CAS 86290-81-5	IIT Research Institute (1993a)
RAT Local /systemic effects (M/F) Inhalation: vapour Repeated Dose for 90 days	NOAEC (local effect): 10000 mg/m <sup>3</sup> (red nasal discharge at sign of contact) (M/F) NOAEC (systemic effect): 20000	Key Study, Reliable without restriction Gasoline Vapour Condensate	API 2005



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OECD Guideline 413 (EPA OPPTS 870.3465 90-Day Inhalation Toxicity)	mg/m3 (exclusive of male hydrocarbon nephropathy)		
<b>Skin</b>			
RAT OECD Guideline 410 (21/28-days)	NOAEL (systemic effect): 3750 mg/kg	Key Study, Reliable with restriction CAS 86290-81-5	UBTL, Inc. 1985

### (j) Aspiration hazard

Because of the low viscosity of this product  $<1 \text{ mm}^2/\text{s}$  at  $37,8 \text{ }^\circ\text{C}$ , aspiration of the product into the lungs may occur, according to the criteria for classification listed in Annex I Part 3, Regulation 1272/2008.

These results lead to classification as Asp. Tox. 1, H304 (May be fatal if swallowed and enters airways).

### Other information

There are no further information.

## SECTION 12: ECOLOGICAL INFORMATION

Note that the information in this section refer to the main component of the mixture (UVCB Substance, CAS number 86290-81-5).

According to the ecological information reported below (toxicity short/long term to fish invertebrates algae and aquatic plants, biodegradation etc), this product is classified as Aquatic Chronic 2, H411 (Toxic to aquatic life with long lasting effects).

### 12.1 Toxicity

The following is a summary of the more representative study of the registration dossier.

Endpoint	Results	Remarks	Reference
<b>Aquatic Toxicity</b>			
Invertebrates Daphnia magna Short-term toxicity OECD Guideline 202	EL50 48/h: 4,5 mg/l NOELR 48/h: 0,5 mg/l	Key Study, Reliable without restriction	CONCAWE, 1995
Invertebrates Daphnia magna Long-term toxicity OECD Guideline 211	NOELR 21/days : 2,6 mg/l EL50 21/days: 10 mg/l	Key Study, Reliable without restriction CAS 64741-66-8	Springborn Laboratories, Inc. 1999
Algae Short-term toxicity Selastrum capricornutum OECD Guideline 201	EL50 72/h: 3,1 mg/l EL50 96/h: 3,7 mg/l NOELR 72/h: 0,5 mg/l	Key Study, Reliable without restriction	CONCAWE, 1995
Fish Short-term toxicity OECD Guideline 203	LC50 48/h: 5,4 mg/l	Supporting study Reliable with restriction CAS 86290-81-5	Lockhart WL, Danell RW and Murray DAJ 1987
Fish Short-term toxicity Pimephales promelas Method EPA 66013-75-009	LL50 96/h: 8,2 mg/l	Key Study, Reliable without restriction CAS 64741-66-8	Petroleum Product Stewardship Council (PPSC) 1995a



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Fish Long-term toxicity Pimephales promelas OECD Guideline 204	NOELR 14/days: 2,6 mg/l LL50 14 days: 5,2 mg/l	Supporting study Reliable with restriction CAS 64741-63-5	Springborn Laboratories, Inc. 1999
Micro-organism Tetrahymena pyriformis QSAR modeled data	EC50 40/h: 15,41 mg/l	Key Study Reliable with restriction	Redman, A. et al. 2010

### 12.2 Persistence and degradability

#### *Abiotic degradation:*

Hydrolysis: these products are resistant to hydrolysis because they lack a functional group that is hydrolytically reactive. Therefore, this fate process will not contribute to a measurable degradative loss of these substances from the environment.

Photolysis in air: endpoint not required by REACH.

Photolysis in water and soil: endpoint is not required by REACH.

#### *Biotic degradation:*

Water / sediment / soil: substance is a hydrocarbon UVCB. Standard tests for this endpoint are intended for single substance.

### 12.3 Bioaccumulative potential

Substance is a hydrocarbon UVCB. Standard tests for this endpoint are intended for single substances and are not appropriate for this complex substance.

### 12.4 Mobility in soil

*Partition coefficient Koc:* Substance is a hydrocarbon UVCB. Standard tests for this endpoint are intended for single substances and are not appropriate for this complex substance.

### 12.5 Results of PBT and vPvB assessment

#### *Comparison with the criteria in Annex XIII of REACH*

Persistence Assessment: An evaluation of representative hydrocarbon structures indicate some structures meet the Persistent (P) or very Persistent (vP) criteria.

Bioaccumulation Assessment: An evaluation of representative hydrocarbon structures indicate NO structures meet the very Bioaccumulative (vB) criterion but some structures meet the Bioaccumulative (B) criterion.

Toxicity Assessment: For representative hydrocarbons structures that were found to meet the P and B criteria, a toxicity evaluation was performed. No structures relevant to petroleum substances were found to meet the toxicity criterion except anthracene which has been confirmed as a PBT substance. Anthracene is not present in this substance at greater than 0.1%, therefore, this substance is not considered a PBT/vPvB.

### 12.6 Other adverse effects

No data available.

## SECTION 13: DISPOSAL CONSIDERATIONS

### 13.1 Waste treatment methods

Do not dispose the product, either new or used, by discharging into sewers, tunnels, lakes or water courses.

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Dispose wastes and contaminated packaging according to local regulations.

European Waste Catalogue code(s) (Decision 2001/118/CE): 13 07 02\*. These codes can be given only as a suggestion, according to the original composition of the product, and its intended (foreseeable) use(s).

The final user (producer of the waste) has the responsibility for the attribution of the most suitable code, according to the actual use(s) of the material, contaminations or alterations. The product does not contain halogenated compounds.

Disposal of emptied containers: do not dispose the containers in the environment. Dispose in accordance with local regulations.

Do not cut, weld, bore, burn or incinerate emptied containers, unless they have been cleaned and declared safe.

### SECTION 14: TRANSPORT INFORMATION

#### 14.1 UN number

UN 1203

#### 14.2 UN proper shipping name

*Italian:* BENZINA

*English:* MOTOR SPIRIT/GASOLINE/PETROL

#### 14.3 Transport hazard class(es)

<i>Road transport (ADR):</i>	Class: 3 Subsidiary risks: -
<i>Railway transport (RID):</i>	Class: 3 Subsidiary risks: -
<i>Inland waterways transport (ADN):</i>	Class: 3 Subsidiary risks: N2, CMR, F
<i>Sea transport (IMDG):</i>	Class: 3 Subsidiary risks: -
<i>Air transport (IATA):</i>	Class: 3 Subsidiary risks: -

#### 14.4 Packing group

PG: II

#### 14.5 Environmental hazards

<i>Road transport (ADR):</i>	Dangerous for the environment
<i>Railway transport (RID):</i>	Dangerous for the environment
<i>Inland waterways transport (ADN):</i>	Dangerous for the environment
<i>Sea transport (IMDG):</i>	Marine Pollutant (P)
<i>Air transport (IATA):</i>	Dangerous for the environment

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### 14.6 Special precautions for user

Transportation, including loading and unloading, must be performed by personnel who have received the necessary training required by the relevant modal regulations concerning the transport of dangerous goods.

Ensure that the transfer of the material under conditions of containment or extraction ventilation.

During loading and unloading apply safety measures required by section 7.1 and individual protection measures required by section 8.2.2 of this SDS.

Further prescriptions are reported in the applicable regulations.

#### General additional information

Mark and labeling: WARNING LABEL N. 3 + MARK OF ENVIRONMENTAL HAZARD  
(except packaging exemption)

#### Additional information on road transport (ADR)

Tunnel restriction code: (D/E)  
Hazard Identification Number (tank): 33  
High Consequence Dangerous Goods (HCDG): YES, only for tank over 3000 liters

#### Additional information on railway transport (RID)

Hazard Identification Number (tank): 33  
High Consequence Dangerous Goods (HCDG): YES, only for tank over 3000 liters

#### Additional information on internal waterways transport (ADN)

Hazard Identification Number (tank): 33  
High Consequence Dangerous Goods (HCDG): YES, only for tank over 3000 liters

#### Additional information on sea transport (IMDG)

Emergency measures on board: EmS F-E, S-E

#### Additional information on air transport (IATA)

Emergency measures in case of aircraft accidents: ERG Code 3H

### 14.7 Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable (refer to Annex I of MARPOL Convention).

## SECTION 15: REGULATORY INFORMATION

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

#### Authorisations according to REACH Regulation (Title VII):

Product not subject to authorisation.

#### Restrictions according to REACH Regulation (Title VIII):

Product subject to restrictions: entry 3 (dangerous liquid substances/mixtures), Appendix 2 - entry 28 (substances classified as carcinogen category 1B), Appendix 4 - entry 29 (substances classified as mutagen category 1B), entry 40 (flammable substances)

#### Other European Regulation and National Legislation

- Directive 2012/18/UE and Italian D. Lgs. 105/2015, on the control of major-accident hazards involving dangerous substances.

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Seveso category:

Annex 1, part 1: category P5a- flammable liquids

category E2- Hazardous to the Aquatic Environment in Category Chronic 2

Annex 1 part 2: category 34- Petroleum products and alternative fuels

- Directive 98/24/EC and Italian D. Lgs. 81/2008 e s.m.i., on the protection of the health and safety of workers from the risks related to chemical agents at work
- Directive 2004/37/EC and Italian D. Lgs. 81/2008 e s.m.i., on the protection of workers from the risks related to exposure to carcinogens or mutagens at work
- Italian D. Lgs. 152/2006 e s.m.i., on waste disposal

### 15.2 Chemical safety assessment

Chemical safety assessment has been carried out for components of the mixture.

## SECTION 16: OTHER INFORMATION

### Revision Index:

*First issue date:* 20/05/2016

*Revision Number:* 01

*Revision Date:* 27/10/2017

*Grounds for review:* Section 1.2 updated

*Revision Number:* 02

*Revision Date:* 15/02/2018

*Grounds for review:* Section 14 updated

*Revision Number:* 03

*Revision Date:* 29/07/2019

*Grounds for review:* Section 1 updated  
Section 3 updated  
Section 8 updated  
Section 16 updated  
Exposure scenario updated

### Legend to abbreviations and acronyms

ACGIH	=	American Conference of Governmental Industrial Hygienists
API	=	American Petroleum Institute
CSR	=	Chemical Safety Report
DNEL=		Derived No Effect Level
DMEL	=	Derived Minimum Effect Level
EC50	=	Effective Concentration, 50%
EL50	=	Effective Load, 50%
Klimisch	=	Criterion for the evaluation of the method reliability
LC50	=	Lethal Concentration, 50%

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LD50	=	Lethal Dose, 50%
LL50	=	Lethal Load, 50%
NOAEC	=	No Observed Adverse Effect Concentration
NOAEL	=	No Observed Adverse Effect Level
NOEL	=	No Observed Effect Level
OECD	=	Organisation for Economic Co-operation and Development
PNEC	=	Predicted No Effect Concentration
PBT	=	Persistent, Bioaccumulative and Toxic
STOT	=	Tossicità specifica per organi bersaglio
(STOT) RE	=	Specific target organ toxicity — repeated exposure
(STOT) SE	=	Specific target organ toxicity — single exposure
TLV®TWA	=	Threshold Limit Value – time-weighted average
TLV®STEL	=	Threshold Limit Value – short-term exposure limit
UVCB	=	Unknown or Variable composition, Complex reaction products or Biological materials
vPvB	=	very Persistent and very Bioaccumulative
P	=	Persistent
vP	=	very Persistent
B	=	Bioaccumulative
vB	=	very Bioaccumulative

### Key literature references and sources for data

Registration Dossier.

CRS 2016, CSR 2017, CSR 2018

### Procedure used to derive the classification according to Regulation (EC) No. 1272/2008

Expert judgment and/or Calculation method.

### Full text of appropriate statements

#### Hazard Statements

H224:	Extremely flammable liquid and vapour
H225:	Highly flammable liquid and vapour
H301:	Toxic if swallowed
H302:	Harmful if swallowed
H304:	May be fatal if swallowed and enters airways
H311:	Toxic in contact with skin
H315:	Causes skin irritation
H319:	Causes serious eye irritation
H336:	May cause drowsiness or dizziness
H340:	May cause genetic defects
H350:	May cause cancer
H361:	Suspected of damaging fertility or the unborn child
H361d:	Suspected of damaging the unborn child
H361f:	Suspected of damaging fertility
H372:	Causes damage to organs through prolonged or repeated exposure
H373:	May cause damage to organs through prolonged or repeated exposure
H400:	Very toxic to aquatic life
H410:	Very toxic to aquatic life with long lasting effects
H411:	Toxic to aquatic life with long lasting effects

#### Hazard Classes

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Acute Tox. 3:	Acute toxicity, Category 3
Acute Tox. 4:	Acute toxicity, Category 4
Aquatic Acute 1:	Hazardous to the aquatic environment
Aquatic Chronic 1:	Hazardous to the aquatic environment, Category 1
Aquatic Chronic 2:	Hazardous to the aquatic environment, Category 2
Asp. Tox. 1:	Aspiration hazard, Category 1
Carc. 1A:	Carcinogenicity, Category 1A
Carc. 1B:	Carcinogenicity, Category 1B
Eye Irrit. 2:	Eye irritation, Category 2
Flam. Liq. 1:	Flammable Liquid, Category 1
Flam. Liq. 2:	Flammable Liquid, Category 2
Muta. 1B:	Germ cell mutagenicity, Category 1B
Repr. 2:	Reproductive toxicity, Category 2
Skin Irrit. 2:	Skin irritation, Category 2
STOT RE 1:	Specific target organ toxicity — repeated exposure, Category 1
STOT RE 2:	Specific target organ toxicity — repeated exposure, Category 2
STOT SE 3:	Specific target organ toxicity — single exposure, Category 3

### Notes

note P: The classification as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0,1 % w/w benzene (EINECS No 200-753-7).

When the substance is not classified as a carcinogen at least the precautionary statements (P102-)P260-P262-P301 + P310-P331 (Table 3.1) or the S-phrases (2-)23-24-62 (Table 3.2) shall apply.

### Advice on workers training

Properly train workers potentially exposed to this substance on the basis of the contents of this safety data sheet

*To the best of our knowledge, the information contained herein is accurate. This information is intended to describe the product for the purposes of health, safety and environmental requirements only and it should not therefore be construed as guaranteeing any specific property of the product. The information and recommendations are offered for the user's consideration and examination. It is the user's responsibility to satisfy itself that the product is suitable for the intended use. Uses not listed in this document are not recommended unless an assessment is completed.*

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### ANNEX 1

#### EXPOSURE SCENARIOS

Related to Gasoline, ETBE, MTBE, TAME and Ethanol

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### INDEX

- GASOLINE**

Identified use name	Life cycle	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Specific Environmental Release Category (spERC)
1. Distribution of substance (classified as H340 and/or H350 and/or H361; containing 0% to 1% benzene)	Industrial	n.a.	n.a.	1, 2, 3, 8a, 8b, 15	4, 5, 6a, 6b, 6c, 6d, 7	ESVOC SpERC 1.1b.v1
2. Formulation & (re)packing of substances and mixtures (classified as H340 and/or H350 and/or H361; containing 0% to 1% benzene)	Industrial	n.a.	n.a.	1, 2, 3, 8a, 8b, 15	2	ESVOC SpERC 2.2.v1
3. Use as a fuel (classified as H340 and/or H350 and/or H361; containing 0% to 1% benzene)	Industrial	n.a.	n.a.	1, 2, 3, 8a, 8b, 16	7	ESVOC SpERC 7.12a.v1
4. Use as a fuel (classified as H340 and/or H350 and/or H361; containing 0% to 1% benzene)	Professional	n.a.	n.a.	1, 2, 3, 8a, 8b, 16	9a, 9b	ESVOC SpERC 9.12b.v1
5. Use as a fuel (classified as H340 and/or H350 and/or H361; containing 0% to 1% benzene)	Consumer	n.a.	13	n.a.	9a,9b	ESVOC SpERC 9.12c.v1

- ETBE**

Identified use name	Life cycle	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Specific Environmental Release Category (spERC)
1. Use as a fuel	Industrial	n.a.	n.a.	1, 2, 3, 8a, 8b, 16	8b	ESVOC3 SpERC
2. Use as a fuel	Professional	n.a.	n.a.	1, 2, 3, 8a, 8b, 9, 16	8b, 8e	ESVOC30 SpERC
3. Use as a fuel	Consumer	n.a.	13	n.a.	8d	ESVOC30 SpERC



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- **MTBE**

Identified use name	Life cycle	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Specific Environmental Release Category (spERC)
1. Use as a fuel	Industrial	n.a.	n.a.	1, 2, 3, 8a, 8b, 16	8b	ESVOC3 SpERC
2. Use as a fuel	Professional	n.a.	n.a.	1, 2, 3, 8a, 8b, 9, 16	8b, 8e	ESVOC30 SpERC
3. Use as a fuel	Consumer	n.a.	13	n.a.	8d	ESVOC30 SpERC

- **TAME**

Identified use name	Life cycle	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Specific Environmental Release Category (spERC)
1. Use as a fuel	Industrial	n.a.	n.a.	1, 2, 3, 8a, 8b, 16	8b	ESVOC3 SpERC
2. Use as a fuel	Professional	n.a.	n.a.	1, 2, 3, 8a, 8b, 9, 16	8b, 8e	ESVOC30 SpERC
3. Use as a fuel	Consumer	n.a.	13	n.a.	8d	ESVOC30 SpERC

- **ETHANOL**

Identified use name	Life cycle	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Specific Environmental Release Category (spERC)
1. Formulation & (re)packing of substances and mixtures	Industrial	n.a.	n.a.	3, 5, 8a, 8b, 9, 14	2	-

# Material Safety Data Sheet

According to Regulation (EC) n. 1907/2006 and subsequent amendments thereto

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### GASOLINE

#### 1. Distribution of substance

(classified as H340 and/or H350 and/or H361; containing 0% to 1% benzene) – Industrial Sector

#### – HUMAN HEALTH –

Section 1	
<b>Title</b>	
01a - Distribution of substance (classified as H340 and/or H350 and/or H361; (containing 0% to 1% benzene))	
<b>Use Descriptor</b>	
Sector(s) of Use	
Process Categories	1, 2, 3, 8a, 8b, 15
Environmental Release Categories	4, 5, 6a, 6b, 6d, 7
Specific Environmental Release Category	ESVOC SpERC 1.1b.v1
<b>Processes, tasks, activities covered</b>	
Bulk 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, and associated laboratory activities. Excludes emissions during transport.	
<b>Assessment Method</b>	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
<b>Product characteristics</b>	
Physical form of product	Liquid, vapour pressure > 10 kPa at STP <b>OC5</b>
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) <b>G13</b>
Amount used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) <b>G2</b>
Human factors not influenced by risk management	Not applicable
Other Operational Conditions affecting exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently. <b>G15</b> . Assumes a good basic standard of occupational hygiene is implemented <b>G1</b> .
Contributing Scenarios	
Specific Risk Management Measures and Operating Conditions	
General Measures (skin irritants). <b>G19</b> .	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. <b>E3</b>
General Measures (carcinogens). <b>G18</b> .	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised staff; provide specific activity training to operators to minimise exposures; wear suitable gloves (tested to EN374) and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. <b>G20</b> .
CS15 General exposures (closed systems). + CS56 With sample collection.	Handle substance within closed systems. <b>E47</b> . Sample via a closed loop or other system intended to avoid exposure. <b>E8</b> . Wear suitable gloves tested to EN374. <b>PPE15</b> .

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CS15 General exposures (closed systems). OC9 Outdoor.	Handle substance within closed systems. <b>E47</b> .
CS2 Process sampling	Sample via a closed loop or other system to avoid exposure. <b>E8</b> .
CS36 Laboratory activities.	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. <b>E12</b> .
CS501 Bulk closed loading and unloading.	Ensure material transfers are under containment or extract ventilation. <b>E66</b> .
CS39 Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance. <b>E55</b> . Retain drain downs in sealed storage pending disposal or for subsequent recycle. <b>ENV4</b> . Clear spills immediately. <b>C&amp;H13</b> . Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. <b>PPE16</b> .
CS67 Storage.	Ensure operation is undertaken outdoors. <b>E69</b> . Store substance within a closed system. <b>E84</b> .
<b>Section 3 Exposure Estimation</b>	
<b>3.1. Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. <b>G21</b> .	
<b>Section 4 Guidance to check compliance with the Exposure Scenario</b>	
<b>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. <b>G22</b> . Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. <b>G23</b> . Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. <b>G32</b> . Available hazard data do not enable the derivation of a DNEL for carcinogenic effects. <b>G33</b> . Available hazard data do not support the need for a DNEL to be established for other health effects. <b>G36</b> . Risk Management Measures are based on qualitative risk characterisation. <b>G37</b> .	

### – ENVIRONMENT –

<b>Section 1</b>	
<b>Title</b>	
Distribution of substance	
<b>Section 2 Operational conditions and risk management measures</b>	
<b>Section 2.2 Control of environmental exposure</b>	
<b>Product characteristics</b>	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
<b>Amounts used</b>	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	1.1E+07
Fraction of Regional tonnage used locally	2.0E-03
Annual site tonnage (tonnes/year)	2.1E+04
Maximum daily site tonnage (kg/day)	7.1E+04
<b>Frequency and duration of use</b>	
Continuous release [FD2].	
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 given operational conditions affecting environmental exposure</b>	
Release fraction to air from process (initial release prior to RMM)	0.001
Release fraction to wastewater from process (initial release prior to RMM)	0.00001
Release fraction to soil from process (initial release prior to RMM)	0.00001
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	

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Risk from environmental exposure is driven by freshwater. [TCR1a] No wastewater treatment required [TCR6]	
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 $\geq$ (%)	0.0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%)	0.0
<b>Organisation measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Not applicable as there is no release to wastewater [STP1].	
Estimated substance removal from wastewater via domestic sewage treatment (%)	96.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	96.1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	2.6+E6
Assumed domestic sewage treatment plant flow (m3/d)	2000
<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 national regulations [ETW3].	
<b>Conditions and measures related to external recovery of waste</b>	
External recovery and recycling of waste should comply with applicable local and/or national regulations [ERW1].	
<b>Section 3 Exposure Estimation</b>	
<b>3.2. Environment</b>	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
<b>Section 4 Guidance to check compliance with the Exposure Scenario</b>	
<b>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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ) [DSU4].	
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	1.0E-02
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	2.8E-02

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### 2. Formulation & (re)packing of substances and mixtures (classified as H340 and/or H350 and/or H361; containing 0% to 1% benzene) – Industrial Sector

#### – HUMAN HEALTH –

Section 1	
<b>Title</b>	
02 - Formulation & (re)packing of substances and mixtures (classified as H340 and/or H350 and/or H361; (containing 0% to 1% benzene))	
<b>Use Descriptor</b>	
Sector(s) of Use	
Process Categories	1, 2, 3, 8a, 8b, 15
Environmental Release Categories	2
Specific Environmental Release Category	ESVOC SpERC 2.2.v1
<b>Processes, tasks, activities covered</b>	
Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tableting, compression, pelletization, extrusion, large and small scale packing, maintenance, sampling and associated laboratory activities.	
<b>Assessment Method</b>	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
<b>Product characteristics</b>	
Physical form of product	Liquid, vapour pressure > 10 kPa at STP <b>OC5</b>
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) <b>G13</b>
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) <b>G2</b>
Human factors not influenced by risk management	Not applicable
Other Operational Conditions affecting exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently. <b>G15</b> . Assumes a good basic standard of occupational hygiene is implemented <b>G1</b> .
<b>Contributing Scenarios</b>	<b>Specific Risk Management Measures and Operating Conditions</b>
General Measures (skin irritants). <b>G19</b> .	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. <b>E3</b>
General Measures (carcinogens). <b>G18</b> .	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised staff; provide specific activity training to operators to minimise exposures; wear suitable gloves (tested to EN374) and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. <b>G20</b> .
CS15 General exposures (closed systems). + CS56 With sample collection.	Handle substance within closed systems. <b>E47</b> . Sample via a closed loop or other system intended to avoid exposure. <b>E8</b> . Wear suitable gloves tested to EN374. <b>PPE15</b> .
CS15 General exposures (closed systems). OC9 Outdoor	Handle substance within a closed system. <b>E47</b> .

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CS2 Process sampling	Sample via a closed loop or other system intended to avoid exposure. <b>E8.</b>
CS36 Laboratory activities	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure. <b>E12.</b>
CS14 Bulk transfers	Ensure material transfers are under containment or extract ventilation. <b>E66.</b>
CS8 Drum/batch transfers	Ensure material transfers are under containment or extract ventilation. <b>E66.</b>
CS39 Equipment cleaning and maintenance	Drain down and flush system prior to equipment break-in or maintenance. <b>E55.</b> Retain drain downs in sealed storage pending disposal or for subsequent recycle. <b>ENV4.</b> Clear spills immediately. <b>C&amp;H13.</b> Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. <b>PPE16.</b>
CS67 Storage.	Store substance within a closed system. <b>E84.</b> Wear suitable gloves tested to EN374. <b>PPE15.</b>
<b>Section 3 Exposure Estimation</b>	
<b>3.1. Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. <b>G21.</b>	
<b>Section 4 Guidance to check compliance with the Exposure Scenario</b>	
<b>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. <b>G22.</b> Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. <b>G23.</b> Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. <b>G32.</b> Available hazard data do not support the need for a DNEL to be established for other health effects. <b>G36.</b> Risk Management Measures are based on qualitative risk characterisation. <b>G37.</b>	

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### – ENVIRONMENT –

<b>Section 1</b>	
<b>Title</b>	
02 - Formulation & (re)packing of substances and mixtures	
<b>Section 2 Operational conditions and risk management measures</b>	
<b>Section 2.2 Control of environmental exposure</b>	
<b>Product characteristics</b>	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
<b>Amounts used</b>	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	1.0E+07
Fraction of Regional tonnage used locally	3.0E-03
Annual site tonnage (tonnes/year)	3.0E+04
Maximum daily site tonnage (kg/day)	1.0E+05
<b>Frequency and duration of use</b>	
Continuous release [FD2].	
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 given 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)	6.4E-04
Release fraction to soil from process (initial release prior to RMM)	0.00001
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
<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. [TCR1b]	
Prevent discharge of undissolved substance to or recover from onsite wastewater. [TCR14]	
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9]	
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 $\geq$ (%)	95.7
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%)	0.0
<b>Organisation measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Not applicable as there is no release to wastewater [STP1].	
Estimated substance removal from wastewater via domestic sewage treatment (%)	96.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	96.1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	1.1+E5
Assumed domestic sewage treatment plant flow (m3/d)	2000
<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 national regulations [ETW3].	
<b>Conditions and measures related to external recovery of waste</b>	
External recovery and recycling of waste should comply with applicable local and/or national regulations [ERW1].	
<b>Section 3 Exposure Estimation</b>	
<b>3.2. Environment</b>	

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The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].

### Section 4 Guidance to check compliance with the Exposure Scenario

#### 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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>) [DSU4].

Maximum Risk Characterisation Ratio for Wastewater Emissions RCR<sub>water</sub>

1.8E-01

Maximum Risk Characterisation Ratio for Wastewater Emissions RCR<sub>water</sub>

9.1E-01



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### 3. Use as a fuel

(classified as H340 and/or H350 and/or H361; containing 0% to 1% benzene) – Industrial Sector

#### – HUMAN HEALTH –

Section 1	
<b>Title</b>	
Use as a fuel: Industrial (classified as H340 and/or H350 and/or H361; (containing 0% to 1% benzene))	
<b>Use Descriptor</b>	
Sector(s) of Use	
Process Categories	1, 2, 3, 8a, 8b, 16
Environmental Release Categories	7
Specific Environmental Release Category	ESVOC SpERC 7.12a.v1
<b>Processes, tasks, activities covered</b>	
Covers the use as a fuel or in fuels (or fuel additives and additive components) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.	
<b>Assessment Method</b>	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
<b>Product characteristics</b>	
Physical form of product	Liquid, vapour pressure > 10 kPa at STP <b>OC5</b>
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) <b>G13</b>
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) <b>G2</b>
Human factors not influenced by risk management	Not applicable
Other Operational Conditions affecting exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently. <b>G15</b> . Assumes a good basic standard of occupational hygiene is implemented <b>G1</b> .
Contributing Scenarios	
Specific Risk Management Measures and Operating Conditions	
General Measures (skin irritants). <b>G19</b> .	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. <b>E3</b>
General Measures (carcinogens). <b>G18</b> .	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised staff; provide specific activity training to operators to minimise exposures; wear suitable gloves (tested to EN374) and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. <b>G20</b> .
CS502 Bulk closed unloading	Ensure material transfers are under containment or extract ventilation. <b>E66</b> .
CS8 Drum/batch transfers	Ensure material transfers are under containment or extract ventilation. <b>E66</b> .
CS507 Refuelling	Ensure material transfers are under containment or extract ventilation. <b>E66</b> .
CS8 Drum/batch transfers	Ensure material transfers are under containment or extract ventilation. <b>E66</b> .
CS507 Refuelling	Ensure material transfers are under containment or extract ventilation. <b>E66</b> .
CS508 Refuelling aircraft	Ensure material transfers are under containment or extract ventilation. <b>E66</b> .

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CS15 General exposures (closed systems)	Handle substance within a closed system. <b>E47</b> . Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. <b>E1</b> .
GEST_12I Use as a fuel, CS107 (closed systems)	Handle substance within closed systems. <b>E47</b> .
CS39 Equipment cleaning and maintenance.	Drain down system prior to equipment break-in or maintenance. <b>E65</b> . Retain drain downs in sealed storage pending disposal or for subsequent recycle. <b>ENVT4</b> . Clear spills immediately. <b>C&amp;H13</b> . Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. <b>E1</b> . Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. <b>PPE16</b> .
CS67 Storage.	Store substance within a closed system. <b>E84</b> . Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. <b>E1</b> .
<b>Section 3 Exposure Estimation</b>	
<b>3.1. Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. <b>G21</b> .	
<b>Section 4 Guidance to check compliance with the Exposure Scenario</b>	
<b>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. <b>G22</b> . Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. <b>G23</b> . Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. <b>G32</b> . Available hazard data do not support the need for a DNEL to be established for other health effects. <b>G36</b> . Risk Management Measures are based on qualitative risk characterisation. <b>G37</b> .	

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### – ENVIRONMENT –

<b>Section 1</b>	
<b>Title</b>	
Use as a fuel: Industrial	
<b>Section 2 Operational conditions and risk management measures</b>	
<b>Section 2.2 Control of environmental exposure</b>	
<b>Product characteristics</b>	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
<b>Amounts used</b>	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	9.4E+05
Fraction of Regional tonnage used locally	1.0E+00
Annual site tonnage (tonnes/year)	9.4E+05
Maximum daily site tonnage (kg/day)	3.1E+06
<b>Frequency and duration of use</b>	
Continuous release [FD2].	
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 given 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)	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 release estimates used [TCS1].	
<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 Humans via Indirect Exposure (Primarily Inhalation) [TCR1k] If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9]	
Treat air emission to provide a typical removal efficiency of (%)	9.5E+01
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency $\geq$ (%)	91.7
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of $\geq$ (%)	0.0
<b>Organisation measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Not applicable as there is no release to wastewater [STP1].	
Estimated substance removal from wastewater via domestic sewage treatment (%)	96.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	96.1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	5.3E+06
Assumed domestic sewage treatment plant flow (m3/d)	2000
<b>Conditions and measures related to external treatment of waste for disposal</b>	
Combustion emissions limited by required exhaust emission controls [ETW1]. Combustion emissions considered in regional exposure assessment [ETW2]. External treatment and disposal of waste should comply with applicable local and/or national regulations.[ETW3]	
<b>Conditions and measures related to external recovery of waste</b>	
This substance is consumed during use and no waste of the substance is generated [ERW3].	
<b>Section 3 Exposure Estimation</b>	
<b>3.2. Environment</b>	

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The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].

### Section 4 Guidance to check compliance with the Exposure Scenario

#### 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 [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>) [DSU4].

Maximum Risk Characterisation Ratio for Wastewater Emissions RCR<sub>water</sub>

5.9E-01

Maximum Risk Characterisation Ratio for Wastewater Emissions RCR<sub>water</sub>

4.7E-01

# Material Safety Data Sheet

According to Regulation (EC) n. 1907/2006 and subsequent amendments thereto

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### 4. Use as a fuel

(classified as H340 and/or H350 and/or H361; containing 0% to 1% benzene) – Professional Sector

### – HUMAN HEALTH –

Section 1	
<b>Title</b>	
Use as a fuel: Professional (classified as H340 and/or H350 and/or H361; (containing 0% to 1% benzene))	
<b>Use Descriptor</b>	
Sector(s) of Use	
Process Categories	1, 2, 3, 8a, 8b, 16
Environmental Release Categories	9a, 9b
Specific Environmental Release Category	ESVOC SpERC 9.12b.v1
<b>Processes, tasks, activities covered</b>	
Covers the use as a fuel or in fuels (or fuel additives and additive components) and includes activities associated with its transfer, use, equipment maintenance and handling of waste..	
<b>Assessment Method</b>	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
<b>Product characteristics</b>	
Physical form of product	Liquid, vapour pressure > 10 kPa at STP <b>OC5</b>
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) <b>G13</b>
Amounts used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) <b>G2</b>
Human factors not influenced by risk management	Not applicable
Other Operational Conditions affecting exposure	Assumes use at not more than 20°C above ambient temperature, unless stated differently. <b>G15</b> . Assumes a good basic standard of occupational hygiene is implemented <b>G1</b> .
Contributing Scenarios	Specific Risk Management Measures and Operating Conditions
General Measures (skin irritants). <b>G19</b> .	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin effects that may develop. <b>E3</b>
General Measures (carcinogens). <b>G18</b> .	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised staff; provide specific activity training to operators to minimise exposures; wear suitable gloves (tested to EN374) and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. <b>G20</b> .
CS15 General exposures (closed systems), OC9 Outdoor.	Handle substance within a closed system. <b>E47</b> .
CS502 Bulk closed unloading	Ensure material transfers are under containment or extract ventilation. <b>E66</b> .
CS8 Drum/batch transfers	Ensure material transfers are under containment or extract ventilation. <b>E66</b> .
CS507 Refuelling	Ensure material transfers are under containment or extract ventilation. <b>E66</b> .
GEST_12I Use as a fuel, CS107 (closed systems)	Handle substance within closed systems. <b>E47</b> .

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CS5 Equipment maintenance	Drain down system prior to equipment break-in or maintenance. <b>E65</b> . Retain drain downs in sealed storage pending disposal or for subsequent recycle. <b>ENV4</b> . Clear spills immediately. <b>C&amp;H13</b> . Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. <b>E1</b> . Ensure operatives are trained to minimise exposures. <b>E19</b> .
CS67 Storage.	Store substance within a closed system. <b>E84</b> . Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. <b>E1</b> .
<b>Section 3 Exposure Estimation</b>	
<b>3.1. Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. <b>G21</b> .	
<b>Section 4 Guidance to check compliance with the Exposure Scenario</b>	
<b>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. <b>G22</b> . Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. <b>G23</b> . Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. <b>G32</b> . Available hazard data do not support the need for a DNEL to be established for other health effects. <b>G36</b> . Risk Management Measures are based on qualitative risk characterisation. <b>G37</b> .	

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### – ENVIRONMENT –

<b>Section 1</b>	
<b>Title</b>	
Use as a fuel: Professional	
<b>Section 2 Operational conditions and risk management measures</b>	
<b>Section 2.2 Control of environmental exposure</b>	
<b>Product characteristics</b>	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
<b>Amounts used</b>	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	8.8E+05
Fraction of Regional tonnage used locally	5.0E-04
Annual site tonnage (tonnes/year)	4.4E+02
Maximum daily site tonnage (kg/day)	1.2E+03
<b>Frequency and duration of use</b>	
Continuous release [FD2].	
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 given operational conditions affecting environmental exposure</b>	
Release fraction to air from wide dispersive use (regional use only) [OOC7]	0.01
Release fraction to wastewater wide dispersive use [OOC8]	0.00001
Release fraction to soil from wide dispersive use (regional use only) [OOC9]	0.00001
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
<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 [TCR1a]	
No wastewater treatment required [TCR6]	
Treat air emission to provide a typical removal efficiency of (%)	N/A
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency (%)	0.0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0.0
<b>Organisation measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Not applicable as there is no release to wastewater [STP1]	
Estimated substance removal from wastewater via domestic sewage treatment (%)	96.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	96.1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	6.4E+04
Assumed domestic sewage treatment plant flow (m3/d)	2000
<b>Conditions and measures related to external treatment of waste for disposal</b>	
Combustion emissions limited by required exhaust emission controls [ETW1]. Combustion emissions considered in regional exposure assessment [ETW2]. External treatment and disposal of waste should comply with applicable local and/or national regulations.[ETW3]	
<b>Conditions and measures related to external recovery of waste</b>	
This substance is consumed during use and no waste of the substance is generated [ERW3].	
<b>Section 3 Exposure Estimation</b>	
<b>3.2. Environment</b>	

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The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].

### Section 4 Guidance to check compliance with the Exposure Scenario

#### 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 [DSU1]. Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>) [DSU4].

Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater

9.5E-03

Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater

2.0E-02



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### 5. Use as a fuel

(classified as H340 and/or H350 and/or H361; containing 0% to 1% benzene) – Consumer

#### – HUMAN HEALTH –

Section 1		
<b>Title</b>		
Use as a fuel: Consumer (classified as H340 and/or H350 and/or H361; (containing 0% to 1% benzene))		
<b>Use Descriptor</b>		
Sector(s) of Use		
Product Categories	13	
Environmental Release Categories	9a, 9b	
Specific Environmental Release Category	ESVOC SpERC 9.12c.v1	
<b>Processes, tasks, activities covered</b>		
Covers consumer uses in fuels.		
<b>Assessment Method</b>		
See Section 3.		
Section 2 Operational conditions and risk management measures		
Section 2.1 Control of consumer exposure		
<b>Product characteristics</b>		
Physical form of product	Liquid	
Vapour pressure (Pa)	Liquid, vapour pressure > 10 kPa at STP <b>OC5</b>	
Concentration of substance in product	Unless otherwise stated, cover concentrations up to 100% [ConsOC1]	
Amounts used	Unless otherwise stated, covers use amounts up to 37500g [ConsOC2]; covers skin contact area up to 420cm <sup>2</sup> [ConsOC5]	
Frequency and duration of use/exposure	Unless otherwise stated, covers use frequency up to 0.143 times per day [ConsOC4]; covers exposure up to 2 hours per event [ConsOC14]	
Other Operational Conditions affecting exposure	Unless otherwise stated assumes use at ambient temperatures [ConsOC15]; assumes use in a 20 m <sup>3</sup> room [ConsOC11]; assumes use with typical ventilation [ConsOC8].	
Product Category	Specific Risk Management Measures and Operating Conditions	
PC13:Fuels--Liquid - subcategories added: Automotive Refuelling	OC	Unless otherwise stated, covers concentrations up to 1% [ConsOC1]; covers use up to 52 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 210.00 cm <sup>2</sup> [ConsOC5]; for each use event, covers use amounts up to 37500g [ConsOC2]; covers outdoor use [ConsOC12]; covers use in room size of 100m <sup>3</sup> [ConsOC11]; for each use event, covers exposure up to 0.05hr/event[ConsOC14];
	RMM	No specific RMMs developed beyond those OCs stated
PC13:Fuels--Liquid - subcategories added: Scooter Refuelling	OC	Unless otherwise stated, covers concentrations up to 1% [ConsOC1]; covers use up to 52 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 210.00 cm <sup>2</sup> [ConsOC5]; for each use event, covers use amounts up to 3750g [ConsOC2]; covers outdoor use [ConsOC12]; covers use in room size of 100m <sup>3</sup> [ConsOC11]; for each use event, covers exposure up to 0.03hr/event[ConsOC14];
	RMM	No specific RMMs developed beyond those OCs stated
PC13:Fuels--Liquid - subcategories added: Garden Equipment - Use	OC	Unless otherwise stated, covers concentrations up to 1% [ConsOC1]; covers use up to 26 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 750g [ConsOC2]; covers outdoor use [ConsOC12]; covers use in room size of 100m <sup>3</sup> [ConsOC11]; for each use event, covers exposure up to 2.00hr/event[ConsOC14];
	RMM	No specific RMMs developed beyond those OCs stated

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PC13:Fuels--Liquid (subcategories added): Garden Equipment - Refuelling	OC	Unless otherwise stated, covers concentrations up to 1% [ConsOC1]; covers use up to 26 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 420.00 cm2 [ConsOC5]; for each use event, covers use amounts up to 750g [ConsOC2]; Covers use in a one car garage (34m3) under typical ventilation [ConsOC10]; covers use in room size of 34m3[ConsOC11]; for each use event, covers exposure up to 0.03hr/event[ConsOC14];
	RMM	No specific RMMs developed beyond those OCs stated
<b>Section 3 Exposure Estimation</b>		
<b>3.1. Health</b>		
The ECETOC TRA tool has been used to estimate consumer exposures, consistent with the content of ECETOC Report #107 and the Chapter R15 of the IR&CSA TGD. Where exposure determinants differ to these sources, then they are indicated.		
<b>Section 4 Guidance to check compliance with the Exposure Scenario</b>		
<b>4.1. Health</b>		
Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given in section 2 are implemented. G39. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. G23.		

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### – ENVIRONMENT –

<b>Section 1</b>	
<b>Title</b>	
Use as a fuel: Consumer	
<b>Section 2 Operational conditions and risk management measures</b>	
<b>Section 2.2 Control of environmental exposure</b>	
<b>Product characteristics</b>	
Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
<b>Amounts used</b>	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	8.2E+06
Fraction of Regional tonnage used locally	5.0E-04
Annual site tonnage (tonnes/year)	4.1E+03
Maximum daily site tonnage (kg/day)	1.1E+04
<b>Frequency and duration of use</b>	
Continuous release [FD2].	
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 given operational conditions affecting environmental exposure</b>	
Release fraction to air from wide dispersive use (regional use only) [OOC7]	1.0E-2
Release fraction to wastewater wide dispersive use [OOC8]	0.00001
Release fraction to soil from wide dispersive use (regional use only) [OOC9]	0.00001
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Not applicable as there is no release to wastewater [STP1].	
Estimated substance removal from wastewater via domestic sewage treatment (%)	96.1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	5.3E+05
Assumed domestic sewage treatment plant flow (m3/d)	2000
<b>Conditions and measures related to external treatment of waste for disposal</b>	
Combustion emissions limited by required exhaust emission controls [ETW1]. Combustion emissions considered in regional exposure assessment [ETW2]. External treatment and disposal of waste should comply with applicable local and/or national regulations.[ETW3]	
<b>Conditions and measures related to external recovery of waste</b>	
This substance is consumed during use and no waste of the substance is generated. [ERW3]	
<b>Section 3 Exposure Estimation</b>	
<b>3.2. Environment</b>	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
<b>Section 4 Guidance to check compliance with the Exposure Scenario</b>	
<b>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 [DSU1].	
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	9.6E-03
Maximum Risk Characterisation Ratio for Wastewater Emissions RCRwater	2.1E-02

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### ETBE

#### 1. Use as a fuel – Industrial Sector

Section 1 Exposure Scenario	
<b>Title</b>	
Use as a fuel	
<b>Use Descriptor</b>	
Sector(s) of Use	Industrial (SU3)
Process Categories	1, 2, 3, 8a, 8b, 16
Environmental Release Categories	8b
Specific Environmental Release Category	ESVOC3 SpERC
<b>Processes, tasks, activities covered</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	
<b>Product characteristics</b>	
Physical form of product	Liquid, vapour pressure > 10 kPa [OC5].
Concentration of substance in product	Covers percentage substance in the product up to 15% [Gnew].
Amount used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	Not applicable
Other Operational Conditions Affecting Exposure	Assumes a good basic standard of occupational hygiene is implemented [G1].
Contributing Scenarios	Specific Risk Management Measures and Operating Conditions
Bulk transfers [CS14].; Batch process [CS55]. With sample collection [CS56]. ; Filling / preparation of equipment from drums or containers. [CS45].	Handle substance within a predominantly closed system provided with extract ventilation [E49]. Avoid carrying out activities involving exposure for more than 4 hours [OC28], or: Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]
Drum/batch transfers [CS8]. ; Filling / preparation of equipment from drums or containers. [CS45]. Bulk transfers [CS14]. ; Dedicated facility [CS81]	Use drum pumps [E53].
General exposures (closed systems) [CS15].	No specific measures identified [E18].
General exposures (closed systems) [CS15]. ; With sample collection [CS56].	Provide extract ventilation to material transfer points and other openings [E82].
General exposures (closed systems) [CS15]. ; Use in contained batch processes [CS37]. ; With sample collection [CS56].	Provide extract ventilation to points where emissions occur [E54].
(closed systems) [CS107] U of fuel	No specific measures identified [E18].
(closed systems) [CS107] Btch process [CS55].	Provide extract ventilation to material transfer points and other openings [E82].

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Equipment cleaning and maintenance [CS39]. Non-dedicated facility [CS82]e.g. fuel pump repair indoor	Drain down system prior to equipment break-in or maintenance [E65].Avoid carrying out activities involving exposure for more than 4 hours [OC28]
Storage [CS67]; General exposures (closed systems) [CS15].	No specific measures identified [EI18].
Storage [CS67]; General exposures (closed systems) [CS15]. ; With sample collection [CS56].	Ensure operation is undertaken outdoors [E69].
<b>Section 2.2 Control of environmental exposure</b>	
<b>Product characteristics</b>	
Substance is a unique structure [PrC1]. Predominantly hydrophobic [PrC4a]. Readily biodegradable [PrC5a].	
<b>Operational condition</b>	
Outdoor use [OOC1].	
<b>Amount used</b>	
Regional use tonnage (tonnes/year) [A2]:	901,000
Fraction of regional tonnage used locally [A3]:	0.02
Average local daily tonnage (kg/d) [A5]:	51,486
Annual site tonnage (tonnes/year) [A6]	18,020
<b>Frequency and duration of use</b>	
Continuous release [FD2].	
Emission days (days/year)	350
<b>Other given operational conditions affecting environmental exposure</b>	
Use in closed systems. Either wet or dry processes.	
Release fraction to air from process:	1.00E-04
Release fraction to wastewater from process:	1.00E-05
Release fraction to soil from process (regional only):	1.00E-05
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used [TCS 1].	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Air:	No air emission controls required; required removal efficiency is 0% [TCR5].
Wastewater:	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >95% [TCR9].
Soil:	No soil emission controls required; required removal efficiency is 0% [TCR7].
<b>Organisation measures to prevent/limit release from site</b>	
Prevent discharge of undissolved substance to or recover from wastewater [OMS1].	
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Assumed industrial sewage treatment plant effluent flow is 2000 m3/d.	
<b>Conditions and measures related to external treatment of waste for disposal</b>	
Not applicable	
<b>Conditions and measures related to external recovery of waste</b>	
Not applicable	
<b>Other environmental control measures additional to above</b>	
None	

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### 2. Use as a fuel – Professional Sector

Section 1 Exposure Scenario	
<b>Title</b>	
Use as a fuel	
<b>Use Descriptor</b>	
Sector(s) of Use	Professional (SU22)
Process Categories	1, 2, 3, 8a, 8b, 9, 16
Environmental Release Categories	8b, 8e
Specific Environmental Release Category	ESVOC30 SpERC
<b>Processes, tasks, activities covered</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	
<b>Product characteristics</b>	
Physical form of product	Liquid, vapour pressure > 10 kPa [OC5].
Concentration of substance in product	Covers percentage substance in the product up to 15% [Gnew].
Amount used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	Not applicable
Other Operational Conditions Affecting Exposure	Assumes a good basic standard of occupational hygiene is implemented [G1].
Contributing Scenarios	Specific Risk Management Measures and Operating Conditions
Bulk transfers [CS14]. ; Batch process [CS55]. Filling / preparation of equipment from drums or containers. [CS45].	Ensure operation is undertaken outdoors [E69]. Avoid carrying out activities involving exposure for more than 4 hours [OC28], or: Wear a respirator conforming to EN140 with Type A filter or better. [PPE22].
Drum/batch transfers [CS8]. ; Filling / preparation of equipment from drums or containers. [CS45]. Bulk transfers [CS14]. ; Dedicated facility [CS81]	Ensure operation is undertaken outdoors [E69]. ; Ensure material transfers are under containment or extract ventilation [E66].
Refuelling [CS507]	Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40]. Avoid carrying out activities involving exposure for more than 1 hour [OC27], or: Wear a respirator conforming to EN140 with Type A filter or better. [PPE22].
General exposures (closed systems) [CS15]. ; With sample collection [CS56].	Avoid carrying out activities involving exposure for more than 4 hours [OC28], or: Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]
General exposures (closed systems) [CS15]. ; Use in contained batch processes [CS37]. ; with sample collection [CS56].	Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40].
Drum and small package filling [CS6]. Dedicated facility [CS81]	Use drum pumps or carefully pour from container [E64]. Avoid carrying out activities involving exposure for more than 4 hours [OC28], or: Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]
(closed systems) [CS107] use a	Ensure operation is undertaken outdoors [E69]. , or: Provide a good standard of

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fuel	controlled ventilation (10 to 15 air changes per hour) [E40].
Equipment cleaning and maintenance [CS39]. Non-dedicated facility [CS82]e.g fuel pump repair indoor	Drain down and flush system prior to equipment break-in or maintenance [E55].Avoid carrying out activities involving exposure for more than 4 hours [OC28], or: Wear a respirator conforming to EN140 with Type A filter or better. [PPE22].
Equipment cleaning and maintenance [CS39]. Non-dedicated facility [CS82]e.g fuel pump repair outdoor	Drain down and flush system prior to equipment break-in or maintenance [E55].Avoid carrying out activities involving exposure for more than 4 hours [OC28], or: Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]
Storage [CS67]; General exposures (closed systems) [CS15].	No specific measures identified [E118].
<b>Section 2.2 Control of environmental exposure</b>	
<b>Product characteristics</b>	
Substance is a unique structure [PrC1]. Predominantly hydrophobic [PrC4a]. Readily biodegradable [PrC5a].	
<b>Operational condition</b>	
Outdoor use [OOC1].	
<b>Amount used</b>	
Average daily use over a year for wide dispersive use (kg/d):	4.94
<b>Frequency and duration of use</b>	
Dispersive use [FD3].	
Emission days (days/year)	365
<b>Other given operational conditions affecting environmental exposure</b>	
Use in open systems.	
Release fraction to air from wide dispersive use (regional only):	1.00E-02
Release fraction to wastewater from wide dispersive use:	1.00E-05
Release fraction to surface water from wide dispersive use (regional only):	1.00E-04
Release fraction to soil from wide dispersive use (regional only):	1.00E-05
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used [TCS 1].	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Air:	No air emission controls required; required removal efficiency is 0% [TCR5].
Wastewater:	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >95% [TCR9].
Soil:	No soil emission controls required; required removal efficiency is 0% [TCR7].
<b>Organisation measures to prevent/limit release from site</b>	
Prevent discharge of undissolved substance to or recover from wastewater [OMS1].	
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Assumed industrial sewage treatment plant effluent flow is 2000 m3/d.	
<b>Conditions and measures related to external treatment of waste for disposal</b>	
Not applicable	
<b>Conditions and measures related to external recovery of waste</b>	
Not applicable	
<b>Other environmental control measures additional to above</b>	
None	



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### 3. Use as a fuel – Consumer

Section 1 Exposure Scenario	
<b>Title</b>	
Use as a fuel	
<b>Use Descriptor</b>	
Sector(s) of Use	Consumer (SU21)
Product Categories	13
Environmental Release Categories	8d
Specific Environmental Release Category	ESVOC30 SpERC
<b>Processes, tasks, activities covered</b>	
Use of fuel for refuelling 2-stroke and 4-stroke engines	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
<b>Product characteristics</b>	
Physical form of product	Liquid, vapour pressure > 10 kPa [OC5].
Vapour pressure	170 hPa at 25 °C
Concentration of substance in product	Covers percentage substance in the product up to 15% [Gnew].
Amount used	Up to 60 litres per refuelling
Frequency and duration of use/exposure	Up to 3 times a week
Other Operational Conditions Affecting Exposure	Unless otherwise stated assumes use at ambient temperatures [ConsOC15]
Contributing Scenarios	
Specific Risk Management Measures and Operating Conditions	
PC13: Fuel	OC Unless otherwise stated, covers concentrations up to 15% [ConsOC1]; covers use up to 150 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers exposure up to 15 min/event[ConsOC14];
	RMM No specific RMMs identified beyond those OCs stated
Section 2.2 Control of environmental exposure	
<b>Product characteristics</b>	
Substance is a unique structure [PrC1]. Predominantly hydrophobic [PrC4a]. Readily biodegradable [PrC5a].	
<b>Operational condition</b>	
Indoor/Outdoor use [OOC3].	
<b>Amount used</b>	
Average daily use over a year for wide dispersive use (kg/d):	4.94
<b>Frequency and duration of use</b>	
Dispersive use [FD3].	
Emission days (days/year)	365
<b>Other given operational conditions affecting environmental exposure</b>	
Use in open systems.	
Release fraction to air from wide dispersive use (regional only):	1.00E-02
Release fraction to wastewater from wide dispersive use:	1.00E-05
Release fraction to surface water from wide dispersive use (regional only):	1.00E-04
Release fraction to soil from wide dispersive use (regional only):	1.00E-05
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used [TCS 1].	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Air:	No air emission controls required; required removal efficiency is 0% [TCR5].



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Wastewater:	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >95% [TCR9].
Soil:	No soil emission controls required; required removal efficiency is 0% [TCR7].
<b>Organisation measures to prevent/limit release from site</b>	
Prevent discharge of undissolved substance to or recover from wastewater [OMS1].	
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Assumed industrial sewage treatment plant effluent flow is 2000 m <sup>3</sup> /d.	
<b>Conditions and measures related to external treatment of waste for disposal</b>	
Not applicable	
<b>Conditions and measures related to external recovery of waste</b>	
Not applicable	
<b>Other environmental control measures additional to above</b>	
None	

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### MTBE

#### 1. Use as a fuel – Industrial Sector

Section 1 Exposure Scenario	
<b>Title</b>	
Use as a fuel	
<b>Use Descriptor</b>	
Sector(s) of Use	Industrial (SU3)
Process Categories	1, 2, 3, 8a, 8b, 16
Environmental Release Categories	8b
Specific Environmental Release Category	ESVOC3 SpERC
<b>Processes, tasks, activities covered</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 [OC5].
Concentration of substance in product	Covers percentage substance in the product up to 15% [Gnew].
Amount used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	Not applicable
Other Operational Conditions Affecting Exposure	Assumes a good basic standard of occupational hygiene is implemented [G1].
Contributing Scenarios	Specific Risk Management Measures and Operating Conditions
General measures (skin irritants) [G19].	Avoid all skin contact with product, clean up contamination/spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely, wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop [E3].
Bulk transfers [CS14]. ; Batch process [CS55]. With sample collection [CS56]. ; Filling / preparation of equipment from drums or containers. [CS45].	Ensure material transfers are under containment or extract ventilation [E66].
Drum/batch transfers [CS8]. ; Filling / preparation of equipment from drums or containers. [CS45]. Bulk transfers [CS14]. ; Dedicated facility [CS81]	Use drum pumps [E53].
General exposures (closed systems) [CS15].	No specific measures identified [EI18].
General exposures (closed systems) [CS15]. ; With sample collection [CS56].	No specific measures identified [EI18].
General exposures (closed systems) [CS15]; Use in contained batch processes [CS37]. ; With sample collection [CS56].	Avoid carrying out activities involving exposure for more than 4 hours [OC28], or: Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]

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(closed systems) [CS107] Use of fuel	No specific measures identified [E118].
(closed systems) [CS107] Batch process [CS55].	Avoid carrying out activities involving exposure for more than 4 hours [OC28], or: Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]
Equipment cleaning and maintenance [CS39]. Non-dedicated facility [CS82] e.g fuel pump repair indoor	Avoid carrying out activities involving exposure for more than 4 hours [OC28] Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]
Storage [CS67]; General exposures (closed systems) [CS15].	No specific measures identified [E118].
Storage [CS67]; General exposures (closed systems) [CS15]. With sample collection [CS56].	Ensure operation is undertaken outdoors [E69].
<b>Section 2.2 Control of environmental exposure</b>	
<b>Product characteristics</b>	
Substance is a unique structure [PrC1]. Predominantly hydrophobic [PrC4a]. Readily biodegradable [PrC5a].	
<b>Operational condition</b>	
Outdoor use [OOC1].	
<b>Amount used</b>	
Fraction of EU tonnage used in region [A1]:	0.57
Regional use tonnage (tonnes/year) [A2]:	659,000
Fraction of regional tonnage used locally [A3]:	0.02
Average local daily tonnage (kg/d) [A5]:	37,657
Annual site tonnage (tonnes/year) [A6]	13,180
<b>Frequency and duration of use</b>	
Continuous release [FD2].	
Emission days (days/year)	350
<b>Other given operational conditions affecting environmental exposure</b>	
Use in closed systems. Either wet or dry processes.	
Release fraction to air from process:	1.00E-04
Release fraction to wastewater from process:	1.00E-05
Release fraction to soil from process (regional only):	1.00E-05
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used [TCS 1].	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Air:	No air emission controls required; required removal efficiency is 0% [TCR5].
Wastewater:	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >95% [TCR9].
Soil:	No soil emission controls required; required removal efficiency is 0% [TCR7].
<b>Organisation measures to prevent/limit release from site</b>	
Prevent discharge of undissolved substance to or recover from wastewater [OMS1].	
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Assumed industrial sewage treatment plant effluent flow is 2000 m3/d.	
<b>Conditions and measures related to external treatment of waste for disposal</b>	
Not applicable	
<b>Conditions and measures related to external recovery of waste</b>	
Not applicable	
<b>Other environmental control measures additional to above</b>	
None	

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### 2. Use as a fuel – Professional Sector

Section 1 Exposure Scenario	
<b>Title</b>	
Use as a fuel	
<b>Use Descriptor</b>	
Sector(s) of Use	Professional (SU22)
Process Categories	1, 2, 3, 8a, 8b, 9, 16
Environmental Release Categories	8b, 8e
Specific Environmental Release Category	ESVOC30 SpERC
<b>Processes, tasks, activities covered</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	
<b>Product characteristics</b>	
Physical form of product	Liquid, vapour pressure > 10 kPa [OC5].
Concentration of substance in product	Covers percentage substance in the product up to 15% [Gnew].
Amount used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	Not applicable
Other Operational Conditions Affecting Exposure	Assumes a good basic standard of occupational hygiene is implemented [G1].
<b>Contributing Scenarios</b>	<b>Specific Risk Management Measures and Operating Conditions</b>
General measures (skin irritants) [G19].	Avoid all skin contact with product, clean up contamination/spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely, wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop [E3].
Bulk transfers [CS14]. ; Batch process [CS55]. Filling / preparation of equipment from drums or containers. [CS45].	Ensure material transfers are under containment or extract ventilation [E66].
Drum/batch transfers [CS8]. ; Filling / preparation of equipment from drums or containers. [CS45]. Bulk transfers [CS14]. ; Dedicated facility [CS81]	Ensure material transfers are under containment or extract ventilation [E66].
Refuelling [CS507]	Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40].
General exposures (closed systems) [CS15]. ; With sample collection [CS56].	No specific measures identified [E118].
General exposures (closed systems) [CS15]. ; Use in contained batch processes [CS37]. ; With sample collection [CS56].	Ensure operation is undertaken outdoors [E69].
Drum and small package filling	Use drum pumps or carefully pour from container [E64]. Avoid carrying out activities

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[CS6]. Dedicated facility [CS81]	involving exposure for more than 1 hour [OC27], or: Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]
(closed systems) [CS107]use a fuel	No specific measures identified [EI18].
Equipment cleaning and maintenance [CS39]. Non-dedicated facility [CS82]e.g fuel pump repair indoor	Drain down system prior to equipment break-in or maintenance [E65].Avoid carrying out activities involving exposure for more than 4 hours [OC28], or: Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]
Equipment cleaning and maintenance [CS39]. Non-dedicated facility [CS82]e.g fuel pump repair outdoor	Drain down system prior to equipment break-in or maintenance [E65].Avoid carrying out activities involving exposure for more than 4 hours [OC28], or: Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]
Storage [CS67]; General exposures (closed systems) [CS15].	No specific measures identified [EI18].
<b>Section 2.2 Control of environmental exposure</b>	
<b>Product characteristics</b>	
Substance is a unique structure [PrC1]. Predominantly hydrophobic [PrC4a]. Readily biodegradable [PrC5a].	
<b>Operational condition</b>	
Outdoor use [OOC1].	
<b>Amount used</b>	
Average daily use over a year for wide dispersive use (kg/d):	3.61
<b>Frequency and duration of use</b>	
Dispersive use [FD3].	
Emission days (days/year)	365
<b>Other given operational conditions affecting environmental exposure</b>	
Use in open systems.	
Release fraction to air from wide dispersive use (regional only):	1.00E-02
Release fraction to wastewater from wide dispersive use:	1.00E-05
Release fraction to surface water from wide dispersive use (regional only):	1.00E-04
Release fraction to soil from wide dispersive use (regional only):	1.00E-05
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used [TCS 1].	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Air:	No air emission controls required; required removal efficiency is 0% [TCR5].
Wastewater:	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >95% [TCR9].
Soil:	No soil emission controls required; required removal efficiency is 0% [TCR7].
<b>Organisation measures to prevent/limit release from site</b>	
Prevent discharge of undissolved substance to or recover from wastewater [OMS1].	
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Assumed industrial sewage treatment plant effluent flow is 2000 m3/d.	
<b>Conditions and measures related to external treatment of waste for disposal</b>	
Not applicable	
<b>Conditions and measures related to external recovery of waste</b>	
Not applicable	
<b>Other environmental control measures additional to above</b>	
None	

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### 3. Use as a fuel – Consumer

Section 1 Exposure Scenario	
<b>Title</b>	
Use as a fuel	
<b>Use Descriptor</b>	
Sector(s) of Use	Consumer (SU21)
Product Categories	13
Environmental Release Categories	8d
Specific Environmental Release Category	ESVOC30 SpERC
<b>Processes, tasks, activities covered</b>	
Use of fuel for refuelling 2-stroke and 4-stroke engines	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
<b>Product characteristics</b>	
Physical form of product	Liquid, vapour pressure > 10 kPa [OC5].
Vapour pressure	330 hPa at 25 °C
Concentration of substance in product	Covers percentage substance in the product up to 15% [Gnew].
Amount used	Up to 60 litres per refuelling
Frequency and duration of use/exposure	Up to 3 times a week
Other Operational Conditions Affecting Exposure	Unless otherwise stated assumes use at ambient temperatures [ConsOC15]
Contributing Scenarios	
Specific Risk Management Measures and Operating Conditions	
PC13: Fuel	OC Unless otherwise stated, covers concentrations up to 15% [ConsOC1]; covers use up to 150 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers exposure up to 15 min/event[ConsOC14];
	RMM No specific RMMs identified beyond those OCs stated
Section 2.2 Control of environmental exposure	
<b>Product characteristics</b>	
Substance is a unique structure [PrC1]. Predominantly hydrophobic [PrC4a]. Readily biodegradable [PrC5a].	
<b>Operational condition</b>	
Outdoor use [OOC1].	
<b>Amount used</b>	
Average daily use over a year for wide dispersive use (kg/d):	3.61
<b>Frequency and duration of use</b>	
Dispersive use [FD3].	
Emission days (days/year)	365
<b>Other given operational conditions affecting environmental exposure</b>	
Use in open systems.	
Release fraction to air from wide dispersive use (regional only):	1.00E-02
Release fraction to wastewater from wide dispersive use:	1.00E-05
Release fraction to surface water from wide dispersive use (regional only):	1.00E-04
Release fraction to soil from wide dispersive use (regional only):	1.00E-05
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used [TCS 1].	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Air:	No air emission controls required; required removal efficiency is 0% [TCR5].

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Wastewater:	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >95% [TCR9].
Soil:	No soil emission controls required; required removal efficiency is 0% [TCR7].
<b>Organisation measures to prevent/limit release from site</b>	
Prevent discharge of undissolved substance to or recover from wastewater [OMS1].	
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Assumed industrial sewage treatment plant effluent flow is 2000 m <sup>3</sup> /d.	
<b>Conditions and measures related to external treatment of waste for disposal</b>	
Not applicable	
<b>Conditions and measures related to external recovery of waste</b>	
Not applicable	
<b>Other environmental control measures additional to above</b>	
None	

# Material Safety Data Sheet

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### TAME

#### 1. Use as a fuel – Industrial Sector

Section 1 Exposure Scenario	
<b>Title</b>	
Use as a fuel	
<b>Use Descriptor</b>	
Sector(s) of Use	Industrial (SU3)
Process Categories	1, 2, 3, 8a, 8b, 16
Environmental Release Categories	8b
Specific Environmental Release Category	ESVOC3 SpERC
<b>Processes, tasks, activities covered</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	
<b>Product characteristics</b>	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa [OC4].
Concentration of substance in product	Covers percentage substance in the product up to 15% [Gnew].
Amount used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	Not applicable
Other Operational Conditions Affecting Exposure	Assumes a good basic standard of occupational hygiene is implemented [G1].
Contributing Scenarios	Specific Risk Management Measures and Operating Conditions
Bulk transfers [CS14]. ; Batch process [CS55]. With sample collection [CS56]. ; Filling / preparation of equipment from drums or containers. [CS45].	Ensure material transfers are under containment or extract ventilation [E66]. Use vapour recovery units when necessary [A7]. {Clear transfer lines prior to de-coupling [E39]}. ; {Transfer via enclosed lines [E52]}.
Drum/batch transfers [CS8]. ; Filling / preparation of equipment from drums or containers. [CS45]. Bulk transfers [CS14]. ; Dedicated facility [CS81]	Use drum pumps [E53].{Avoid spillage when withdrawing pump [C&H16]}.
General exposures (closed systems) [CS15].	No specific measures identified [EI18].
General exposures (closed systems) [CS15]. ; Equipment cleaning and maintenance [CS39]. ; With sample collection [CS56].	No specific measures identified [EI18].
General exposures (closed systems) [CS15]. ; Use in contained batch processes [CS37]. ; With sample collection [CS56].	No specific measures identified [EI18].



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General exposures (open systems) [CS16]. ; (closed systems) [CS107]refuelling [CS507]	No specific measures identified [E118].
General exposures (open systems) [CS16]. ; (closed systems) [CS107]Batch process [CS55].	No specific measures identified [E118].
Equipment cleaning and maintenance [CS39]. Non-dedicated facility [CS82]e.g fuel pump repair indoor	Provide enhanced mechanical ventilation by mechanical means [E48].or: Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]{Allow time for product to drain from workpiece [E121]}. {Wear suitable coveralls to prevent exposure to the skin [PPE27]}.
Vessel and container cleaning [CS103]Non-dedicated facility [CS82]	Ensure material transfers are under containment or extract ventilation [E66]. Apply vessel entry procedures including use of forced supplied air [AP15]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4]. {Wear suitable coveralls to prevent exposure to the skin [PPE27]}.
Storage [CS67]; General exposures (closed systems) [CS15].	No specific measures identified [E118].
Storage [CS67]; General exposures (closed systems) [CS15]. ; With sample collection [CS56].	{Ensure samples are obtained under containment or extract ventilation [E76]}
<b>Section 2.2 Control of environmental exposure</b>	
<b>Product characteristics</b>	
Substance is a unique structure [PrC1]. Predominantly hydrophobic [PrC4a]. Readily biodegradable [PrC5a].	
<b>Operational condition</b>	
Outdoor use [OOC1].	
<b>Amount used</b>	
Fraction of EU tonnage used in region [A1]:	0.37
Regional use tonnage (tonnes/year) [A2]:	125,000
Fraction of regional tonnage used locally [A3]:	0.02
Average local daily tonnage (kg/d) [A5]:	7,143
Annual site tonnage (tonnes/year) [A6]	2,500
<b>Frequency and duration of use</b>	
Continuous release [FD2].	
Emission days (days/year)	350
<b>Other given operational conditions affecting environmental exposure</b>	
Use in closed systems. Either wet or dry processes.	
Release fraction to air from process:	1.00E-04
Release fraction to wastewater from process:	1.00E-05
Release fraction to soil from process (regional only):	1.00E-05
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used [TCS 1].	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Air:	No air emission controls required; required removal efficiency is 0% [TCR5].
Wastewater:	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >95% [TCR9].
Soil:	No soil emission controls required; required removal efficiency is 0% [TCR7].
<b>Organisation measures to prevent/limit release from site</b>	
Prevent discharge of undissolved substance to or recover from wastewater [OMS1].	
<b>Conditions and measures related to municipal sewage treatment plant</b>	

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Assumed industrial sewage treatment plant effluent flow is 2000 m3/d.
<b>Conditions and measures related to external treatment of waste for disposal</b>
Not applicable
<b>Conditions and measures related to external recovery of waste</b>
Not applicable
<b>Other environmental control measures additional to above</b>
None

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### 2. Use as a fuel – Professional Sector

Section 1 Exposure Scenario	
<b>Title</b>	
Use as a fuel	
<b>Use Descriptor</b>	
Sector(s) of Use	Professional (SU22)
Process Categories	1, 2, 3, 8a, 8b, 9, 16
Environmental Release Categories	8b, 8e
Specific Environmental Release Category	ESVOC30 SpERC
<b>Processes, tasks, activities covered</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	
<b>Product characteristics</b>	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa [OC4].
Concentration of substance in product	Covers percentage substance in the product up to 15% [Gnew].
Amount used	Not applicable
Frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	Not applicable
Other Operational Conditions Affecting Exposure	Assumes a good basic standard of occupational hygiene is implemented [G1].
Contributing Scenarios	Specific Risk Management Measures and Operating Conditions
Bulk transfers [CS14]. ; Batch process [CS55]. With sample collection [CS56]. ; Filling / preparation of equipment from drums or containers. [CS45].	Ensure material transfers are under containment or extract ventilation [E66]. {Clear transfer lines prior to de-coupling [E39]}. ; {Transfer via enclosed lines [E52]}. {Ensure operation is undertaken outdoors [E69]}.
Drum/batch transfers [CS8]. ; Filling / preparation of equipment from drums or containers. [CS45]. Bulk transfers [CS14]. ; Dedicated facility [CS81]	Ensure material transfers are under containment or extract ventilation [E66]. {Use drum pumps [E53]}. {Avoid spillage when withdrawing pump [C&H16]}.
Dipping, immersion and pouring [CS4]. refuelling [CS507]	Avoid carrying out activities involving exposure for more than 4 hours [OC28]or: Ensure material transfers are under containment or extract ventilation [E66]. {Avoid spillage when withdrawing pump [C&H16]}.
General exposures (closed systems) [CS15]. ; Equipment cleaning and maintenance [CS39]. ; With sample collection [CS56].	No specific measures identified [EI18].
General exposures (closed systems) [CS15]. ; Use in contained batch processes [CS37]. ; With sample collection [CS56].	No specific measures identified [EI18].
Drum and small package filling	Fill containers/cans at dedicated fill points supplied with local extract ventilation

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[CS6]. Dedicated facility [CS81]	[E51]or: Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]{Ensure material transfers are under containment or extract ventilation [E66]}.
General exposures (open systems) [CS16]. ; (closed systems) [CS107]; Refueling [CS507].	No specific measures identified [E118].
Equipment cleaning and maintenance [CS39]. Non-dedicated facility [CS82]e.g fuel pump repair indoor	Drain down system prior to equipment break-in or maintenance [E65].{Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings (professional use) [E60]}.
Equipment cleaning and maintenance [CS39]. Non-dedicated facility [CS82]e.g fuel pump repair outdoor	Drain down system prior to equipment break-in or maintenance [E65].{Ensure operation is undertaken outdoors [E69]}.
Storage [CS67]; General exposures (closed systems) [CS15].	No specific measures identified [E118].
<b>Section 2.2 Control of environmental exposure</b>	
<b>Product characteristics</b>	
Substance is a unique structure [PrC1]. Predominantly hydrophobic [PrC4a]. Readily biodegradable [PrC5a].	
<b>Operational condition</b>	
Outdoor use [OOC1].	
<b>Amount used</b>	
Average daily use over a year for wide dispersive use (kg/d):	0.68
<b>Frequency and duration of use</b>	
Dispersive use [FD3].	
Emission days (days/year)	365
<b>Other given operational conditions affecting environmental exposure</b>	
Use in open systems.	
Release fraction to air from wide dispersive use (regional only):	1.00E-02
Release fraction to wastewater from wide dispersive use:	1.00E-05
Release fraction to surface water from wide dispersive use (regional only):	1.00E-04
Release fraction to soil from wide dispersive use (regional only):	1.00E-05
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used [TCS 1].	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Air:	No air emission controls required; required removal efficiency is 0% [TCR5].
Wastewater:	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >95% [TCR9].
Soil:	No soil emission controls required; required removal efficiency is 0% [TCR7].
<b>Organisation measures to prevent/limit release from site</b>	
Prevent discharge of undissolved substance to or recover from wastewater [OMS1].	
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Assumed industrial sewage treatment plant effluent flow is 2000 m3/d.	
<b>Conditions and measures related to external treatment of waste for disposal</b>	
Not applicable	
<b>Conditions and measures related to external recovery of waste</b>	
Not applicable	
<b>Other environmental control measures additional to above</b>	
None	

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### 3. Use as a fuel – Consumer

Section 1 Exposure Scenario	
<b>Title</b>	
Use as a fuel	
<b>Use Descriptor</b>	
Sector(s) of Use	Consumer (SU21)
Product Categories	13
Environmental Release Categories	8d
Specific Environmental Release Category	ESVOC30 SpERC
<b>Processes, tasks, activities covered</b>	
Use of fuel for refuelling 2-stroke and 4-stroke engines	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
<b>Product characteristics</b>	
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa [OC4].
Vapour pressure	91 hPa at 25 °C
Concentration of substance in product	Covers percentage substance in the product up to 15% [Gnew].
Amount used	Up to 60 litres per refuelling
Frequency and duration of use/exposure	Up to 3 times a week
Other Operational Conditions Affecting Exposure	Unless otherwise stated assumes use at ambient temperatures [ConsOC15]
<b>Contributing Scenarios</b>	<b>Specific Risk Management Measures and Operating Conditions</b>
PC13: Fuel	OC Unless otherwise stated, covers concentrations up to 15% [ConsOC1]; covers use up to 150 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers exposure up to 15 min/event[ConsOC14];
	RMM No specific RMMs identified beyond those OCs stated
Section 2.2 Control of environmental exposure	
<b>Product characteristics</b>	
Substance is a unique structure [PrC1]. Predominantly hydrophobic [PrC4a]. Readily biodegradable [PrC5a].	
<b>Operational condition</b>	
Indoor/Outdoor use [OOC3].	
<b>Amount used</b>	
Average daily use over a year for wide dispersive use (kg/d):	0.68
<b>Frequency and duration of use</b>	
Dispersive use [FD3].	
Emission days (days/year)	365
<b>Other given operational conditions affecting environmental exposure</b>	
Use in open systems.	
Release fraction to air from wide dispersive use (regional only):	1.00E-02
Release fraction to wastewater from wide dispersive use:	1.00E-05
Release fraction to surface water from wide dispersive use (regional only):	1.00E-04
Release fraction to soil from wide dispersive use (regional only):	1.00E-05
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used [TCS 1].	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Air:	No air emission controls required; required removal efficiency is 0% [TCR5].

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Wastewater:	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >95% [TCR9].
Soil:	No soil emission controls required; required removal efficiency is 0% [TCR7].
<b>Organisation measures to prevent/limit release from site</b>	
Prevent discharge of undissolved substance to or recover from wastewater [OMS1].	
<b>Conditions and measures related to municipal sewage treatment plant</b>	
Assumed industrial sewage treatment plant effluent flow is 2000 m <sup>3</sup> /d.	
<b>Conditions and measures related to external treatment of waste for disposal</b>	
Not applicable	
<b>Conditions and measures related to external recovery of waste</b>	
Not applicable	
<b>Other environmental control measures additional to above</b>	
None	

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### ETHANOL

#### 1. Formulation & (re)packing of substances and mixtures – Industrial Sector

Section 1 Exposure Scenario		
<b>Title</b>		
Formulation & (re)packing of substances and mixtures		
Ethanol REACH Association reference no. ES3		
<b>Use Descriptor</b>		
Sector(s) of Use	3, 10	
Process Categories	3, 5, 8a, 8b, 9, 14	
Environmental Release Categories	2	
<b>Processes, tasks, activities covered</b>		
Covers industrial formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, large and small scale packing, maintenance. Includes formulation of fuels containing ethanol.		
<b>Metodologia di valutazione</b>		Ecetoc TRA integrated model version 2, EUSES v.2.
Section 2 Operational conditions and risk management measures		
Process category: Manufacture or formulation of chemical products or articles using technologies related to mixing and blending of solid or liquid materials, and where the process is in stages and provides the opportunity for significant contact at any stage. Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage. Sampling, loading, filling, transfer, dumping, bagging in nondedicated and dedicated facilities with possible exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment.		
Environmental release category: Manufacture of organic and inorganic substances in chemical, petrochemical, primary metals and minerals industry including intermediates, monomers using continuous processes or batch processes applying dedicated or multi-purpose equipment, either technically controlled or operated by manual interventions		
Number of sites using the substance: Substance widely used.		
Sezione 2.1 Control of worker exposure		
<b>Product characteristic (including package design affecting exposure)</b>	Physical state	Liquid
	Concentration of substance in product	Up to 100%
	Vapour pressure of substance	5.73 kPa
<b>Amounts used</b>	n.a. in tier1 TRA model	
<b>Frequency and duration of use/exposure</b>	Frequency of exposure (weekly)	> 4 Days/week
	Frequency of exposure (annual)	240 Days/year
	Duration of exposure	> 4 Hours/day
<b>Human factors not influenced by risk management</b>	Potentially exposed body parts	Two hands face side only (automated processes/PROC3) Two hands (transfer, filling, etc./PROC8a,b)
	Exposed skin surface	480 cm <sup>2</sup> (automated processes/PROC3) 960 cm <sup>2</sup> (transfer, filling, etc./PROC8a,b)
<b>Other given operational conditions affecting workers exposure</b>	Assumes a good basic standard of occupational hygiene is implemented.	
	Setting (indoor/outdoor)	Indoors
<b>Technical conditions and measures at process level (source) to prevent release</b>	No specific measures identified.	
<b>Technical conditions and measures to control dispersion from source towards the worker</b>	Ensure material transfers are under containment or extract ventilation. Provide good ventilation to points where emissions occur. Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).	

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<b>Organisational measures to prevent /limit releases, dispersion and exposure</b>	No specific measures identified.		
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	PPE: Eye Protection – suitable eye protection should be worn when handling product if there is a risk of splashing. Wear suitable gloves tested to EN374 during the activities where excessive skin contact is possible.		
<b>Sezione 2.2 Control of environmental exposure</b>			
<b>Product characteristics</b>	Physical state	Liquid	
	Concentration of substance in product	Up to 100%	
<b>Amounts used</b>	Daily at point source	n.a.	
	Annually at point source	280,000 t/year (maximum at point source in worst case)	
	Annually total	3,800,000 t/year	
<b>Frequency and duration of use</b>	Pattern of release	Continuous 300 days per year	
<b>Environment factors not influenced by risk management</b>	Flow rate of receiving surface water	18,000m <sup>3</sup> /day (default)	
<b>Other given operational conditions affecting environmental exposure</b>	Processing setting (indoor/outdoor)	Indoor	
	Processing temperature	Ambient	
	Processing pressure	Ambient	
<b>Technical conditions and measures at process level (source) to prevent release</b>	Keep containers tightly closed. Store in a bounded area. Do not discharge into sewers or drains. Waste product and empty containers should be disposed of as hazardous waste in accordance with all local and national regulations. Formulation activity is assumed to be a predominantly enclosed process.		
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	Apply technical measures aiming at reduction and cleaning of waste water (WWTP/local STP (e.g. biological treatment))	Efficacy > 90%	
<b>Organizational measures to prevent/limit release from site</b>	Do not release wastewater directly into environment	Wastewater release into municipal STP.	
<b>Conditions and measures related to municipal sewage treatment plant</b>	Size of STP	> 2,000 m <sup>3</sup> /day	
	Degradation efficacy	90% (for ethanol)	
	Sludge treatment	Disposal or recovery	
<b>Conditions and measures related to treatment of waste</b>	Hazardous waste incineration or dispose for use in recycled fuels		
<b>Exposure estimation</b>			
Workers exposure estimation is calculated with Ecetoc TRA model v2.. Below given exposure estimates are based on the PROC with the highest exposure levels in this scenario (PROC8a).			
<b>Workers exposure</b>	<b>Exposure estimate</b>	<b>DNEL</b>	<b>Comment</b>
Inhalation (mg/m <sup>3</sup> )	96.04	950	PROC 8a results in the highest exposure in this exposure scenario
Dermal (mg/Kg/day)	13.71	343	
Combined (mg/Kg/day)	27.43	343	
Environmental exposure estimation is based on Ecetoc TRA model v2 including the data from TGD A&B tables (MC-1b, IC-9, UC-27, fraction main source 0,1) and based on the worst-case scenario. Ethanol is fully soluble in water, readily biodegradable, not bio-accumulative, does not accumulate in the sediments or soil and is assumed to degrade by 90% in the local and/or municipal STP under evaluated conditions.			
<b>Release times per year (day/year)</b>	300	Local release to air (kg/day)	469
<b>Fraction used at main local source</b>	0.1	Local release to waste water (kg/day)	28
<b>Amount used locally</b>	93.333	Local release to soil	9



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(kg/day)		(kg/day)	
<b>Environmental exposure</b>	PEC	PNEC	<b>Comment</b>
<b>In STP / untreated wastewater(mg/l)</b>	1.73	580	-
<b>In local freshwater (mg/l)</b>	0.185	0.96	-
<b>In local soil</b>	0.0117 (mg/kg)	0.63 (mg/ kgwwt)	-
<b>In local marine water (mg/l)</b>	0.0186	0.79	-
<b>Total daily intake via local environment (mg/kgdw/d)</b>	Negligible compared to daily dietary intake and endogenous formation.		
<b>Guidance to DU to evaluate whether he works inside the boundaries set by the ES</b>			
<p>The workers exposure and environmental emissions have been evaluated using Ecetoc TRA integrated tool version 2. If the local environmental emission conditions deviate significantly from the used default values, please use the algorithm below to estimate the correct local emissions and RCRs:  <math>PEC_{corrected} = PEC_{calculated} * (\text{local emission fraction}) * (\text{local WWTP flow rate fraction}) * (\text{local river flow rate fraction}) * (\text{local STP efficiency fraction})</math>  <u>Example for calculating your local freshwater PEC:</u>  <math>Corrected \text{ local freshwater PEC} = 0.185 * (\text{your local emission [kg/day]} / 28) * (2,000 / \text{your local WWTP flow rate [m}^3\text{/day]}) * (18,000 / \text{your local river flow rate [m}^3\text{/day]}) * ((1 - \text{your local WWTP efficiency})/0.1)</math></p>			
<b>Additional good practice advice beyond the REACH CSA</b>		Use specific measures expected to reduce the predicted exposure beyond the level estimated based on the exposure scenario when possible.	
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH			