

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

### 1.1. Product identifier

REACH – type	: Substance
Trade name	: ETBE
Chemical name	: 2-ethoxy-2-methylpropane
IUPAC name	: ethyl tert-butyl ether
EU index number	: N/A
EC number	: 211-309-7
CAS number	: 637-92-3
REACH - registration number	: 01-2119452785-29-0023
Product code	: ETBE
Formula	: C <sub>6</sub> H <sub>14</sub> O
Product group	: Raw material

### 1.2. Relevant identified uses and uses advised against

#### 1.2.1. Relevant identified uses

Main category	: Industrial use, Professional use, Consumer use
Use of the substance/mixture	: Fuels / Fuel additives
Function or category	: Additives for fuels

Title	Use descriptors
(1) Manufacture of ETBE	SU3, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15, ERC1
(2) Formulation and (re)packing of ETBE and mixtures	SU3, PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15, ERC2
(3) Distribution of ETBE	SU3, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15, ERC1, ERC2, ESVOG SPERC 1.1b.v1
(4) Use of ETBE in fuels – Industrial	SU3, PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16, ESVOG SPERC 7.12a.v1
(5) Use of ETBE in fuels – Professional	SU22, PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC9, PROC16, ESVOG SPERC 9.12c.v1
(6) Use in fuels - Consumers	SU21, PC13, ERC8d, ESVOG SPERC 9.12c.v1

Full text of the use descriptors: see paragraph 16.

#### 1.2.2. Uses advised against

The relevant uses are listed above. Other uses are not recommended unless an evaluation has been carried out, prior to this kind of use, that demonstrates that this use will be controlled.

### 1.3. Identification of the supplier of the safety data sheet

Company name:	Ecofuel
Address:	Via Maritano, 26
City/Country:	San Donato Milanese, MI, IT
Telephone:	+39 02 520 56147
e-mail of Service Technician:	<a href="mailto:Reach@ecofuel.eni.com">Reach@ecofuel.eni.com</a>

#### 1.4. Emergency telephone number

Emergency telephone number : National Centre for Toxicological Information +39 0382 24444 (24h) (IT + EN)

## SECTION 2: Hazards identification

### 2.1. Classification of substance/mixture

#### Classification according to the regulation (EC) no. 1272/2008 [EU-GHS / CLP]

STOT SE 3 H336

Flam. Liq. 2 H225

Full text of the classification categories and hazard statements: see paragraph 16

#### Adverse physicochemical, human health and environmental effects

High concentrations of vapours may cause: migraines, nausea and dizziness. The vapours may form flammable and explosive mixtures with air. For specific information on the toxicological properties and classification of the product, see point 11 and/or point 12 of the sheet.

### 2.2. Label elements

#### Labelling according to Regulation (EC) no. 1272/2008 [CLP]

Hazard pictograms (CLP)



GHS02

GHS07

Signal word (CLP)

: Hazard

Hazard Statements (CLP)

: H225 - Highly flammable liquid and vapours  
H336 - May cause drowsiness or dizziness

Precautionary Statements (CLP)

: P101 - If medical advice is needed, have product container or label at hand.  
P102 - Keep out of reach of children.  
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.  
P243 - Take precautionary measures against static discharge.  
P261 - Avoid breathing dust/fumes/gas/mist/vapours/spray.  
P271 - Use only outdoors or in a well-ventilated area.  
P304+P340 - IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.  
P403+P233 - Store in a well-ventilated place. Keep container tightly closed.  
P501 - Dispose of contents/container in accordance with Legislative Decree 152/2006 and subsequent amendments

Child-proof fastening

: No

Tactile danger signal word

: No

#### Other:

General indications

: (Not applicable - Classified as hazardous according to (EC) no. 1272/2008)

### 2.3. Other hazards (not relevant for classification)

Physical / chemical

: The product has a low vapour pressure which, at ambient temperature, is not sufficient to form a significant concentration of vapours. At extreme heat, or in the case of spray or mist, exposure may cause irritation to the airways, nausea, illness and dizziness.

Health

: Any material, in the event of accidents involving pressurised pipes and similar, could be accidentally injected under the skin, sometimes without any apparent surface wounds. In this case the victim must be taken to hospital for suitable treatment as quickly as possible.

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Environment : None.

Pollutants : None.

(air pollutants or other substances)

Other hazards that do not contribute to the classification : None.

This substance/mixture does not meet the PBT criteria of annex XIII of the REACH regulation.

This substance/mixture does not meet the vPvB criteria of annex XIII of the REACH regulation.

### SECTION 3: Composition/information on ingredients

#### 3.1. Substance

Composition - General indications : Mono-component  
Organic

Hazardous substances and/or substances with occupational exposure limits : See table

Type of substance : Mono-constituent

Chemical name : 2-ethoxy-2-methylpropane

CAS number : 637-92-3

EC number : 211-309-7

EU index number : N/A

Name	Product identifier	%	Classification according to Regulation (EC) no. 1272/2008 [EU-GHS / CLP]
Ethanol	(CAS number) 64-17-5 (EC number) 200-578-6 (EU index number) 603-002-00-5	< 0.5	Flam. Liq. 2, H225 Eye Irrit. 2, H319
Ethyl tert-butyl ether	(CAS number) 1634-04-4 (EC number) 216-653-1 (EU index number) 603-181-00-x	< 2.5	Flam. Liq. 2, H225 Skin Irrit. 2, H315
Tert-Butanol	(CAS Number) 75-65-0 (EC Number) 200-889-7 (EU index number) 603-005-00-1	< 1.0	Flam. Liq. 2, H225 Acute Tox. 4, H332

Full text of the H phrases: see section 16

#### 3.2. Mixture

Not applicable

### SECTION 4: First aid measures

#### 4.1. Description of first aid measures

First aid measures after inhalation : If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Keep the victim in the recovery position. If necessary, perform an external cardiac massage and consult a doctor.

First aid measures after skin contact : Wash with plenty of soap and water. Remove contaminated clothes and shoes and dispose of them safely. Consult a doctor immediately in the event of irritation, swelling or redness that develops and persists.

First aid measures after contact with eyes : Rinse gently with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If irritation, blurred vision or persistent swelling occurs, consult a specialist.

First aid measures after ingestion : Do not introduce anything into the mouth of a person in an unconscious state. Do not induce vomiting to avoid aspiration into the lungs. If the victim is conscious, rinse the mouth with water without swallowing. Keep at rest. Seek medical advice or take to hospital. If the person is unconscious, keep in the recovery position. Do not wait for symptoms to appear.

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

Symptoms/injuries in case of inhalation : May cause drowsiness or dizziness. Irritation of the upper respiratory tract.

Symptoms/injuries after skin contact : Causes skin irritation

Symptoms/injuries after contact with the eyes : Slight irritation of the eyes.

#### 4.3. Indication of the necessity to consult a doctor immediately and provide special treatments

None in normal conditions.

### SECTION 5: Fire-fighting measures

#### 5.1. Extinguishing media

Appropriate extinguishing medium : Small fires: carbon dioxide, dry chemical powders, alcohol-resistant foam, earth or sand. Large fires: alcohol-resistant foam or water spray. These media must be used only by properly trained personnel.

Inappropriate extinguishing agent : Do not aim water jets directly on the burning product. These may cause spraying and the fire to spread. Avoid the simultaneous use of foam and water on the same surface because water destroys foam.

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

Fire hazard : Vapours are heavier than air and can accumulate in closed environments and depressions, propagate at ground level, and pose a risk of fire and explosion even from a distance.

Combustion products : Incomplete combustion could generate a complex mixture of solid and liquid particles dispersed in the air and gases, including carbon monoxide and NOx (noxious/toxic gases). Unidentified organic and inorganic compounds.

#### 5.3. Advice for fire-fighters

Fire-extinguishing instructions : Use jets of water to cool surfaces and containers exposed to flames or heat.

Special equipment for fire-fighters: : In case of fire or fires in confined or poorly-ventilated spaces, wear flameproof clothing and an autonomous respirator with a full mask that works under positive pressure.

Further information (fire-fighting) : In case of fire, never disperse the waste water, residual product and other contaminated materials, but collect these separately and handle them accordingly.

### SECTION 6: Accidental release measures

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

##### 6.1.1. For non-emergency personnel

Means of protection : Keep unauthorised personnel away from the area of the release. Alert the emergency teams.

Emergency procedures : Alert the emergency teams.

##### 6.1.2. For emergency personnel

Means of protection : Large spills: all-body protective clothing resistant to chemical agents and made from antistatic material. Work gloves (preferably half-arm) that provide suitable resistance to chemical agents. Gloves made from PVA (polyvinyl alcohol) are not waterproof and are unsuitable for emergency use. Non-slip safety shoes or boots resistant to chemical agents. Protective glasses and/or protective devices to cover the face if splashing or eye contact is possible or likely. Respiratory protection: 20. A half or full mask equipped with a filter(s) for organic vapours (AX) or an autonomous respirator may be used based on the entity of the spill and foreseeable level of exposure. In the event that the situation cannot be fully assessed or if there is a risk of a lack of oxygen, use an autonomous respirator exclusively.

#### 6.2. Environmental precautions

Prevent the substance from entering the sewage system, rivers or other bodies of water. Remove spills immediately. Risk of contamination of potable water (groundwater).

#### 6.3. Methods and materials for containment and site clean up

Methods for containment : If necessary, stem the product using dry earth, sand or other non-flammable material. Large spills can be covered, with care, with foam, if available, in order to prevent the risk of fire. Do not use direct jets. Inside buildings or confined spaces, ensure appropriate ventilation is available.

Methods for cleaning : If necessary, store the contaminated material for later safe disposal, use suitable containers only (watertight, sealed, impermeable, earthed).

Other information (accidental spillage) : The recommended measures are based on the most likely spill scenarios for this product. Local conditions (wind, air or water temperature, direction and speed of waves and currents) can, however, significantly influence the choice of action to be implemented. Consult local experts where necessary. Local legislation may set out or limit the actions to be implemented.

#### 6.4. Reference to other sections

See Section 8. For further information, see section 13.

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

Precautions for safe handling : Risk of explosive mixture of vapours and air. Make sure that all requirements concerning explosive atmospheres and structures that store and handle flammable products are correctly observed. Adopt precautionary measures against static discharges. Ensure that the container, tanks and storage and transfer equipment are earthed. Use only non-sparking tools. The vapour is heavier than air. Take particular care over accumulation in wells and confined spaces. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only loading from below for cisterns, in compliance with the relevant European legislation. Do not use compressed air during filling, draining or handling operations. Avoid contact with skin, eyes and clothing. Do not ingest. Do not breathe vapours.

Hygiene measures : Do not breathe fumes/mists/vapours. Avoid contact with skin. Do not eat, drink or smoke when using this product. Carefully wash hands after handling. Do not reuse contaminated garments.

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

Technical measures : The structure of the storage area, the specifications of the tanks, the equipment and the operating procedures must comply with applicable European, national or local legislation. Storage plants/areas must be equipped with dedicated systems to prevent soil and water contamination in the event of leaks or spills. Activities involving the cleaning, inspection and internal maintenance of storage tanks must be carried out by qualified and suitably equipped personnel, as set out by national or local legislation or company rules. Before accessing the storage tanks and beginning any type of operation in a confined space (e.g. tunnels), carry out a clean up, check the atmosphere and check the oxygen content and degree of flammability.

Conditions for storage : If the product is supplied in containers: 20. Keep it in the original containers only or in containers suitable for the type of product. Store in a well-ventilated place. Keep the containers properly sealed and labelled.

Incompatible products : Keep away from: strong oxidants.

Packaging and containers: : Empty containers may contain flammable product residues. Do not weld, braze, drill, cut or incinerate empty containers unless they have been suitably cleaned.

### 7.3. Specific end uses

For further information on personal protective equipment and operating conditions, refer to the section "Exposure scenarios".

## SECTION 8: Exposure control/personal protection

### 8.1. Control parameters

2-ethoxy-2-methylpropane (637-92-3)		
USA - ACGIH	ACGIH TLV® -TWA (ppm)	25 ppm
USA - ACGIH	Commento (ACGIH)	ACGIH 2015
Ethanol (64-17-5)		
Austria	MAK (ppm)	1000 ppm
Austria	MAK Short-term (ppm)	2000 ppm
Belgium	Limit value (ppm)	1000 ppm
Denmark	Grænseværdi (langvarig) (ppm)	1000 ppm
Denmark	Grænseværdi (kortvarig) (ppm)	2000 ppm
France	VME (ppm)	5000 ppm
France	VLE (ppm)	1000 ppm
Germany	TRGS 900 Professional exposure limits (ppm)	500 ppm
Germany	TRGS 900 Extreme limit (ppm)	1000 ppm
Hungary	CK-érték	1900 mg/m <sup>3</sup>
Hungary	MK-érték	7600 mg/m <sup>3</sup>
Holland	MAC TGG 8h (mg/m <sup>3</sup> )	260 mg/m <sup>3</sup>

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Poland	NDSch (mg/m <sup>3</sup> )	1900 mg/m <sup>3</sup>
Spain	VLA-ED (ppm)	1000 ppm
Sweden	Nivågränsvärde (NVG) (ppm)	500 ppm
Sweden	Kortidsvärde (KTV) (ppm)	1000 ppm
United Kingdom	WEL TWA (ppm)	1000 ppm
Switzerland	VME (ppm)	500 ppm
Switzerland	VLE (ppm)	1000 ppm
Canada (Quebec)	VECD (ppm)	1000 ppm
USA - ACGIH	ACGIH TLV® -STEL (ppm)	1000 ppm

**2-ethoxy-2-methylpropane (637-92-3)**

## DNEL / DMEL (Workers)

Acute - systemic effects, inhalation	2800 mg/m <sup>3</sup>
Long-term - systemic effects, skin	6767 mg/kg of body weight/day
Long-term - systemic effects, inhalation	352 mg/m <sup>3</sup>
Long-term - local effects, inhalation	105 mg/m <sup>3</sup>

## DNEL / DMEL (general public)

Acute - systemic effects, inhalation	1680 mg/m <sup>3</sup>
Long-term - systemic effects, oral	12.5 mg/kg of body weight/day
Long-term - systemic effects, inhalation	105 mg/m <sup>3</sup>
Long-term - systemic effects, skin	4060 mg/kg of body weight/day
Long-term - local effects, inhalation	63 mg/m <sup>3</sup>

## PNEC (Water)

PNEC water (freshwater)	510 µg/l
PNEC water (sea water)	17 mg/l

## PNEC (sediments)

Sediments (freshwater)	2.86 mg/kg dwt
Sediment (sea water)	0.078 mg/kg dwt

## PNEC (Soil)

PNEC Soil	274 µg/kg
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## PNEC (STP)

Purification system	12.5 mg/l
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Control methods (monitoring) : Refer to Legislative Decree 81/2008 and good industrial hygiene practices.

**8.2. Exposure controls**

Technical control measures : Minimise exposure to mists/vapours/aerosols. Before accessing the storage tanks and beginning any type of operation in a confined space (e.g. tunnels), carry out a clean up, check the atmosphere and check the oxygen content and degree of flammability.

Personal protective equipment (for industrial or professional use) : At high conc. of vapour/gas: gas mask with Type AX filter. Goggles. EN 166. Gloves. Safety shoes. Protective clothing. Face shield.



Protective clothing - type of material : Personnel must wear anti-static clothing made of heat resistant natural or synthetic fibres

Hand protection : Wear: gloves. Use the gloves in accordance with the conditions and limits set out by the manufacturer. Replace the gloves immediately when cut or perforated or show other signs of deterioration. If required, refer to the standard UNI EN 374.

Type	Material	Permeation	Thickness	Penetration	Standard
Disposable gloves	Neoprene rubber (HNBR), Polyvinyl alcohol (PVA)	6 (> 480 Minutes)	N/A	N/A	EN 374

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Eye protection	: Goggles or face mask
Skin and body protection	: Long-sleeved anti-static work clothes, heat resistant if required. Refer to the standards UNI EN 340 and the other applicable UNI-EN-ISO standards for the characteristics and performance in relation to the risks of the work area. Anti-static and non-slip safety shoes or boots, resistant to chemical agents.
Respiratory protection	: In confined spaces (e.g. in tanks): the use of respiratory protection (half masks, masks, respiratory devices) must be assessed in relation to the work activity and envisaged duration and intensity of exposure. For specifications refer to MD 02/05/2001. If it is not possible to determine or safely estimate exposure levels or if there is a risk of a lack of oxygen, use an autonomous respirator exclusively
Thermal protection	: None in normal conditions.
Environmental exposure controls	: On-site treatment of waste water is required. Do not dispose of in the environment. Storage plants/areas must be equipped with dedicated systems to prevent soil and water contamination in the event of leaks or spills. Prevent the release of undissolved substances or recover them from the waste water. Do not distribute the mud generated during the treatment of industrial waste over natural terrain. The sludge generated by treatment of industrial waters must be incinerated, contained or treated.
Limitation and control of the exposure of consumers.	: Ensure adequate ventilation.
Further information	: Do not eat, drink or smoke when using this product. This safety data sheet complies with the specific conditions justifying registration of the substance according to articles 17 or 18 of the REACH regulation.

### 8.3. Hygiene measures

General protective and hygiene measures at the workplace	: Do not eat, drink or smoke with dirty hands. Do not reuse contaminated garments. Avoid breathing vapours or mists.
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## SECTION 9: Physical and chemical properties

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

Physical state	: Liquid
Appearance	: Clear liquid.
Molecular mass	: 102.18 g/mol
Colour	: Colourless.
Odour	: characteristic.
Odour Threshold	: No data available.
pH	: No data available.
Evaporation rate rel. To butyl acetate	: No data available.
Melting point	: No data available.
Freezing point	: -94 °C
Boiling point	: 73.1 °C
Flash point	: -19 °C
Auto-ignition temperature	: 392 °C
Decomposition temperature	: No data available.
Flammability (solids, gas)	: No data available.
Vapour pressure	: 17.3 hPa at 25°C
Relative vapour density at 20 °C	: No data available.
Relative density	: 0.75
Solubility	: Water: 16400 mg/l at 20°C
Log Pow	: 1.48 at 20°C
Kinematic viscosity	: 0.53 mm <sup>2</sup> /s at 20°C
Dynamic viscosity	: No data available.
Explosive properties	: None.

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Oxidising properties	: None.
Flammability/explosive limits	: 1.23 - 7.7 vol % ≈ 52 g/m <sup>3</sup>

**9.2. Further information**

Further indications	: No data available.
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*The data above (9.1 - 9.2) represent typical values and are purely indicative.*

**SECTION 10: Stability and reactivity****10.1. Reactivity**

This substance does not present further hazards connected with reactivity with respect to those given below.

**10.2. Chemical stability**

Product stable in relation to its intrinsic properties. May constitute a flammable/explosive vapour-air mixture. Risk of explosion if heated under confinement.

**10.3. Possibility of hazardous reactions**

Contact with strong oxidants (such as peroxides and chromates) may generate a fire hazard. Reacts with (certain) acids: (increased) risk of fire. A mixture with nitrates or other strong oxidants (such as chlorates, perchlorates and liquid oxygen) may generate an explosive mass. Sensitivity to heat, friction and shock cannot be assessed in advance.

**10.4. Conditions to be avoided**

Take precautionary measures against static discharges. Keep away from strong oxidants. Keep away from flames, hot surfaces and sources of ignition.

**10.5. Incompatible materials**

Oxidising agents. Strong acids.

**10.6. Hazardous decomposition products**

None.

**SECTION 11: Toxicological information****11.1. Information on toxicological effects**

Acute toxicity	: Not classified (Data conclusive, not sufficient for classification)
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**2-ethoxy-2-methylpropane (637-92-3)**

DL50 oral rat	2003 mg/kg (OECD 401)
DL50 skin rat	2000 mg/kg (OECD 402)
CL50 inhalation rat (mg/l)	5.88 mg/l/4h (OECD 403)

**Ethanol (64-17-5)**

DL50 oral rat	10470 mg/kg of body weight OECD Guideline 401
DL50 skin rabbit	> 15800 mg/kg of body weight
CL50 inhalation rat (mg/l)	51 mg/l 6 hours - OECD Guideline 403

Skin corrosion/irritation	: Not classified (Data conclusive, not sufficient for classification)
Serious eye damage/serious eye irritation	: Not classified (Data conclusive, not sufficient for classification)
Respiratory or skin sensitisation	: Not classified (Data conclusive, not sufficient for classification)
Germ cell mutagenicity	: Not classified (Data conclusive, not sufficient for classification)
Carcinogenicity	: Not classified (Data conclusive, not sufficient for classification)
Reproductive toxicity	: Not classified (Data conclusive, not sufficient for classification)
Specific Target Organ Toxicity (single exposure)	: May cause drowsiness or dizziness. The product is highly volatile, even at ambient temperature. Exposure to high concentrations of vapours, particularly in closed or insufficiently ventilated environments, may cause irritation of the respiratory tract, nausea, illness and dizziness, and the loss of consciousness.

**2-ethoxy-2-methylpropane (637-92-3)**

NOAEL (taken orally, rat)	100 - 400 mg/kg of body weight
NOAEC (inhalation, rat, vapour)	500 - 5000 ppmv

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Specific Target Organ Toxicity (repeated exposure) : Not classified (Data conclusive, not sufficient for classification)

<b>2-ethoxy-2-methylpropane (637-92-3)</b>	
NOAEL (taken orally, rat, 90 days)	209 mg/kg of body weight/day
NOAEC (inhalation, rat, vapour, 90 days)	500 mg/m <sup>3</sup> EPA OTS 798.2450

<b>Ethanol (64-17-5)</b>	
NOAEL (subchronic, taken orally, animal/male, 90 days)	3250 mg/kg of body weight

Aspiration hazard : Not classified (Data conclusive, not sufficient for classification)

<b>2-ethoxy-2-methylpropane (637-92-3)</b>	
Kinematic viscosity	0.53 mm <sup>2</sup> /s at 20°C

Potentially dangerous effects on human health and potential symptoms : High concentrations of vapours may cause: migraines, nausea and dizziness.

Further information : Likely exposure routes: inhalation, skin and eyes.

**SECTION 12: Ecological information****12.1. Toxicity**

Ecology - general : Not harmful to aquatic organisms. Use in accordance with good working practices, avoiding release of the product into the environment.

<b>2-ethoxy-2-methylpropane (637-92-3)</b>	
CL50 fish 1	< 974.1 mg/l <i>Poecilia reticulata</i> (96 hours) - OECD 203
CL50 fish 2	574 mg/l <i>Menidia beryllina</i> (96 hours) - OECD 203
CL50 other aquatic organisms 1	37 mg/l <i>Americamysis bahia</i> (96 hours) - EPA OTS 797.1930
CE50 Daphnia 1	110 mg/l (48 hours) - OECD 202
CE50 other aquatic organisms 1	1100 mg/l <i>Pseudokirchneriella subcapitata</i> (72 hours) - OECD 201
CE50 other aquatic organisms 2	25 mg/l <i>Pseudomonas putida</i> - EC10 (16 hours)
LOEC (chronic)	100 mg/l <i>Daphnia Magna</i> (21 days) - EPA OPPTS 850.1300
NOEC (chronic)	3.39 mg/l <i>Americamysis bahia</i> - EPA OPPTS 850.1350

<b>ethanol, ethyl alcohol (64-17-5)</b>	
CL50 fish 1	14.2 mg/l (96 hours - US EPA E03-05 - <i>Pimephales promelas</i> - 1984)
CL50 other aquatic organisms 1	0.1 - 1 mg/l (48 hours - <i>Eisenia fetida</i> )
CE50 Daphnia 1	5012 mg/l (48 hours - LC50 - ASTM E729-80)
CE50 other aquatic organisms 1	5.8 g/l 4 hours
CL50 fish 2	11200 mg/l (24 hours - US EPA E03-05 - <i>Oncorhynchus mykiss</i> )
ErC50 (algae)	22.6 mg/l (10d)
Chronic NOEC for fish	250 mg/l 5 days
Chronic NOEC for crustaceans	9.6 mg/l
Chronic NOEC for algae	280 mg/l

**12.2. Persistence and degradability**

<b>2-ethoxy-2-methylpropane (637-92-3)</b>	
Persistence and degradability	Readily biodegradable.
Biochemical oxygen demand (BOD)	6.6 g O <sub>2</sub> /g substance OECD Guideline 301 D (Rapidly biodegradable: closed cup test)
Biodegradation	6 % OECD Guideline 301 D

<b>ethanol, ethyl alcohol (64-17-5)</b>	
Persistence and degradability	Readily biodegradable.
Biochemical oxygen demand (BOD)	1067 - 1236 g O <sub>2</sub> /g substance
Chemical oxygen demand (COD)	1.99 g O <sub>2</sub> /g substance

**12.3. Bioaccumulation potential**

<b>2-ethoxy-2-methylpropane (637-92-3)</b>	
Log Pow	1.48 at 20°C

<b>ethanol, ethyl alcohol (64-17-5)</b>	
Bioconcentration factor (FCB REACH)	3.2
Log Pow	-0.35

**12.4. Mobility in soil****2-ethoxy-2-methylpropane (637-92-3)**

Log Koc	1.3 (calculated value)
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**ethanol, ethyl alcohol (64-17-5)**

Log Koc	< 3
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**12.5. Results of PBT and vPvB assessment****2-ethoxy-2-methylpropane (637-92-3)**

This substance/mixture does not meet the PBT criteria of annex XIII of the REACH regulation.

This substance/mixture does not meet the vPvB criteria of annex XIII of the REACH regulation.

**Component**

ethanol, ethyl alcohol (64-17-5)	This substance/mixture does not meet the PBT criteria of annex XIII of the REACH regulation. This substance/mixture does not meet the vPvB criteria of annex XIII of the REACH regulation.
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**12.6. Other adverse effects**






No further information available

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

- |   |  |
|---|--|
| Local legislation (waste)                 | : Disposal in accordance with the legal provisions in force/Dispose according to Legislative Decree 152/06 and subsequent amendments   |
| Waste treatment procedure                 | : Do not dump the product, either new or used, on soil or in sewage systems, wells or water courses. Collect and dispose of through authorised collectors (Legislative Decree 152/2006 and related legislation).   |
| Recommendations on disposal in the drains | : Not applicable because no direct release into drains is recorded.  |
| Recommendations on disposal               | : 13 07 03* ("other fuels (including mixtures)"). The CER code given is only a general indication, based on the original composition of the product and its envisaged use. The user is responsible for choosing the most suitable CER code based on the effective use of the product, any alterations or contaminations. |
| Further indications                       | : Dispose of empty containers that have not been cleaned in conditions of safety, in accordance with Legislative Decree 152/2006 and subsequent amendments.  |
| Ecology - waste                           | : Do not dispose of in the environment.  |

**SECTION 14: Transport information**

Pursuant to the requirements of ADR / RID / ADNR / IMDG / ICAO / IATA

ADR	IMDG	IATA	ADN	RID
<b>14.1. UN number</b>				
1179	1179	1179	1179	1179
<b>14.2. UN shipment name</b>				
ETHYL-BUTYL ETHER	ETHYL-BUTYL ETHER	Ethyl-butyl ether	ETHYL-BUTYL ETHER	ETHYL-BUTYL ETHER
<b>Description of the transport document</b>				
UN 1179 ETHYL-BUTYL ETHER, 3, II, (D/E)	UN 1179 ETHYL-BUTYL ETHER, 3, II			
<b>14.3. Transport hazard classes</b>				
3	3	3	3	3
				
<b>14.4. Packing group</b>				
II	II	II	II	II
<b>14.5. Environmental hazards</b>				
Environmentally hazardous: No	Environmentally hazardous: No Marine pollution: No	Environmentally hazardous: No	Environmentally hazardous: No	Environmentally hazardous: No
Further information (transport): None.				

**14.6. Special precautions for users****- Land transport**

Regulation for transport (ADR)	: Subject to requirements
Classification code (UN)	: F1
Limited quantities (ADR)	: 1L
Excepted quantities (ADR)	: E2
Transport category (ADR)	: 2
Hazard number (Kemler code)	: 33
Orange panel	:



Tunnel restriction code (ADR)	: D/E
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**- Maritime transport**

Regulation for transport (IMDG)	: Subject to requirements
Limited quantities (IMDG)	: 1 L
Excepted quantities (IMDG)	: E2
Packing instructions (IMDG)	: P001
EmS-No. (Fire class)	: F-E
EmS-No. (Spillage)	: S-D
Stowage category (IMDG)	: B

**- Air transport**

Regulation for transport (ICAO)	: Subject to requirements
Excepted quantities for passenger and cargo planes (IATA)	: E2
Max net quantities of limited quantities for passenger and cargo planes (IATA)	: 1L

**- Transport by inland waterways**

Regulation for transport (ADN)	: Subject to requirements
Classification code (ADN)	: F1
Limited quantities (ADN)	: 1 L
Excepted quantities (ADN)	: E2

**- Transport by rail**

Regulation for transport (RID)	: Subject to requirements
Classification code (RID)	: F1
Limited quantities (RID)	: 1L
Excepted quantities (RID)	: E2
Packing instructions (RID)	: P001, IBC02, R001
Transport category (RID)	: 2
Hazard number (RID)	: 33

**14.7. Transport of bulk material in accordance with annex II of MARPOL 73/78 and the IBC code**

IBC code	: Applicable.
Type of vessel	: Type 3
Pollutant category	: Y

**SECTION 15: Regulatory information****15.1. Standards and legislation on health, safety and environment specific to the substance or mixture****15.1.1. EU regulations**

No restrictions pursuant to annex XVII of the REACH regulation  
2-etoxy-2-methylpropane is not in the REACH Candidate List  
None of the ingredients are in the REACH Candidate List (> 0.1 % m/m).

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2-etoxy-2-methylpropane is not in Annex XIV of the REACH List

Does not contain substances listed in Annex XIV of the REACH List

Applicable legislation of the European Union : Regulation (EC) No. 1272/2008 of the European Parliament and of the Council of 16 December 2008 concerning the classification, labelling and packaging of substances and mixtures amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 (et sequens). Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (et sequens).

**15.1.2. Domestic standards****Germany**

Reference to Annex VwVwS : Water hazard class 1 (WGK) (D), low hazard to waters (Classification according to VwVwS, annex 3; No WGK 7257)

12th Order implementing the federal law on Emissions - 12.BImSchV : Not subject to the 12th BImSchV (decree on protection against emissions) (Regulation on major accidents)

**Denmark**

Notes on classification : The guidelines on managing emergencies relating to the storage of flammable liquids must be observed

Recommendations of the Danish regulation : Persons under 18 years of age are not allowed to work with this product

**15.2. Chemical safety assessment**

A chemical safety assessment was carried out.

**SECTION 16: Further information**

Notes on changes:

REACH – type. EU index number. EC no. CAS no. Product code. Hazard pictograms (CLP). CLP signal word. Signal words (CLP). Precautionary Statements (CLP). Hazard symbols. R phrases. Name. IOELV TWA (ppm). IOELV STEL (ppm). MAK (ppm). MAK Short-term (ppm). Limit value (ppm). TRGS 900 Professional exposure limits (ppm). TRGS 900 Extreme limit (ppm). ACGIH TLV®-TWA (ppm). VLA-ED (ppm). VLE (ppm). VME (ppm). WEL TWA (ppm). WEL STEL (ppm). Grænseværdi (langvarig) (ppm). Grænseværdi (kortvarig) (ppm). Nivågränsvärde (NVG) (ppm). Kortidsvärde (KTV) (ppm). Acute - local effects, inhalation. Long-term - systemic effects, skin. Long-term - systemic effects, inhalation. Acute - local effects, inhalation. Long-term - systemic effects, oral. Long-term - systemic effects, skin. Form. DL50 oral rat. DL50 skin rat. CL50 inhalation rat (mg/l). NOAEL (taken orally, rat, 90 days). NOAEL (inhalation, rat, vapour, 90 days). NOAEL (inhalation, rat, vapour). NOAEL (chronic, taken orally, animal/male, 2 years). CL50 fish 1. CL50 other aquatic organisms 1. CE50 Daphnia 1. CE50 other aquatic organisms 1. CE50 other aquatic organisms 2. LOEC (chronic). NOEC (chronic). Biodegradation. BCF fish 1. Log Koc. REACH - registration number. Acute - systemic effects, inhalation. Long-term - local effects, inhalation. Acute - systemic effects, inhalation. Long-term - systemic effects, inhalation. Long-term - local effects, skin. Long-term - local effects, inhalation. ATE powders/mists. Reason for absence of classification. Reason for absence of classification.

Abbreviations and acronyms:

vPvB	Very Persistent and very Bioaccumulative
RID	Regulations governing the international carriage of dangerous goods by rail
PNEC	Predicted No Effect Concentration
PBT	Persistent, Bioaccumulative and Toxic substance
NOEC	No Observed Effect Concentration
NOAEL	No Observed Adverse Effect Level
NOAEC	No Observed Adverse Effect Concentration
LOAEL	Lowest Observed Adverse Effect Level
LD50	Median lethal dose that kills 50 percent of a test sample
LC50	Median lethal concentration of a group of test animals
IMDG	International Maritime Dangerous Goods
IATA	International Air Transport Association
DNEL	Derived No-Effect Level
DMEL	Derived Minimal Effect Level
BCF	Bioconcentration Factor
ATE	Acute Toxicity Estimate

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ADR	European agreement governing the international carriage of dangerous goods by road
ADN	European agreement governing the international carriage of dangerous goods by inland waterways

Data sources : Regulation (EC) No. 1272/2008 of the European Parliament and of the Council of 16 December 2008 concerning the classification, labelling and packaging of substances and mixtures amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 (et sequens).

Suggested vocational training : Provide professional workers with appropriate training in the use of Personal Protective Equipment (PPE), in relation to the information in this safety data sheet.

Further information : None.

## Full text of the H and EUH phrases:

Eye Irrit. 2	Serious eye damage/eye irritation, Category 2
Flam. Liq. 2	Flammable liquids Category 2
Acute Tox. 4	Acute toxicity taken orally, through the skin, by inhalation, category 4
STOT SE 3	Specific Target Organ Toxicity (single exposure) — category 3 — Narcosis
H225	Highly flammable liquid and vapour
H315	Causes skin irritation
H319	Causes serious eye irritation
H332	Harmful if inhaled
H336	May cause drowsiness or dizziness
ERC1	Manufacture of substances
ERC2	Formulation of preparations
ERC8d	Wide dispersive outdoor use of processing aids in open systems
ESVOC SPERC 1.1b.v1	Distribution: Industrial (SU3)
ESVOC SPERC 7.12a.v1	Use as a fuel: Industrial (SU3)
ESVOC SPERC 9.12c.v1	Use as a fuel/fuel additive: Consumer (SU21)
PC13	Fuels/fuel additives
PROC1	Use in a closed process, no likelihood of exposure (no sampling)
PROC15	Use as laboratory reagent
PROC16	Using material as fuel sources, limited exposure to unburned product to be expected
PROC2	Use in closed, continuous process with occasional controlled exposure (with sampling)
PROC3	Use in closed batch process (synthesis or formulation) (with sampling)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
SU21	Consumer uses: private households (= general public = consumers)
SU22	Professional uses: public domain (administration, education, entertainment, services, craftsmen)
SU3	Industrial uses: use of substances on their own or in preparations* for industrial manufacturing

SDS EU (REACH Annex II) eni 2015

*This information is based on our current knowledge and describes the product only for the purposes of protection of health, safety and the environment. The information does not, therefore, lay down any guarantees of the specific characteristics of the product.*

**ETBE**

Safety Data Sheet

Compliant with Regulation (EU) no. 830/2015

Product code: **ETBE**

Date of revision of the SDS: **01/09/2016**

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## **ANNEX**

### **EXPOSURE SCENARIOS**

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1. Manufacture of ETBE

Section 1	
Title	
Manufacture of ETBE – CAS NR 637-92-3	
Use descriptors	
Use sector	Industrial (SU3)

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Process categories	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC15
<b>Processes, tasks, activities covered</b>	
Manufacture of ETBE. Includes recycling/recovery operations, transport of material, storage, sampling, associated laboratory work, maintenance and loading operations (including those for ships/barges, cistern carriages on road or rail, and containers for loose goods).	
<b>Section 2 Operating conditions and risk management measures</b>	
<b>Section 2.1 Control of worker exposure</b>	
<b>Product characteristics</b>	
Physical state of product	Liquid, vapour pressure > 10 kPa under standard conditions (OC5).
Concentration of substance in product	Covers a percentage of substance in the product up to 100% (if not otherwise indicated) (G13).
Quantity used	Not applicable
Frequency and duration of use/exposure	Covers a daily exposure of up to 8 hours (if not otherwise indicated) (G2).
Human factors not influenced by risk management	Not applicable.
Other operating conditions that affect exposure	Assumes a use of the product at a temperature no greater than 20° C with respect to ambient temperature, unless specified otherwise (G15). Assumes the application of a basic standard of workplace hygiene (G1).
<b>Exposure scenarios</b>	<b>Specific measures for risk management and operating conditions</b>
General exposure (closed systems) (CS15)	No specific measures have been identified (E118).
General exposure (closed systems) (CS15); with sampling (CS56).	Ensure that the operation is carried out outside (E69). Do not carry out activities that include the possibility of exposure of more than 4 hours (OC28). or (G9) Wear a full mask (compliant with standard EN140) equipped with type A filter or superior (PPE22).
General exposure (closed systems) (CS15); Use in discontinuous processes under containment (CS37); with sampling (CS56).	Provide extraction ventilation at emission points (E54).
General exposure (open systems) (CS16). Discontinuous process (CS55). With sampling (CS56). Filling/preparation of equipment from drums or containers (CS45).	Ensure that the transfer of the material takes place under containment or extraction ventilation conditions (E66).
Sampling during process (CS2); dedicated structure (CS81)	Provide extraction ventilation at emission points (E54).
Laboratory activity (CS36); Cleaning (CS47).	Handle under a chemical hood or with extraction ventilation (E83).
Open loading/unloading of loose product (CS503); non-dedicated structure (CS82).	Do not carry out activities that include the possibility of exposure of more than 4 hours (OC28); or (G9) Wear a full mask (compliant with standard EN140) equipped with type A filter or superior (PPE22).
Closed loading/unloading of loose product (CS501) dedicated structure (CS81)	Do not carry out activities that include the possibility of exposure of more than 4 hours (OC28); or (G9) Wear a full mask (compliant with standard EN140) equipped with type A filter or superior (PPE22).
Cleaning and maintenance of equipment (CS39); non-dedicated structure (CS82).	Drain and bleed the system before opening or performing maintenance on equipment (E55). Do not carry out activities that provide the possibility of exposure of more than 1 hour (OC27). Wear a full mask (compliant with standard EN140) equipped with type A filter or superior (PPE22).
Storage (CS67) General exposure (closed systems) (CS15)	No specific measures have been identified (E118).
Storage (CS67) General exposure (closed systems) (CS15) with sampling (CS56)	Provide an extraction ventilation system at all material transfer points and other openings (E82). Do not carry out activities that include the possibility of exposure of more than 4 hours (OC28); or (G9) Wear a full mask (compliant with standard EN140) equipped with type A filter or superior (PPE22).

<b>Section 2.2 Control of environmental exposure</b>	
<b>Product characteristics</b>	
The substance is formed of a single chemical entity (PrC1); Prevalently hydrophobic (PrC4a); Readily biodegradable (PrC5a).	
<b>Operating conditions</b>	
For outside use (OOC1).	
<b>Amounts used</b>	
Volume produced in EU (tons/year)	3,004,450
Fraction of EU tonnage used locally (A1)	0,226
Regional tonnage (tons/year) (A2)	679.000
Fraction of regional tonnage used locally (A3)	0.4
Average daily tonnage at site (kg/per day)	905.333
Annual tonnage at site (tons/year)	271.600
<b>Frequency and duration of use</b>	
Continuous release (FD2)	
Emission Days (days/year) (FD4)	300
<b>Other operating conditions that affect environmental exposure</b>	
Use in closed systems, in dry or wet processes.	
Fraction released into air by process	1.00e-3
Fraction released into waste water by process	3.00e-4
Fraction released into soil by process (regional only)	1.00e-4
<b>RMMs</b>	
<b>Process (source) measures and technical conditions to prevent releases</b>	
The procedures vary from site to site, therefore conservative estimates of process emissions are used (TCS1)	
<b>Technical conditions on site and measures to reduce or limit discharges, air emissions and soil spills</b>	
Air	No emission control required; required removal efficiency of 0% (TCR5)
Waste water	In the event of discharge to an urban waste water treatment plant, no treatment is required (TCR9)
Soil	Treat emissions in such a way as to ensure typical removal efficacy of (%) (TCR7)
<b>Organisational measures to prevent/limit release from the site (1286)</b>	
Prevent the release of undissolved substances or recover them from the waste water (OMS1).	
<b>Conditions and measures regarding the municipal waste water treatment plant (1273)</b>	
The estimated flow rate exiting the industrial waste water treatment plant is 2000 m <sup>3</sup> /day.	
<b>Conditions and measures concerning the external treatment of waste for disposal (1272)</b>	
Not applicable	
<b>Conditions and measures concerning the external recovery of waste (1271)</b>	
Not applicable	
<b>Other environmental control measures in addition to the previous (1287)</b>	
None	

## 2. Formulation of ETBE

Section 1	
Title	
Formulation of ETBE; CAS NR 637-92-3	
Use descriptors	
Use sector	Industrial (SU3)
Process categories	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8A, PROC8B, PROC9, PROC15
Environmental release categories	ERC2
Processes, tasks, activities covered	
Formulation, packaging and repackaging of the substance and its mixtures in discontinuous or continuous operations, including storage, transfer of material, mixing, large and small-scale packaging maintenance and associated laboratory activities.	
Section 2 Operating conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical state of product	Liquid, vapour pressure > 10 kPa under standard conditions (OC5).
Concentration of substance in product	Covers a percentage of substance in the product up to 100% (if not otherwise indicated) (G13).
Quantity used	Not applicable.
Frequency and duration of use/exposure	Covers a daily exposure of up to 8 hours (if not otherwise indicated) (G2).
Human factors not influenced by risk management	Not applicable.
Other operating conditions that affect exposure	Assumes a use of the product at a temperature no greater than 20° C with respect to ambient temperature, unless specified otherwise (G15). Assumes the application of a basic standard of workplace hygiene (G1).
Exposure scenarios	Specific measures for risk management and operating conditions
General exposure (closed systems) (CS15)	No specific measures have been identified (E118).
General exposure (closed systems) (CS15); with sampling (CS56).	Ensure that the operation is carried out outside (E69). Do not carry out activities that include the possibility of exposure of more than 4 hours (OC28). or (G9) Wear a full mask (compliant with standard EN140) equipped with type A filter or superior (PPE22).
General exposure (closed systems) (CS15); Use in discontinuous processes under containment (CS37); with sampling (CS56).	Provide extraction ventilation at emission points (E54).
General exposure (open systems) (CS16). Discontinuous process (CS55). With sampling (CS56). Filling/preparation of equipment from drums or containers (CS45).	Provide extraction ventilation at emission points (E54).
General exposure (closed systems) (CS15); Discontinuous processes at high temperatures (CS136); with sampling (CS56); The operation is performed at high temperatures (> 20° C above ambient temperature) (OC7).	Formulate the substances in closed or ventilated mixing recipients (E46); Provide extraction ventilation at emission points (E54).
Sampling during process (CS2)	Provide extraction ventilation at emission points (E54).
Mixing operations (open systems) (CS30); Discontinuous process (CS55).	Provide extraction ventilation at emission points (E54). Do not carry out activities that include the possibility of exposure of more than 4 hours (OC28). or (G9) Wear a full mask (compliant with standard EN140) equipped with type A filter or superior (PPE22).

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Manual (CS34); Transfer/pouring from containers (CS22); non-dedicated structure (CS82).	Ensure that the transfer of the material takes place under containment or extraction ventilation conditions (E66). Do not carry out activities that include the possibility of exposure of more than 4 hours (OC28). or (G9) Wear a full mask (compliant with standard EN140) equipped with type A filter or superior (PPE22).
Transfer of drums/lots (CS8); dedicated structure (CS81)	Use pumps for drums (E53); Limit exposure by partially isolating operations or equipment and provide correct extraction ventilation in the event of openings (E60).
Filling of drums and small containers (CS6); dedicated structure (CS81)	Fill containers/cans at dedicated filling points equipped with localised extraction ventilation (E51).
Cleaning and maintenance of equipment (CS39); non-dedicated structure (CS82).	Drain and bleed the system before opening or performing maintenance on equipment (E55). Do not carry out activities that provide the possibility of exposure of more than 1 hour (OC27). Wear a full mask (compliant with standard EN140) equipped with type A filter or superior (PPE22).
<b>Section 2.2 Control of environmental exposure</b>	
<b>Product characteristics</b>	
The substance is formed of a single chemical entity (PrC1); Prevalently hydrophobic (PrC4a); Readily biodegradable (PrC5a).	
<b>Operating conditions</b>	
For outside use (OOC1).	
<b>Amounts used</b>	
Regional tonnage (tons/year) (A2)	901.000
Fraction of regional tonnage used locally (A3)	0.05
Average daily tonnage at site (kg/per day)	150.167
Annual tonnage at site (tons/year)	45.050
<b>Frequency and duration of use</b>	
Continuous release (FD2)	
Emission Days (days/year) (FD4)	300
<b>Other operating conditions that affect environmental exposure</b>	
Use in closed systems, in dry or wet processes.	
Fraction released into air by process	1.00e-03
Fraction released into waste water by process	3.00e-04
Fraction released into soil by process (regional only)	1.00e-04
<b>RMMs</b>	
<b>Process (source) measures and technical conditions to prevent releases</b>	
The procedures vary from site to site, therefore conservative estimates of process emissions are used (TCS1)	
<b>Technical conditions on site and measures to reduce or limit discharges, air emissions and soil spills</b>	
Air	No emission control required; required removal efficiency of 0% (TCR5)
Waste water	In the event of discharge to an urban waste water treatment plant, no treatment is required (TCR9)
Soil	Treat emissions in such a way as to ensure typical removal efficacy of (%) (TCR7)
<b>Organisational measures to prevent/limit release from the site (1286)</b>	
Prevent the release of undissolved substances or recover them from the waste water (OMS1).	
<b>Conditions and measures regarding the municipal waste water treatment plant (1273)</b>	
The estimated flow rate exiting the industrial waste water treatment plant is 2000 m <sup>3</sup> /day.	
<b>Conditions and measures concerning the external treatment of waste for disposal (1272)</b>	
Not applicable	
<b>Conditions and measures concerning the external recovery of waste (1271)</b>	
Not applicable	
<b>Other environmental control measures in addition to the previous (1287)</b>	
None	

## 3. Distribution of ETBE

Section 1	
Title	
Distribution of ETBE; CAS NR 637-92-3	
Use descriptors	
Use sector	Industrial (SU3)
Process categories	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC9, PROC15
Environmental release categories	ERC1, ERC2
Specific environmental release categories	ESVOC3 SpERC
Processes, tasks, activities covered	
Loading (on ships/barges, cistern carriages on road or rail, and IBC containers) and repackaging (in drums and small containers) of the substance, including sampling, storage, unloading, distribution and associated laboratory activities (GES1A_I).	
Section 2 Operating conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical state of product	Liquid, vapour pressure > 10 kPa under standard conditions (OC5).
Concentration of substance in product	Covers a percentage of substance in the product up to 100% (if not otherwise indicated) (G13).
Quantity used	Not applicable.
Frequency and duration of use/exposure	Covers a daily exposure of up to 8 hours (if not otherwise indicated) (G2).
Human factors not influenced by risk management	Not applicable.
Other operating conditions that affect exposure	Assumes a use of the product at a temperature no greater than 20° C with respect to ambient temperature, unless specified otherwise (G15). Assumes the application of a basic standard of workplace hygiene (G1).
Exposure scenarios	Specific measures for risk management and operating conditions
General exposure (closed systems) (CS15)	No specific measures have been identified (E118).
General exposure (closed systems) (CS15); with sampling (CS56).	Ensure that the operation is carried out outside (E69). Do not carry out activities that include the possibility of exposure of more than 4 hours (OC28). or (G9) Wear a full mask (compliant with standard EN140) equipped with type A filter or superior (PPE22).
General exposure (closed systems) (CS15); Use in discontinuous processes under containment (CS37); with sampling (CS56).	Provide extraction ventilation at emission points (E54).
General exposure (open systems) (CS16). Discontinuous process (CS55). With sampling (CS56). Filling/preparation of equipment from drums or containers (CS45).	Provide extraction ventilation at emission points (E54). Ensure that samples are taken under containment or extraction ventilation conditions (E76).
Sampling during process (CS2)	Do not carry out activities that provide the possibility of exposure of more than 15 minutes (OC26). Wear a full mask (compliant with standard EN140) equipped with type A filter or superior (PPE22).
Laboratory activity (CS36); Cleaning (CS47)	Ensure an adequate standard of controlled ventilation (from 10 to 15 air exchanges per hour) (E40).
Closed loading/unloading of loose product (CS501) dedicated structure (CS81)	Ensure that the operation is carried out outside (E69); Do not carry out activities that include the possibility of exposure of more than 1 hour (OC27); Wear a full mask (compliant with standard EN140) equipped with type A filter or superior (PPE22).

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Open loading/unloading of loose product (CS503); non-dedicated structure (CS82).	Ensure that the transfer of the material takes place under containment or extraction ventilation conditions (E66).  Do not carry out activities that include the possibility of exposure of more than 4 hours (OC28); or (G9) Wear a full mask (compliant with standard EN140) equipped with type A filter or superior (PPE22).
Filling of drums and small containers (CS6); dedicated structure (CS81).	Fill containers/cans at dedicated filling points equipped with localised extraction ventilation (E51).
Cleaning and maintenance of equipment (CS39); non-dedicated structure (CS82).	Drain and bleed the system before opening or performing maintenance on equipment (E55).  Do not carry out activities that provide the possibility of exposure of more than 4 hours (OC28). Wear a full mask (compliant with standard EN140) equipped with type A filter or superior (PPE22).
Storage (CS67) General exposure (closed systems) (CS15)	No specific measures have been identified (E118).
Storage (CS67) General exposure (closed systems) (CS15) with sampling (CS56).	Professional and domestic use of the product that leads to the immersion of substances in a matrix (OC27).  Wear a full mask (compliant with standard EN140) equipped with type A filter or superior (PPE22).

**Section 2.2 Control of environmental exposure****Product characteristics**

The substance is formed of a single chemical entity (PrC1); Prevalently hydrophobic (PrC4a); Readily biodegradable (PrC5a).

**Transport and distribution****Operating conditions**

For outside use (OOC1).

**Amounts used**

Fraction of EU tonnage used locally (A1)	1.00
Regional tonnage (tons/year) (A2)	901.000
Fraction of regional tonnage used locally (A3)	0.02
Average daily tonnage at site (kg/per day)	51.486
Annual tonnage at site (tons/year)	18.020

**Frequency and duration of use**

Continuous release (FD2)	
Emission Days (days/year) (FD4)	350

**Other operating conditions that affect environmental exposure**

Use in closed systems, in dry or wet processes.

Fraction released into air by process	1.00e-04
Fraction released into waste water by process	1.00e-05
Fraction released into soil by process (regional only)	1.00e-05

**RMMs****Process (source) measures and technical conditions to prevent releases**

The procedures vary from site to site, therefore conservative estimates of process emissions are used (TCS1)

**Technical conditions on site and measures to reduce or limit discharges, air emissions and soil spills**

Air	No emission control required; required removal efficiency of 0% (TCR5)
Waste water	Treat waste water on site (before discharge operations begin) to ensure the required removal efficacy >97 % (TCR8)
Soil	Treat emissions in such a way as to ensure typical removal efficacy of (%) (TCR7)

**Organisational measures to prevent/limit release from the site (1286)**

Prevent the release of undissolved substances or recover them from the waste water (OMS1).

**Conditions and measures regarding the municipal waste water treatment plant (1273)**

The estimated flow rate exiting the industrial waste water treatment plant is 2000 m<sup>3</sup>/day.

**Conditions and measures concerning the external treatment of waste for disposal (1272)**

Not applicable

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<b>Conditions and measures concerning the external recovery of waste (1271)</b>	
Not applicable	
<b>Other environmental control measures in addition to the previous (1287)</b>	
None	
<b>Storage</b>	
<b>Operating conditions</b>	
For outside use (OOC1).	
<b>Amounts used</b>	
Fraction of EU tonnage used locally (A1)	1.00
Regional tonnage (tons/year) (A2)	901.000
Fraction of regional tonnage used locally (A3)	1
Average daily tonnage at site (kg/per day)	2,468,493
Annual tonnage at site (tons/year)	901.000
<b>Frequency and duration of use</b>	
Continuous release (FD2)	
Emission Days (days/year) (FD4)	365
<b>Other operating conditions that affect environmental exposure</b>	
Use in closed systems, in dry or wet processes.	
Release from process waste water (Kg/day)	8.4
<b>RMMs</b>	
<b>Process (source) measures and technical conditions to prevent releases</b>	
The procedures vary from site to site, therefore conservative estimates of process emissions are used (TCS1)	
<b>Technical conditions on site and measures to reduce or limit discharges, air emissions and soil spills</b>	
Air	Emission controls are not applicable because no direct release into the air is recorded (TCR2).
Waste water	Treat waste water on site (before discharge operations begin) to ensure the required removal efficacy >99 % (TCR8)
Soil	Soil emission controls are not applicable because no direct release into the soil is recorded (TCR4).
<b>Organisational measures to prevent/limit release from the site (1286)</b>	
Prevent the release of undissolved substances or recover them from the waste water (OMS1).	
<b>Conditions and measures regarding the municipal waste water treatment plant (1273)</b>	
The estimated flow rate exiting the industrial waste water treatment plant is 2000 m <sup>3</sup> /day.	
<b>Conditions and measures concerning the external treatment of waste for disposal (1272)</b>	
Not applicable	
<b>Conditions and measures concerning the external recovery of waste (1271)</b>	
Not applicable	
<b>Other environmental control measures in addition to the previous (1287)</b>	
None	

#### 4. Use of ETBE in fuels – Industrial

Section 1	
Title	
Use of ETBE in fuels; CAS NR 637-92-3	
Use descriptors	
Use sector	Industrial (SU3)
Process categories	PROC1, PROC2, PROC3, PROC8A, PROC8B, PROC16
Specific environmental release categories	ESVOC3 SpERC
Processes, tasks, activities covered	
Covers use as a fuel (or fuel additive), including activities associated with the transfer, use and maintenance of equipment and disposal of waste (GES12_I).	
Section 2 Operating conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical state of product	Liquid, vapour pressure > 10 kPa under standard conditions (OC5).
Concentration of substance in product	Covers a percentage of substance in the product up to 15%
Quantity used	Not applicable
Frequency and duration of use/exposure	Covers a daily exposure of up to 8 hours (if not otherwise indicated) (G2).
Human factors not influenced by risk management	Not applicable.
Other operating conditions that affect exposure	Assumes the application of a basic standard of workplace hygiene (G1).
Exposure scenarios	Specific measures for risk management and operating conditions
Transfer of loose products (CS14); Discontinuous process (CS55); with sampling (CS56); Filling/preparation of equipment from drums or containers (CS45).	Handle the substance within a prevalently closed system equipped with extraction ventilation (E49). Do not carry out activities that provide the possibility of exposure of more than 4 hours (OC28). Wear a full mask (compliant with standard EN140) equipped with type A filter or superior (PPE22).
Transfer of drums/lots (CS8); Filling/preparation of equipment from drums or containers (CS45); Transfer of loose products (CS14); dedicated structure (CS81).	Use pumps for drums (E53).
General exposure (closed systems) (CS15)	No specific measures have been identified (EI18).
General exposure (closed systems) (CS15); with sampling (CS56).	Provide an extraction ventilation system at all material transfer points and other openings (E82).
General exposure (closed systems) (CS15); Use in discontinuous processes under containment (CS37); with sampling (CS56).	Provide extraction ventilation at emission points (E54).
(closed systems) (CS107); use of fuel.	No specific measures have been identified (EI18).
Cleaning and maintenance of equipment (CS39); non dedicated structure (CS82) for example repair of fuel pumps inside buildings.	Drain the system before opening or performing maintenance on equipment (E65). Do not carry out activities that provide the possibility of exposure of more than 4 hours (OC28).
Storage (CS67); General exposure (closed systems) (CS15)	No specific measures have been identified (EI18).
Storage (CS67);	Ensure that the operation is carried out outside (E69)

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General exposure (closed systems) (CS15); with sampling (CS56).	
<b>Section 2.2 Control of environmental exposure</b>	
<b>Product characteristics</b>	
The substance is formed of a single chemical entity (PrC1); Prevalently hydrophobic (PrC4a); Readily biodegradable (PrC5a).	
<b>Transport and distribution</b>	
<b>Operating conditions</b>	
For outside use (OOC1).	
<b>Amounts used</b>	
Regional tonnage (tons/year) (A2)	901.000
Fraction of regional tonnage used locally (A3)	0.02
Average daily tonnage at site (kg/per day)	51.486
Annual tonnage at site (tons/year)	18.020
<b>Frequency and duration of use</b>	
Continuous release (FD2)	
Emission Days (days/year) (FD4)	350
<b>Other operating conditions that affect environmental exposure</b>	
Use in closed systems, in dry or wet processes.	
Fraction released into air by process	1.00e-04
Fraction released into waste water by process	1.00e-05
Fraction released into soil by process (regional only)	1.00e-05
<b>RMMs</b>	
<b>Process (source) measures and technical conditions to prevent releases</b>	
The procedures vary from site to site, therefore conservative estimates of process emissions are used (TCS1)	
<b>Technical conditions on site and measures to reduce or limit discharges, air emissions and soil spills</b>	
Air	No emission control required; required removal efficiency of 0% (TCR5)
Waste water	Treat waste water on site (before discharge operations begin) to ensure the required removal efficacy >95 % (TCR8)
Soil	Treat emissions in such a way as to ensure typical removal efficacy of 0% (TCR7)
<b>Organisational measures to prevent/limit release from the site (1286)</b>	
Prevent the release of undissolved substances or recover them from the waste water (OMS1).	
<b>Conditions and measures regarding the municipal waste water treatment plant (1273)</b>	
The estimated flow rate exiting the industrial waste water treatment plant is 2000 m <sup>3</sup> /day.	
<b>Conditions and measures concerning the external treatment of waste for disposal (1272)</b>	
Not applicable	
<b>Conditions and measures concerning the external recovery of waste (1271)</b>	
Not applicable	
<b>Other environmental control measures in addition to the previous (1287)</b>	
None	

## 5. Use of ETBE in fuels – Professional

Section 1	
Title	
Use of ETBE in fuels; CAS NR 637-92-3	
Use descriptors	
Use sector	Professional (SU22)
Process categories	PROC1, PROC2, PROC3, PROC8A, PROC8B, PROC9, PROC16
Specific environmental release categories	ESVOC30 SpERC
Processes, tasks, activities covered	
Covers use as a fuel (or fuel additive), including activities associated with the transfer, use and maintenance of equipment and disposal of waste (GES12_I).	
Section 2 Operating conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical state of product	Liquid, vapour pressure > 10 kPa under standard conditions (OC5).
Concentration of substance in product	Covers a percentage of substance in the product up to 15%
Quantity used	Not applicable
Frequency and duration of use/exposure	Covers a daily exposure of up to 8 hours (if not otherwise indicated) (G2).
Human factors not influenced by risk management	Not applicable.
Other operating conditions that affect exposure	Assumes the application of a basic standard of workplace hygiene (G1).
Exposure scenarios	Specific measures for risk management and operating conditions
Transfer of loose products (CS14); Discontinuous process (CS55); Filling/preparation of equipment from drums or containers (CS45).	Ensure that the operation is carried out outside (E69) Do not carry out activities that provide the possibility of exposure of more than 4 hours (OC28). Wear a full mask (compliant with standard EN140) equipped with type A filter or superior (PPE22).
Transfer of drums/lots (CS8); Filling/preparation of equipment from drums or containers (CS45); Transfer of loose products (CS14); dedicated structure (CS81).	Ensure that the operation is carried out outside (E69). Ensure that the transfer of the material takes place under containment or extraction ventilation conditions (E66).
Fuelling (CS507)	Ensure an adequate standard of controlled ventilation (from 10 to 15 air exchanges per hour) (E40). Do not carry out activities that provide the possibility of exposure of more than 1 hour (OC27). Wear a full mask (compliant with standard EN140) equipped with type A filter or superior (PPE22).
General exposure (closed systems) (CS15); with sampling (CS56).	Do not carry out activities that provide the possibility of exposure of more than 4 hours (OC28). Wear a full mask (compliant with standard EN140) equipped with type A filter or superior (PPE22).
General exposure (closed systems) (CS15); Use in discontinuous processes under containment (CS37); with sampling (CS56).	Ensure an adequate standard of controlled ventilation (from 10 to 15 air exchanges per hour) (E40).
Filling of drums and small containers (CS6); dedicated structure (CS81)	Use pumps for drums or take particular care during pouring operations from containers (E64). Do not carry out activities that provide the possibility of exposure of more than 4 hours (OC28). Wear a full mask (compliant with standard EN140) equipped with type A filter or superior (PPE22).

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(closed systems) (CS107); use of fuel.	Ensure that the operation is carried out outside (E69) or (G9) Ensure an adequate standard of controlled ventilation (from 10 to 15 air exchanges per hour) (E40).
Cleaning and maintenance of equipment (CS39). non dedicated structure (CS82) for example repair of fuel pumps inside buildings.	Drain and bleed the system before opening or performing maintenance on equipment (E55). Do not carry out activities that include the possibility of exposure of more than 4 hours (OC28) or (G9) Wear a full mask (compliant with standard EN140) equipped with type A filter or superior (PPE22).
Cleaning and maintenance of equipment (CS39). non dedicated structure (CS82) for example repair of fuel pumps outside buildings.	Drain and bleed the system before opening or performing maintenance on equipment (E55). Do not carry out activities that include the possibility of exposure of more than 4 hours (OC28) or (G9) Wear a full mask (compliant with standard EN140) equipped with type A filter or superior (PPE22).
Storage (CS67); General exposure (closed systems) (CS15)	No specific measures have been identified (E118).
<b>Section 2.2 Control of environmental exposure</b>	
<b>Product characteristics</b>	
The substance is formed of a single chemical entity (PrC1); Prevalently hydrophobic (PrC4a); Readily biodegradable (PrC5a).	
<b>Operating conditions</b>	
For outside use (OOC1).	
<b>Amounts used</b>	
Average daily consumption for a dispersive type of use (Kg/day)	4.94
<b>Frequency and duration of use</b>	
Dispersive use (FD3).	
Emission Days (days/year) (FD4)	365
<b>Other operating conditions that affect environmental exposure</b>	
Use in open systems	
Fraction released into air from highly dispersive use (regional only) (OOC7)	1.00e-2
Fraction released into waste water from highly dispersive use (OOC8)	1.00e-05
Fraction released onto water surface from highly dispersive use (regional only)	1.00e-04
Fraction released into soil from highly dispersive use (regional only) (OOC9)	1.00e-05
<b>RMMs</b>	
<b>Process (source) measures and technical conditions to prevent releases</b>	
The procedures vary from site to site, therefore conservative estimates of process emissions are used (TCS1)	
<b>Technical conditions on site and measures to reduce or limit discharges, air emissions and soil spills</b>	
Air	No emission control required; required removal efficiency of 0% (TCR5)
Waste water	Treat waste water on site (before discharge operations begin) to ensure the required removal efficacy of 95 % (TCR8)
Soil	Treat emissions in such a way as to ensure typical removal efficacy of 0% (TCR7)
<b>Organisational measures to prevent/limit release from the site (1286)</b>	
Prevent the release of undissolved substances or recover them from the waste water (OMS1).	
<b>Conditions and measures regarding the municipal waste water treatment plant (1273)</b>	
The estimated flow rate exiting the industrial waste water treatment plant is 2000 m <sup>3</sup> /day.	
<b>Conditions and measures concerning the external treatment of waste for disposal (1272)</b>	
Not applicable	
<b>Conditions and measures concerning the external recovery of waste (1271)</b>	
Not applicable	
<b>Other environmental control measures in addition to the previous (1287)</b>	
None	

## 6. Use of ETBE in fuels – Consumers

Section 1		
Title		
Use of ETBE in fuels; CAS NR 637-92-3		
Use descriptors		
Use sector	Consumers (SU21)	
Process categories	PC13	
Environmental release categories	ERC8d	
Specific environmental release categories	ESVOC30 SpERC	
Processes, tasks, activities covered		
Use of fuel for fuelling of 2 and 4-stroke engines.		
Section 2 Operating conditions and risk management measures		
Section 2.1 Control of worker exposure		
Product characteristics		
Physical state of product	Liquid, vapour pressure > 10 kPa under standard conditions (OC5).	
Vapour pressure	170 hPa at 25°C	
Concentration of substance in product	Petrol, containing < 15% of substance	
Quantity used	Up to 60 litres for fuelling	
Frequency and duration of use/exposure	Up to 3 times per week	
Other operating conditions that affect exposure	Use at ambient temperature is assumed unless otherwise specified (ConsOC15)	
Exposure scenarios	Specific measures for risk management and operating conditions	
PC13: Fuel	OC	Unless specified otherwise, includes concentrations up to 15% (ConsOC1); includes usage up to 150 days/year (ConsOC3); includes usage up to 1 time per day of use (ConsOC4); for each usage, includes exposures of up to 15 minutes per event (ConsOC14).
	RMM	No specific RMM value developed in addition to the OCs given.
Section 2.2 Control of environmental exposure		
Product characteristics		
The substance is formed of a single chemical entity (PrC1); Prevalently hydrophobic (PrC4a); Readily biodegradable (PrC5a).		
Operating conditions		
For inside/outside use (OOC3).		
Amounts used		
Average daily consumption for a dispersive type of use (Kg/day)		4.94
Frequency and duration of use		
Dispersive use (FD3).		
Emission Days (days/year) (FD4)		365
Other operating conditions that affect environmental exposure		
Use in open systems		
Fraction released into air from highly dispersive use (regional only) (OOC7)		1.00e-02
Fraction released into waste water from highly dispersive use (OOC8)		1.00e-05
Fraction released onto water surface from highly dispersive use (regional only)		1.00e-04
Fraction released into soil from highly dispersive use (regional only) (OOC9)		1.00e-05
RMMs		
Process (source) measures and technical conditions to prevent releases		
The procedures vary from site to site, therefore conservative estimates of process emissions are used (TCS1)		
Technical conditions on site and measures to reduce or limit discharges, air emissions and soil spills		
Air	No emission control required; required removal efficiency of 0% (TCR5)	

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Waste water	Treat waste water on site (before discharge operations begin) to ensure the required removal efficacy of 95 % (TCR8)
Soil	Treat emissions in such a way as to ensure typical removal efficacy of 0% (TCR7)
<b>Organisational measures to prevent/limit release from the site (1286)</b>	
Prevent the release of undissolved substances or recover them from the waste water (OMS1).	
<b>Conditions and measures regarding the municipal waste water treatment plant (1273)</b>	
The estimated flow rate exiting the industrial waste water treatment plant is 2000 m <sup>3</sup> /day.	
<b>Conditions and measures concerning the external treatment of waste for disposal (1272)</b>	
Not applicable	
<b>Conditions and measures concerning the external recovery of waste (1271)</b>	
Not applicable	
<b>Other environmental control measures in addition to the previous (1287)</b>	
None	