



MTBE

Safety data sheet

Compliant with Regulation (EU) no. 830/2015

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

Version of the SDS: 2.00

ecofuel

Replaces the sheet: V 1.0 of
01/12/2010

1: Identification of substance/mixture and company/undertaking

1.1. Product identifier

REACH – type	: Substance
Trade name	: MTBE
Chemical name	: methyl tert-butyl ether (MTBE)
IUPAC name	: methyl tert-butyl ether (MTBE)
EU index number	: 603-181-00-X
EC number	: 216-653-1
CAS number	: 1634-04-4
REACH - registration number	: 01-2119452786-27-0029
Product code	: MTBE
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 MTBE	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) Use of MTBE as an intermediate - Industrial	SU3, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15, ERC6a
(4) Use of MTBE as a process solvent and extraction agent - Industrial	SU3, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15, ERC4
(5) Transport and distribution of MTBE - Industrial	SU3, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15, ERC1, ERC2
(6) Use of MTBE in fuels – Industrial	SU3, PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16, ERC8b, ESVO C SPERC 7.12a.v1
(7) Use of MTBE in fuels – Professional	SU22, PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16, ERC8b, ERC8e
(8) Use of MTBE in fuels – Consumers	SU21, PC13, ERC8d, ESVO C 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

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City/Country: San Donato Milanese, MI, IT
Telephone: +39 02 520 56147
e-mail of Service Technician: Reach@ecofuel.eni.com

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]

Flam. Liq. 2 H225
Skin Irrit. 2 H315

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

Adverse physicochemical, human health and environmental effects

No further information available

2.2. Label elements

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

Hazard pictograms (CLP)



Signal word (CLP)

: Hazard

Hazard Statements (CLP)

: H225 - Highly flammable liquid and vapour
H315: - Causes skin irritation

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.
P280 - Wear protective gloves
P302+P352: IF ON SKIN: Wash with plenty of soap and water.
P403+P235: Store in a well-ventilated place. Keep cool.
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

: 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.

Health

: Low acute toxicity taken orally, through the skin, by inhalation.

Environment

: None.

Pollutants

: None.

(air pollutants or other substances)

Other hazards that do not contribute to the classification : Any substance, 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. 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 : methyl tert-butyl ether (MTBE)

CAS number : 1634-04-4

EC number : 216-653-1

EU index number : 603-181-00-X

Name	Product identifier	%	Classification according to Regulation (EC) no. 1272/2008 [EU-GHS / CLP]
Methanol	(CAS number) 67-56-1 (EC number) 200-659-6 (EU index number) 603-001-00-X	< 2.5	Flam. Liq. 2, H225 Acute Tox. 3 (Oral), H301 Acute Tox. 3 (Dermal), H311 Acute Tox. 3 (Inhalation: vapour), H331 STOT SE 1, H370
Tert-butanol	(CAS number) 75-65-0 (EC number) 200-889-7 (EU index number) 603-005-00-1	< 2.5	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 INHALED: if breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. If the victim is unconscious and not breathing: trained personnel should check the air passage is free and perform artificial respiration. If necessary, perform an external cardiac massage and consult a doctor. If breathing is difficult, administer oxygen if possible, or carry out assisted breathing. Monitor their breathing and pulse.

First aid measures after skin contact : Wash with plenty of soap and water. Remove contaminated clothes and shoes and dispose of them safely. Wash contaminated clothing before reuse. 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 : 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 (general indications) : 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.
- Symptoms/injuries after skin contact : 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. Other extinguishing gases (according to the regulations).
- Inappropriate extinguishing agent : Do not use 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.
- Explosion hazard : Risk of explosion if heated under confinement.
- Reactivity due to fire : When heated/combusted: releases (carbon monoxide/carbon dioxide).
- 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 : In case of serious and widespread fire: evacuate the area. Risk of explosion. Use remote fire-fighting media.
- 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

- General measures : If the conditions are right, stop or contain leaking at the source. Avoid direct contact with released material. Stay upwind. In the case of large spills, alert the people in the areas downwind. Keep unauthorised personnel away from the area of the release. Alert the emergency teams. Eliminate all sources of ignition if safety conditions allow (e.g.: electricity, sparks, fires, flare stacks). Only use non-sparking equipment. If required, report the event to the relevant bodies in accordance with applicable legislation.

6.1.1. For non-emergency personnel

- Means of protection : Keep unauthorised personnel away from the area of the release. Alert the emergency teams. Avoid direct contact with released material.

6.1.2. For emergency personnel

Means of protection

: Small spills: traditional antistatic work garments should generally be appropriate. 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. Protective helmet. 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: A half or full mask equipped with a filter(s) for organic vapours (AX) (and H₂S (B), when applicable), 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.

Emergency procedures

: Stop the leak, if this is possible without exposure to danger. Prevent product from going into sewers and water sources. Prevent product from accumulating in confined spaces or below ground level. Alert the competent authorities in accordance with the regulations in force.

6.2. Environmental precautions

There must be a procedure for handling spills on site, to ensure that there are appropriate measures in place for minimising the impact of occasional spillage.

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. Absorb the spilt product using non-flammable material. In the event of contamination of the environmental matrixes (soil, subsoil, surface waters and groundwater), remove the contaminated soil and treat the contaminated matrixes in accordance with Legislative Decree 152/06 and subsequent amendments (and applicable local legislation). If necessary, store the contaminated material for later safe disposal, use suitable containers only (watertight, sealed, impermeable, earthed). If possible, contain larger spills in water using floating barriers or other appropriate mechanical devices.

Methods for cleaning

: Transfer the product and other recovered materials in appropriate tanks or containers, and proceed with storage/disposal in accordance with the applicable legislation.

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.

6.4. Reference to other sections

For further information regarding personal protective equipment, refer to the section "Exposure control and personal protection".

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 sources of heat/sparks/naked flames/heated surfaces. Do not smoke.

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	: Keep only in the original container.
Incompatible products	: Keep away from: strong oxidants.
Place of storage	: Store in a well-ventilated place.
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.
Packaging materials	: Use mild steel and stainless steel for containers and linings. Some synthetic materials may not be suitable for containers or inner linings based on the specifications of the material and planned use. Contact the manufacturer to check compatibility in accordance with the conditions for specific use.

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**

methyl tert-butyl ether (MTBE) (1634-04-4)		
EEC	IOELV TWA (mg/m ³)	183.5 mg/m ³
EEC	IOELV TWA (ppm)	50 ppm
EEC	IOELV STEL (mg/m ³)	367 mg/m ³
EEC	IOELV STEL (ppm)	100 ppm
Austria	MAK (ppm)	50 ppm
Austria	MAK Short-term (ppm)	100 ppm
Belgium	Limit value (ppm)	40 ppm
Denmark	Grænseværdi (langvarig) (ppm)	40 ppm
Denmark	Grænseværdi (kortvarig) (ppm)	80 ppm
Germany	TRGS 900 Professional exposure limits (ppm)	50 ppm
Germany	TRGS 900 Extreme limit (ppm)	75 ppm
Italy	V. L. 8 hours (mg/m ³)	183.5 mg/m ³
Italy	V. L. 8 hours (ppm)	50 ppm
Italy	V. L. Short-term (mg/m ³)	367 mg/m ³
Italy	V. L. Short-term (ppm)	100 ppm
Spain	VLA-ED (ppm)	40 ppm
Sweden	Nivågränsvärde (NVG) (ppm)	30 ppm
Sweden	Kortidsvärde (KTV) (ppm)	60 ppm
United Kingdom	WEL TWA (ppm)	25 ppm
United Kingdom	WEL STEL (ppm)	75 ppm
Switzerland	VME (ppm)	50 ppm
Switzerland	VLE (ppm)	75 ppm
USA - ACGIH	ACGIH TLV®-TWA (ppm)	50 ppm
USA - ACGIH	Commento (ACGIH)	ACGIH 2015
Methanol (67-56-1)		
EEC	IOELV TWA (mg/m ³)	260 mg/m ³
EEC	IOELV TWA (ppm)	200 ppm
Austria	MAK (mg/m ³)	260 mg/m ³
Austria	MAK (ppm)	200 ppm
Austria	MAK Short-term (mg/m ³)	1040 mg/m ³

Austria	MAK Short-term (ppm)	800 ppm
Belgium	Limit value (mg/m ³)	266 mg/m ³
Belgium	Limit value (ppm)	200 ppm
Belgium	Short-term value (mg/m ³)	333 mg/m ³
Belgium	Short-term value (ppm)	250 ppm
Denmark	Grænseværdi (langvarig) (mg/m ³)	260 mg/m ³
Denmark	Grænseværdi (langvarig) (ppm)	200 ppm
Denmark	Grænseværdi (kortvarig) (mg/m ³)	520 mg/m ³
Denmark	Grænseværdi (kortvarig) (ppm)	400 ppm
France	VME (mg/m ³)	1300 mg/m ³
France	VME (ppm)	100 ppm
France	VLE (mg/m ³)	260 mg/m ³
France	VLE (ppm)	200 ppm
Germany	TRGS 900 Limit values for occupational exposure (mg/m ³)	270 mg/m ³
Germany	TRGS 900 Professional exposure limits (ppm)	200 ppm
Germany	TRGS 900 Extreme limit (mg/m ³)	1080 mg/m ³
Germany	TRGS 900 Extreme limit (ppm)	800 ppm
Hungary	AK-érték	260 mg/m ³
Ireland	OEL (8 hours ref) (mg/m ³)	260 mg/m ³
Ireland	OEL (8 hours ref) (ppm)	200 ppm
Italy	V. L. 8 hours (mg/m ³)	200 mg/m ³ Legislative Decree 81/08 (Note "Skin")
Italy	V. L. 8 hours (ppm)	260 ppm Legislative Decree 81/08 (Note "Skin")
Poland	NDS (mg/m ³)	100 mg/m ³
Poland	NDSch (mg/m ³)	300 mg/m ³
Spain	VLA-ED (mg/m ³)	266 mg/m ³
Spain	VLA-ED (ppm)	200 ppm
Spain	VLA-EC (mg/m ³)	250 mg/m ³
Spain	VLA-EC (ppm)	333 ppm
Sweden	Nivågränsvärde (NVG) (mg/m ³)	250 mg/m ³
Sweden	Nivågränsvärde (NVG) (ppm)	200 ppm
Sweden	Kortidsvärde (KTV) (mg/m ³)	350 mg/m ³
Sweden	Kortidsvärde (KTV) (ppm)	250 ppm
United Kingdom	WEL TWA (mg/m ³)	266 mg/m ³
United Kingdom	WEL TWA (ppm)	200 ppm
United Kingdom	WEL STEL (mg/m ³)	250 mg/m ³
United Kingdom	WEL STEL (ppm)	333 ppm
Switzerland	VME (mg/m ³)	260 mg/m ³
Switzerland	VME (ppm)	200 ppm
Switzerland	VLE (mg/m ³)	1040 mg/m ³
Switzerland	VLE (ppm)	800 ppm
USA - ACGIH	ACGIH TLV®-TWA (mg/m ³)	262 mg/m ³ (Note "Skin")
USA - ACGIH	ACGIH TLV®-TWA (ppm)	200 ppm (Note "Skin")
USA - ACGIH	ACGIH TLV®-STEL (mg/m ³)	328 mg/m ³ (Note "Skin")
USA - ACGIH	ACGIH TLV®-STEL (ppm)	250 ppm (Note "Skin")
USA - NIOSH	NIOSH REL (TWA) (mg/m ³)	260 mg/m ³
USA - NIOSH	NIOSH REL (TWA) (ppm)	200 ppm
USA - NIOSH	NIOSH REL (STEL) (mg/m ³)	250 mg/m ³
USA - NIOSH	NIOSH REL (STEL) (ppm)	325 ppm
USA - OSHA	OSHA PEL (TWA) (mg/m ³)	260 mg/m ³

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USA - OSHA	OSHA PEL (TWA) (ppm)	200 ppm
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methyl tert-butyl ether (MTBE) (1634-04-4)

DNEL / DMEL (Workers)

Acute - local effects, inhalation	357 mg/m ³
Long-term - systemic effects, skin	5100 mg/kg of body weight/day
Long-term - systemic effects, inhalation	178.5 mg/m ³ /day

DNEL / DMEL (general public)

Acute - local effects, inhalation	214 mg/m ³
Long-term - systemic effects, oral	7.1 mg/kg of body weight/day
Long-term - systemic effects, skin	3570 mg/kg of body weight/day
Long-term - local effects, inhalation	53.6 mg/m ³

PNEC (Water)

PNEC water (freshwater)	5.1 mg/l
PNEC water (sea water)	260 µg/l
PNEC water (intermittent, freshwater)	47.2 mg/l

PNEC (sediments)

Sediments (freshwater)	23 mg/kg dwt
Sediment (sea water)	1.17 mg/kg dwt

PNEC (Soil)

PNEC soil	1.56 mg/kg dwt
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PNEC (STP)

Purification system	71 mg/l
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Control methods (monitoring) :

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)

: Goggles. At high conc. of vapour/gas: gas mask with Type AX filter. Complete flameproof clothing. Face shield. Safety shoes. Gloves.



Hand protection

: In the event of possible skin contact, use long-sleeved gloves that are resistant to chemical agents and fleeced inside. 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
Reusable gloves	Neoprene rubber (HNBR), Polyvinyl alcohol (PVA)	6 (> 480 Minutes)	N/A	N/A	EN 374

Eye protection	: In the event of possible contact with the eyes, use goggles or other protective equipment (face shields). If required, refer to standard UNI EN 166. Face shield
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. Wash contaminated clothing before reuse
Respiratory protection	: In ventilated environments or outdoors: in the event of handling the product without suitable vapour containment systems, use masks or half masks with filter for hydrocarbon vapours (AX). (EN 136/140/145). 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
Environmental exposure controls	: 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. On-site treatment of waste water is required. 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.

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.
Colour	: Colourless.
Odour	: characteristic.
Odour Threshold	: No data available.
pH	: not applicable
Evaporation rate rel. To butyl acetate	: No data available.
Melting point	: No data available.
Freezing point	: -108.6 °C
Boiling point	: 55.3
Flash point	: -28 °C
Auto-ignition temperature	: 460 °C
Decomposition temperature	: No data available.
Flammability (solids, gas)	: Highly flammable liquid and vapour
Vapour pressure	: 33 kPa at 25°C
Relative vapour density at 20 °C	: No data available.
Relative density	: 0.74 hPa at 20°C
Solubility	: Water: 41,850 mg/l at 20°C
Log Pow	: 1.06 20-25 °C
Kinematic viscosity	: 0.464 mm ² /s at 20°C
Dynamic viscosity	: No data available.
Explosive properties	: None.
Oxidising properties	: None.
Flammability/explosive limits	: No data available.

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

None in normal conditions.

10.2. Chemical stability

No further information available

10.3. Possibility of hazardous reactions

Contact with strong oxidants (such as peroxides and chromates) may generate a fire hazard. 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

Keep away from strong oxidants. Keep away from flames, hot surfaces and sources of ignition. Do not smoke. Take precautionary measures against static discharges.

10.5. Incompatible materials

Strong oxidants, strong acids.

10.6. Hazardous decomposition products

None.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Low acute toxicity taken orally, through the skin, by inhalation. (Data conclusive, not sufficient for classification)

methyl tert-butyl ether (MTBE) (1634-04-4)	
DL50 oral rat	≈ 2000 mg/kg (OECD 401)
DL50 skin rat	≈ 2000 mg/kg (OECD 402)
CL50 inhalation rat (mg/l)	85 mg/l/4h (OECD 403)

Methanol (67-56-1)	
DL50 oral rat	1187 - 2769 mg/kg of body weight/day (Gavage) (BASF, 1975)
DL50 skin rabbit	17100 mg/kg of body weight/day (Rowe and McCollister - 1981)
CL50 inhalation rat (mg/l)	128200 mg/l/4h (BASF, 1980)

Skin corrosion/irritation : Repeated and prolonged contact with skin may cause reddening of the skin, irritation and allergic dermatitis due to fat removing effects.

Skin irritant

pH: not applicable

Serious eye damage/serious eye irritation : Not classified (Data conclusive, not sufficient for classification)

pH: not applicable

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

methyl tert-butyl ether (MTBE) (1634-04-4)	
NOAEC (inhalation, rat, vapour)	800 ppmV/6h/day

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

methyl tert-butyl ether (MTBE) (1634-04-4)	
NOAEL (taken orally, rat, 90 days)	209 mg/kg of body weight/day
NOAEC (inhalation, rat, vapour, 90 days)	800 mg/m ³

Methanol (67-56-1)	
LOAEC (inhalation, rat, vapour, 90 days)	1.3 mg/l (OECD 453)
NOAEC (inhalation, rat, vapour, 90 days)	0.13 mg/l (OECD 453)

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

methyl tert-butyl ether (MTBE) (1634-04-4)	
Kinematic viscosity	0.464 mm ² /s at 20°C

Potentially dangerous effects on human health and potential symptoms : Prolonged or repeated contact may cause slight temporary skin irritation.

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

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : The product is not considered to be hazardous to aquatic organisms and does not cause long-term adverse effects in the aquatic environment.

methyl tert-butyl ether (MTBE) (1634-04-4)	
CL50 fish 1	672 mg/l Pimephales promelas - ASTM E1241-92
CL50 fish 2	574 mg/l Menidia beryllina - OECD Guideline 203
CL50 other aquatic organisms 1	200 mg/l Americamysis bahia - EPA OPPTS 850.1035
CE50 Daphnia 1	472 mg/l Daphnia Magna - EPA OPPTS 850.1010
CE50 other aquatic organisms 1	187 mg/l Americamysis bahia - EPA OPPTS 850.1035
CE50 other aquatic organisms 2	710 mg/l Pseudomonas putida - EC10 (18 h)
LOEC (chronic)	50 mg/l Americamysis bahia - EPA OPPTS 850.1350
NOEC (chronic)	26 mg/l Americamysis bahia - EPA OPPTS 850.1350

Methanol (67-56-1)	
CL50 fish 1	15400 mg/l (Lepomis macrochirus - 96h - EPA-660/3-75-009, 1975)
CE50 Daphnia 1	≥ 10000 mg/l (48h - DIN 38412 Teil 11)
ErC50 (algae)	22000 mg/l (Pseudokirchnerella subcapitata - 72h - OECD 201)
IC50 micro-organisms	> 1000 mg/l/3h (OECD 209)

12.2. Persistence and degradability

methyl tert-butyl ether (MTBE) (1634-04-4)	
Persistence and degradability	Half-life: 3 - 6 days.
Biodegradation	100 % after 30 hours

Methanol (67-56-1)	
Persistence and degradability	From the standpoint of the environment, the product must be considered "non persistent" according to the criteria of section 1.1 of Annex XIII of the REACH regulation.
Biodegradation	≥ 71.5 % (5d, freshwater; > 91 % 20d)

12.3. Bioaccumulation potential

methyl tert-butyl ether (MTBE) (1634-04-4)	
BCF fish 1	1.4 - 1.5 28 days (Cyprinus carpio)
Log Pow	1.06 20-25 °C

Methanol (67-56-1)	
BCF fish 1	< 10 (Hansch and Leo, 1979; Gluth et al., 1985; Freitag et al., 1985; Howard, 1990)
Log Pow	-0.77

12.4. Mobility in soil

methyl tert-butyl ether (MTBE) (1634-04-4)	
Log Koc	0.95

Methanol (67-56-1)	
Ecology - soil	LC50 Anelidae: > 1 mg/cm ² /48 (Eisenia Fetida - OECD 207).

12.5. Results of PBT and vPvB assessment

methyl tert-butyl ether (MTBE) (1634-04-4)	
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	
Methanol (67-56-1)	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. The substance does not meet the criteria for classification like PBT or vPvB.

12.6. Other adverse effects

Further indications : Do not dispose of in the environment.

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).

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. Do not pierce, cut, grind, weld, braze, burn or incinerate empty containers or drums that have not been cleaned.

code H : H3-B - "Flammable": liquid substances and preparations having a flash point equal to or greater than 21°C and less than or equal to 55°C.
H4 - "Irritant": non-corrosive substances and preparations which, through immediate, prolonged or repeated contact with the skin or mucous membranes, cause inflammation.

SECTION 14: Transport information

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

ADR	IMDG	IATA	ADN	RID
14.1. UN number				
2398	2398	2398	2398	2398
14.2. UN shipment name				
METHYL TERT-BUTYL ETHER	METHYL TERT-BUTYL ETHER	METHYL TERT-BUTYL ETHER	METHYL TERT-BUTYL ETHER	METHYL TERT-BUTYL ETHER
Description of the transport document				
UN 2398 METHYL TERT-BUTYL ETHER, 3, II, (D/E)	UN 2398 METHYL TERT-BUTYL ETHER (MTBE)(1634-04-4), 3, II			
14.3. Transport hazard classes				
3	3	3	3	3
				
14.4. Packing group				
II	II	II	II	II
14.5. Environmental hazards				
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

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Excepted quantities (ADR) : E2
 Transport category (ADR) : 2
 Hazard number (Kemler code) : 33
 Orange panel :



Tunnel restriction code (ADR) : D/E

- Maritime transport

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

- Air transport

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

Classification code (ADN) : F1
 Limited quantities (ADN) : 1 L
 Excepted quantities (ADN) : E2

- Transport by rail

Classification code (RID) : F1
 Limited quantities (RID) : 1L
 Excepted quantities (RID) : E2
 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 : Z

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
 methyl tert-butyl ether (MTBE) is not in the REACH Candidate List
 None of the ingredients are in the REACH Candidate List (> 0.1 % m/m).
 methyl tert-butyl ether (MTBE) 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).

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Seveso information : Legislative Decree 105/2015 (Assimilation of Directive 2012/18/EU):
Category Seveso - P5c

15.1.2. Domestic standards

Legislative Decree 152/06: "Environmental standards" and subsequent amendments and additions

Legislative Decree 81/2008 on "Implementation of Article 1 of the Law of August 3, 2007 relating to protection of human health and safety at the workplace."

Germany

Reference to Annex VwVwS : Water hazard class (WGK) (D) 1, low hazard to waters (Classification according to VwVwS, annex 2; No WGK 1200)

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

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. REACH - registration number. 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 (inhalation, rat, vapour). NOAEL (taken orally, rat, 90 days). NOAEL (inhalation, rat, vapour, 90 days). CL50 fish 1. CL50 other aquatic organisms 1. CE50 Daphnia 1. CE50 other aquatic organisms 2. LOEC (chronic). NOEC (chronic). Biodegradation. BCF fish 1. Log Koc.

Abbreviations and acronyms:

ADN	European agreement governing the international carriage of dangerous goods by inland waterways
ADR	European agreement governing the international carriage of dangerous goods by road
BCF	Bioconcentration factor
DMEL	Derived Minimal Effect Level
DNEL	Derived No-Effect Level
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods
LC50	Median lethal concentration of a group of test animals
LD50	Median lethal dose that kills 50 percent of a test sample
LOAEL	Lowest Observed Adverse Effect Level
NOAEC	No Observed Adverse Effect Concentration
NOAEL	No Observed Adverse Effect Level
NOEC	No Observed Effect Concentration
PBT	Persistent, Bioaccumulative and Toxic substance
PNEC	Predicted No Effect Concentration
REACH	Registration, Evaluation, Authorisation & restriction of CHemicals, Regulation (EC) no. 1907/2006.
RID	Regulations governing the international carriage of dangerous goods by rail
vPvB	Very Persistent and very Bioaccumulative

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:

Acute Tox. 3 (Dermal)	Acute toxicity (contact with skin), category 3
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Acute Tox. 3 (Inhalation: vapour)	Acute toxicity (inhalation: vapour) Category 3
Acute Tox. 3 (Oral)	Acute toxicity (oral), category 3
Flam. Liq. 2	Flammable liquids Category 2
Skin Irrit. 2	Skin corrosion/irritation, category 2
STOT SE 1	Specific Target Organ Toxicity (single exposure), category 1
H225	Highly flammable liquid and vapour
H301	Toxic if swallowed
H311	Toxic in contact with skin
H315	Causes skin irritation
H331	Toxic if inhaled
H332	Harmful if inhaled
H370	Causes damage to organs
ERC1	Manufacture of substances
ERC2	Formulation of preparations
ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
ERC8b	Wide dispersive indoor use of reactive substances in open systems
ERC8d	Wide dispersive outdoor use of processing aids in open systems
ERC8e	Wide dispersive outdoor use of reactive substances in open systems
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 bath process (synthesis or formulation) (with sampling)
PROC4	Use in bath 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

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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.

ANNEX

EXPOSURE SCENARIOS

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1. Manufacture of MTBE

Section 1	
Title	
Manufacture of MTBE – CAS RN 1634-04-4	
Use descriptors	
Use sector	Industrial (SU3)
Process categories	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC15
Environmental release categories	ERC1
Processes, tasks, activities covered	
Manufacture of MTBE. 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).	
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 measures (skin irritant agents) (G19)	Avoid direct contact of the product with the skin. Identify potential areas of indirect contact with the skin. Wear protective gloves (tested in accordance with standard EN374) if there is a possibility of the substance coming into contact with the hands. Eliminate any contaminations/leaks as soon as they occur. Immediately remove any contamination with the skin. Provide personnel with basic training aimed at preventing/limiting exposure and report the onset of any skin problems (E3).
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).
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).

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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)	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).
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 outside use (OOC1).	
Amounts used	
Fraction of EU tonnage used locally (A1)	0.25
Regional tonnage (tons/year) (A2)	290.000
Fraction of regional tonnage used locally (A3)	0.4
Average daily tonnage at site (kg/per day)	386.667
Annual tonnage at site (tons/year)	116.000
Frequency and duration of use	
Continuous release (FD2)	
Emission Days (days/year) (FD4)	300
Other operating conditions that affect environmental exposure	
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
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 >99% (TCR8)
Soil	No soil emission controls are required; required removal efficiency of 0%.
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 ³ /day.	
Conditions and measures concerning the external treatment of waste for disposal (1272)	
Not applicable	
Conditions and measures concerning the external recovery of waste (1271)	
Not applicable	
Other environmental control measures in addition to the previous (1287)	
None	

2. Formulation of MTBE

Section 1	
Title	
Formulation of MTBE; CAS NR 1634-04-4	
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 measures (skin irritant agents) (G19)	Avoid direct contact of the product with the skin. Identify potential areas of indirect contact with the skin. Wear protective gloves (tested in accordance with standard EN374) if there is a possibility of the substance coming into contact with the hands. Eliminate any contaminations/leaks as soon as they occur. Immediately remove any contamination with the skin. Provide personnel with basic training aimed at preventing/limiting exposure and report the onset of any skin problems (E3).
General exposure (closed systems) (CS15)	No specific measures have been identified (E118).
General exposure (closed systems) (CS15); with sampling (CS56).	Ensure an adequate standard of controlled ventilation (from 10 to 15 air exchanges per hour) (E40).
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);	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).
Laboratory activity (CS36). Cleaning (CS47)	Handle under a chemical hood or with extraction ventilation (E83).
Closed loading/unloading of loose product (CS501). dedicated structure (CS81)	Provide an extraction ventilation system at all material transfer points and other openings (E82).
Mixing operations (open systems) (CS30); Discontinuous process	Provide extraction ventilation at emission points (E54).

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(CS55).	
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).
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 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).	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).
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 outside use (OOC1).	
Amounts used	
Fraction of EU tonnage used locally (A1)	0.57
Regional tonnage (tons/year) (A2)	659.000
Fraction of regional tonnage used locally (A3)	0.05
Average daily tonnage at site (kg/per day)	109.833
Annual tonnage at site (tons/year)	32.950
Frequency and duration of use	
Continuous release (FD2)	
Emission Days (days/year) (FD4)	300
Other operating conditions that affect environmental exposure	
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
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 >99% (TCR8)
Soil	No soil emission controls are required; required removal efficiency of 0%.
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 ³ /day.	
Conditions and measures concerning the external treatment of waste for disposal (1272)	
Not applicable	
Conditions and measures concerning the external recovery of waste (1271)	
Not applicable	

MTBE

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Other environmental control measures in addition to the previous (1287)
None

3. Use of MTBE as an intermediate - Industrial

Section 1	
Title	
Use of MTBE as an intermediate; CAS NR 1634-04-4	
Use descriptors	
Use sector	Industrial (SU3)
Process categories	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC15
Environmental release categories	ERC6a
Processes, tasks, activities covered	
Use of substance as an intermediate agent. Includes recycling/recovery, transport of material, storage, sampling, associated laboratory work, maintenance and loading operations (onto ships/barges, cistern carriages on road or rail, and containers for the storage of loose goods).	
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 measures (skin irritant agents) (G19)	Avoid direct contact of the product with the skin. Identify potential areas of indirect contact with the skin. Wear protective gloves (tested in accordance with standard EN374) if there is a possibility of the substance coming into contact with the hands. Eliminate any contaminations/leaks as soon as they occur. Immediately remove any contamination with the skin. Provide personnel with basic training aimed at preventing/limiting exposure and report the onset of any skin problems (E3).
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).
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 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).
Closed loading/unloading of loose product (CS501). dedicated structure (CS81)	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).
Cleaning and maintenance of equipment (CS39);	Drain and bleed the system before opening or performing maintenance on equipment (E55). Do not carry out activities that provide the possibility of

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non-dedicated structure (CS82).	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).	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).
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 outside use (OOC1).	
Amounts used	
Fraction of EU tonnage used locally (A1)	0.01
Regional tonnage (tons/year) (A2)	8.030
Fraction of regional tonnage used locally (A3)	1
Average daily tonnage at site (kg/per day)	26.767
Annual tonnage at site (tons/year)	8.030
Frequency and duration of use	
Continuous release (FD2)	
Emission Days (days/year) (FD4)	300
Other operating conditions that affect environmental exposure	
Use in closed systems, in dry or wet processes.	
Fraction released into air by process	5.00e-02
Fraction released into waste water by process	8.00e-06
Fraction released into soil by process (regional only)	1.00e-04
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 >90% (TCR8)
Soil	No soil emission controls are required; required removal efficiency of 0%.
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 ³ /day.	
Conditions and measures concerning the external treatment of waste for disposal (1272)	
Not applicable	
Conditions and measures concerning the external recovery of waste (1271)	
Not applicable	
Other environmental control measures in addition to the previous (1287)	
None	

4. Use of MTBE as a process solvent and extraction agent - Industrial

Section 1	
Title	
Use of MTBE as a process solvent and extraction agent; CAS NR 1634-04-4	
Use descriptors	
Use sector	Industrial (SU3, SU8, SU9)
Process categories	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC15
Environmental release categories	ERC4
Processes, tasks, activities covered	
Use of the substance as a process solvent and extraction agent. Includes recycling/recovery, transport of material, storage, sampling, associated laboratory work, maintenance and loading operations (onto ships/barges, cistern carriages on road or rail, and containers for the storage of loose goods).	
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 measures (skin irritant agents) (G19)	Avoid direct contact of the product with the skin. Identify potential areas of indirect contact with the skin. Wear protective gloves (tested in accordance with standard EN374) if there is a possibility of the substance coming into contact with the hands. Eliminate any contaminations/leaks as soon as they occur. Immediately remove any contamination with the skin. Provide personnel with basic training aimed at preventing/limiting exposure and report the onset of any skin problems (E3).
General exposure (closed systems) (CS15)	No specific measures have been identified (E18).
General exposure (closed systems) (CS15); with sampling (CS56).	Ensure that the operation is carried out outside (E69).
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 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).
Closed loading/unloading of loose product (CS501).	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)

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dedicated structure (CS81)	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 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).	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).
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 outside use (OOC1).	
Amounts used	
Fraction of EU tonnage used locally (A1)	0.00
Regional tonnage (tons/year) (A2)	2.010
Fraction of regional tonnage used locally (A3)	0.3
Average daily tonnage at site (kg/per day)	1.834
Annual tonnage at site (tons/year)	603
Frequency and duration of use	
Continuous release (FD2)	
Emission Days (days/year) (FD4)	120
Other operating conditions that affect environmental exposure	
Use in closed systems, in dry or wet processes.	
Fraction released into air by process	2.50e-01
Fraction released into waste water by process	1.00e-01
Fraction released into soil by process (regional only)	1.00e-03
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 >99% (TCR8)
Soil	No soil emission controls are required; required removal efficiency of 0%.
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 ³ /day.	
Conditions and measures concerning the external treatment of waste for disposal (1272)	
Not applicable	
Conditions and measures concerning the external recovery of waste (1271)	
Not applicable	
Other environmental control measures in addition to the previous (1287)	
None	

5. Transport and distribution of MTBE - Industrial

Section 1	
Title	
Distribution of MTBE; CAS NR 1634-04-4	
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 measures (skin irritant agents) (G19)	Avoid direct contact of the product with the skin. Identify potential areas of indirect contact with the skin. Wear protective gloves (tested in accordance with standard EN374) if there is a possibility of the substance coming into contact with the hands. Eliminate any contaminations/leaks as soon as they occur. Immediately remove any contamination with the skin. Provide personnel with basic training aimed at preventing/limiting exposure and report the onset of any skin problems (E3).
General exposure (closed systems) (CS15)	No specific measures have been identified (EI18).
General exposure (closed systems) (CS15); with sampling (CS56).	Ensure that the operation is carried out outside (E69).
General exposure (closed systems) (CS15); Use in discontinuous processes under containment (CS37); with sampling (CS56).	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).
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)	Handle under a chemical hood or with extraction ventilation (E83).
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)

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	equipped with type A filter or superior (PPE22).
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) 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).
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)	0.57
Regional tonnage (tons/year) (A2)	659.000
Fraction of regional tonnage used locally (A3)	0.02
Average daily tonnage at site (kg/per day)	37.657
Annual tonnage at site (tons/year)	13.180
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 >95 % (TCR8)
Soil	No soil emission controls are required; required removal efficiency of 0%.
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 ³ /day.	
Conditions and measures concerning the external treatment of waste for disposal (1272)	
Not applicable	
Conditions and measures concerning the external recovery of waste (1271)	
Not applicable	
Other environmental control measures in addition to the previous (1287)	

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None	
Storage	
Operating conditions	
For outside use (OOC1).	
Amounts used	
Fraction of EU tonnage used locally (A1)	0.57
Regional tonnage (tons/year) (A2)	659.000
Fraction of regional tonnage used locally (A3)	1
Average daily tonnage at site (kg/per day) (A4)	1,805,479
Annual tonnage at site (tons/year) (A5)	659.000
Frequency and duration of use	
Continuous release (FD2)	
Emission Days (days/year) (FD4)	365
Other operating conditions that affect environmental exposure	
Use in closed systems, in dry or wet processes.	
Release from process waste water (Kg/day)	8.4
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	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).
Organisational measures to prevent/limit release from the site (1286)	
Prevent the release of undissolved substances or recover them from the waste water (OMS1). Prevent leaks and spills onto soil.	
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 ³ /day.	
Conditions and measures concerning the external treatment of waste for disposal (1272)	
Not applicable	
Conditions and measures concerning the external recovery of waste (1271)	
Not applicable	
Other environmental control measures in addition to the previous (1287)	
None	

6. Use of MTBE in fuels – Industrial

Section 1	
Title	
Use of MTBE in fuels; CAS NR 1634-04-4	
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
General measures (skin irritant agents) (G19)	Avoid direct contact of the product with the skin. Identify potential areas of indirect contact with the skin. Wear protective gloves (tested in accordance with standard EN374) if there is a possibility of the substance coming into contact with the hands. Eliminate any contaminations/leaks as soon as they occur. Immediately remove any contamination with the skin. Provide personnel with basic training aimed at preventing/limiting exposure and report the onset of any skin problems (E3).
Transfer of loose products (CS14); 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).
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).	No specific measures have been identified (EI18).
General exposure (closed systems) (CS15); Use in discontinuous processes under containment (CS37); 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).
(closed systems) (CS107); use of fuel.	No specific measures have been identified (EI18).
(closed systems) (CS107); Discontinuous process (CS55).	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).
Cleaning and maintenance of equipment (CS39); non dedicated structure (CS82) for example repair of fuel pumps inside	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).

buildings.	
Storage (CS67); General exposure (closed systems) (CS15)	No specific measures have been identified (E118).
Storage (CS67); General exposure (closed systems) (CS15); with sampling (CS56).	Ensure that the operation is carried out outside (E69)
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)	0.57
Regional tonnage (tons/year) (A2)	659.000
Fraction of regional tonnage used locally (A3)	0.02
Average daily tonnage at site (kg/per day)	37.657
Annual tonnage at site (tons/year)	13.180
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 >95 % (TCR8)
Soil	No soil emission controls are required; required removal efficiency of 0%.
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 ³ /day.	
Conditions and measures concerning the external treatment of waste for disposal (1272)	
Not applicable	
Conditions and measures concerning the external recovery of waste (1271)	
Not applicable	
Other environmental control measures in addition to the previous (1287)	
None	

7. Use of MTBE in fuels – Professional

Section 1	
Title	
Use of MTBE in fuels; CAS NR 1634-04-4	
Use descriptors	
Use sector	Professional (SU22)
Process categories	PROC1, PROC2, PROC3, PROC8A, PROC8B, PROC9, PROC16
Environmental release categories	ERC8b, ERC8e
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	
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
General measures (skin irritant agents) (G19)	Avoid direct contact of the product with the skin. Identify potential areas of indirect contact with the skin. Wear protective gloves (tested in accordance with standard EN374) if there is a possibility of the substance coming into contact with the hands. Eliminate any contaminations/leaks as soon as they occur. Immediately remove any contamination with the skin. Provide personnel with basic training aimed at preventing/limiting exposure and report the onset of any skin problems (E3).
Transfer of loose products (CS14); Discontinuous process (CS55); 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).
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 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).
General exposure (closed systems) (CS15); with sampling (CS56).	No specific measures have been identified (EI18)
General exposure (closed systems) (CS15); Use in discontinuous processes under containment (CS37); with sampling (CS56).	Ensure that the operation is carried out outside (E69)
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 1 hour (OC27). Wear a full mask (compliant with standard EN140) equipped with type A filter or superior (PPE22).
(closed systems) (CS107); use of fuel.	No specific measures have been identified (EI18).

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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 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 the system before opening or performing maintenance on equipment (E65). 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).

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 outside use (OOC1).

Amounts used

Average daily consumption for a dispersive type of use (Kg/day)	3.61
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Frequency and duration of use

Dispersive use (FD3).

Emission Days (days/year) (FD4)	365
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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)
Waste water	Treat waste water on site (before discharge operations begin) to ensure the required removal efficacy of 38 % (TCR8)
Soil	No soil emission controls are required; required removal efficiency of 0%.

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 m³/day.

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

Not applicable

Conditions and measures concerning the external recovery of waste (1271)

Not applicable

Other environmental control measures in addition to the previous (1287)

None

8. Use of MTBE in fuels – Consumers

Section 1		
Title		
Use of MTBE in fuels; CAS NR 1634-04-4		
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	330 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 outside use (OOC1).		
Amounts used		
Average daily consumption for a dispersive type of use (Kg/day)		3.61
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		

Safety data sheet

Compliant with Regulation (EU) no. 830/2015

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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 37 % (TCR8)
Soil	Treat emissions in such a way as to ensure typical removal efficacy of 0% (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 ³ /day.	
Conditions and measures concerning the external treatment of waste for disposal (1272)	
Not applicable	
Conditions and measures concerning the external recovery of waste (1271)	
Not applicable	
Other environmental control measures in addition to the previous (1287)	
None	