Gasoline (all types)

Safety Data Sheet

EU SDS format according to COMMISSION REGULATION (EU) 2020/878
Release Date: 2025-06-10 Revision Date: 2025-06-03 Replaces version of: 2021-01-01 Version: 2.0

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

1.1. Product identifier

Product form	:	Mixture
Trade name	:	Gasoline (all types)
Product Type	:	Fuels
Product group	:	Commercial Product

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

1.2.1. Relevant identified uses

Main Use Category	:	Industrial use,Professional use,Consumer use
Specification for professional/industrial use	:	Use in closed systems Widespread dispersive use
Use of substance/mixture	:	Fuel components Motor fuel Coatings, thinners Detergent/washing agents and additives Rubber production and processing
Function or use category	:	Fuels, Coatings and paints, Thinners, Pickling solutions, Cleaning/washing agents and additives, Polymer preparations and compounds

Title	Use Descriptors
Distribution of the substance (Ref. SE: 01a)	SU3, PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC15, ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7, ESVOC SPERC 1.1b.v1
Formulation and (re)packaging of substances and mixtures (Ref. SE: 02)	SU3, SU10, PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC15, ERC2, ESVOC SPERC 2.2.v1
Use in coatings (Ref. SE: 03a)	SU3, PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC15, ERC4, ESVOC SPERC 4.3a.v1
Detergent/washing agents and additives (Ref. SE: 04a)	SU3, PROC1, PROC2, PROC3, PROC8a, PROC8b, ERC4, ESVOC SPERC 4.4a.v1
Use as fuel (Ref. SE: 12a)	SU3, PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16, ERC7, ESVOC SPERC 7.12a.v1
Rubber production and processing (Ref. SE: 19)	SU3, SU10, SU11, PROC1, PROC2, PROC3, PROC8b, PROC9, PROC15, ERC1, ERC4, ERC6d, ESVOC SPERC 4.7a.v1
Use as fuel (Ref. SE: 12b)	SU22, PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16, ERC9a, ERC9b, ESVOC SPERC 9.12b.v1
Use as fuel (Ref. SE: 12c)	SU21, PC13, ERC9a, ERC9b, ESVOC SPERC 9.12c.v1

Full text of the descriptors of use : see section 16

1.2.2. Uses advised against

The relevant uses are listed above. No other uses are recommended unless an assessment has been conducted, prior to the start of such use, demonstrating that the risks associated with that use are controlled

1.3. Details of the supplier of the safety data sheet

Producer
JEnergy S.p.A.
Via Adolfo Ravà, 49
IT 00142 Rome, Italy
T +39 06590101, F +39 065414923
reach@jenergyspa.it

1.4. Emergency telephone number

Emergency number : +39 06590101
CAV "Pediatric Hospital Bambino Gesù" - Roma - +39 06 6859 3726 - 24h
Hospital company "University of Foggia" - Foggia - +39 800 18 3459 - 24h
Hospital company "A. Cardarelli" - Napoli - +39 081 5453 333 - 24h
CAV "Policlinico Umberto I" - Roma - +39 06 4997 8000 - 24h
CAV "Policlinico A. Gemelli" - Roma - +39 06 3054 343- 24h
Hospital company "Careggi" Medical Toxicology Department - Firenze - +39 055 7947 819 - 24h
CAV "National" - Pavia - +39 0382 24444 - 24h
Hospital company "Niguarda Ca' Granda" - Milano - +39 02 6610 1029 - 24h
Hospital company "Papa Giovanni XXIII" - Bergamo - +39 800 88 3300 - 24h
Hospital company Verona - Verona - +39 800 01 1858 - 24h

SECTION 2: Hazard Identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [EU-GHS / CLP]

Flammable liquids, category 1	H224
Skin corrosion/irritation, category 2	H315
Germ cell mutagenicity, category 1B	H340
Carcinogenicity, category 1A	H350
Reproductive toxicity, category 2	H361fd
Specific Target Organ Toxicity – Single Exposure, Category 3 – Narcosis	H336
Aspiration hazard, category 1	H304
Hazardous to the aquatic environment – Chronic hazard, category 2	H411

Full text of H and EUH phrases: see section 16

Adverse physicochemical effects on human health and the environment

Highly flammable liquid and vapors. Irritating to the skin. High concentrations of vapours may cause: migraine, nausea, dizziness. Aspiration into the lungs may cause chemical pneumonia. May cause cancer. May cause genetic alterations. Suspected of demaging fertility. Suspected of demaging the unboarn child. Toxic to aquatic organisms, may cause long-term negative effects for the aquatic environment. For specific information on the toxicological characteristics and product classification, refer to section 11 and/or 12 of the data sheet.

2.2. Label elements

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

Hazard pictograms (CLP) :

GHS02 GHS07 GHS08 GHS09

Signal word (CLP) : Danger

Contains : Petrol (low boiling point naphtha - unspecified) (benzene > 0,1 % p); Ethyl t-butyl ether; 2-methyl-2-methoxybutane; Tert-amyl methyl ether

Hazard statements (CLP) : H224 - Extremely flammable liquid and vapours.
H304 - May be fatal if swallowed and enters airways.
H315 - Causes skin irritation.
H336 - May cause drowsiness or dizziness.
H340 - May cause genetic defects.
H350 - May cause cancer.
H361fd - Suspected of demaging fertility. Suspected of demaging the unborn child.
H411 - Toxic to aquatic life with long-lasting effects.

Precautionary statements (CLP) : P201 - Obtain special instructions before use.
P210 - Keep away from heat sources, hot surfaces, sparks, open flames, or other ignition

sources. No smoking.
P280 - Wear protective gloves, protective clothing, eye protection, ande face protection
P301+P310 - IF SWALLOWED: immediately call a POISON CENTER or doctor/physician.
P312 - If you feel unwell, contact a POISON CONTROL CENTER or doctor.
P331 - DO NOT induce vomiting.
P370+P378 - In case of a fire: use dry chemical powder to extinguish.
P403+P233 - Keep the container tightly closed and in a well-ventilated place.
P501 - Dispose of the product and container in accordance with applicable regulations (Legislative Decree 152/2006 and subsequent amendments).

2.3. Other hazards (not relevant to classification)

Hazards not resulting in classification: : The product can be electrostatically charged: always use grounding connections when transferring it from one container to another. The vapors may form flammable and explosive mixture with air. The product is heavier than air, and in the event of spills, vapors may accumulate in confined and low-lying areas, where they may pose a risk of fire due to accidental ignition.

This substance/mixture doesn't fulfil the PBT criteria of the REACH Regulation, Annex XIII
This substance/mixture doesn't fulfil the vPvB criteria of the REACH Regulation, Annex XIII
Does not contain PBT and/or vPvB substances ≥ 0.1% evaluated in accordance with Annex XIII of REACH

The mixture does not contain a substance(s) included in the list established in accordance with Article 59(1) of the REACH Regulation for having endocrine-disrupting properties, nor any substance(s) identified as having endocrine-disrupting properties(s) according to the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at a concentration of 0.1% or more

SECTION 3: Composition/Information on Ingredients

3.2. Mixtures

Notes : Composition/information on ingredients:
Mixrure of hydrocarbons
Additives

Name	Product identifier	%	Classification according to Regulation (EC) No 1272/2008 [EU-GHS / CLP]
Gasoline (low boiling point naphtha - unspecified) (benzene > 0,1 % w/w)	CAS Number: 86290-81-5 EC Number: 289-220-8 EC Index No.: 649-378-00-4 REACH No.: 01-2119471335-39	≥ 85 < 100	Flam. Liq. 1, H224 Skin Irrit. 2, H315 Muta. 1B, H340 Carc. 1B, H350 Repr. 2, H361fd STOT SE 3, H336 Asp. Tox. 1, H304 Aquatic Chronic 2, H411
tert-butylmethyl ether; MTBE; 2-methoxy-2-methylpropane (Additive)	CAS Number: 1634-04-4 EC Number: 216-653-1 EC Index No.: 603-181-00-X REACH no.: 01-2119452786-27	≥ 0.1 < 5	Flam. Liq. 2, H225 Skin Irrit. 2, H315
Ethyl t-butyl ether (Additive)	CAS Number: 637-92-3 EC Number: 211-309-7 EC Index No.: N/A REACH no.: 01-2119452785-29-0023	≥ 0.1 < 5	Flam. Liq. 2, H225 STOT SE 3, H336

Name	Product identifier	%	Classification according to Regulation (EC) No 1272/2008 [EU-GHS / CLP]
2-methyl-2-methoxybutane; Tert-amyl methyl ether (Additive)	CAS Number: 994-05-8 EC Number: 213-611-4 EC Index No.: 603-213-00-2 REACH no.: 01-2119453236-41	≥ 0.1 < 5	Flam. Liq. 2, H225 Acute Tox. 4 (oral), H302 STOT SE 3, H336
ethanol, ethyl alcohol (Additive)	CAS Number: 64-17-5 EC Number: 200-578-6 EC Index No.: 603-002-00-5 REACH No.: 01-2119457610-43	≥ 0.1 < 5	Flam. Liq. 2, H225
Toluene (Constituent)	CAS Number: 108-88-3 EC Number: 203-625-9 EC Index No.: 601-021-00-3 REACH no.: 01-2119471310-51	≥ 1 < 5	Flam. Liq. 2, H225 Skin Irrit. 2, H315 Eye Irrit. 2, H319 Repr. 2, H361d STOT SE 3, H336 STOT RE 2, H373 Asp. Tox. 1, H304 Aquatic Chronic 3, H412
benzene (Constituent)	CAS Number: 71-43-2 EC Number: 200-753-7 EC Index No.: 601-020-00-8	≥ 0.1 < 1	Flam. Liq. 2, H225 Carc. 1A, H350 Muta. 1B, H340 STOT RE 1, H372 Asp. Tox. 1, H304 Eye Irrit. 2, H319 Skin Irrit. 2, H315
n-Hexane (Constituent)	CAS Number: 110-54-3 EC Number: 203-777-6 EC Index No.: 601-037-00-0 REACH no.: 01-2119480412-44	≥ 0.1 < 5	Flam. Liq. 2, H225 Repr. 2, H361f Asp. Tox. 1, H304 STOT RE 2, H373 Skin Irrit. 2, H315 STOT SE 3, H336 Aquatic Chronic 2, H411

Full text of H and EUH phrases: see section 16

SECTION 4: First Aid Measures

4.1. Description of first aid measures

General first aid measures : IF exposure or potential exposure occurs, seek medical attention. If spontaneous or improperly induced vomiting, transport the person to a hospital to asses the risk of aspiration into the lungs.

First aid measures in case of inhalation : Move the person to a well-ventilated area, keep them warm and at rest. If the casualty is unconscious and not breathing: ensure the airway is clear and begin artificial respiration by trained personnel.. If necessary, perform external cardiac massage and seek medical attention. If the casualty is breathing: Keep in a lateral safety position. Administer oxygen if required.
If hydrogen sulfide (H2S) inhalation is suspected, rescuers must wear appropriate respiratory protective equipment, safety harness, and lifelines, and follow estabilished rescue procedures. Immediately transfer the casualty to a hospital. Begin artificial respiration immediately if breathing has stopped. Administer oxygen if necessary.

First aid measures in case of skin contact : Remove contaminated footwear and clothing and dispose of them safely. Wash skin with soap and water. If inflammation or irritation persists, seek medical attention. When using high-pressure equipment, product injection injuries may occur. Immediately transfer the injured person to the hospital. Do not wait for symptoms to appear.

First aid measures in case of eye contact : Remove contact lenses, if present, if the situation allows the operation to be carried out easily. Rinse thoroughly for at least 15 minutes. Keep the eyelids wide open. If irritation, blurred vision, or persistent swelling, consult a medical professional.

First aid measures in case of ingestion : Do not induce vomiting to prevent the risk of aspiration. If the person is conscious, rinse the mouth with water without swallowing. Keep at rest. Call a doctor or take to the hospital. If the person is unconscious, place them in the recovery position. In case of spontaneous vomiting, keep the head low, to reduce the risk of aspiration into the lungs.

4.2. Main symptoms and effects, both acute and delayed

Symptoms/effects : Potential chronic health effects should be considered.

Symptoms/effects in case of inhalation : Exposure to high concentrations of vapours, particularly in closed or poorly ventilated environments, may cause respiratory irritation, nausea, discomfort and dizziness.

Symptoms/effects in case of skin contact : Causes skin irritation. Repeated and prolonged contact may cause skin redness, irritation and contact dermatitis due to degreasing effect.

Symptoms/effects in case of contact with eyes : May cause mild irritation.

Symptoms/effects in case of ingestion : Ingestion of the fluid may result in aspiration into the lungs with the risk of chemical pneumonitis.

Symptoms/effects after intravenous administration : No information available.

Chronic symptoms : May cause cancer. May cause genetic defects. Suspected of damaging fertility or the unborn child.

4.3. Indication of immediate medical attention and special treatment needed

Seek medical attention if the injured person is in an altered state of consciousness, or if symptoms do not disappear. If swallowed, always assume aspiration has occured. Immediately transport the injured person to the hospital. Do not wait for symptoms to appear. If required, perform gastric lavage ONLY under qualified medical supervision.

SECTION 5: Firefighting Measures

5.1. Extinguishing media

Suitable extinguishing media : Small fires: carbon dioxide, dust, foam, sand or earth. Large fires: foam or water spray. These media should only be used by properly trained personnel. Other extinguishing gases (according to regulations).

Unsuitable extinguishing media : Do not use direct water jets. These can cause splashing, and extend the fire. Avoid the simultaneous use of foam and water on the same surface, as water destroys the foam.

5.2. Special hazards arising from the substance or mixture

Fire hazard : Highly flammable liquid and vapors.

Explosion hazard : Vapors are flammable and may form flammable and explosive mixtures with air. Heat may cause pressure to increase in tanks exposed to fire, leading to explotion, fire spread, and risk of burns and injury.

Hazardous combustion products in the event of fire : Incomplete combustion could generate a complex mixture of airborne solid and liquid particles and gases, including carbon monoxide and NOx (harmful/toxic gases). Oxygenated compounds (aldehydes, etc.). Solid particulate matter. Combustion product include sulphur oxides (SO2 and SO3) and hydrogen sulphide (H2S).

5.3. Advice for firefighters

Extinction instructions : If possible, block leaks at the source. Remove undamaged containers from the danger zone if it is possible to do so without danger. Cover any spills that have not caught fire with foam or earth. Use water jets to cool surfaces and containers exposed to flame or heat. If the fire cannot be controlled, evacuate the area.

Special equipment for fire-fighters : Personal protective equipment for firefighters (see also section 8). In the event of a fire or in confined or poorly ventilated spaces, wear full flame retardant protective clothing and a self-contained breathing apparatus with a full-face mask working under positive pressure. EN 15090. EN 443. EN 469. EN 659.

Other information : In case of a fire, do not disperse wastewater, residual product and other contaminated materials, but collect separately and treat appropriately.

SECTION 6: Accidental Release Measures

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

General measures : If safety conditions permit, stop or contain the leak at source. Eliminate all sources of ignition if safety conditions permit (e.g.: electricity, sparks, fires, torches). Avoid direct contact with the released material. Stay upwind. Use only non-sparking tools. In case of large spills, warn residents of areas downwind. If hazardous levels of hydrogen sulfide (H_2S) are suspected or confirmed in the spilled/released product, additional or specific actions may be necessary, such as restricted access, the use of specialized personal protective equipment (PPE), adoption of specific procedures, and dedicated personnel training.

6.1.1. For those who do not intervene directly

Protection media : See section 8.

Emergency procedures : Notify the emergency response teams. Except in the case of minor spills, the feasibility of the interventions must always be assessed and, if possible, approved by qualified and competent personnel responsible for managing the emergency.

6.1.2. For those who intervene directly

Protection media : Minor spills: Normal anti-static workwear is generally appropriate. Major spills: Full chemical-resistant protective clothing made of antistatic material. Chemical-resistant work gloves, especially those offering protection against aromatic hydrocarbons. Gloves made of PVA (polyvinyl alcohol) are not water-resistant and are not suitable for emergency use. Antistatic, chemical-resistant and non-slip safety shoes or boots. Safety helmet. Protective goggles and/or face protection if splashing or eye contact is possible or foreseeable. Respiratory protection: A half or full-face mask with filter(s) for organic vapours (AX) and, where applicable, for hydrogen sulfide (H2S (B)), or a self-contained breathing apparatus may be used, depending on the extent of the spill and the anticipated exposure levels. If the situation cannot be fully assessed or if there is a risk of oxygen deficiency, only a self-contained breathing apparatus should be used.

Emergency procedures : In the event of major spills, alert residents in areas downwind. Notify the competent authorities in accordance with current regulations.

6.2. Environmental precautions

Prevent the product from accumulating in confined spaces or below ground level. Avoid discharge into sewers, watercourses, or any uncontrolled release into the environment. In the event of contamination of environmental matrices (soil, subsoil, surface water, or groundwater), remove contaminated soil where possible and, in any case, treat the affected matrices in accordance with Legislative Decree 152/06 and its subsequent amendments (as well as any applicable local regulations). The site must have a spill response plan in place to ensure that adequate safeguards are available to minimise the impact of accidental releases. Risk of contamination of drinking water sources (groundwater).

6.3. Methods and materials for containment and remediation

Methods for containment : Contain and absorb the product using earth, sand, or another suitable non-flammable absorbent material. Collect the product and any contaminated material in impermeable, hydrocarbon-resistant containers. Recover or dispose of the material in accordance with Legislative Decree 152/06 and subsequent amendments. Large spills may be carefully covered with foam, if available, to prevent fire hazards. Do not use direct water jets. Inside buildings or confined spaces, ensure adequate ventilation. If in water: In case of small spills in enclosed water bodies (e.g.: in ports),remove the spilled product from the surface using suitable absorbent materials. Collect the product and anyresultingwaste in waterproof and hydrocarbon-resistant containers. Send for recovery or disposal in accordance with Legislative Decree 152/06 and subsequent amendments and additions. If possible, contain larger spills into the water by using floating booms or other appropriate mechanical means. If this is not possible, isolate the area and prevent fire or explosion risks for vessels and other structures, taking into account the wind direction and speed, until the product is fully dispersed.

Other information	:	Provide a containment structure around storage facilities to prevent soil and water contamination in the event of leaks. Do not use solvents or dispersing agents unless expressly recommended by an expert and, where required, authorized by the competent local authorities. The recommended measures are based on the most probable spill scenarios for this product. Local conditions (wind, air temperature wave and current direction and speed) may significantly influence the choice of action to be taken. The concentration of H2S at the top of tanks or containers can reach hazardous levels, especially in cases of prolonged storage. This situation is particularly relevant for operations involving direct exposure to vapors inside tanks or other confined spaces. The spillage of a limited amount of product, particularly in open air, where vapours disperse more quickly, presents a dynamic scenario that can presumably limit exposure to dangerous concentrations. Since H2S is denser than ambient air, a possible exception may involve the accumulation of hazardous concentrations in specific areas such as ditches, depressions or enclosed spaces. In all these circumstances, however, the correct intervention must be assessed on a case-by-case basis.

6.4. Reference to other sections

For further information, see section 8: "Exposure control-personal protection". For further information, see section 13.

SECTION 7: Handling and Storage

7.1. Precautions for safe handling

Precautions for safe handling	:	Obtain special instructions before use. Ensure that all provisions regarding handling and storage of flammable products are properly complied with. Do not use electrical appliances (mobile phones, etc.) that are not approved for use according to the risk characteristics of the area. Do not use compressed air when filling, draining, or handling. Keep away from heat sources/sparks/open flames/hot surfaces. Use and store only outdoors or in a well-ventilated area. During transfer and mixing operations, ensure proper grounding of equipment and avoid the accumulation of electrical charges. Use only bottom loading for tanks, in accordance with the relevant European legislation. Before accessing storage tanks and starting any intervention in confined spaces (e.g. tunnels), carry out adequate cleaning, check the atmosphere and verify oxygen content and flammability levels. Empty containers may contain combustible product residues. Do not puncture, cut, grind, weld, braze, burn, or incinerate unreclaimed empty containers or drums. The product can release hydrogen sulphide: carry out a specific assessment of inhalation risks due to the presence of hydrogen sulphide in the free spaces of tanks, confined spaces, residues and excess product, sludge and wastewater of tanks, and in all situations of unintentional release, to determine the best control according to local conditions. Use only in well-ventilated areas. Avoid contact with skin and eyes during handling. Use the required personal protective equipment.
Hygiene measures	:	Use appropriate personal protective equipment if necessary. Do not breathe fumes/mists/vapors. Avoid contact with skin. Wash hands thoroughly after handling. Do not ingest. Do not smoke. Do not drink or eat while using. Contaminated material must not accumulate in the workplace and should never be stored in pockets. Do not reuse clothing that is still contaminated. Wash hands and other exposed skin areas with mild soap and water before eating, drinking, smoking and when leaving the workplace. Keep work clothing separate from civilian clothing. Wash them separately.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions	:	Store in a dry and well-ventilated place. Do not smoke. Keep away from open flames, hot surfaces and ignition sources. Vapours are heavier than air, and may spread along the ground. Pay particular attention to accumulation in pits and confined spaces.
Incompatible products	:	Keep away from: strong oxidizing agents.
Incompatible materials	:	Some synthetic materials may not be suitable for containers or coatings based on the characteristics of the material and the intended use. Check compatibility with the manufacturer.

Storage location	:	The structure of the storage area, the characteristics of the tanks, the equipment and the operating procedures must comply with the relevant legislation at European, national or local level. Storage facilities/areas must be equipped with appropriate systems to prevent soil and water contamination in the event of leaks or spills. The cleaning, inspection and maintenance of the internal structure of the storage tanks must be carried out by qualified and properly equipped personnel, as established by national, local, or company regulations.
Packaging and containers:	:	If the product is supplied in containers: Keep containers tightly closed and correctly labeled. Store only in the original container or in a container suitable for the type of product. Keep away from sunlight and other heat sources. Light hydrocarbon vapours may accumulate at the top of the containers. Open slowly to control any pressure release. Empty containers may contain flammable product residues. Do not weld, braze, drill, cut, or incinerate empty containers unless they have been properly cleaned/decontaminated.
Packaging Materials	:	For the manufacture of containers or internal coatings, use approved material suitable for the use of the product. Use mild steel and stainless steel for containers and coatings. Some synthetic materials may not be suitable for containers or coatings based on the characteristics of the material and the intended uses. Verify compatibility with the manufacturer..

7.3. Special end-uses

See the list of identified uses and exposure scenarios in the annex to the safety data sheet.

SECTION 8: Exposure Controls /Personal Protective

8.1. Control parameters

8.1.1 National occupational and biological exposure limit values

Gasoline (Low Boiling Point Naphtha - Unspecified) (Benzene > 0.1% w) (86290-81-5)	
Belgium - Occupational exposure limit values	
OEL TWA	900 mg/m³
	300 ppm
OEL STEL	1500 mg/m³
	500 ppm
Ireland - Occupational exposure limit values	
OEL TWA	300 ppm
OEL STEL	500 ppm
Netherlands - Occupational exposure limit values	
TGG-8u (OEL TWA)	240 mg/m³
TGG-15min (OEL STEL)	480 mg/m³
Romania - Occupational exposure limit values	
OEL TWA	300 mg/m³
OEL STEL	500 mg/m³
Spain - Occupational exposure limit values	
VLA-ED (OEL TWA)	300 ppm
Sweden - Occupational exposure limit values	
NGV (OEL TWA)	180 mg/m³
	50 ppm
KGV (OEL STEL)	250 mg/m³
	75 ppm

Gasoline (Low Boiling Point Naphtha - Unspecified) (Benzene > 0.1% w) (86290-81-5)	
Norway - Occupational exposure limit values	
Grenseverdi (OEL TWA)	500 mg/m³
	100 ppm
USA - ACGIH - Occupational Exposure Limit Values	
ACGIH® TLV® TWA	300 ppm
ACGIH® TLV® STEL	500 ppm

tert-butylmethyl ether; MTBE; 2-methoxy-2-methylpropane (1634-04-4)	
EU - Indicative Occupational Exposure Limit Value (IOEL)	
IOEL TWA	183.5 mg/m³
	50 ppm
IOEL STEL	367 mg/m³
	100 ppm
Austria - Occupational exposure limit values	
MAK (OEL TWA)	50 ppm
MAK (OEL STEL)	100 ppm
Belgium - Occupational exposure limit values	
OEL TWA	40 ppm
Denmark - Occupational exposure limit values	
OEL TWA	40 ppm
OEL STEL	80 ppm
Germany - Occupational exposure limit values (TRGS 900)	
AGW (OEL TWA)	50 ppm
AGW (OEL C) [ppm]	75 ppm
Italy - Occupational exposure limit values	
OEL TWA	183.5 mg/m³
	50 ppm
OEL STEL	367 mg/m³
	100 ppm
Spain - Occupational exposure limit values	
VLA-ED (OEL TWA)	40 ppm
Sweden - Occupational exposure limit values	
NGV (OEL TWA)	30 ppm
KGV (OEL STEL)	60 ppm
United Kingdom - Occupational exposure limit values	
WEL TWA (OEL TWA)	25 ppm
WEL STEL (OEL STEL)	75 ppm
Switzerland - Occupational exposure limit values	
MAK (OEL TWA)	50 ppm
KZGW (OEL STEL)	75 ppm

tert-butylmethyl ether; MTBE; 2-methoxy-2-methylpropane (1634-04-4)	
USA - ACGIH - Occupational Exposure Limit Values	
ACGIH® TLV® TWA	50 ppm
Observation (ACGIH)	ACGIH 2015

Ethyl T-Butyl Ether (637-92-3)	
Belgium - Occupational exposure limit values	
OEL TWA	21 mg/m³
	5 ppm
Finland - Occupational exposure limit values	
HTP (OEL TWA)	25 mg/m³
	5 ppm
Germany - Occupational exposure limit values (TRGS 900)	
AGW (OEL C) [ppm]	75 ppm
Ireland - Occupational exposure limit values	
OEL TWA	25 ppm
Poland - Occupational exposure limit values	
NDS (OEL TWA)	100 mg/m³
Spain - Occupational exposure limit values	
VLA-ED (OEL TWA)	21 mg/m³
	5 ppm

2-methyl-2-methoxybutane; Terz-amyl methyl ether (994-05-8)	
Belgium - Occupational exposure limit values	
OEL TWA	85 mg/m³
	20 ppm
Finland - Occupational exposure limit values	
HTP (OEL TWA)	84 mg/m³
	20 ppm
USA - ACGIH - Occupational Exposure Limit Values	
ACGIH® TLV® TWA	20 ppm (ACGIH 2021)

ethanol, ethyl alcohol (64-17-5)	
Austria - Occupational exposure limit values	
MAK (OEL TWA)	1900 mg/m³
	1000 ppm
MAK (OEL STEL)	3800 mg/m³
	2000 ppm
Belgium - Occupational exposure limit values	
OEL TWA	1907 mg/m³
	1000 ppm

ethanol, ethyl alcohol (64-17-5)	
Denmark - Occupational exposure limit values	
OEL TWA	1900 mg/m³
	1000 ppm
OEL STEL	3800 mg/m³
	2000 ppm
Finland - Occupational exposure limit values	
HTP (OEL TWA)	1900 mg/m³
	1000 ppm
HTP (OEL STEL)	2500 mg/m³
	1300 ppm
France - Occupational exposure limit values	
VME (OEL TWA)	1900 mg/m³
	1000 ppm
VLE (OEL C/STEL)	9500 mg/m³
	5000 ppm
Germany - Occupational exposure limit values (TRGS 900)	
AGW (OEL TWA)	380 mg/m³
	200 ppm
AGW (OEL C)	1520 mg/m³
AGW (OEL C) [ppm]	800 ppm
Hungary - Occupational exposure limit values	
AK (OEL TWA)	1900 mg/m³
CK (OEL STEL)	7600 mg/m³
Ireland - Occupational exposure limit values	
OEL STEL	1000 ppm
Latvia - Occupational exposure limit values	
OEL TWA	1000 mg/m³
Netherlands - Occupational exposure limit values	
TGG-8u (OEL TWA)	260 mg/m³
TGG-15min (OEL STEL)	1900 mg/m³
Poland - Occupational exposure limit values	
NDS (OEL TWA)	1900 mg/m³
Romania - Occupational exposure limit values	
OEL TWA	1900 mg/m³
	1000 ppm
OEL STEL	9500 mg/m³
	5000 ppm
Spain - Occupational exposure limit values	
VLA-EC (OEL STEL)	1910 mg/m³

ethanol, ethyl alcohol (64-17-5)	
	1000 ppm
Sweden - Occupational exposure limit values	
NGV (OEL TWA)	1000 mg/m³
	500 ppm
KGV (OEL STEL)	1900 mg/m³
	1000 ppm
United Kingdom - Occupational exposure limit values	
WEL TWA (OEL TWA)	1920 mg/m³
	1000 ppm
Switzerland - Occupational exposure limit values	
MAK (OEL TWA)	960 mg/m³
	500 ppm
KZGW (OEL STEL)	1920 mg/m³
	1000 ppm
USA - ACGIH - Occupational Exposure Limit Values	
ACGIH® TLV® STEL	1900 mg/m³
	1000 ppm

Toluene (108-88-3)	
EU - Indicative Occupational Exposure Limit Value (IOEL)	
IOEL TWA	192 mg/m³
	50 ppm
IOEL STEL	384 mg/m³
	100 ppm
Austria - Occupational exposure limit values	
MAK (OEL TWA)	190 mg/m³
	50 ppm
MAK (OEL STEL)	380 mg/m³
	100 ppm
Belgium - Occupational exposure limit values	
OEL TWA	77 mg/m³
	20 ppm
OEL STEL	384 mg/m³
	100 ppm
Denmark - Occupational exposure limit values	
OEL TWA	94 mg/m³
	25 ppm
OEL STEL	188 mg/m³
	50 ppm

Toluene (108-88-3)	
Finland - Occupational exposure limit values	
HTP (OEL TWA)	81 mg/m³
	25 ppm
HTP (OEL STEL)	380 mg/m³
	100 ppm
France - Occupational exposure limit values	
VME (OEL TWA)	76.8 mg/m³
	20 ppm
VLE (OEL C/STEL)	384 mg/m³
	100 ppm
Germany - Occupational exposure limit values (TRGS 900)	
AGW (OEL TWA)	190 mg/m³
	50 mg/m³
AGW (OEL C)	380 mg/m³
AGW (OEL C) [ppm]	100 ppm
Hungary - Occupational exposure limit values	
AK (OEL TWA)	190 mg/m³
CK (OEL STEL)	380 mg/m³
Ireland - Occupational exposure limit values	
OEL TWA	192 mg/m³
	50 ppm
OEL STEL	384 mg/m³
	100 ppm
Italy - Occupational exposure limit values	
OEL TWA	192 mg/m³
	50 ppm
Latvia - Occupational exposure limit values	
OEL TWA	50 mg/m³
	14 ppm
OEL STEL	150 mg/m³
	40 ppm
Netherlands - Occupational exposure limit values	
TGG-8u (OEL TWA)	150 mg/m³
	39 ppm
TGG-15min (OEL STEL)	384 mg/m³
	100 ppm
Poland - Occupational exposure limit values	
NDS (OEL TWA)	100 mg/m³
NDSCh (OEL STEL)	200 mg/m³

Toluene (108-88-3)	
Romania - Occupational exposure limit values	
OEL TWA	192 mg/m³
	50 ppm
OEL STEL	384 mg/m³
	100 ppm
Spain - Occupational exposure limit values	
VLA-ED (OEL TWA)	192 mg/m³
	50 ppm
VLA-EC (OEL STEL)	384 mg/m³
	100 ppm
Sweden - Occupational exposure limit values	
NGV (OEL TWA)	192 mg/m³
	50 ppm
KGV (OEL STEL)	384 mg/m³
	100 ppm
United Kingdom - Occupational exposure limit values	
WEL TWA (OEL TWA)	191 mg/m³
	50 ppm
WEL STEL (OEL STEL)	384 mg/m³
	100 ppm
Norway - Occupational exposure limit values	
Grenseverdi (OEL TWA)	94 mg/m³
	25 ppm
Switzerland - Occupational exposure limit values	
MAK (OEL TWA)	190 mg/m³
	50 ppm
KZGW (OEL STEL)	760 mg/m³
	200 ppm
USA - ACGIH - Occupational Exposure Limit Values	
ACGIH® TLV® TWA	75.4 mg/m³
	20 ppm

benzene (71-43-2)	
EU - Binding Occupational Exposure Limit (BOEL)	
Local name	Benzene
BOEL TWA	0.66 mg/m³ (Limit value from 5 April 2026)1.65 mg/m³ (Limit value until 5 April 2026)
	0,2 ppm (Limit value from 5 April 2026)0,5 ppm (Limit value until 5 April 2026)
Notes	Skin (possible substantial contribution to total body burden via dermal exposure)
Regulatory reference	DIRECTIVE (EU) 2022/431 (amending Directive 2004/37/EC)

benzene (71-43-2)	
EU - Biological Limit Value (BLV)	
Local name	Benzene
BLV	28 µg/l Parameter: benzene - Medium: blood - Sampling time: immediately at the end of the shift 46 µg/g creatine Parameter: phenylmercapturic - Medium: urine - Sampling time: end of exposure/shift
Regulatory reference	SCOEL List of recommended health-based BLVs and BGVs
Austria - Occupational exposure limit values	
MAK (OEL TWA)	3,2 mg/m³
	1 ppm
MAK (OEL STEL)	1,.8 mg/m³
	4 ppm
Belgium - Occupational exposure limit values	
OEL TWA	3,25 mg/m³
	1 ppm
Denmark - Occupational exposure limit values	
OEL TWA	1,6 mg/m³
	0,5 ppm
OEL STEL	3,2 mg/m³
	1 ppm
Finland - Occupational exposure limit values	
HTP (OEL TWA)	3,25 mg/m³
	1 ppm
France - Occupational exposure limit values	
VME (OEL TWA)	3,25 mg/m³
	1 ppm
Germany - Occupational exposure limit values (TRGS 900)	
AGW (OEL TWA)	1,9 mg/m³
	0,6 ppm
AGW (OEL C)	15,2 mg/m³
AGW (OEL C) [ppm]	4,8 ppm
Hungary - Occupational exposure limit values	
AK (OEL TWA)	3,25 mg/m³
	1 ppm
Ireland - Occupational exposure limit values	
OEL TWA	3,25 mg/m³
	1 ppm
Italy - Occupational exposure limit values	
Local name	Benzene
OEL TWA	0,66 mg/m³1.65 mg/m³ Limit value until 5 April 2026

benzene (71-43-2)	
	0,2 ppm0.5 ppm Limit value until 5 April 2026
Observation	Skin
Regulatory reference	Annex XLIII of Legislative Decree No. 135 of 4 September 2024 - Protection from carcinogens, mutagens or substances toxic to reproduction
Latvia - Occupational exposure limit values	
OEL TWA	3,25 mg/m³
	1 ppm
Netherlands - Occupational exposure limit values	
TGG-8u (OEL TWA)	0,7 mg/m³
Poland - Occupational exposure limit values	
NDS (OEL TWA)	1,6 mg/m³
Romania - Occupational exposure limit values	
OEL TWA	3,25 mg/m³
	1 ppm
Spain - Occupational exposure limit values	
VLA-ED (OEL TWA)	3,25 mg/m³
	1 ppm
Sweden - Occupational exposure limit values	
NGV (OEL TWA)	1,5 mg/m³
	0,5 ppm
KGV (OEL STEL)	9 mg/m³
	3 ppm
United Kingdom - Occupational exposure limit values	
WEL TWA (OEL TWA)	3,25 mg/m³
	1 ppm
Norway - Occupational exposure limit values	
Grenseverdi (OEL TWA)	0,66 mg/m³
	0,2 ppm
Switzerland - Occupational exposure limit values	
MAK (OEL TWA)	0,7 mg/m³
	0,2 ppm
USA - ACGIH - Occupational Exposure Limit Values	
ACGIH® TLV® TWA	0,5 ppm (A1, ACGIH 2021)
ACGIH® TLV® STEL	2,5 ppm (A1, ACGIH 2021)

n-Hexane (110-54-3)	
EU - Indicative Occupational Exposure Limit Value (IOEL)	
Local name	n-Hexane
IOEL TWA	72 mg/m³
	20 ppm

n-Hexane (110-54-3)	
Regulatory reference	COMMISSION DIRECTIVE 2006/15/EC
Austria - Occupational exposure limit values	
MAK (OEL TWA)	72 mg/m³
	20 ppm
MAK (OEL STEL)	288 mg/m³
	80 ppm
Belgium - Occupational exposure limit values	
OEL TWA	72 mg/m³
	20 ppm
Denmark - Occupational exposure limit values	
OEL TWA	72 mg/m³
	20 ppm
OEL STEL	144 mg/m³
	40 ppm
Finland - Occupational exposure limit values	
HTP (OEL TWA)	72 mg/m³
	20 ppm
France - Occupational exposure limit values	
VME (OEL TWA)	72 mg/m³
	20 ppm
Germany - Occupational exposure limit values (TRGS 900)	
AGW (OEL TWA)	180 mg/m³
	50 ppm
AGW (OEL C)	1440 mg/m³
AGW (OEL C) [ppm]	400 ppm
Hungary - Occupational exposure limit values	
AK (OEL TWA)	72 mg/m³
Ireland - Occupational exposure limit values	
OEL TWA	72 mg/m³
	20 ppm
Italy - Occupational exposure limit values	
Local name	n-Hexane
OEL TWA	72 mg/m³
	20 ppm
Regulatory reference	Annex XXXVIII of Legislative Decree No. 135 of 4 September 2024
Latvia - Occupational exposure limit values	
OEL TWA	72 mg/m³
	20 ppm

n-Hexane (110-54-3)	
Netherlands - Occupational exposure limit values	
TGG-8u (OEL TWA)	72 mg/m³
	20 ppm
TGG-15min (OEL STEL)	144 mg/m³
	40 ppm
Poland - Occupational exposure limit values	
NDS (OEL TWA)	72 mg/m³
Romania - Occupational exposure limit values	
OEL TWA	72 mg/m³
	20 ppm
Spain - Occupational exposure limit values	
VLA-ED (OEL TWA)	72 mg/m³
	20 ppm
Sweden - Occupational exposure limit values	
NGV (OEL TWA)	72 mg/m³
	20 ppm
KGV (OEL STEL)	180 mg/m³
	50 ppm
United Kingdom - Occupational exposure limit values	
WEL TWA (OEL TWA)	72 mg/m³
	20 ppm
Norway - Occupational exposure limit values	
Grenseverdi (OEL TWA)	72 mg/m³
	20 ppm
Switzerland - Occupational exposure limit values	
MAK (OEL TWA)	180 mg/m³
	50 ppm
KZGW (OEL STEL)	1440 mg/m³
	400 ppm
USA - ACGIH - Occupational Exposure Limit Values	
ACGIH® TLV® TWA	50 ppm (ACGIH 2021)

8.1.2. Recommended monitoring procedures

Monitoring methods	
Monitoring methods	Monitoring procedures must be selected based on the guidelines established by the competent local authorities or national employment contracts. Refer to Legislative Decree 81/2008 and good industrial hygiene practices. UNI EN 482:2021: Workplace exposure-Procedures for the determination of the concentration of chemical agents - Basic performance requirements. UNI EN 689:2019: Workplace exposure - Measurement of exposure by inhalation to chemical agents - Strategy for compliance assessment with exposure limit values.

8.1.3. Formation of Air Contaminants

Applicable OEL and BLV for air contaminants : None known

8.1.4. DNEL and NECP

Gasoline (all types)	
DNEL/DMEL (additional information)	
Further information	Not applicable
NECP (additional information)	
Further information	Not applicable

Gasoline (Low Boiling Point Naphtha - Unspecified) (Benzene > 0.1% w) (86290-81-5)	
DNEL/DMEL (Workers)	
Acute - systemic effects, inhalation	1300 mg/m³ (DNEL, 15 min)
Acute - local effects, inhalation	1100 mg/m³ (DNEL, 15 min)
Long-term - systemic effects, dermal	23,4 mg/kg body weight/day (DNEL, 8h)
Long-term - systemic effects, inhalation	3.2 mg/m³/day (DNEL, 8h)
DNEL/DMEL (General Population)	
Acute - systemic effects, inhalation	1200 mg/m³ (DNEL, 15 min)
Acute - local effects, inhalation	640 mg/m³ (DNEL, 15 min)
Long-term - systemic effects, inhalation	≥ 180 mg/m³/day (DNEL, 8 h)
Long-term - local effects, inhalation	180 mg/m³ (DNEL, 8 h)
NECP (additional information)	
Further information	Not applicable (UVCB)

tert-butylmethyl ether; MTBE; 2-methoxy-2-methylpropane (1634-04-4)	
DNEL/DMEL (Workers)	
Acute - local effects, inhalation	357 mg/m³
Long-term - systemic effects, dermal	5100 mg/kg bw/day
Long-term - systemic effects, inhalation	178.5 mg/m³
DNEL/DMEL (General Population)	
Acute - local effects, inhalation	214 mg/m³
Long-term - systemic effects, oral	7,1 mg/kg body weight/day
Long-term - systemic effects, inhalation	53.6 mg/m³
Long-term - systemic effects, dermal	3570 mg/kg body weight/day
PNEC (Water)	
PNEC aqua (fresh water)	5,1 mg/l
PNEC aqua (seawater)	260 µg/l
PNEC aqua (intermittent, fresh water)	47,2 mg/l
PNEC (Sediment)	
Sediment (fresh water)	23 mg/kg dwt
Sediment (seawater)	1,17 mg/kg dwt
NECP (Soil)	
Soil NECP	1,56 mg/kg dwt

tert-butylmethyl ether; MTBE; 2-methoxy-2-methylpropane (1634-04-4)	
NECP (STP)	
Wastewater treatment plant	71 mg/l

Ethyl T-Butyl Ether (637-92-3)	
DNEL/DMEL (Workers)	
Acute - systemic effects, inhalation	2800 mg/m³
Long-term - systemic effects, dermal	6767 mg/kg body weight/day
Long-term - systemic effects, inhalation	352 mg/m³
Long-term - local effects, inhalation	105 mg/m³
DNEL/DMEL (General Population)	
Acute - systemic effects, inhalation	1680 mg/m³
Long-term - systemic effects, oral	6 mg/kg body weight/day
Long-term - systemic effects, inhalation	105 mg/m³
Long-term - systemic effects, dermal	4060 mg/kg body weight/day
Long-term - local effects, inhalation	63 mg/m³
PNEC (Water)	
PNEC aqua (fresh water)	0,51 mg/l
PNEC aqua (seawater)	0,017 mg/l
PNEC aqua (intermittent, fresh water)	11 mg/l
PNEC (Sediment)	
Sediment (fresh water)	2,86 mg/kg dwt
Sediment (seawater)	0.078 mg/kg dwt
NECP (Soil)	
Soil NECP	0,24 mg/kg dwt
NECP (STP)	
Wastewater treatment plant	12,5 mg/l

2-methyl-2-methoxybutane; Terz-amyl methyl ether (994-05-8)	
DNEL/DMEL (Workers)	
Acute - systemic effects, inhalation	353,3 mg/m³
Long-term - systemic effects, dermal	1601 mg/kg body weight/day
Long-term - systemic effects, inhalation	88,8 mg/m³
DNEL/DMEL (General Population)	
Acute - systemic effects, inhalation	212 mg/m³
Long-term - systemic effects, oral	1 mg/kg body weight/day
Long-term - systemic effects, inhalation	26,5 mg/m³
Long-term - systemic effects, dermal	961 mg/kg body weight/day
PNEC (Water)	
PNEC aqua (fresh water)	0,51 mg/l
PNEC aqua (seawater)	0,0339 mg/l

2-methyl-2-methoxybutane; Terz-amyl methyl ether (994-05-8)	
PNEC aqua (intermittent, fresh water)	10 mg/l
PNEC (Sediment)	
Sediment (fresh water)	2,99 mg/kg dwt
Sediment (seawater)	0,199 mg/kg dwt
NECP (Soil)	
Soil NECP	0,301 mg/kg dwt
NECP (STP)	
Wastewater treatment plant	25 mg/l

ethanol, ethyl alcohol (64-17-5)	
DNEL/DMEL (Workers)	
Acute - local effects, inhalation	1900 mg/m³
Long-term - systemic effects, dermal	343 mg/kg body weight/day
Long-term - systemic effects, inhalation	950 mg/m³
PNEC (Water)	
PNEC aqua (fresh water)	0,96 mg/l
PNEC aqua (seawater)	0,79 mg/l
PNEC (Sediment)	
Sediment (fresh water)	3,6 mg/kg dwt
Sediment (seawater)	2,9 mg/kg dwt
NECP (Soil)	
Soil NECP	0,63 mg/kg dwt
PNEC (Oral)	
Oral PNEC (secondary poisoning)	720 mg/kg food

Note : The derived no-effect level (DNEL) is a safe level of exposure derived from toxicological data in accordance with specific guidelines contained in the European REACH legislation. The DNEL may differ from an occupational exposure limit (OEL) value for the same chemical substance. OELs may be recommended by an individual company, a governmental regulatory bodies or an expert organisation such as the Scientific Committee on Occupational Exposure Limit Values (SCOEL) or the American Conference of Governmental Industrial Hygienists (ACGIH). OELs are considered safe exposure levels for a typical worker in an 8-hour shift, with a 40-hour workweek, as a time-weighted average concentration (TWA) or a short-term (15-minute) exposure limit (STEL). Although they are also considered as health protection indicators, the OEL is derived by a different process from the REACH.

8.1.5. Control Band

Control band : None established

8.2. Exposure Controls

8.2.1. Appropriate Technical Controls

Appropriate Technical Controls:
Minimize exposure to mists/vapors/aerosols. Before accessing storage tanks and starting any intervention in a confined space (e.g. tunnels), check the atmosphere and verify oxygen content, presence of hydrogen sulfide (H2S) and SOx, and flammability.

8.2.2. Personal protective equipment

Personal protective equipment:
Full face mask (for conditions of use, see: "Respiratory protection"). Face shield. Safety goggles. Protective clothing. Protective Gloves. Safety footwear.

Personal Protective Equipment symbol(s):

8.2.2.1. Eye and face protection

Eye Protection:
Wear safety goggles or face shield. ISO 16321-1

8.2.2.2. Skin protection

Skin and body protection:
Protective clothing (EN 14605 or EN 13034). EN ISO 20346. EN 1149-5. Contaminated clothing must be washed before reuse.

Hand protection:
Protective gloves. Recommended materials: nitrile (NBR) or PVC with a protection index of at least 5 (permeation time ≥240 min). Use gloves in accordance with the manufacturer's instructions and limitations. Immediately replace gloves if they show cuts, holes, or other signs of damage. Refer to standard UNI EN 374 where applicablePersonal hygiene is essential for effective hand protection. Gloves should be worn only on clean hands. After glove removal, hands must be thoroughly washed and dried.

Other skin protection
Clothing - material selection:
Personnel must wear antistatic clothing made of natural fibers or high-temperature-resistant synthetic fibres.

8.2.2.3. Respiratory protection

Respiratory protection:
Apart from other possible actions (plant modifications, operating procedures and other means to reduce workers' exposure), personal protective equipment shall be indicated which may be adopted as necessary. In ventilated or outdoor environments: if the product is handled without suitable vapor containment systems, use masks or half-masks with a hydrocarbon vapor (AX) filter. (EN 136/140/145). In areas where hydrogen sulfide may accumulate, use approved respiratory protective devices: full face masks equipped with Type B filter cartridge (gray for organic vapors, including H2S), or self-contained breathing apparatus. (EN 136/140/145). Combined gas/dust respirator with filter type: EN 14387. In confined spaces (e.g. inside tanks): the use of respiratory protective devices (half masks, full-face masks, breathing apparatus) must be evaluated based on the work activity, the expected duration and intensity of exposure. For technical specifications, refer to the Ministerial Decree 02/05/2001. If exposure levels cannot be determined or estimated with good certainty, or if oxygen deficiency is possible, use only a self-contained respirator.

8.2.2.4. Thermal hazards

Protection against thermal hazards:
None under normal use.

8.2.3. Environmental exposure controls

Environmental exposure controls:
Do not dispose of the product in the environment. Storage facilities/areas must be equipped with appropriate systems to prevent contamination of soil and water in the event of leaks or spills. Prevent the release of undissolved substances into, or recover them from, wastewater. On-site wastewater treatment is required. Do not distribute the sludge generated by industrial water treatment on natural soils. Sludge generated by industrial water treatment shall be incinerated, contained or treated.
Limitation and control of consumer exposure:
Not applicable.

SECTION 9: Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

Physical state	:	Liquid
Color	:	light yellow.
Appearance	:	Clear liquid.
Odour	:	Similar to oil.
Olfactory threshold	:	Data not available (for mixture/components of the mixture)

Melting Point	:	Not applicable
Freezing point	:	< -60 °C
Boiling point	:	≤ 35 °C
Flammability	:	Highly flammable liquid and vapors.
Explosive properties	:	None (based on composition).
Oxidizing properties	:	None (based on composition).
Lower explosive limit	:	1,4 vol %
Upper explosive limit	:	7,6 vol %
Flash point	:	< -40 °C (EN ISO 13736)
Auto-ignition temperature	:	> 280 °C (CAS 64741-55-5)
Decomposition Temperature	:	Data not available (on mixture/mixture components)
ph	:	Not applicable.
Kinematics viscosity	:	< 1 mm²/s (40 °C) (ASTM D 445)
Dynamic viscosity	:	Lack of data (on mixture/mixture components) – Data not available
Solubility	:	Water: Partially soluble
Partition coefficient n-octanol/water (Log Kow)	:	Not applicable for mixtures
Partition coefficient n-octanol/water (Log Pow)	:	Not applicable for mixtures
Vapour pressure	:	4 – 140 kPa (37.8 °C) (EN 13016) (CAS 64741-55-5)
Vapour pressure at 50°C	:	Data not available (on mixture/mixture components)
Density	:	720 – 780 kg/m³ (EN ISO 12185) (CAS 6471-55-5)
Relative Density	:	Data not available (on mixture/mixture components)
Relative vapor density at 20°C	:	Unavailable
Particle characteristics	:	Not applicable

9.2. Other information

9.2.1. Information regarding physical hazard classes

No further information available

9.2.2. Other safety characteristics

Relative evaporation rate (butylacetate=1)	:	Data not available (on mixture/mixture components)
Further information	:	Data not available

SECTION 10: Stability and Reactivity

10.1. Reactivity

The mixture does not present any additional reactivity hazards compareted to the following subheadings.

10.2. Chemical Stability

Stable product based on its intrinsic properties.

10.3. Potential of dangerous reactions

No hazardous reactions are foreseeable (under normal storage and handling conditions). Contact with strong oxidants (such as peroxides and chromates) can cause a fire hazard. Sensitivity to heat, friction and shock cannot be assessed in advance.

10.4. Conditions to be avoided

Keep away from open flames, hot surfaces and ignition sources. Avoid the accumulation of electrostatic charges. Do not smoke.

10.5. Incompatible Materials

Oxidizing agents.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, no dangerous decomposition products should be created. Thermal decomposition generates: Toxic fumes.

SECTION 11: Toxicological information

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

Acute toxicity (oral) : Not classified (Based on available data, the classification criteria are not met)
Acute toxicity (dermal) : Not classified (Based on available data, the classification criteria are not met)
Acute toxicity (inhalation) : Not classified (Based on available data, the classification criteria are not met)
Further information : (depending on composition)

Gasoline (Low Boiling Point Naphtha - Unspecified) (Benzene > 0.1% w) (86290-81-5)	
DL50 oral rat	> 5000 mg/kg (OECD 401)
DL50 Skin Rabbit	> 2000 mg/kg (OECD 402)
CL50 Inhalation - Rat	> 5.16 mg/l (OECD 403)

tert-butylmethyl ether; MTBE; 2-methoxy-2-methylpropane (1634-04-4)	
DL50 oral rat	≈ 4000 mg/kg (OECD 401)
DL50 Dermal Rat	> 2000 mg/kg (OECD 402)
DL50 Dermal Rabbit	> 10000 (OECD 402)
CL50 Inhalation - Rat	85 mg/l/4h (OECD 403)

Ethyl T-Butyl Ether (637-92-3)	
DL50 oral rat	> 2000 mg/kg (OECD 401)
DL50 Dermal Rabbit	> 2000 (OECD 402)
CL50 Inhalation - Rat	> 5.88 mg/l/4h (OECD 403)

2-methyl-2-methoxybutane; Terz-amyl methyl ether (994-05-8)	
DL50 oral rat	1602 – 2417 mg/kg body weight
DL50 Dermal Rabbit	> 2000 mg/kg body weight (OECD 402)
CL50 Inhalation - Rat	> 5.4 mg/l air (OECD 403)

ethanol, ethyl alcohol (64-17-5)	
DL50 oral rat	6200 – 15000 mg/kg body weight (equivalent to OECD Method 401)
DL50 Dermal Rabbit	20 g/kg
CL50 Inhalation - Rat	0,05 mg/l/4h (equivalent to OECD Method 403)

Toluene (108-88-3)	
DL50 oral rat	5580 mg/kg body weight
DL50 Dermal Rabbit	> 5000 mg/kg body weight
CL50 Inhalation - Rat	28.1 mg/l/4h

benzene (71-43-2)	
DL50 oral rat	> 2000 mg/kg body weight (OECD 401)
CL50 Inhalation - Rat	43,767 mg/l air, Animal: rat, Animal sex: female, Guideline: OECD Guideline 403 (Acute Inhalation Toxicity), 95% CL: 41690 - 45939

n-Hexane (110-54-3)	
DL50 oral rat	24 ml/kg OECD 401
DL50 Skin Rabbit	> 2000 mg/kg OECD 402
CL50 Inhalation - Rat [ppm]	> 5 ppm OECD 403

Skin corrosion/ irritation : Causes skin irritation.
pH: Not applicable.
Further information : (depending on the composition)

Gasoline (Low Boiling Point Naphtha - Unspecified) (Benzene > 0,1% w) (86290-81-5)	
ph	Not applicable.

tert-butylmethyl ether; MTBE; 2-methoxy-2-methylpropane (1634-04-4)	
ph	Not applicable

Ethyl T-Butyl Ether (637-92-3)	
ph	Not applicable

Serious eye damage/eye irritation : Not classified (Based on the available data, the classification criteria are not met)
pH: Not applicable.
Further information : (depending on composition)

Gasoline (Low Boiling Point Naphtha - Unspecified) (Benzene > 0,1% w) (86290-81-5)	
ph	Not applicable.

tert-butylmethyl ether; MTBE; 2-methoxy-2-methylpropane (1634-04-4)	
ph	Not applicable

Ethyl T-Butyl Ether (637-92-3)	
ph	Not applicable

Respiratory or skin sensitization : Not classified (Based on the available data, the classification criteria are not met)
Further information : (depending on composition)
Germ cell mutagenicity : It can cause genetic defects.
Further information : (depending on the composition)
According to EU criteria, the presence of benzene in a concentration greater than 0.1 % by weight classifies this product as Mutagen Category 1b, H340
Carcinogenicity : May cause cancer.
Further information : (depending on composition)The product is to be considered carcinogenic due to the presence of benzene; In addition, other chemical compounds potentially present in the product may have harmful effects in the event of prolonged exposure. Therefore, exposure should be limited. Benzene has been classified by the EU as a Carcinogen Category 1 and declared carcinogenic by the IARC. In fact, epidemiological studies have confirmed an increased incidence of leukemia in individuals exposed to this chemical compared to those not exposed.

Gasoline (Low Boiling Point Naphtha - Unspecified) (Benzene > 0,1% w) (86290-81-5)	
NOAEL (chronic, oral, animal/male, 2 years)	50 µl/day No - Observed Adverse Effect Level

tert-butylmethyl ether; MTBE; 2-methoxy-2-methylpropane (1634-04-4)	
NOAEL (chronic,oral,animal/female,2 years)	330 mg/kg body weight (OECD 451)

Ethyl T-Butyl Ether (637-92-3)	
NOAEL (chronic,oral,animal/female,2 years)	542 – 560 mg/kg body weight (Japan Bioassay Research Center 2010a)

2-methyl-2-methoxybutane; Terz-amyl methyl ether (994-05-8)	
NOAEL (chronic, oral, animal/male, 2 years)	> 330 mg/kg body weight Animal: rat, Animal sex: male, Guideline: OECD TG 451 (Carcinogenicity studies)
NOAEL (chronic,oral,animal/female,2 years)	> 1042 mg/kg body weight Animal: rat, Animal sex: female, Guideline: OECD Guideline 451 (Carcinogenicity studies)

Reproductive toxicity : Suspected of damaging fertility. Suspected of damaging the unborn child.

Further information : (depending on composition)Estimate based on components. In accordance with EU criteria, the presence of toluene at concentration greater than 3% by weight classifies this product classified as Repr. 2, H 361d. The substance n-Hexane is classified as Repr. 2 (CLP), as it has shown adverse effects on the reproductive system in animal studies (rats). The actual relevance to humans has not been established.

Ethyl T-Butyl Ether (637-92-3)	
NOAEL (Animal/Male, F0/P)	300 – 1000 mg/kg body weight

Specific Target Organ Toxicity (STOT) — single exposure : May cause drowsiness or dizziness.

Further information : (depending on composition)
The product is highly volatile, even at room temperature. Exposure to high concentrations of vapours, especially in closed or poorly ventilated areas, may cause respiratory irritation, nausea, discomfort, and dizziness, potentially leading to unconsciousness.

Gasoline (Low Boiling Point Naphtha - Unspecified) (Benzene > 0,1% w) (86290-81-5)	
Specific Target Organ Toxicity (STOT) — single exposure	It can cause drowsiness or dizziness.

tert-butylmethyl ether; MTBE; 2-methoxy-2-methylpropane (1634-04-4)	
NOAEC (inhalation, rat, vapour)	800 ppmv/6h/day

Ethyl T-Butyl Ether (637-92-3)	
NOAEC (inhalation, rat, vapour)	800 ppmv/6h/day
Specific Target Organ Toxicity (STOT) — single exposure	It can cause drowsiness or dizziness.

2-methyl-2-methoxybutane; Terz-amyl methyl ether (994-05-8)	
Specific Target Organ Toxicity (STOT) — single exposure	It can cause drowsiness or dizziness.

Toluene (108-88-3)	
Specific Target Organ Toxicity (STOT) — single exposure	It can cause drowsiness or dizziness.

n-Hexane (110-54-3)	
Specific Target Organ Toxicity (STOT) — single exposure	It can cause drowsiness or dizziness.

Specific Target Organ Toxicity (STOT) — repeated exposure : Not classified (Based on available data, the classification criteria are not met)

Further information : (depending on composition)

Gasoline (Low Boiling Point Naphtha - Unspecified) (Benzene > 0,1% w) (86290-81-5)	
NOAEL (subacute, oral, animal/male, 28 days)	< 500 mg/kg body weight
NOAEC (inhalation,rat,vapour,90 days)	10000 mg/m³ OECD 413.

tert-butylmethyl ether; MTBE; 2-methoxy-2-methylpropane (1634-04-4)	
LOAEL (oral,rat,90 days)	200 – 357 mg/kg body weight/day
NOAEL (oral,rat,90 days)	209 – 300 mg/kg body weight/day
NOAEC (inhalation,rat,vapour,90 days)	500 – 800 mg/m³

Ethyl T-Butyl Ether (637-92-3)	
LOAEL (oral,rat,90 days)	28 – 46 mg/kg body weight/day (Japan Bioassay Research Center 2010a, OECD 453)
NOAEL (oral,rat,90 days)	120 – 170 mg/kg body weight/day (Japan Bioassay Research Center 2010a, OECD 453)
NOAEC (inhalation,rat,vapour,90 days)	500 – 2100 mg/m³ (Japan Bioassay Research Center 2010b, OECD 453)

2-methyl-2-methoxybutane; Terz-amyl methyl ether (994-05-8)	
NOAEL (oral,rat,28 days)	125 mg/kg body weight/day
NOAEC (inhalation,rat,gas,28 days)	250 ppmv/6h/day
NOAEL (oral,rat,90 days)	125 mg/kg body weight Animal: rat, Animal sex: male, Guideline: OECD Guideline 407 (28-day repeated dose oral toxicity study in rodents)

Toluene (108-88-3)	
LOAEL (oral,rat,90 days)	1250 mg/kg body weight
NOAEL (oral,rat,90 days)	625 mg/kg body weight
NOAEC (inhalation,rat,vapour,90 days)	2,355 mg/l air
Specific Target Organ Toxicity (STOT) — repeated exposure	May cause damage to organs through prolonged or repeated exposure.

benzene (71-43-2)	
NOAEL (oral,rat,90 days)	100 mg/kg body weight Animal: rat, animal sex: male, Guideline: OECD TG 408 (90-day repeated dose oral toxicity study in rodents)
Specific Target Organ Toxicity (STOT) — repeated exposure	May cause damage to organs through prolonged or repeated exposure.

n-Hexane (110-54-3)	
Specific Target Organ Toxicity (STOT) — repeated exposure	May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard : May be fatal if swallowed and enters airways.

Further information : (depending on composition)
For all petroleum products with a viscosity of less than 20,5 mm2/s at 40 °C, a specific risk is associated with the aspiration of liquid into the lungs, which may occur directly after ingestion, or subsequently if vomiting occurs, either spontaneously or if induced. In this case, chemical pneumonia may develop, a condition requiring medical treatment and which can be fatal.
Aspiration into the lungs may cause chemical pneumonitis.

Gasoline (all types)	
Viscosity, kinematics	< 1 mm²/s (40 °C) (ASTM D 445)

Gasoline (Low Boiling Point Naphtha - Unspecified) (Benzene > 0.1% w) (86290-81-5)	
Viscosity, kinematics	< 1 mm²/s (37,8 °C, (ASTM D 445)

tert-butylmethyl ether; MTBE; 2-methoxy-2-methylpropane (1634-04-4)	
Viscosity, kinematics	0,464 mm²/s (20°C)

Ethyl T-Butyl Ether (637-92-3)	
Viscosity, kinematics	0,47 mm²/s (40°C)

2-methyl-2-methoxybutane; Terz-amyl methyl ether (994-05-8)	
Viscosity, kinematics	0,494 – 0.6 mm²/s

ethanol, ethyl alcohol (64-17-5)	
Viscosity, kinematics	Data not available

benzene (71-43-2)	
Viscosity, kinematics	0,689 mm²/s

11.2. Information on other hazards

11.2.1. Endocrine Disrupting Properties

Adverse health effects caused by endocrine-disrupting properties : None. The mixture does not contain any substance(s) included in the list established in accordance with Article 59(1) of the REACH Regulation for having endocrine disrupting properties, or any substance(s) identified as having endocrine disrupting properties according to the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605, at a concentration equal to or greater than 0.1%.

11.2.2. Other information

Possible harmful effects on humans and possible symptoms : May cause cancer. May cause genetic defects. Suspected of damaging fertility. Suspected of damaging the unborn child. Irritating to the skin. Repeated and prolonged contact may cause skin redness, irritation and contact dermatitis due to its defatting effect. Eye contact may cause temporary redness and irritation. High vapor concentrations may cause: migraine, nausea, dizziness. High concentrations may cause damage to the digestive system, kidneys and central nervous system.

Other information : None

SECTION 12: Ecological Information

12.1. Toxicity

Ecology - general : Toxic to aquatic organisms, may cause long-term negative effects for the aquatic environment. Dispersion into the environment can lead to the contamination of environmental compartments (air, soil, subsoil, surface water and groundwater). Use according to good working practice, avoiding release of the product into the environment. Inform authorities if the product is discharged into the sewage system or public waters.

Ecology - air : Due to the characteristics of the components, part of the product evaporates quickly, dispersing into the air: this phenomenon may contribute to the formation of photochemical smog. Use vapor recovery systems if necessary.

Ecology - water : Toxic to aquatic organisms.

Hazardous to the aquatic environment, short-term (acute) : Not classified (Based on available data, the classification criteria are not met)

Hazardous to the aquatic environment, long-term (chronic) : Toxic to aquatic organisms with long-lasting effects.

Gasoline (Low Boiling Point Naphtha - Unspecified) (Benzene > 0.1% w) (86290-81-5)	
CL50 - Fish [1]	5,4 mg/l 48 h
CL50 - Fish [2]	8,2 mg/l LL50, 96 h
EC50 - Crustaceans [1]	4,5 mg/l EL50, 48 h
EC50 - Other aquatic organisms [1]	3,1 mg/l EL50, 72 h (Selenastrum capricornutum)
EC50 - Other aquatic organisms [2]	15,4 mg/l EC50, 48 h (Tetrahymena Pyriformis)
NOEC (chronic)	2,6 mg/l NOELR, 21 d (Pimephales promelas)

tert-butylmethyl ether; MTBE; 2-methoxy-2-methylpropane (1634-04-4)	
CL50 - Fish [1]	672 – 980 mg/l (Pimephales promelas - ASTM E1241-92 - WAF, US EPA, OECD)
CL50 - Fish [2]	574 mg/l (Menidia berylline - OECD Guideline 203)
EC50 - Crustaceans [1]	472 mg/l (Daphnia Magna - EPA OPPTS 850.1010)
EC50 - Other aquatic organisms [1]	187 mg/l (Americamysis bahia - EPA OPPTS 850.1035)
CE50 72h - Algae [1]	> 908.7 mg/l (Desmodesmus subspicatus, OECD 201)
CE50 96h - Algae [1]	184 mg/l (Pseudokirchneriella subcapitata, US EPA, WAF)
LOEC (chronic)	50 mg/l Americamysis bahia - EPA OPPTS 850.1350
NOEC (chronic)	26 mg/l Americamysis bahia - EPA OPPTS 850.1350
NOEC Chronic Fish	450 mg/l (31d, Pimephales promelas, ASTM E1241-92)

tert-butylmethyl ether; MTBE; 2-methoxy-2-methylpropane (1634-04-4)	
NOEC chronic crustaceans	51 mg/l (21d, EPA OPPTS 850.1300)

Ethyl T-Butyl Ether (637-92-3)	
CL50 - Fish [1]	> 974,1 mg/l (Poecilia reticulata - Slovnaft VÚRUP,a.s. (2005b)) (OECD 203)
CL50 - Fish [2]	574 mg/l (Menidia berylline - BenKinney MT, Barbieri JF, Gross JS & Naro PA (1994)) (OECD 203)
EC50 - Crustaceans [1]	110 mg/l (Daphnia Magna - SafePharm Laboratories (2003a)) (OECD 202)
EC50 - Other aquatic organisms [1]	37 mg/l (Americamysis bahia - T.R. Wilbury Laboratories, Inc. (1994)) (EPA OTS 797.1930)
CE50 72h - Algae [1]	1100 mg/l (Selenastrum capricornutum - Safe Pharm Laboratories (2003b)) (OECD 201)
CE50 72h - Algae [2]	380,68 mg/l (Desmodesmus subspicatus - Slovnaft VÚRUP, a.s. (2005d) (OECD 201)
LOEC (chronic)	50 mg/l Americamysis bahia - EPA OPPTS 850.1350
NOEC (chronic)	26 mg/l Americamysis bahia - EPA OPPTS 850.1350
NOEC Chronic Fish	64 mg/l (5d, Danio rerio, OECD 212)
NOEC chronic crustaceans	51 mg/l (21d, Wildlife International Ltd. (1999)) (EPA OPPTS 850.1300)

2-methyl-2-methoxybutane; Terz-amyl methyl ether (994-05-8)	
CL50 - Fish [1]	580 mg/l (Oncorhynchus mykiss)
EC50 - Crustaceans [1]	100 mg/l (Daphnia magna)
CE50 72h - Algae [1]	230 mg/l (Raphidocelis subcapitata)
CE50 72h - Algae [2]	780 mg/l (Raphidocelis subcapitata)
NOEC (chronic)	3.39 mg/l (Americamysis bahia, 28d)
NOEC Chronic Fish	299 – 450 mg/l (31d)
NOEC chronic crustaceans	51 mg/l (21d)

ethanol, ethyl alcohol (64-17-5)	
CL50 - Fish [1]	14.2 – 15,4 g/l (Pimephales promelas)
CL50 - Fish [2]	13 g/l (Psalm gairdneri)
EC50 - Crustaceans [1]	12,34 g/l (Daphnia Magna)
EC50 - Crustaceans [2]	5,012 g/l (Cériodaphnia dubia)
EC50 - Other aquatic organisms [1]	23,9 g/l (Artemia salina) (24h)
EC50 - Other aquatic organisms [2]	857 mg/l (Artemia salina nauplii) (48 hours)
CE50 72h - Algae [1]	275 mg/l (Chlorella vulgaris)
CE50 72h - Algae [2]	12900 mg/l (Selenastrum capricornutum)
CE50 96h - Algae [1]	675 – 22000 mg/l
ErC50 algae	275 mg/l (Chlorella vulgaris)
NOEC chronic crustaceans	> 10 mg/l Daphnia (21 days)
NOEC chronic algae	3,24 g/l (Skeletonema costatum) (5 days)

Toluene (108-88-3)	
CL50 - Fish [1]	5,5 mg/l
LOEC (chronic)	2,76 mg/l
NOEC (chronic)	0,74 mg/l

Toluene (108-88-3)	
NOEC Chronic Fish	1,39 mg/l

benzene (71-43-2)	
CL50 - Fish [1]	5,3 mg/l (Oncorhynchus mykiss)
CE50 72h - Algae [1]	32 mg/l (Raphidocelis subcapitata)
CE50 72h - Algae [2]	100 mg/l (Raphidocelis subcapitata)
NOEC Chronic Fish	0,8 mg/l (Pimephales promelas, 32d)

n-Hexane (110-54-3)	
CL50 - Fish [1]	> 1000 mg/l 48 h
EC50 - Crustaceans [1]	21,85 mg/l
CE50 72h - Algae [1]	9,28 mg/l

12.2. Persistence and degradability

Gasoline (all types)	
Persistence and degradability	The main constituents of the product are to be considered "inherently" biodegradable, but not "readily" biodegradable: therefore they may be moderately persistent, particularly in anaerobic conditions.

Gasoline (Low Boiling Point Naphtha - Unspecified) (Benzene > 0,1% w) (86290-81-5)	
Persistence and degradability	From an environmental point of view, the product should be considered as "non-persistent", according to the criteria of the REACH reg., Annex XIII (point 1.1).
Biodegradation	The test methods for this endpoint are not applicable to UVCB substances

tert-butylmethyl ether; MTBE; 2-methoxy-2-methylpropane (1634-04-4)	
Persistence and degradability	Half-life: 3 - 6 days, Readily biodegradable.
Biodegradation	100 % after 30 hours

Ethyl T-Butyl Ether (637-92-3)	
Persistence and degradability	Half-life: 5 - 6 days, Readily biodegradable.
Biodegradation	100 % (30h,OECD Guideline 301 D)

2-methyl-2-methoxybutane; Terz-amyl methyl ether (994-05-8)	
Persistence and degradability	Rapidly degradable

ethanol, ethyl alcohol (64-17-5)	
Persistence and degradability	Rapidly degradable

Toluene (108-88-3)	
Persistence and degradability	Rapidly degradable

benzene (71-43-2)	
Persistence and degradability	Rapidly degradable

n-Hexane (110-54-3)	
Persistence and degradability	Rapidly degradable

12.3. Bioaccumulation potential

Gasoline (all types)	
Partition coefficient n-octanol/water (Log Pow)	Not applicable for mixtures
Partition coefficient n-octanol/water (Log Kow)	Not applicable for mixtures
Bioaccumulation potential	Due to the characteristics of the components, the product has a low biodegradability under anaerobic conditions, and may be persistent. Some of the compounds present in the product have a bioaccumulation potential and are harmful to aquatic organisms.

Gasoline (Low Boiling Point Naphtha - Unspecified) (Benzene > 0,1% w) (86290-81-5)	
Bioaccumulation potential	Test methods for this endpoint are not applicable to UVCB substances.

tert-butylmethyl ether; MTBE; 2-methoxy-2-methylpropane (1634-04-4)	
BCF - Fish [1]	1.4 – 1.5 28 days (Cyprinus carpio)
Partition coefficient n-octanol/water (Log Pow)	1.06 (20°C)
Bioaccumulation potential	Low bioaccumulation potential.

Ethyl T-Butyl Ether (637-92-3)	
Partition coefficient n-octanol/water (Log Pow)	1,48 (25°C)
Partition coefficient n-octanol/water (Log Kow)	> 3
Bioaccumulation potential	Low bioaccumulation potential.

2-methyl-2-methoxybutane; Terz-amyl methyl ether (994-05-8)	
Partition coefficient n-octanol/water (Log Pow)	1.55 (20 °C)

ethanol, ethyl alcohol (64-17-5)	
Partition coefficient n-octanol/water (Log Kow)	-0,31

Toluene (108-88-3)	
Bioconcentration factor (FCB REACH)	90
Partition coefficient n-octanol/water (Log Kow)	2,73

12.4. Mobility in soil

Gasoline (all types)	
Ecology - soil	Due to the characteristics of the components, part of the product evaporates quickly, dispersing into the air: this phenomenon contributes to the formation of photochemical smog. The remaining part has a low biodegradability under anaerobic conditions, and may be persistent. Some of the hydrocarbons potentially present have bioaccumulation potential and are harmful to aquatic organisms.

Gasoline (Low Boiling Point Naphtha - Unspecified) (Benzene > 0.1% w) (86290-81-5)	
Mobility in soil	Not applicable (UVCB)
Ecology - soil	Data not available.

tert-butylmethyl ether; MTBE; 2-methoxy-2-methylpropane (1634-04-4)	
Normalized absorption coefficient of organic carbon (Log Koc)	0,95
Ecology - soil	The product is highly volatile.

Ethyl T-Butyl Ether (637-92-3)	
Ecology - soil	The product is highly volatile.

12.5. Results of the PBT and vPvB assessment

Gasoline (all types)
This substance/mixture does not meet the PBT criteria of the REACH Regulation, Annex XIII
This substance/mixture does not meet the vPvB criteria of the REACH Regulation, Annex XIII

Component	
Substance(s) not meeting the PBT criteria of the REACH Regulation, in accordance with Annex XIII	Gasoline (low boiling point naphtha - unspecified) (benzene > 0.1 % w) (86290-81-5), tert-butylmethyl ether; MTBE; 2-methoxy-2-methylpropane (1634-04-4), Ethyl t-butyl ether (637-92-3)
Substance(s) not meeting the vPvB criteria of REACH, in accordance with Annex XIII	Gasoline (low boiling point naphtha - unspecified) (benzene > 0.1 % w) (86290-81-5), tert-butylmethyl ether; MTBE; 2-methoxy-2-methylpropane (1634-04-4), Ethyl t-butyl ether (637-92-3)

12.6. Endocrine Disrupting Properties

Adverse effects on the environment due to endocrine-disrupting properties : None is known. The mixture does not contain any substance(s) included in the list established in accordance with Article 59(1) of REACH as having endocrine-disrupting properties, or any substance(s) identified as having endocrine-disrupting properties according to the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at a concentration equal to or greater than 0.1%.

12.7. Other adverse effects

Other adverse effects : None.

Gasoline (all types)	
Other information	This product does not have specific bacterial culture inhibition properties. In any case, water contaminated by the product must be treated in wastewater treatment plants suitable for this purpose.

Gasoline (Low Boiling Point Naphtha - Unspecified) (Benzene > 0,1% w) (86290-81-5)	
Other information	This product does not have specific bacterial culture inhibition properties. In any case, water contaminated by the product must be treated in wastewater treatment plants suitable for this purpose.

tert-butylmethyl ether; MTBE; 2-methoxy-2-methylpropane (1634-04-4)	
Other information	No other effects are known

Ethyl T-Butyl Ether (637-92-3)	
Other information	No other effects are known

SECTION 13: Disposal Considerations

13.1. Waste treatment methods

Waste treatment methods : Do not discharge the product, whether new or used, into sewers, tunnels or waterways. Collect and deliver to authorized collectors (Legislative Decree 152/2006 and related regulations).

Recommendations for disposal in sewers : Do not distribute sludge generated by industrial water treatment on natural soils. Sludge generated from industrial water treatment must be incinerated, kept in containment, or treated.

Advice for the disposal of the Product/Packaging : European Waste Catalogue code(s) (Decision 2001/118/EC): 13 07 02* ("Gasoline"). The EWC code indicated is only a general indication, based on the original composition of the product and its intended use. The user has the final responsibility for selecting the most appropriate EWC code, based on the actual use of the product, and any alterations or contamination.

Additional information	:	Do not puncture, cut, grind, weld, braze, burn, or incinerate empty containers or drums that have not been decontaminated. Empty containers may contain flammable product residues. Dispose of empty containers that have not been decontaminated safely, in accordance with Italian Legislative Decree 152/2006 and subsequent amendments.
About Green Waste	:	The product as such does not contain halogenated compounds.
European List of Wastes (LoW, EC 2150/2002)	:	13 07 02* - Gasoline

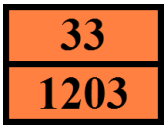
SECTION 14: Transportation Information

In accordance with: ADR / IMDG / IATA / ADN / RID

ADR	IMDG	IATA	DNA	RID
14.1. UN number or ID number				
UN 1203	UN 1203	UN 1203	UN 1203	UN 1203
14.2. UN proper shipping name				
GASOLINE	GASOLINE	Gasoline	GASOLINE	GASOLINE
Transport document description				
A 1203 GASOLINE, 3, II, (D/E), HAZARDOUS TO THE ENVIRONMENT	A 1203 GASOLINE, 3, II, MARINE POLLUTANT/ENVIRONMENTALLY HAZARDOUS	UN 1203 Gasoline, 3, II, ENVIRONMENTALLY HAZARDOUS	A 1203 GASOLINE, 3, II, HAZARDOUS TO THE ENVIRONMENT	A 1203 GASOLINE, 3, II, HAZARDOUS TO THE ENVIRONMENT
14.3. Transport hazard classes				
3	3	3	3	3
				
14.4. Packaging group				
II	II	II	II	II
14.5. Environmental hazards				
Environmental hazardous: Yes	Environmental hazardous: Yes Marine pollutant: Yes EmS No. (Fire): F-E EmS No.: S-E	Environmental hazardous: Yes	Environmental hazardous: Yes	Environmental hazardous: Yes
No further information available				

14.6. Special precautions for users

Ground transport

Transport Regulations (ADR)	:	Subject to the provisions
Classification Code (ADR)	:	F1
Special Provisions (ADR)	:	243, 534, 664
Limited quantities (ADR)	:	1l
Exempt quantities (ADR)	:	E2
Transport category (ADR)	:	2
Hazard identification number (n°. Kemler)	:	33
Orange panel	:	
Tunnel Restriction Code (ADR)	:	D/E

Sea transport

Transport Regulations (IMDG)	:	Subject to the provisions
Special Provisions (IMDG)	:	243
Limited quantities (IMDG)	:	1 L
Exempt quantities (IMDG)	:	E2
IBC Packaging Instructions (IMDG)	:	IBC02
Stowage category (IMDG)	:	E
Properties and Observations (IMDG)	:	Immiscible with water.

Air transport

Transport Regulations (IATA)	:	Subject to the provisions
Air passenger and cargo exempt quantities (IATA)	:	E2
Max. net quantity of limited air passenger and cargo quantities (IATA)	:	1L
Max. net quantities per passenger and cargo aircraft (IATA)	:	5L
Net quantity max. for passenger and cargo aircraft (IATA)	:	60L
Special Provisions (IATA)	:	A100
ERG Code (IATA)	:	3H

River transport

Transport Regulations (ADN)	:	Subject to the provisions
Classification Code (ADN)	:	F1
Limited quantities (ADN)	:	1 L
Exempt quantities (ADN)	:	E2
Required Equipment (ADN)	:	PP, EX, A
Ventilation (ADN)	:	VE01

Transport by rail

Transport Regulations (RID)	:	Subject to the provisions
Classification Code (RID)	:	F1
Special Provisions (RID)	:	243, 534
Limited quantities (RID)	:	1L
Exempt quantities (RID)	:	E2
Transport category (RID)	:	2
Hazard Identification Number (RID)	:	33

14.7. Bulk shipping in accordance with IMO acts

IBC Code : Not applicable (refer to MARPOL Annex I).

SECTION 15: Regulatory Information

15.1. Health, safety and environmental laws and regulations specific to the substance or mixture

15.1.1. EU Regulations

Additional Rules, Restrictions and Legal Requirements : Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 on the registration, evaluation, authorisation and restriction of chemical substances (REACH). (et sequens). Regulation (EC) No. 1272/2008 of the European Parliament and of the Council of 16 December 2008 on the classification, labelling and packaging of substances and mixtures amending and repealing Directives 67/548/EEC and 1999/45/EC and amending the Regulation (EC) No. 1907/2006 (et sequens). Substances that deplete the ozone layer (1005/2009) – substances listed in Annex I (ODP). POP (2019/1021) - Persistent organic pollutants. Regulation EU (649/2012) - Export and Import of Hazardous Chemicals (PIC). Commission Delegated Regulation (EU) 2017/2100. Commission Regulation (EU) 2018/605.

REACH Annex XVII (List of Restrictions)

EU Restriction List (Annex XVII of REACH)		
Reference code	**Applicable to**	**Title or description**
5.	benzene	Benzene
28.	Gasoline (low boiling point naphtha - unspecified) (benzene > 0,1 % p)	Substances classified as carcinogenic, category 1A or 1B in Part 3 of Annex VI to Regulation (EC) No 1272/2008 and listed in Appendix 1 or 2, respectively.
29.	Gasoline (low boiling point naphtha - unspecified) (benzene > 0,1 % p)	Substances classified as germ cell mutagenic, category 1A or 1B in Part 3 of Annex VI to Regulation (EC) No 1272/2008 and listed in Appendix 3 or 4 respectively.
3(a)	Gasoline (all types) ; Gasoline (low boiling point naphtha - unspecified) (benzene > 0,1 % p); tert-butylmethyl ether; MTBE; 2-methoxy-2-methylpropane ; Ethyl t-butyl ether ; 2-methyl-2-methoxybutane; tert-amyl methyl ether; ethanol, ethyl alcohol; Toluene; benzene; n-Hexane	Substances or mixtures that meet the criteria for one or more of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard classes 2.1 to 2.4, 2.6 and 2.7, 2.8 types A and B, 2.9, 2.10, 2.12, 2.13 categories 1 and 2, 2.14 categories 1 and 2, 2.15 Types A to F
3(b)	Gasoline (all types) ; Gasoline (low boiling point naphtha - unspecified) (benzene > 0,1 % p); tert-butylmethyl ether; MTBE; 2-methoxy-2-methylpropane ; Ethyl t-butyl ether ; 2-methyl-2-methoxybutane; tert-amyl methyl ether; Toluene; benzene; n-Hexane	Substances or mixtures that meet the criteria for one or more of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard classes 3.1 to 3.6, 3.7 adverse effects on sexual function and fertility or development, 3.8 effects other than narcotic effects, 3.9 and 3.10
3(c)	Gasoline (all types) ; Gasoline (low boiling point naphtha - unspecified) (benzene > 0,1 % p); Toluene; n-Hexane	Substances or mixtures that meet the criteria for one or more of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard class 4.1
40.	Gasoline (all types) ; GAsoline (low boiling point naphtha - unspecified) (benzene > 0,1 % p); tert-butylmethyl ether; MTBE; 2-methoxy-2-methylpropane ; Ethyl t-butyl ether ; 2-methyl-2-methoxybutane; tert-amyl methyl ether; ethanol, ethyl alcohol; Toluene; benzene; n-Hexane	Substances classified as flammable gases of category 1 or 2, flammable liquids of category 1, 2, or 3, flammable solids of category 1 or 2, substances and mixtures which, in contact with water, emit flammable gases of category 1, 2, or 3, pyrophoric liquids of category 1, or pyrophoric solids of category 1, even if they are not listed in Annex VI, Part 3, of Regulation (EC) No. 1272/2008.
48.	Toluene	Toluene

Annex XIV REACH (Authorization List)

Does not contain any substances listed in Annex XIV of REACH (Authorization List)

List of substances included in the "Candidate List" of the REACH Regulation (SVHC)

Does not contain any substances listed in the REACH Candidate List

PIC Regulation (Prior Informed Consent)

Contains one or more substances listed in the PIC list (EU Regulation 649/2012 concerning the export and import of hazardous chemicals): Benzene (71-43-2).

POP Regulation (Persistent Organic Pollutants)

Does not contain any substances listed in the POP list (EU Regulation 2019/1021 on persistent organic pollutants).

Ozone Regulation (2024/590)

Does not contain any substances listed in the ozone depletion list (Regulation EU 2024/590 on substances that deplete the ozone layer).

Council Regulation (EC) on the control of dual-use items

Does not contain any substances subject to the COUNCIL REGULATION (EC) on the control of dual-use items.

Seveso Directive (disaster risk reduction)

Seveso Further information : Seveso Category: P5a

Explosives Precursors Regulation (2019/1148)

It does not contain any substances listed in the Explosives Precursors Regulation list (Regulation EU 2019/1148 on the marketing and use of explosives precursors).

Drug Precursors Regulation (273/2004)

Contains one or more substances listed in the Drug Precursors Regulation list (Regulation (EC) 273/2004 on the manufacture and placing on the market of certain substances used in the illicit manufacture of narcotic drugs and psychotropic substances)

Name	CN designation	CAS Number	CN Code	Category Subcategory	Threshold	Annex
Toluene		108-88-3	2902 30 00	Category 3		Annex I

15.1.2. National Regulations

Legislative Decree n. 81/2008, on "Implementation of art. 1 of the law 3 August 2007, regarding health protection and safety in the workplace"
Legislative Decree n. 105/2015 (adoption of Directive 2012/18/EC on the control of major-accident hazards involving certain dangerous substances)
Legislative Decree n. 152/06 "Norms in environmental matters", and successive modifications and integrations
Legislative Decree n. 151/2001 (T.U. of the legislative provisions on the protection and support of maternity and paternity)

France

Occupational diseases	
Code	Description
RG 4	Hemopathies caused by benzene and all products containing it
RG 4 BIS	Gastrointestinal diseases caused by benzene, toluene, xylenes and all products containing them
RG 59	Occupational poisoning from hexane
RG 84	Conditions caused by liquid organic solvents for professional use: saturated or unsaturated or cyclic aliphatic liquid hydrocarbons and mixtures thereof; halogenated liquid hydrocarbons; nitrate derivatives of aliphatic hydrocarbons; alcohols; glycols, glycols ethers; ketones; aldehydes; aliphatic and cyclic ethers, including tetrahydrofuran; esters; dimethylformamide and dimethylacetamide; acetonitrile and propionitrile; pyridine; dimethyl sulfone and dimethyl sulfoxide

Germany

Restrictions on use : Employment bans or restrictions for the protection of young people in the workplace pursuant to § 22 JArbSchG in the case of the formation of dangerous substances must be observed.
The prohibitions and restrictions pursuant to § 4 and §5 MuSchArbV must be observed.

National Laws and Recommendations : TRGS 400: Risk assessment for activities involving hazardous substances.
TRGS 401: Risks arising from skin contact - identification, assessment, measures.
TRGS 402: Identification and assessment of risks from inhalation exposure during activities with hazardous substances.
TRGS 500: Protective measures.
TRGS 510: Storage of hazardous substances in non-fixed tanks.
TRGS 555: Work instructions and information for workers.
TRGS 720 / TRBS 2152: Explosive atmospheres – general.
TRGS 727: Prevention of ignition hazards due to electrostatic charges.
TRGS 751 / TRBS 3151: Prevention of fire, explosion and pressure hazards at service stations and gas refueling systems for land vehicles.
TRGS 800: Fire protection measures.
TRGS 900: Occupational exposure limits.
TRGS 903: Biological limit values.
TRGS 905: List of mutagenic, carcinogenic or teratogenic substances.
TRGS 910: Measures of the related risk concept for activities involving hazardous carcinogenic substances.

Water hazard class (WGK) (D) : WGK 3, Highly hazardous to water (classification according to AwSV, Annex 1).

WGK note : The classification is based on the Ordinance on Facilities for the Handling Substances Hazardous to Water (Verordnung über Anlagen zum Umgang mit wassergefährdenden Stoffen (AwSV)) of 18 April 2017 (BGBl 2017, Teil I, Nr. 22, Seite 905).

Storage class (LGK, TRGS 510) : LGK 3 - Flammable liquids.

Joint Storage Table :

LGK 1	LGK 2A	LGK 2B	LGK 3	LGK 4.1A
LGK 4.1B	LGK 4.2	LGK 4.3	LGK 5.1A	LGK 5.1B
LGK 5.1C	LGK 5.2	LGK 6.1A	LGK 6.1B	LGK 6.1C
LGK 6.1D	LGK 6.2	LGK 7	LGK 8A	LGK 8B
LGK 10	LGK 11	LGK 12	LGK 13	LGK 10-13

Joint storage permitted for : LGK 1, LGK 2A, LGK 4.1A, LGK 4.1B, LGK 4.2, LGK 4.3, LGK 5.1A, LGK 5.1C, LGK 5.2, LGK 6.1B, LGK 6.2, LGK 7.

Restricted joint storage permitted for : LGK 5.1B, LGK 6.1D, LGK 11, LGK 10-13.

Joint storage permitted for : LGK 2B, LGK 3, LGK 6.1A, LGK 6.1C, LGK 8A, LGK 8B, LGK 10, LGK 12, LGK 13.

Chemical Prohibition Ordinance (ChemVerbotsV) : This product is subject to Annex 2 of ChemVerbotsV, entry 1. The following requirements must be observed: authorization requirement (according to § 6 paragraph 1 sentence 1), basic requirements for delivery (according to § 8 paragraphs 1, 3 and 4), identification and documentation (according to § 9 paragraphs 1 to 3) and exclusion from shipping route (according to § 10).

Hazardous Incident Ordinance (12. BImSchV) : Not subject to the Hazardous Incident Ordinance (12. BImSchV)

Holland

ABM Category : Z(2) - biodegradable substances with hazardous properties for humans and the environment (carcinogenicity/mutagenicity/reproductive toxicity/bioaccumulation potential or toxicity)

SZW-lijst van kankerverwekkende stoffen : The following substances are listed:Gasoline (low boiling point naphtha - not specified) (benzene > 0.1 % w), ethanol, ethyl alcohol, benzene

SZW-lijst van mutagene stoffen : The following substances are listed: Gasoline (low boiling point naphtha - not specified) (benzene > 0.1 % w), benzene

SZW-lijst van reprotoxische stoffen – Borstvoeding : The following substances are listed: ethanol, ethyl alcohol

SZW-lijst van reprotoxische stoffen – Vruchtbaarheid : The following substances are listed: Ethanol, Ethyl Alcohol, N-Hexane

SZW-lijst van reprotoxische stoffen – Ontwikkeling : ethanol, ethyl alcohol, Toluene are listed

Denmark

Fire hazard class : Class I-1

Storage unit : 1 liter

Classification remarks : F+ <Flam. Liq. 1>; For the storage of flammable liquids, follow the guidelines for emergency management.

Danish National Regulations : Pregnant/breastfeeding women working with the product must not come into direct contact with it.
The requirements of the Danish Authority for Occupational Safety regarding work with carcinogenic substances must be followed during use and disposal.

Switzerland

Storage class (LK)	:	LK 3 - Flammable liquids
Chemicals Ordinance (ChemO, SR 813.11)	:	Group 1

15.2. Chemical Safety Assessment

No chemical safety assessment has been carried out for this mixture
A chemical safety assessment has been carried out for the following substances in this mixture:
Gasoline (low boiling point naphtha - unspecified) (benzene > 0,1 % p)
tert-butylmethyl ether; MTBE; 2-methoxy-2-methylpropane
Ethyl t-butyl ether
2-methyl-2-methoxybutane; Tert-amyl methyl ether
ethanol, ethyl alcohol

SECTION 16: Other Information

Indications of changes:
EU SDS format according to COMMISSION REGULATION (EU) 2020/878. All sections.

Abbreviations and acronyms:	
	Full text of the H sentences referenced in this safety data sheet. These statements are for information only and may not correspond to the actual classification of the product.
	N/D = not available
	N/A = not applicable
ADN	European Agreement on the International Carriage of Dangerous Goods by Inland Waterways
ADR	European Agreement on the International Carriage of Dangerous Goods by Road
STA	Acute toxicity estimate
BCF	Bioconcentration factor
CAS Number	Chemical Abstract Service (CAS) Number
CLP	Classification, Labelling and Packaging Regulation (EC) No 1272/2008
DMEL	Derived Minimal Effect Level
DNEL	Derived No-Effect Level
EC number	European Community Number
EC50	Effective concentration for 50% of the tested population (median effective concentration)
ED	Endocrine Disruptor
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods Code
IOELV	Indicative Occupational Exposure Limit Value
LC50	Lethal concentration for 50% of the tested population (median lethal concentration)
LD50	Lethal dose resulting in the death of 50% of the tested population (median lethal dose)
LOAEC	Lowest Observed Adverse Effect Concentration
LOAEL	Lowest Observed Adverse Effect Level
NOAEC	No Observed Adverse Effect Concentration
NOAEL	No Observed Adverse Effect Level
NOEC	No Observed Effect Concentration

Abbreviations and acronyms:	
N.A.S.	Not otherwise specified
OECD	Organisation for Economic Co-operation and Development
OEL	Occupational Exposure Limit
PBT	Persistent, bioaccumulative and toxic
PNEC	Predicted No-Effect Concentration
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals, Regulation (EC) No 1907/2006
RID	Regulation on the International Carriage of Dangerous Goods by Rail
SDS	Safety Data Sheet
STP	Sewage Treatment Plant
TRGS	Technical Rules for Hazardous Substances
VOC	Volatile organic compounds
vPvB	Very persistent and very bioaccumulative
WGK	Water Hazard Class

Data Sources : This Safety Data Sheet is based on the characteristics of the components/additives, according to the information provided by the original suppliers. Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, 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 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

Training advice : Provide adequate training to professional operators on the use of Personal Protective Equipment (PPE), based on the information contained in this Safety Data Sheet.

Other information : Do not use the product for purpose not specified by the manufacturer. If hydrogen sulfide (H2S) inhalation is suspected, rescuers must wear suitable respiratory equipmentharnesses, and safety ropes, and follow established emergency procedures. Transfer the injured person to a hospital immediately. Immediately begin artificial respiration if breathing has stopped. Administer oxygen if necessary. This warning is particularly relevant for operations involving direct exposure to vapors inside tanks or other confined spaces.

Full text of hazard statements H and EUH:	
Acute Tox. 4 (orally)	Acute toxicity (oral), category 4
Aquatic Chronic 2	Hazardous to the aquatic environment – Chronic hazard, category 2
Aquatic Chronic 3	Hazardous to the aquatic environment – Chronic hazard, category 3
Asp. Tox. 1	Aspiration hazard, category 1
Carc. 1A	Carcinogenicity, category 1A
Carc. 1B	Carcinogenicity, category 1B
Eye Irrit. 2	Serious eye damage/eye irritation, category 2
Flam. Liq. 1	Flammable liquids, category 1
Flam. Liq. 2	Flammable liquids, category 2
Muta.. 1B	Germ cell mutagenicity, category 1B
Repr. 2	Reproductive toxicity, category 2
Skin Irrit. 2	Skin corrosion/irritation, category 2
STOT RE 1	Specific target organ toxicity – repeated exposure, category 1

Full text of hazard statements H and EUH:	
STOT RE 2	Specific Target Organ Toxicity – Repeated Exposure, Category 2
STOT SE 3	Specific Target Organ Toxicity – Single Exposure, Category 3 – Narcosis
H224	Highly flammable liquid and vapors.
H225	Easily flammable liquid and vapours.
H302	Harmful if swallowed.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H319	It causes severe eye irritation.
H336	May cause drowsiness or dizziness.
H340	May cause genetic defects.
H350	May cause cancer.
H361d	Suspected of damaging the unborn child.
H361f	Suspected of damaging fertility.
H361fd	Suspected of damaging fertility. Suspected of damaging the unborn child.
H372	It causes organ damage with prolonged or repeated exposure.
H373	May cause damage to organs through prolonged or repeated exposure.
H411	Toxic to aquatic organisms with long-lasting effects.
H412	Harmful to aquatic organisms with long-lasting effects.

Full text of usage descriptors:	
ERC1	Manufacture of the substance
ERC2	Formulation of mixtures
ERC3	Formulation in solid matrix
ERC4	Industrial use of non-reactive processing aids (not included inside or on the surface of the article)
ERC5	Industrial use resulting in inclusion inside or on the surface of an article
ERC6a	Use of intermediates
ERC6b	Industrial use of reactive processing aids (without inclusion inside or on the surface of the article)
ERC6c	Industrial use of monomers in polymerization processes (with or without inclusion inside or on the surface of the article)
ERC6d	Industrial use of reaction process regulators in polymerization (with or without inclusion in or on the surface of an article)
ERC7	Industrial use of functional fluids
ERC9a	General use of functional fluids (indoor use)
ERC9b	General use of functional fluids (outdoor use)
ESVOC SPERC 1.1b.v1	Distribution: Industrial (SU3)
ESVOC SPERC 2.2.v1	Formulation and packaging of preparations and mixtures: industrial (SU10)
ESVOC SPERC 4.3a.v1	Uses in coatings: industrial (SU3)
ESVOC SPERC 4.4a.v1	Use in Cleaning Agents: Industrial (SU3)
ESVOC SPERC 4.7a.v1	Metal working fluids and rolling oils: Industrial (SU3)
ESVOC SPERC 7.12a.v1	Use as fuel: industrial (SU3)

Full text of usage descriptors:	
ESVOC SPERC 9.12b.v1	Use as fuel: Professional (SU22)
ESVOC SPERC 9.12c.v1	Use as fuel: Consumer (SU21)
PC13	Fuels
PROC1	Chemical production or refining in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC15	Laboratory reagents use
PROC16	Use of fuels
PROC2	Chemical production or refining in a closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation of chemical substances in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions
PROC8a	Transfer of substance or preparation (filling/emptying) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (filling/emptying) at dedicated facilities
PROC9	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
SU10	Formulation [mixing] of preparations and/or repackaging (except alloys)
SU11	Manufacture of rubber products
SU21	Consumer uses: households (= general public = consumers)
SU22	Professional uses: public domain (administration, education, entertainment, services, crafts)
SU3	Industrial uses: use of substances as such or in preparations at industrial sites

Classification and procedures used to determine the classification of mixtures pursuant to Regulation (EC) 1272/2008 [CLP]:		
Flam. Liq. 1	H224	Based on experimental data: Weight of evidence
Skin Irrit. 2	H315	Calculation method
Muta. 1B	H340	Concentration limits
Carc. 1A	H350	Concentration limits
Repr. 2	H361fd	Concentration limits
STOT SE 3	H336	Calculation method
Asp. Tox. 1	H304	Calculation method
Aquatic Chronic 2	H411	Calculation method

ANNEX

EXPOSURE SCENARIOS

Related to the components GASOLINE (all types), ETBE, MTBE, TAME and Ethanol

Identified use name	Sector	Area of use SU	Process Categories PROC	Environmental Release Categories ERC	Specific environmental release categories SpERC
01a- Distribution of the substance (GEST1A_I) Industrial (G26)	Industrial	3	1, 2, 3., 8a, 8b, 15	1,2,3,4,5,6a,6b,6c,6d,7	ESVOC SpERC 1.1b.v1
02- Formulation and (re)packaging of substances and mixtures (GEST2_I) Industrial (G26)	Industrial	3,10	1, 2, 3., 8a, 8b, 15	2	ESVOC SpERC 2.2.v1
03a-Use in coatings (GEST3_I) Industrial (G26)	Industrial	3	1, 2, 3., 8a, 8b, 15	4	ESVOC SpERC 4.3a.v1
04a-Use in cleaning products (GEST4_I) Industrial (G26)	Industrial	3	1, 2, 3., 8a, 8b.	4	ESVOC SpERC 4.4a.v1
12a- Use as fuel (GEST12_I): Industrial (G26)	Industrial	3	1, 2, 3., 8a, 8b, 16	7	ESVOC SpERC 7.12a.v1
12b- Use as fuel (GEST12_I) Professional (G27)	Professional	22	1, 2, 3., 8a, 8b, 16	9a,9b	ESVOC SpERC 9.12b.v1
12c- Use as fuel (GEST12_I) Consumer (G28)	Consumer	21	13	9a,9b	ESVOC SpERC 9.12c.v1
19- Rubber manufacturing and processing (GEST19_I) Industrial (G26)	Industrial	3,10.11	1,2,3, 8b,9,15	1,4,6d	ESVOC SpERC4.19.v1

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GASOLINE (Low boiling point naphtha classified as R45 and/or R46 and/or R62 and/or R63 (containing between 0% and 1% benzene)

1. Distribution of the substance

Section 1 Exposure scenario titled: Low boiling point naphtha containing between 0% and 1% benzene	
Title	
Distribution of the substance	
Use Descriptor	
Sector of use	3
Process Categories	1, 2, 3, 8a, 8b, 15
Environmental Release Categories	1, 2, 3, 4, 5, 6a, 6b, 6c, 6d, 7
Specific Environment Release Categories	ESVOC SpERC 1.1b.v1
Processes, tasks, activities covered	
Loading of bulk substances (on ships/barges, tank trucks/railcars, and IBCs) in closed or contained systems, including accidental exposure during sampling, storage, unloading, maintenance, and associated laboratory activities (CGES1A_I).	
Assessment Method	
See section 3.	
Section 2 Operating Conditions and Risk Management Measures	
Section 2.1 Control of worker exposure	
Product Characteristics	
Physical state of product	Liquid, vapor pressure > 10 kPa under standard conditions (OC5).
Concentration of substance in product	Covers a percentage of substance in the product up to 100% (unless otherwise stated) (G13).
Quantity used	Not applicable.
Frequency and duration of use/exposure	Covers daily exposure of up to 8 hours (unless otherwise specified) (G2).
Human factors not influenced by risk management	Not applicable
Other operational conditions affecting exposure	Assumes use of the product at a temperature not exceeding 20°C above ambient temperature, unless otherwise specified (G15). Assumes the application of an adequate basic standard of hygiene in the workplace (G1).
Scenario characteristics	**Specific measures for risk management and operational conditions**
General Measures (Skin Irritants) (G19)	Avoid direct contact with the skin. Identify potential areas of indirect skin contact. Wear protective gloves (tested according to EN374) if skin contact is likely. Eliminate contamination/spills as soon as they occur. Immediately remove any contamination from the skin. Provide basic training to personnel aimed at preventing/limiting exposure and report the onset of any dermatological problems (E3).
General measures (carcinogens) (G18)	Consider technical advances and process upgrades (including automation) to eliminate spills. Limit exposure by adopting measures such as closed systems, dedicated systems and and appropriate general/local exhaust ventilation systems. Drain systems and clean transfer lines before discontinuing containment. Clean/purge equipment, where possiblebefore maintenance. Where there is a possibility of exposure: restrict access to authorized personnel only, provide operators with specific training on the activities and operations to be performed in order to minimize the risk of exposure, wear gloves and protective suits to prevent skin contamination, use respiratory protection when required for certain exposure scenarios, immediately eliminate any spills, and dispose of waste safely. Ensure the adoption of safe work systems or equivalent solutions for risk management. Inspect, check, and regularly maintain all control devices and measures.

	Consider the need for a risk-based health surveillance system (G20).
General exposures (closed systems) (CS15) + sampling (CS56)	Handle the substance in a closed system (E47). Sampling using a closed circuit or a system designed to prevent exposure (E8). Wear protective gloves compliant with standard EN374 (PPE15).
General exposures (closed systems) (CS15) + Outdoors (OC9)	Handle the substance in a closed system (E47).
Sampling during the process (CS2)	Sampling using a closed circuit or a system designed to prevent exposure (E8).
Laboratory activities (CS36)	Handle only under a fume hood or use equivalent methods to minimize exposure risks (E12).
Bulk closed loading and unloading (CS501).	Ensure material transfers are under containment or extract ventilation (E66).
Equipment Cleaning and Maintenance (CS39)	Drain down and flush system prior to equipment break-in or maintenance (E55). Store drains in sealed containers pending disposal or subsequent recycling (ENVT4). Remove spills immediately (C&H13). Wear chemical-resistant gloves (compliant with EN374 standard), together with basic training (PPE16).
Storage (CS67)	Ensure the operation is carried out outdoors (E69). Store the substance within a closed system (E84).
Section 2.2 Environmental Exposure Control	
Product characteristics	
Substance is complex UVCB (PrC3). Predominantly hydrophobic (PrC4a)	
Amounts used	
Fraction of EU tonnage used in region (A1)	0.1
Regional tonnage (tonnes/year) (A2)	1.87e7
Fraction of regional tonnage used locally (A3)	0.002
Annual site tonnage (tonnes/year) (A5)	3.75e4
Maximum Daily Site Tonnage (kg/day) (A4)	1.2e5
Frequency and duration of use	
Continuous release (FD2)	
Emission days (days/year) (FD4)	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor (EF1)	10
Local marine water dilution factor (EF2)	100

Other operational conditions affecting environmental exposure	
Fraction released into the air from process (initial release before risk management measures are applied) (OOC4)	0.001
Fraction released into waste water from process (initial release before risk management measures are applied) (OOC5)	0.00001
Fraction released into soil from process (initial release before risk management measures are applied) (OOC6)	0.00001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used (TCS1)	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Environmental risk is related to indirect exposure of humans via ingestion (TCR1k). In case of discharge to an urban wastewater treatment plant, no treatment is required (TCR9).	
Treat emissions in such a way as to ensure a typical removal efficiency of (%) (TCR7).	90
Treat wastewater on site (before discharge) to ensure the required removal efficiency ≥ (%)	12
In case of discharge to an urban wastewater treatment plant, ensure the required removal efficiency on site ≥ (%)	0
Organizational measures to prevent/limit release from the site (1286)	
Do not spread sludge generated from industrial water treatment on natural land (OMS2). Sludge generated from industrial water treatment must be incinerated, kept under containment, or treated (OMS3)	
Conditions and measures related to municipal sewage treatment plant (1273)	
Estimated removal of the substance in wastewater by a municipal wastewater treatment plant (%) (STP3)	95.5
Total removal efficiency from wastewater after applying on-site and off-site RMMs (municipal wastewater treatment) (%) (STP4)	95.5
Maximum safe site tonnage (MSafe) based on release after total wastewater removal treatment (kg/day) (STP6)	1.1e6
Assumed flow rate of the municipal wastewater treatment plant (m^3/day) (STP5)	2000
Conditions and measures related to external treatment of waste for disposal (1272)	
This substance is consumed during use and no waste related to the substance is generated, to be disposed of (ETW5).	
Conditions and measures related to external recovery of waste (1271)	
External waste collection and recycling must comply with applicable local and/or national legislation (ERW1).	
Section 3 Exposure Estimation	
3.1 Health	
For the purpose of assessing workplace exposure levels, where not explicitly specified, the **ECETOC TRA method** was used (G21).	
3.2 Environment	
The Hydrocarbon Block Method (HBM) was used to calculate environmental exposure with the Petrorisk model (EE2).	

Section 4
4.1 Health
Exposures are not expected to exceed the DN(M)EL when the Risk Management Measures (RMMs) and Operational Conditions (OCs) described in Section 3 are applied (G22). Where different Risk Management Measures/Operating Conditions are in place, users are required to ensure that risks are managed at least at an equivalent level (G23). Available hazard data do not support the derivation of a DNEL for skin irritation effects (G32). Available hazard data do not support the need to establish a DNEL for other health effects (G36). Risk Management Measures are based on the qualitative characterization of risk (G37).
4.2 Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industrieslibraries.html) [DSU4].

2. Formulation and (re)packaging of substances and mixtures

Section 1 Exposure to the scenario entitled Low boiling point naphthenes containing between 0% and 1% benzene	
Title	
Formulation and (re)packaging of substances and mixtures	
Use Descriptor	
Sector of use	3, 10
Process Categories	1, 2, 3, 8a, 8b, 15
Environmental Release Categories	2
Specific Environment Release Categories	ESVOC SpERC 2.2.v1
Processes, tasks, activities covered	
Formulation of the substance and its mixtures in continuous and batch operations within closed systems or under containment, including accidental exposure during storage, material transfer, mixing, maintenance, sampling, and associated laboratory activities (E14).	
Assessment Method	
See section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristics	
Physical state of product	Liquid, vapor pressure > 10 kPa under standard conditions (OC5).
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) (G13).
Quantity used	Not applicable.
Frequency and duration of use/exposure	Covers daily exposure of up to 8 hours (unless otherwise specified) (G2).
Human factors not influenced by risk management	Not applicable.
Other operational conditions affecting exposure	Assumes use of the product at a temperature not exceeding 20°C above ambient temperature, unless otherwise specified (G15). Assumes the application of an adequate basic standard of hygiene in the workplace (G1).
Scenario characteristics	**Specific risk management measures and operational conditions**
General Measures (Skin Irritants) (G19)	Avoid direct contact with the skin. Identify potential areas of indirect skin contact. Wear protective gloves (tested according to EN374) if skin contact is likely. Eliminate contamination/spills as soon as they occur. Immediately remove any contamination from the skin. Provide basic training to personnel aimed at preventing/limiting exposure and report the onset of any dermatological problems (E3).
General measures (carcinogens) (G18)	Consider technical advances and process upgrades (including automation) to eliminate spills. Limit exposure by adopting measures such as closed systems, dedicated systems and and appropriate general/local exhaust ventilation systems. Drain systems and clean transfer lines before discontinuing containment. Clean/purge equipment, where possiblebefore maintenance. Where there is a possibility of exposure: restrict access to authorized personnel only, provide operators with specific training on the activities and operations to be performed in order to minimize the risk of exposure, wear gloves and protective suits to prevent skin contamination, use respiratory protection when required for certain exposure scenarios, immediately eliminate any spills, and dispose of waste safely. Ensure the adoption of safe work systems or equivalent solutions for risk management. Inspect, check, and regularly maintain all control devices and measures. Consider the need for a risk-based health surveillance system (G20).
General Exposures (Closed Systems) (CS15) + sampling (CS56)	Handle the substance in a closed system (E47). Sampling using a closed circuit or a system designed to prevent exposure (E8).

	Wear protective gloves compliant with standard EN374 (PPE15).
General Exposures (Closed Systems) (CS15) + Outdoors (OC9)	Handle the substance in a closed system (E47).
Sampling during the process (CS2)	Sampling using a closed circuit or a system designed to prevent exposure (E8).
Laboratory activities (CS36)	Handle only under a fume hood or use equivalent methods to minimize exposure risks (E12).
Bulk product transfer (CS14)	Ensure material transfers are under containment or extract ventilation (E66).
Drum/batch transfers (CS8)	Ensure material transfers are under containment or extract ventilation (E66).
Equipment Cleaning and Maintenance (CS39)	Drain down and flush system prior to equipment break-in or maintenance (E55). Store drains in sealed containers pending disposal or subsequent recycling (ENVT4). Remove spills immediately (C&H13). Wear chemical-resistant gloves (compliant with EN374 standard), together with basic training (PPE16).
Section 2.2 Environmental Exposure Control	
Product characteristics	
Substance is complex UVCB (PrC3). Predominantly hydrophobic (PrC4a)	
Amounts used	
Fraction of EU tonnage used in region (A1)	0.1
Regional tonnage (tonnes/year) (A2)	1.65e7
Fraction of regional tonnage used locally (A3)	0.0018
Annual site tonnage (tonnes/year) (A5)	3.0e4
Maximum Daily Site Tonnage (kg/day) (A4)	1.0e5
Frequency and duration of use	
Continuous release (FD2)	
Emission days (days/year) (FD4)	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor (EF1)	10
Local marine water dilution factor (EF2)	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to risk management measures) (OOC4)	
Release fraction to wastewater from process (initial release prior to risk management measures) (OOC5)	0.025
Release fraction to soil from process (initial release prior to risk management measures) (OOC6)	0.002
Fraction released into soil from process (initial release before risk management measures are applied) (OOC6)	0.0001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used (TCS1)	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Prevent the release of undissolved substances or recover them from wastewater (TRC14). Environmental risk is related to indirect exposure of humans via ingestion (TCR1k). In case of discharge to an urban wastewater treatment plant, no treatment is required (TCR9).	
Treat emissions in such a way as to ensure a typical removal efficiency of (%) (TCR7).	56.5
Treat wastewater on site (before discharge) to ensure the required removal efficiency ≥ (%)	95.594.7
In case of discharge to an urban wastewater treatment plant, ensure the required removal efficiency on site ≥ (%)	0
Organizational measures to prevent/limit release from the site (1286)	
Do not spread sludge generated from industrial water treatment on natural land (OMS2). Sludge generated from industrial water treatment must be incinerated, kept under containment, or treated (OMS3).	
Conditions and measures related to municipal sewage treatment plant (1273)	

Estimated removal of the substance in wastewater by a municipal wastewater treatment plant (%) (STP3).	95.5
Total removal efficiency from wastewater after applying on-site and off-site RMMs (municipal wastewater treatment) (%) (STP4).	95.5
Maximum safe site tonnage (MSafe) based on release after total wastewater removal treatment (kg/day) (STP6).	1.0e5
Assumed flow rate of the municipal wastewater treatment plant (m^3/day) (STP5).	2000
Conditions and measures related to external treatment of waste for disposal (1272)	
External waste treatment and disposal must comply with applicable local and/or national legislation (ETW3).	
Conditions and measures relating to external waste recovery (1271)	
External waste collection and recycling must comply with applicable local and/or national legislation (ERW1).	
Section 3 Exposure Estimation	
3.1 Health	
For the purpose of assessing workplace exposure levels, where not explicitly specified, the ECETOC TRA method was used (G21).	
3.2 Environment	
The Hydrocarbon Block Method (HBM) was used to calculate environmental exposure with the Petrorisk model (EE2).	
Section 4	
4.1 Health	
Exposures are not expected to exceed the DN(M)EL when the Risk Management Measures (RMMs) and Operational Conditions (OCs) described in Section 3 are applied (G22). Where different Risk Management Measures/Operating Conditions are in place, users are required to ensure that risks are managed at least at an equivalent level (G23). Available hazard data do not support the derivation of a DNEL for skin irritation effects (G32). Available hazard data do not support the need to establish a DNEL for other health effects (G36). Risk Management Measures are based on the qualitative characterization of risk (G37).	
4.2 Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industrieslibraries.html) [DSU4].	

3. Use in coatings

Section 1 Exposure scenario titled: Low boiling point naphtha containing between 0% and 1% benzene	
Title	
Use in coatings	
Use Descriptor	
Sector of use	3
Process Categories	1, 2, 3, 8a, 8b, 15
Environmental Release Categories	4
Specific Environment Release Categories	ESVOC SpERC 4.3a.v1
Processes, tasks, activities covered	
Covers use in coatings (paints, inks, adhesives, etc.) within closed systems or under containment, including accidental exposure during use (receipt of material, storage, preparation and transfer of bulk or semi-bulk products, application and film formation activities), equipment cleaning, maintenance, and associated laboratory activities (CGES3_I).	
Assessment Method	
See section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristics:	
Physical state of product	Liquid, vapor pressure > 10 kPa under standard conditions (OC5).
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) (G13).
Quantity used	Not applicable.
Frequency and duration of use/exposure	Covers daily exposure of up to 8 hours (unless otherwise specified) (G2).
Human factors not influenced by risk management	Not applicable.
Other operational conditions affecting exposure	Assumes use of the product at a temperature not exceeding 20 °C above ambient temperature, unless otherwise specified (G15). Assumes the application of an adequate basic standard of hygiene in the workplace (G1).
Scenario characteristics	**Specific measures for risk management and operational conditions**
General Measures (Skin Irritants) (G19)	Avoid direct contact with the skin. Identify potential areas of indirect skin contact. Wear protective gloves (tested according to EN374) if skin contact is likely. Eliminate contamination/spills as soon as they occur. Immediately remove any contamination from the skin. Provide basic training to personnel aimed at preventing/limiting exposure and report the onset of any dermatological problems (E3).
General measures (carcinogens) (G18)	Consider technical advances and process upgrades (including automation) to eliminate spills. Limit exposure by adopting measures such as closed systems, dedicated systems and and appropriate general/local exhaust ventilation systems. Drain systems and clean transfer lines before discontinuing containment. Clean/purge equipment, where possiblebefore maintenance. Where there is a possibility of exposure: restrict access to authorized personnel only, provide operators with specific training on the activities and operations to be performed in order to minimize the risk of exposure, wear gloves and protective suits to prevent skin contamination, use respiratory protection when required for certain exposure scenarios, immediately eliminate any spills, and dispose of waste safely. Ensure the adoption of safe work systems or equivalent solutions for risk management. Inspect, check, and regularly maintain all control devices and measures. Consider the need for a risk-based health surveillance system (G20).
Film formation - force drying, stoving	Handle the substance in a closed system (E47).

and other technologies (CS99)	Ensure an adequate standard of general ventilation. Natural ventilation occurs through doors, windows, etc. In controlled ventilation environments, air is introduced or removed by an electric extractor (E1).
General Exposures (Closed Systems) (CS15)	Handle the substance in a closed system (E47). Ensure an adequate standard of general ventilation. Natural ventilation occurs through doors, windows, etc. In controlled ventilation environments, air is introduced or removed by an electric extractor (E1).
Product transfers (C3)	Ensure material transfers are under containment or extract ventilation (E66).
Laboratory activities (CS36)	Handle only under a fume hood or use equivalent methods to minimize exposure risks (E12).
Equipment Cleaning and Maintenance (CS39)	Drain down and flush system prior to equipment break-in or maintenance (E55). Store drains in sealed containers pending disposal or subsequent recycling (ENVT4). Remove spills immediately (C&H13). Wear chemical-resistant gloves (compliant with EN374 standard), together with basic training (PPE16).
Storage (CS67)	Store the substance within a closed system (E84).

Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB (PrC3). Predominantly hydrophobic (PrC4a)	
Amounts used	
Fraction of EU tonnage used in region (A1)	0.1
Regional tonnage (tonnes/year) (A2)	6.2e3
Fraction of regional tonnage used locally (A3)	1.0
Annual site tonnage (tonnes/year) (A5)	6.2e3
Maximum Daily Site Tonnage (kg/day) (A4)	2.1e4
Frequency and duration of use	
Continuous release (FD2)	
Emission days (days/year) (FD4)	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor (EF1)	10
Local marine water dilution factor (EF2)	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to risk management measures) (OOC4)	0.98
Release fraction to wastewater from process (initial release prior to risk management measures) (OOC5)	0.007
Release fraction to soil from process (initial release prior to risk management measures) (OOC6)	0
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Prevent the release of undissolved substances or recover them from wastewater (TRC14). Environmental risk is related to indirect exposure of humans via ingestion (TCR1k). In case of discharge to an urban wastewater treatment plant, no treatment is required (TCR9).	
Treat emissions in such a way as to ensure a typical removal effectiveness of (%) (TCR7).	94.1
Treat waste water on site (before starting the discharge operation) to ensure the required removal effectiveness ≥ (%):	92.6
In case of discharge to an urban wastewater treatment plant, ensure the required on-site removal effectiveness ≥ (%)	0
Organizational measures to prevent/limit release from the site (1286)	
Do not spread sludge generated from industrial water treatment on natural land (OMS2). Sludge generated from industrial water treatment must be incinerated, kept under containment, or treated (OMS3)	
Conditions and measures related to municipal sewage treatment plant (1273)	

Estimated removal of the substance from wastewater via urban sewage treatment (%) (STP3).	95.5
Total removal efficiency from wastewater after applying on-site and off-site RMMs (municipal wastewater treatment) (%) (STP4).	95.5
Maximum safe site tonnage (MSafe) based on release after total wastewater removal treatment (kg/day) (STP6).	2.1e4
Assumed flow rate for the urban wastewater treatment plant (m3/d) (STP5)	2000
Conditions and measures related to external treatment of waste for disposal (1272)	
External waste treatment and disposal must comply with applicable local and/or national legislation (ETW3).	
Conditions and measures relating to external waste recovery (1271)	
External waste collection and recycling must comply with applicable local and/or national legislation (ERW1).	
Section 3 Exposure Estimation	
3.1 Health	
For the purpose of assessing workplace exposure levels, where not explicitly specified, the ECETOC TRA method was used (G21).	
3.2 Environment	
The Hydrocarbon Block Method (HBM) was used to calculate environmental exposure with the Petrorisk model (EE2).	
Section 4	
4.1 Health	
Exposures are not expected to exceed the DN(M)EL when the Risk Management Measures (RMMs) and Operational Conditions (OCs) described in Section 3 are applied (G22). Where different Risk Management Measures/Operating Conditions are in place, users are required to ensure that risks are managed at least at an equivalent level (G23). Available hazard data do not support the derivation of a DNEL for skin irritation effects (G32). Available hazard data do not support the need to establish a DNEL for other health effects (G36). Risk Management Measures are based on the qualitative characterization of risk (G37).	
4.2 Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industrieslibraries.html) [DSU4].	

4. Use in cleaning products

Section 1 Exposure to the Low Boiling Point Nafte Scenario Containing Between 0% and 1% Benzene	
Title	
Use in cleaning products (GEST4_I)	
Use Descriptor	
Sector of use	3
Process Categories	1, 2, 3, 8a, 8b
Environmental Release Categories	4
Specific Environment Release Categories	ESVOC SpERC 4.4a.v1
Processes, tasks, activities covered	
Covers use as a component of cleaning products within closed systems or under containment, including accidental exposure during transfer from storage, mixing/dilution in the preparatory phase and during cleaning activities, as well as cleaning and maintenance of equipment (CGES4_I).	
Assessment Method	
See section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristics:	
Physical state of product	Liquid, vapor pressure > 10 kPa under standard conditions (OC5).
Concentration of t substance in product	Covers a percentage of substance in the product up to 100% (unless otherwise stated) (G13).
Quantity used	Not applicable.
Frequency and duration of use/exposure	Covers a daily exposure of up to 8 hours (unless otherwise specified) (G2).
Human factors not influenced by risk management	Not applicable.
Other operating conditions affecting exposure	It assumes that the product is used at a temperature not exceeding 20° C above the ambient temperature, unless otherwise specified (G15). It presupposes the application of an appropriate basic standard for hygiene in the workplace (G1).
Scenario characteristics	**Specific risk management measures and operating conditions**
General Measures (Skin Irritants) (G19)	Avoid direct contact with the skin. Identify potential areas of indirect skin contact. Wear protective gloves (tested according to EN374) if skin contact is likely. Eliminate contamination/spills as soon as they occur. Immediately remove any contamination from the skin. Provide basic training to personnel aimed at preventing/limiting exposure and report the onset of any dermatological problems (E3).
General measures (carcinogens) (G18)	Consider technical advances and process upgrades (including automation) to eliminate spills. Limit exposure by adopting measures such as closed systems, dedicated systems and and appropriate general/local exhaust ventilation systems. Drain systems and clean transfer lines before discontinuing containment. Clean/purge equipment, where possiblebefore maintenance. Where there is a possibility of exposure: restrict access to authorized personnel only, provide operators with specific training on the activities and operations to be performed in order to minimize the risk of exposure, wear gloves and protective suits to prevent skin contamination, use respiratory protection when required for certain exposure scenarios, immediately eliminate any spills, and dispose of waste safely. Ensure the adoption of safe work systems or equivalent solutions for risk management. Inspect, check, and regularly maintain all control devices and measures. Consider the need for a risk-based health surveillance system (G20).
Bulk product transfer (CS14)	Ensure material transfers are under containment or extract Ventilation (E66).

Use in contained systems (C38), Automated process with (semi) closed systems. (CS93).	Handle substance within a closed system (E47). Wear protective gloves compliant with standard EN374 (PPE15).
Filling/preparation of equipment from drums or containers (CS45).	Ensure material transfers are under containment or extract ventilation (E66).
Equipment Cleaning and Maintenance (CS39)	Drain down and flush system prior to equipment break-in or maintenance (E55). Store drains in sealed containers pending disposal or subsequent recycling (ENVT4). Remove spills immediately (C&H13). Wear chemical-resistant gloves (compliant with EN374 standard), together with basic training (PPE16).
Storage (CS67)	Store the substance within a closed system (E84).
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB (PrC3). Predominantly hydrophobic (PrC4a)	
Quantities used	
Fraction of EU tonnage used in region (A1)	0.1
Regional tonnage (tonnes/year) (A2)	5.12e2
Fraction of regional tonnage used locally (A3)	0.2
Annual site tonnage (tonnes/year) (A5)	1.0e2
Maximum Daily Site Tonnage (kg/day) (A4)	5.0e3
Frequency and duration of use	
Continuous release (FD2)	
Emission days (days/year) (FD4)	20
Environmental factors not influenced by risk management	
Local freshwater dilution factor (EF1)	10
Local marine water dilution factor (EF2)	100
Other operational conditions affecting environmental exposure	
Fraction released into the air from process (initial release before risk management measures are applied) (OOC4)	1.0
Fraction released into waste water from process (initial release before risk management measures are applied) (OOC5)	0.00003
Fraction released into soil from process (initial release before risk management measures are applied) (OOC6)	0

Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used (TCS1)	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Prevent the release of undissolved substances or recover them from wastewater (TRC14). Environmental risk is related to indirect exposure of humans via ingestion (TCR1k). In case of discharge to an urban wastewater treatment plant, no treatment is required (TCR9).	
Treat emissions in such a way as to ensure a typical removal efficiency of (%) (TCR7).	70
Treat wastewater on site (before discharge) to ensure the required removal efficiency ≥ (%)	4.4
In case of discharge to an urban wastewater treatment plant, ensure the required removal efficiency on site ≥ (%)	0
Organizational measures to prevent/limit release from the site (1286)	
Do not spread sludge generated from industrial water treatment on natural land (OMS2). Sludge generated from industrial water treatment must be incinerated, kept under containment, or treated (OMS3).	
Conditions and measures related to municipal sewage treatment plant (1273)	
Estimated substance removal from wastewater via urban treatment plant (%) (STP3).	95.5
Total efficiency of removal from wastewater after onsite and offsite (urban treatment plant) RMMs (%) (STP4)	95.5
Maximum allowable tonnage for the site (MSafe) based on release after total wastewater removal treatment (kg/d) (STP6).	2.9e4
Assumed flow rate for the urban wastewater treatment plant (m3/d) (STP5)	2000
Conditions and measures relating to the external treatment of waste for disposal (1272)	
External waste treatment and disposal must comply with applicable local and/or national legislation (ETW3).	
Conditions and measures relating to external waste recovery (1271)	
External waste collection and recycling must comply with applicable local and/or national legislation (ERW1).	
Section 3 Exposure Estimation	
3.1 Health	
For the purpose of assessing workplace exposure levels, where not explicitly specified, the ECETOC TRA method was used (G21).	
3.2 Environment	
The Hydrocarbon Block Method (HBM) was used to calculate environmental exposure with the Petrorisk model (EE2).	
Section 4	
4.1 Health	
Exposures are not expected to exceed the DN(M)EL when the Risk Management Measures (RMMs) and Operational Conditions (OCs) described in Section 3 are applied (G22). Where different Risk Management Measures/Operating Conditions are in place, users are required to ensure that risks are managed at least at an equivalent level (G23). Available hazard data do not support the derivation of a DNEL for skin irritation effects (G32). Available hazard data do not support the need to establish a DNEL for other health effects (G36). Risk Management Measures are based on the qualitative characterization of risk (G37).	
4.2 Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industrieslibraries.html) [DSU4].	

5. Use as fuel – Industrial sector

Section 1 Exposure to the Low Boiling Point Nafte Scenario Containing Between 0% and 1% Benzene	
Title	
Use as Fuel	
Use Descriptor	
Sector of use	3
Category Processing	1, 2, 3, 8a, 8b, 16
Environmental Release Categories	7
Specific Environment Release Categories	ESVOC SpERC 7.12a.v1
Processes, tasks, activities covered	
Covers use as a fuel (or fuel additive and additive component) within closed systems or under containment, including accidental exposure during activities associated with transfer, use, equipment maintenance, and waste product handling (CGES12_I).	
Assessment Method	
See section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristics	
Physical state of product	Liquid, vapor pressure > 10 kPa under standard conditions (OC5).
Concentration of substance in product	Covers percentage substance in the product up to 100% (unless stated differently) (G13).
Quantity used	Not applicable.
Frequency and duration of use/exposure	Covers a daily exposure of up to 8 hours (unless otherwise specified) (G2).
Human factors not influenced by risk management	Not applicable.
Other operational conditions affecting exposure	Assumes use of the product at a temperature not exceeding 20°C above ambient temperature, unless otherwise specified (G15). Assumes the application of an adequate basic standard of hygiene in the workplace (G1).
Scenario characteristics	**Specific risk management measures and operational conditions**
General Measures (Skin Irritants) (G19)	Avoid direct contact with the skin. Identify potential areas of indirect skin contact. Wear protective gloves (tested according to EN374) if skin contact is likely. Eliminate contamination/spills as soon as they occur. Immediately remove any contamination from the skin. Provide basic training to personnel aimed at preventing/limiting exposure and report the onset of any dermatological problems (E3).
General measures (carcinogens) (G18)	Consider technical advances and process upgrades (including automation) to eliminate spills. Limit exposure by adopting measures such as closed systems, dedicated systems and and appropriate general/local exhaust ventilation systems. Drain systems and clean transfer lines before discontinuing containment. Clean/purge equipment, where possiblebefore maintenance. Where there is a possibility of exposure: restrict access to authorized personnel only, provide operators with specific training on the activities and operations to be performed in order to minimize the risk of exposure, wear gloves and protective suits to prevent skin contamination, use respiratory protection when required for certain exposure scenarios, immediately eliminate any spills, and dispose of waste safely. Ensure the adoption of safe work systems or equivalent solutions for risk management. Inspect, check, and regularly maintain all control devices and measures. Consider the need for a risk-based health surveillance system (G20).
Closed discharge of bulk products (CS502)	Ensure material transfers are under containment or extract ventilation (E66).

Drum/batch transfers (CS8)	Ensure material transfers are under containment or extract ventilation (E66).
Refueling (CS 507)	Ensure material transfers are under containment or extract ventilation (E66).
Aircraft Refueling (CS508)	Ensure material transfers are under containment or extract ventilation (E66).
General Exposures (Closed Systems) (CS15)	Handle the substance in a closed system (E47). Ensure an adequate standard of general ventilation. Natural ventilation occurs through doors, windows, etc. In controlled ventilation environments, air is introduced or removed by an electric extractor (E1).
Use as fuel (GEST12_I), (closed systems) (CS107)	Handle the substance in a closed system (E47).
Equipment Cleaning and Maintenance (CS39)	Drain down system prior to equipment break-in or maintenance (E65). Store drains in sealed containers pending disposal or subsequent recycling (ENVT4). Remove spills immediately (C&H13). Ensure an adequate standard of general ventilation. Natural ventilation occurs through doors, windows, etc. In controlled ventilation environments, air is introduced or removed by an electric extractor (E1). Wear chemical-resistant gloves (compliant with EN374 standard), together with basic training (PPE16).
Storage (CS67)	Store the substance within a closed system (E84). Ensure an adequate standard of general ventilation. Natural ventilation occurs through doors, windows, etc. In controlled ventilation environments, air is introduced or removed by an electric extractor (E1).

Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB (PrC3). Predominantly hydrophobic (PrC4a)	
Quantities used	
Fraction of EU tonnage used in region (A1)	0.1
Regional tonnage (tonnes/year) (A2)	1.4e6
Fraction of regional tonnage used locally (A3)	1
Annual site tonnage (tonnes/year) (A5)	1.4e6
Maximum Daily Site Tonnage (kg/day) (A4)	4.6e6
Frequency and duration of use	
Continuous release (FD2)	
Emission days (days/year) (FD4)	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor (EF1)	10
Local marine water dilution factor (EF2)	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to risk management measures) (OOC4)	0.0025
Release fraction to wastewater from process (initial release prior to risk management measures) (OOC5)	0.00001
Release fraction to soil from process (initial release prior to risk management measures) (OOC6)	0
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Environmental risk is related to indirect exposure of humans via ingestion (TCR1k). In case of discharge to an urban wastewater treatment plant, no treatment is required (TCR9).	
Treat emissions in such a way as to ensure a typical removal efficiency of (%) (TCR7).	99.4
Treat wastewater on site (before discharge) to ensure the required removal efficiency ≥ (%)	76.9

In case of discharge to an urban wastewater treatment plant, ensure the required removal efficiency on site ≥ (%)	0
Organizational measures to prevent/limit release from the site (1286)	
Do not spread sludge generated from industrial water treatment on natural land (OMS2). Sludge generated from industrial water treatment must be incinerated, kept under containment, or treated (OMS3)	
Conditions and measures related to municipal sewage treatment plant (1273)	
Estimated substance removal from wastewater via urban treatment plant (%) (STP3).	95.5
Total efficiency of removal from wastewater after onsite and offsite (urban treatment plant) RMMs (%) (STP4)	95.5
Maximum allowable tonnage for the site (MSafe) based on release after total wastewater removal treatment (kg/d) (STP6).	4.6e6
Assumed flow rate for the urban wastewater treatment plant (m3/d) (STP5)	2000
Conditions and measures related to external treatment of waste for disposal (1272)	
Combustion emissions limited by required exhaust emission controls (ETW1). Combustion emissions considered in regional exposure assessment (ETW2).	
Conditions and measures relating to external waste recovery (1271)	
External treatment and disposal of waste should comply with applicable local and/or national legislation (ERW3).	
Section 3 Exposure Estimation	
3.1 Health	
For the purpose of assessing workplace exposure levels, where not explicitly specified, the ECETOC TRA method was used (G21).	
3.2 Environment	
The Hydrocarbon Block Method (HBM) was used to calculate environmental exposure with the Petrorisk model (EE2).	
Section 4	
4.1 Health	
Exposures are not expected to exceed the DN(M)EL when the Risk Management Measures (RMMs) and Operational Conditions (OCs) described in Section 3 are applied (G22). Where different Risk Management Measures/Operating Conditions are in place, users are required to ensure that risks are managed at least at an equivalent level (G23). Available hazard data do not support the derivation of a DNEL for skin irritation effects (G32). Available hazard data do not support the need to establish a DNEL for other health effects (G36). Risk Management Measures are based on the qualitative characterization of risk (G37).	
4.2 Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industrieslibraries.html) [DSU4].	

6. Use as fuel – Professional sector

Section 1 Exposure to the Low Boiling Point Nafte Scenario Containing Between 0% and 1% Benzene	
Title	
Use as Fuel	
Use Descriptor	
Sector of use	22
Process Categories	1, 2, 3, 8a, 8b, 16
Environmental Release Categories	9a, 9b
Specific Environment Release Categories	ESVOC SpERC 9.12.v1
Processes, tasks, activities covered	
Covers use as a fuel (or fuel additive and additive component) within closed systems or under containment, including accidental exposure during activities associated with transfer, use, equipment maintenance, and waste product handling (CGES12_I).	
Valuation method	
See section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristics	
Physical state of product	Liquid, vapor pressure > 10 kPa under standard conditions (OC5).
Concentration of substance in product	Covers percentage substance in the product up to 100% (unless stated differently) (G13).
Quantity used	Not applicable.
Frequency and duration of use/exposure	Covers a daily exposure of up to 8 hours (unless otherwise specified) (G2).
Human factors not influenced by risk management	Not applicable.
Other operational conditions affecting exposure	Assumes use of the product at a temperature not exceeding 20°C above ambient temperature, unless otherwise specified (G15). Assumes the application of an adequate basic standard of hygiene in the workplace (G1).
Scenario characteristics	**Specific risk management measures and operating conditions**
General Measures (Skin Irritants) (G19)	Avoid direct contact with the skin. Identify potential areas of indirect skin contact. Wear protective gloves (tested according to EN374) if skin contact is likely. Eliminate contamination/spills as soon as they occur. Immediately remove any contamination from the skin. Provide basic training to personnel aimed at preventing/limiting exposure and report the onset of any dermatological problems (E3).
General measures (carcinogens) (G18)	Consider technical advances and process upgrades (including automation) to eliminate spills. Limit exposure by adopting measures such as closed systems, dedicated systems and and appropriate general/local exhaust ventilation systems. Drain systems and clean transfer lines before discontinuing containment. Clean/purge equipment, where possiblebefore maintenance. Where there is a possibility of exposure: restrict access to authorized personnel only, provide operators with specific training on the activities and operations to be performed in order to minimize the risk of exposure, wear gloves and protective suits to prevent skin contamination, use respiratory protection when required for certain exposure scenarios, immediately eliminate any spills, and dispose of waste safely. Ensure the adoption of safe work systems or equivalent solutions for risk management. Inspect, check, and regularly maintain all control devices and measures. Consider the need for a risk-based health surveillance system (G20).
General Exposures (Closed Systems) (CS15), Outdoor (OC9)	Handle the substance in a closed system (E47).

Closed discharge of bulk products (CS502)	Ensure material transfers are under containment or extract ventilation (E66).
Drum/batch transfers (CS8)	Ensure material transfers are under containment or extract ventilation (E66).
Refueling (CS 507)	Ensure material transfers are under containment or extract ventilation (E66).
Aircraft Refueling (CS508)	Ensure material transfers are under containment or extract ventilation (E66).
Use as fuel (GEST12_I), (closed systems) (CS107)	Handle the substance in a closed system (E47).
Equipment Maintenance (CS5)	Drain down system prior to equipment break-in or maintenance (E65). Store drains in sealed containers pending disposal or subsequent recycling (ENVT4). Remove spills immediately (C&H13). Ensure an adequate standard of general ventilation. Natural ventilation occurs through doors, windows, etc. In controlled ventilation environments, air is introduced or removed by an electric extractor (E1). Wear chemical-resistant gloves (compliant with EN374 standard), together with basic training (PPE16). Ensure that operational personnel are properly trained in order to limit potential exposure (EI19).
Storage (CS67)	Store the substance within a closed system (E84). Ensure an adequate standard of general ventilation. Natural ventilation is via doors, windows, etc. In controlled ventilation rooms, air is introduced or eliminated by an electric exhaust fan (E1).

Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB (PrC3). Predominantly hydrophobic (PrC4a)	
Quantities used	
Fraction of EU tonnage used in region (A1)	0.1
Regional tonnage (tonnes/year) (A2)	1.19e6
Fraction of regional tonnage used locally (A3)	0.0005
Annual site tonnage (tonnes/year) (A5)	5.9e2
Maximum Daily Site Tonnage (kg/day) (A4)	1.6e3
Frequency and duration of use	
Continuous release (FD2)	
Emission days (days/year) (FD4)	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor (EF1)	10
Local marine water dilution factor (EF2)	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to risk management measures) (OOC4)	0.01
Release fraction to wastewater from process (initial release prior to risk management measures) (OOC5)	0.00001
Release fraction to soil from process (initial release prior to risk management measures) (OOC6)	0.00001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Environmental risk is related to indirect exposure of humans via ingestion (TCR1k). In case of discharge to an urban wastewater treatment plant, no treatment is required (TCR9).	
Treat emissions in such a way as to ensure a typical removal efficiency of (%) (TCR7).	N/A
Treat wastewater on site (before discharge) to ensure the required removal efficiency ≥ (%)	3.4
In case of discharge to an urban wastewater treatment plant, ensure the required removal efficiency on site ≥ (%)	0

Organizational measures to prevent/limit release from the site (1286)	
Do not spread sludge generated from industrial water treatment on natural land (OMS2). Sludge generated from industrial water treatment must be incinerated, kept under containment, or treated (OMS3)	
Conditions and measures related to municipal sewage treatment plant (1273)	
Estimated substance removal from wastewater via urban treatment plant (%) (STP3).	95.5
Total efficiency of removal from wastewater after onsite and offsite (urban treatment plant) RMMs (%) (STP4)	95.5
Maximum allowable tonnage for the site (MSafe) based on release after total wastewater removal treatment (kg/d) (STP6).	1.5e4
Assumed flow rate for the urban wastewater treatment plant (m3/d) (STP5)	2000
Conditions and measures related to external treatment of waste for disposal (1272)	
Combustion emissions limited by required exhaust emission controls (ETW1). Combustion emissions considered in regional exposure assessment (ETW2).	
Conditions and measures relating to external waste recovery (1271)	
External treatment and disposal of waste should comply with applicable local and/or national legislation (ERW3).	
Section 3 Exposure Estimation	
3.1 Health	
For the purpose of assessing workplace exposure levels, where not explicitly specified, the ECETOC TRA method was used (G21).	
3.2 Environment	
The Hydrocarbon Block Method (HBM) was used to calculate environmental exposure with the Petrorisk model (EE2).	
Section 4	
4.1 Health	
Exposures are not expected to exceed the DN(M)EL when the Risk Management Measures (RMMs) and Operational Conditions (OCs) described in Section 3 are applied (G22). Where different Risk Management Measures/Operating Conditions are in place, users are required to ensure that risks are managed at least at an equivalent level (G23). Available hazard data do not support the derivation of a DNEL for skin irritation effects (G32). Available hazard data do not support the need to establish a DNEL for other health effects (G36). Risk Management Measures are based on the qualitative characterization of risk (G37).	
4.2 Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industrieslibraries.html) [DSU4].	

7. Fuel use – Consumers

Section 1 Exposure to the Low Boiling Point Nafte Scenario Containing Between 0% and 1% Benzene		
Title		
Use as Fuel		
Use Descriptor		
Sector of use	21	
Category Processing	13	
Environmental Release Categories	9a, 9b	
Specific Environment Release Categories	ESVOC SpERC 9.12c.v1	
Processes, tasks, activities covered		
Covers consumer use as a liquid fuel (GES12_C)		
Assessment Method		
See section 3.		
Section 2 Operational conditions and risk management measures		
Section 2.1 Control of worker exposure		
Product Characteristics		
Physical state of product	Liquid, vapor pressure > 10 kPa under standard conditions (OC5).	
Concentration of substance in product	Unless otherwise specified, covers concentrations up to 100% (ConsOC1).	
Quantity used	Unless otherwise specified, covers consumption up to 37,500 grams (ConsOC2); covers a skin contact area up to 420 cm² (ConsOC5).	
Frequency and duration of use/exposure	Unless otherwise specified, covers frequencies of use up to 0.413 times per day (ConsOC4); covers exposures up to 2 hours for each event (ConsOC14).	
Human factors not influenced by risk management	Unless otherwise specified, use is assumed to occur at ambient temperature (ConsOC15); it is assumed to take place in a 20 m³ room (ConsOC11); it is assumed to occur under typical ventilation conditions (ConsOC8).	
Scenario characteristics	**Specific risk management measures and operational conditions**	
Fuel – liquid – subcategory added: refueling of motor vehicles (PC13)	OC	Unless otherwise specified, includes concentrations up to 1% (ConsOC1); includes use up to 52 days/year (ConsOC3); includes frequencies of use up to once per day (ConsOC4); includes a skin contact area up to 210.00 cm² (ConsOC5); for each use, includes consumption up to 37500 grams (ConsOC2); includes outdoor use (ConsOC12); assumes use in a 100 m3 room (ConsOC11); for each use, includes exposure up to 0.04 hours per event (ConsOC14).
	RMM	No specific RMM value developed beyond the reported OCs.
Fuel – liquid –added subcategory: scooters refuelling (PC13)	OC	Unless otherwise specified, includes concentrations up to 1% (ConsOC1); includes use up to 52 days/year (ConsOC3); includes frequencies of use up to once per day (ConsOC4); for each use, includes consumption up to 37500 grams (ConsOC2); includes outdoor use (ConsOC12); assumes use in a 100 m3 room (ConsOC11); for each use, includes exposure up to 0.04 hours per event (ConsOC14).
	RMM	No specific RMM value developed beyond the reported OCs.
Fuel – liquid –subcategory added: garden equipment – use (PC13)	OC	Unless otherwise specified, includes concentrations up to 1% (ConsOC1); includes use up to 52 days/year (ConsOC3); includes frequencies of use up to once per day (ConsOC4); for each use, includes consumption up to 37500 grams (ConsOC2); includes outdoor use (ConsOC12); assumes use in a 100 m3 room (ConsOC11); for each use, includes exposure up to 0.04 hours per event (ConsOC14).
	RMM	No specific RMM value developed beyond the reported OCs.

Fuel – liquid – subcategory added: garden equipment – refueling (PC13)	OC	Unless otherwise specified, includes concentrations up to 1% (ConsOC1); includes use up to 52 days/year (ConsOC3); includes frequencies of use up to once per day (ConsOC4); includes a skin contact area up to 210.00 cm^2 (ConsOC5); for each use, includes consumption up to 37500 grams (ConsOC2); includes use in a car garage (34 m^3) under typical ventilation conditions (ConsOC10); assumes use in a 100 m3 room (ConsOC11); for each use, includes exposure up to 0.04 hours per event (ConsOC14).
	RMM	No specific RMM value developed beyond the reported OCs.

Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB (PrC3). Predominantly hydrophobic (PrC4a)	
Quantities used	
Fraction of EU tonnage used in region (A1)	0.1
Regional tonnage (tonnes/year) (A2)	1.39e7
Fraction of regional tonnage used locally (A3)	0.0005
Annual site tonnage (tonnes/year) (A5)	7.0e3
Maximum Daily Site Tonnage (kg/day) (A4)	1.9e4
Frequency and duration of use	
Continuous release (FD2)	
Emission days (days/year) (FD4)	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor (EF1)	10
Local marine water dilution factor (EF2)	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to risk management measures) (OOC4)	0.01
Release fraction to wastewater from process (initial release prior to risk management measures) (OOC5)	0.00001
Release fraction to soil from process (initial release prior to risk management measures) (OOC6)	0.00001
Conditions and measures relating to the municipal recovery plan	
Environmental risk is related to indirect exposure of humans (mainly inhalation).	
Estimated substance removal from wastewater via urban treatment plant (%) (STP3).	95.5
Maximum allowable tonnage for the site (MSafe) based on release after total wastewater removal treatment (kg/d) (STP6).	1.8e5
Assumed flow rate for the urban wastewater treatment plant (m3/d) (STP5)	2000
Conditions and measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls (ETW1). Combustion emissions considered in regional exposure assessment (ETW2).	
Conditions and measures relating to external waste recovery	
External treatment and disposal of waste should comply with applicable local and/or national legislation (ERW3).	
Section 3 Exposure Estimation	
3.1 Health	
For the purpose of assessing workplace exposure levels, where not explicitly specified, the ECETOC TRA method was used (G21).	
3.2 Environment	
The Hydrocarbon Block Method (HBM) was used to calculate environmental exposure with the Petrorisk model (EE2).	
Section 4	
4.1 Health	
No exposure assessment has been presented for human health (G39). Where different Risk Management Measures/Operational Conditions are adopted, users are required to ensure that risks are managed to at least an equivalent level (G23).	
4.2 Environment	

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1].
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industrieslibraries.html) [DSU4].

8. Rubber manufacturing and processing

Section 1 Exposure scenario titled: Low boiling point naphtha containing between 0% and 1% benzene	
Title	
Rubber production and processing	
Use Descriptor	3, 10, 11
Sector of use	1, 2, 3, 8a, 8b, 9, 210
Process Categories	1, 4, 6D
Environmental Release Categories	
Processes, tasks, activities covered	
Manufacturing of tires and general rubber products in closed or contained systems, including potential accidental exposure during the processing of raw (unprocessed) rubber, handling and mixing of rubber additives, classification, vulcanization, cooling, finishing, and maintenance (CGES19_I).	
Assessment Method	
See section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristics:	
Physical state of product	
Concentration of t substance in product	Covers a percentage of substance in the product up to 100% (unless otherwise stated) (G13).
Quantity used	Not applicable.
Frequency and duration of use/exposure	Covers a daily exposure of up to 8 hours (unless otherwise specified) (G2).
Human factors not influenced by risk management	Not applicable.
Scenario characteristics	**Specific measures for risk management and operational conditions**
General Measures (Skin Irritants) (G19)	Avoid direct contact with the skin. Identify potential areas of indirect skin contact. Wear protective gloves (tested according to EN374) if skin contact is likely. Eliminate contamination/spills as soon as they occur. Immediately remove any contamination from the skin. Provide basic training to personnel aimed at preventing/limiting exposure and report the onset of any dermatological problems (E3).
General measures (carcinogens) (G18)	Consider technical advances and process upgrades (including automation) to eliminate spills. Limit exposure by adopting measures such as closed systems, dedicated systems and and appropriate general/local exhaust ventilation systems. Drain systems and clean transfer lines before discontinuing containment. Clean/purge equipment, where possiblebefore maintenance. Where there is a possibility of exposure: restrict access to authorized personnel only, provide operators with specific training on the activities and operations to be performed in order to minimize the risk of exposure, wear gloves and protective suits to prevent skin contamination, use respiratory protection when required for certain exposure scenarios, immediately eliminate any spills, and dispose of waste safely. Ensure the adoption of safe work systems or equivalent solutions for risk management. Inspect, check, and regularly maintain all control devices and measures. Consider the need for a risk-based health surveillance system (G20).
Product transfers (CS3) (closed systems) (CS107)	Store the substance within a closed system (E84). Ensure material transfers are under containment or extract ventilation (E66).
General Exposures (Closed Systems) (CS15)	Handle the substance in a closed system (E47).
Product transfers (CS3)	Ensure material transfers are under containment or extract ventilation (E66).
Weighing of bulk products (CS91)	Handle the substance in a closed system (E47).

	Wear protective gloves that comply with the EN374 (PPE15) standard.
Laboratory activities (CS36)	Handle only under a fume hood or use equivalent methods to minimize exposure risks (E12).
Equipment Maintenance (CS5)	Drain down system prior to equipment break-in or maintenance (E65). Store drains in sealed containers pending disposal or subsequent recycling (ENVT4). Remove spills immediately (C&H13). Ensure an adequate standard of general ventilation. Natural ventilation occurs through doors, windows, etc. In controlled ventilation environments, air is introduced or removed by an electric extractor (E1).
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is complex UVCB (PrC3). Predominantly hydrophobic (PrC4a)	
Quantities used	
Fraction of EU tonnage used in region (A1)	0.1
Regional tonnage (tonnes/year) (A2)	94
Fraction of regional tonnage used locally (A3)	1
Annual site tonnage (tonnes/year) (A5)	94
Maximum Daily Site Tonnage (kg/day) (A4)	4.7e3
Frequency and duration of use	
Continuous release (FD2)	
Emission days (days/year) (FD4)	20
Environmental factors not influenced by risk management	
Local freshwater dilution factor (EF1)	10
Local marine water dilution factor (EF2)	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to risk management measures) (OOC4)	0.003
Release fraction to wastewater from process (initial release prior to risk management measures) (OOC5)	0.01
Release fraction to soil from process (initial release prior to risk management measures) (OOC6)	0.0001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Prevent the release of undissolved substances or recover them from wastewater (TRC14). Environmental risk is related to indirect exposure of humans via ingestion (TCR1k). In case of discharge to an urban wastewater treatment plant, no treatment is required (TCR9).	
Treat emissions in such a way as to ensure a typical removal efficiency of (%) (TCR7).	0
Treat waste water on site (before starting the discharge operation) to ensure the required removal effectiveness ≥ (%):	23.9
In case of discharge to an urban wastewater treatment plant, ensure the required on-site removal effectiveness ≥ (%)	0
Organizational measures to prevent/limit release from the site (1286)	
Do not spread sludge generated from industrial water treatment on natural land (OMS2). Sludge generated from industrial water treatment must be incinerated, kept under containment, or treated (OMS3)	
Conditions and measures relating to the municipal waste water treatment plant (1273)	
Estimated removal of wastewater substance by means of an urban treatment plant (%) (STP3).	95.5
Total effectiveness of wastewater removal, after the adoption of on-site and offsite (urban-type treatment plant) RMMs (%) (STP4)	95.5
Maximum allowable tonnage for the site (MSafe) based on release after total wastewater removal treatment (kg/d) (STP6).	4.2e4
Assumed flow rate for the urban wastewater treatment plant (m3/d) (STP5)	2000
Conditions and measures related to external treatment of waste for disposal (1272)	
External waste treatment and disposal must comply with applicable local and/or national legislation (ETW3).	

Conditions and measures relating to external waste recovery (1271)
External waste collection and recycling must comply with applicable local and/or national legislation (ERW1).
Section 3 Exposure Estimation
3.1 Health
For the purpose of assessing workplace exposure levels, where not explicitly specified, the ECETOC TRA method was used (G21).
3.2 Environment
The Hydrocarbon Block Method (HBM) was used to calculate environmental exposure with the Petrorisk model (EE2).
Section 4
4.1 Health
Exposures are not expected to exceed the DN(M)EL when the Risk Management Measures (RMMs) and Operational Conditions (OCs) described in Section 3 are applied (G22). Where different Risk Management Measures/Operating Conditions are in place, users are required to ensure that risks are managed at least at an equivalent level (G23). Available hazard data do not support the derivation of a DNEL for skin irritation effects (G32). Available hazard data do not support the need to establish a DNEL for other health effects (G36). Risk Management Measures are based on the qualitative characterization of risk (G37).
4.2 Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industrieslibraries.html) [DSU4].

ETBE

1. Formulation of ETBE

Section 1	
Title	
Formulation of ETBE; CAS NR 637-92-3	
Use Descriptor	
Sector of use	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 batch or continuous operations, including storage, material transfer, mixing, large and small-scale packaging, maintenance, and associated laboratory activities.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristics:	
Physical state of product	Liquid, vapor pressure > 10 kPa under standard conditions (OC5).
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) (G13).
Quantity used	Not applicable.
Frequency and duration of use/exposure	Covers daily exposure of up to 8 hours (unless otherwise specified) (G2).
Human factors not influenced by risk management	Not applicable.
Other operational conditions affecting exposure	Assumes use of the product at a temperature not exceeding 20°C above ambient temperature, unless otherwise specified (G15). Assumes the application of an adequate basic standard of hygiene in the workplace (G1).
Exposure scenarios	**Specific measures for risk management and operational conditions**
General Exposures (Closed Systems) (CS15)	No specific measures have been identified (EI18)
General exposures (closed systems) (CS15); sampling (CS56).	Ensure that the operation is carried out outdoors (E69). Do not carry out activities involving potential exposure for more than 4 hours (OC28) or (G9). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
General exposure (closed systems) (CS15); Use in batch processes under containment (CS37); with sampling (CS56).	Provide extract ventilation to points where emissions occur (E54).
General exposures (open systems) (CS16). Batch process (CS55). With sampling (CS56). Filling/preparation of equipment from drums or containers (CS45).	Provide extract ventilation to points where emissions occur (E54).

General exposures (closed systems) (CS15); Batch processes at elevated temperatures (CS136); with sampling (CS56); Operation is carried out at high temperatures (>20°C above ambient temperature) (OC7).	Formulate substances in closed or ventilated mixing containers (E46). Provide extract ventilation to points where emissions occur (E54).
In-process sampling (CS2)	Provide extract ventilation to points where emissions occur (E54).
Mixing operations (open systems) (CS30); Batch process (CS55).	Provide extract ventilation to points where emissions occur (E54). Do not carry out activities involving potential exposure for more than 4 hours (OC28) or (G9). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Manual (CS34); Transfer/pouring from containers (CS22); Non-dedicated facility (CS82).	Ensure material transfers are under containment or extract ventilation (E66). Do not carry out activities involving potential exposure for more than 4 hours (OC28) or (G9). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Drum/batch transfers (CS8); dedicated facility (CS81)	Use drum pumps (E53); Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings (E60).
Drums and small containers filling (CS6); Dedicated facility (CS81).	Fill containers/cans at dedicated fill points supplied with local extract ventilation. (E51).
Cleaning and maintenance of equipment (CS39); Non-dedicated facility (CS82).	Drain down and flush system prior to equipment break-in or maintenance (E55). Do not carry out activities that involve the possibility of exposure for a period of more than 1 hour (OC27). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).

Section 2.2 Environmental Exposure Control	
Product characteristics	
Substance is a unique structure(PrC1); Predominantly hydrophobic (PrC4a); Readily biodegradable (PrC5a).	
Operational Conditions	
For external use (OOC1).	
Amounts used	
Regional tonnage (tonnes/year) (A2)	901,000
Fraction of EU tonnage used in region (A3)	0.05
Average daily site tonnage (kg/day)	150,167
Annual site tonnage (tons/year)	45,050
Frequency and duration of use	
Continuous release (FD2)	
Emission days (days/year) (FD4)	300
Other given operational conditions affecting environmental exposure	
Use in closed systems, in dry or wet processes.	
Release fraction to air from process	1.00E-03
Release fraction to wastewater from process	3.00E-04
Release fraction to soil from process (only regional)	1.00E-04

RMMs	
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Air	No air emission control required; required removal efficiency is 0% (TCR5).
Wastewater	In case of discharge to an urban wastewater treatment plant, no treatment is required (TCR9).
Soil	Treat emissions in such a way as to ensure a typical removal efficiency of (%) (TCR7).
Organizational measures to prevent/limit release from the site (1286)	
Prevent the release of undissolved substances or their recovery from wastewater (OMS1).	
Conditions and measures related to municipal sewage treatment plant (1273)	
It is assumed that the output flow rate from the industrial wastewater treatment plant is 2000 m3/day.	
Conditions and measures related to external treatment of waste for disposal (1272)	
Not applicable	
Conditions and measures relating to external waste recovery (1271)	
Not applicable	
Other environmental control measures in addition to the above (1287)	
None	

2. Distribution of ETBE

Section 1	
Title	
Distribution of ETBE; CAS NR 637-92-3	
Use Descriptor	
Sector of use	Industrial (SU3)
Process Categories	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC9, PROC15
Environmental Release Categories	ERC1, ERC2
Specific Environment Release Categories	ESVOC3 SpERC
Processes, tasks, activities covered	
Loading of bulk substances (on ships/barges, tank trucks/railcars, and IBCs) in closed or contained systems, including accidental exposure during sampling, storage, unloading, maintenance, and associated laboratory activities (CGES1A_I).	
Section 2 Operating Conditions and Risk Management Measures	
Section 2.1 Control of worker exposure	
Product Characteristics	
Physical state of product	Liquid, vapor pressure > 10 kPa under standard conditions (OC5).
Concentration of substance in product	Covers a percentage of substance in the product up to 100% (unless otherwise stated) (G13).
Quantity used	Not applicable.
Frequency and duration of use/exposure	Covers daily exposure of up to 8 hours (unless otherwise specified) (G2).
Human factors not influenced by risk management	Not applicable
Other operational conditions affecting exposure	Assumes use of the product at a temperature not exceeding 20°C above ambient temperature, unless otherwise specified (G15). Assumes the application of an adequate basic standard of hygiene in the workplace (G1).
Exposure scenarios	**Specific risk management measures and operating conditions**
General Exposures (Closed Systems) (CS15)	No specific measures have been identified (EI18)
General exposures (closed systems) (CS15); sampling (CS56).	Ensure that the operation is carried out outdoors (E69). Do not carry out activities involving potential exposure for more than 4 hours (OC28) or (G9). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
General exposure (closed systems) (CS15); Use in batch processes under containment (CS37); with sampling (CS56).	Provide extract ventilation to points where emissions occur (E54).
General exposures (open systems) (CS16). Discontinuous process (CS55). With sampling (CS56). Filling/preparation of equipment from drums or containers (CS45).	Provide extract ventilation to points where emissions occur (E54). Ensure that samples are collected under containment or extraction ventilation conditions (E76).

In-process sampling (CS2)	Do not carry out activities that involve the possibility of exposure for more than 15 minutes (OC26). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Laboratory activities 8CS36); Cleaning (CS47)	Ensure an adequate standard of controlled ventilation (10 to 15 air changes per hour) (E40).
Bulk closed loading and unloading (CS501). Dedicated facility (CS81)	Ensure that the operation is carried out outdoors (E69); Do not carry out activities that involve the possibility of exposure for a period of more than 1 hour (OC27). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Bulk opened loading and unloading (CS503); non-dedicated facility (CS82).	Ensure material transfers are under containment or extract ventilation (E66). Do not carry out activities involving potential exposure for more than 4 hours (OC28) or (G9). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Drums and small containers filling (CS6); Dedicated facility (CS81).	Fill containers/cans at dedicated fill points supplied with local extract ventilation (E51).
Cleaning and maintenance of equipment (CS39); Non-dedicated facility (CS82).	Drain down and flush system prior to equipment break-in or maintenance (E55). Do not carry out activities that involve the possibility of exposure for a period of more than 1 hour (OC27). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Storage (CS67) General Exposures (Closed Systems) (CS15)	No specific measures have been identified (EI18)
Storage (CS67) General exposures (closed systems) (CS15) with sampling (CS56).	Professional and domestic use of the product involving the immersion of substances in a matrix. Wear a respirator conforming to EN140 with Type A filter or better (PPE22).

Section 2.2 Environmental Exposure Control		
Product characteristics		
Substance is a unique structure(PrC1); Predominantly hydrophobic (PrC4a); Readily biodegradable (PrC5a).		
Transport and distribution		
Operational Conditions		
For external use (OOC1).		
Amounts used		
Fraction of EU tonnage used in region (A1)		1.00
Regional tonnage (tonnes/year) (A2)		901,000
Fraction of regional tonnage used locally (A3)		0.02
Average daily site tonnage (kg/day)		51,486
Annual site tonnage (tons/year)		18,020
Frequency and duration of use		
Continuous release (FD2)		
Emission days (days/year) (FD4)		350
Other given operational conditions affecting environmental exposure		
Use in closed systems, in dry or wet processes.		
Release fraction to air from process		1.00E-04
Release fraction to wastewater from process		1.00E-05
Release fraction to soil from process (only regional)		1.00E-05
RMMs		
Technical conditions and measures at process level (source) to prevent release		
Common practices vary across sites thus conservative process release estimates used [TCS1].		
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil		
Air	No air emission control required; required removal efficiency is 0% (TCR5).	
Wastewater	Treat wastewater on-site (prior to discharge) to ensure the required removal efficiency >97% (TCR8).	
Soil	Treat emissions in such a way as to ensure a typical removal efficiency of (%) (TCR7).	
Organizational measures to prevent/limit release from the site (1286)		
Prevent the release of undissolved substances or their recovery from wastewater (OMS1).		
Conditions and measures related to municipal sewage treatment plant (1273)		

It is assumed that the output flow rate from the industrial wastewater treatment plant is 2000 m3/day.	
Conditions and measures related to external treatment of waste for disposal (1272)	
Not applicable	
Conditions and measures relating to external waste recovery (1271)	
Not applicable	
Other environmental control measures in addition to the above (1287)	
None	
Storage	
Operational Conditions	
For external use (OOC1).	
Amounts used	
Fraction of EU tonnage used in region (A1)	1.00
Regional tonnage (tonnes/year) (A2)	901,000
Fraction of regional tonnage used locally (A3)	1
Average daily site tonnage (kg/day)	2,468,493
Annual site tonnage (tons/year)	901,000
Frequency and duration of use	
Continuous release (FD2)	
Emission days (days/year) (FD4)	365
Other given operational conditions affecting environmental exposure	
Use in closed systems, in dry or wet processes.	
Release from process waste water (Kg/day)	8.4
RMMs	
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Air	Emission controls are not applicable, as no direct release into the air is recorded (TCR2).
Wastewater	Treat wastewater on-site (prior to discharge) to ensure the required removal efficiency >97% (TCR8).
Soil	Soil emission controls are not applicable as there is no direct release to soil (TCR4).
Organizational measures to prevent/limit release from the site (1286)	
Prevent the release of undissolved substances or their recovery from wastewater (OMS1).	
Conditions and measures related to municipal sewage treatment plant (1273)	
It is assumed that the output flow rate from the industrial wastewater treatment plant is 2000 m3/day.	
Conditions and measures related to external treatment of waste for disposal (1272)	
Not applicable	
Conditions and measures relating to external waste recovery (1271)	
Not applicable	
Other environmental control measures in addition to the above (1287)	
None	

3. Use of ETBE in fuels – Industrial sector

Section 1	
Title	
Use of ETBE in fuels; CAS NR 637-92-3	
Use Descriptor	
Sector of use	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 transfer, use, equipment maintenance and disposal of waste (GES12_I).	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristics	
Physical state of product	Liquid, vapor pressure > 10 kPa under standard conditions (OC5).
Concentration of substance in product	Covers up to 15% of the substance in the product.
Quantity used	Not applicable
Frequency and duration of use/exposure	Covers daily exposure of up to 8 hours (unless otherwise specified) (G2).
Human factors not influenced by risk management	Not applicable.
Other operational conditions affecting exposure	Assumes the application of an adequate basic standard of hygiene in the workplace (G1).
Exposure scenarios	**Specific measures for risk management and operational conditions**
Bulk product transfer (CS14); Batch process (CS55); with sampling (CS56); Filling/preparation of equipment from drums or containers (CS45).	Handle the substance within a predominantly closed system equipped with extraction ventilation (E49). Do not carry out activities involving potential exposure for more than 4 hours (OC28). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Drum/batch transfers (CS8); Filling/preparation of equipment from drums or containers (CS45). Bulk product transfer (CS14); dedicated facility (CS81).	Use drum pumps (E53).
General Exposures (Closed Systems) (CS15)	No specific measures have been identified (EI18).
General exposures (closed systems) (CS15); with sampling (CS56).	Ensure an extraction ventilation system at the material transfer points and other openings (E82).
General exposures (closed systems) (CS15); Use in batch processes under containment (CS37); with sampling (CS56).	Provide extract ventilation to points where emissions occur (E54).
(closed systems) (CS107); fuel consumption.	No specific measures have been identified (EI18).
Equipment Cleaning and Maintenance (CS39); non-dedicated facility (CS82) e.g. repair fuel pumps inside buildings.	Drain down system prior to equipment break-in or maintenance (E65). Do not carry out activities involving potential exposure for more than 4 hours (OC28).
Storage (CS67); General Exposures (Closed Systems) (CS15)	No specific measures have been identified (EI18).
Storage (CS67);	Ensure that the operation is carried out outdoors (E69).

General exposures (closed systems) (CS15); with sampling (CS56).	
Section 2.2 Environmental Exposure Control	
Product characteristics	
Substance is a unique structure(PrC1); Predominantly hydrophobic (PrC4a); Readily biodegradable (PrC5a).	
Transport and distribution	
Operational Conditions	
For external use (OOC1).	
Amounts used	
Regional tonnage (tonnes/year) (A2)	901,000
Fraction of regional tonnage used locally (A3)	0.02
Average daily site tonnage (kg/day)	51,486
Annual site tonnage (tons/year)	18,020
Frequency and duration of use	
Continuous release (FD2)	
Emission days (days/year) (FD4)	350
Other given operational conditions affecting environmental exposure	
Use in closed systems, in dry or wet processes.	
Release fraction to air from process	1.00E-04
Release fraction to wastewater from process	1.00E-05
Release fraction to soil from process (only regional)	1.00E-05
RMMs	
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Air	No air emission control required; required removal efficiency is 0% (TCR5).
Wastewater	Treat wastewater on-site (prior to discharge) to ensure the required removal efficiency >95% (TCR8).
Soil	Treat emissions in such a way as to ensure a typical removal efficiency of (%) (TCR7).
Organizational measures to prevent/limit release from the site (1286)	
Prevent the release of undissolved substances or their recovery from wastewater (OMS1).	
Conditions and measures related to municipal sewage treatment plant (1273)	
It is assumed that the output flow rate from the industrial wastewater treatment plant is 2000 m3/day.	
Conditions and measures related to external treatment of waste for disposal (1272)	
Not applicable	
Conditions and measures relating to external waste recovery (1271)	
Not applicable	
Other environmental control measures in addition to the above (1287)	
None	

4. Use of ETBE in fuels – Professional sector

Section 1	
Title	
Use of ETBE in fuels; CAS NR 637-92-3	
Use Descriptor	
Sector of use	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 transfer, use, equipment maintenance and disposal of waste (GES12_I).	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristics	
Physical state of product	Liquid, vapor pressure > 10 kPa under standard conditions (OC5).
Concentration of substance in product	Covers up to 15% of the substance in the product.
Quantity used	Not applicable
Frequency and duration of use/exposure	Covers daily exposure of up to 8 hours (unless otherwise specified) (G2).
Human factors not influenced by risk management	Not applicable.
Other operational conditions affecting exposure	Assumes the application of an adequate basic standard of hygiene in the workplace (G1).
Exposure scenarios	**Specific measures for risk management and operational conditions**
Bulk product transfer (CS14); Batch process (CS55); Filling/preparation of equipment from drums or containers (CS45).	Ensure that the operation is carried out outdoors (E69). Do not carry out activities involving potential exposure for more than 4 hours (OC28). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Drum/batch transfers (CS8); Filling/preparation of equipment from drums or containers (CS45); Bulk product transfer (CS14); dedicated facility (CS81).	Ensure that the operation is carried out outdoors (E69). Ensure material transfers are under containment or extract ventilation (E66).
Refueling (CS507)	Ensure an adequate standard of controlled ventilation (10 to 15 air changes per hour) (E40). Do not carry out activities involving potential exposure for more than 1 hour (OC27). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
General exposures (closed systems) (CS15); with sampling (CS56).	Do not carry out activities involving potential exposure for more than 4 hours (OC28). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
General exposures (closed systems) (CS15); Use in batch processes under containment (CS37); with sampling (CS56).	Ensure an adequate standard of controlled ventilation (10 to 15 air changes per hour) (E40).
Filling drums and small containers (CS6); Dedicated facility (CS81)	Use drum pumps or take particular care when pouring from containers (E64). Do not carry out activities involving potential exposure for more than 4 hours (OC28). Wear a respirator conforming to EN140 with Type A filter or better (Wear a respirator conforming to EN140 with Type A filter or better (PPE22).).

(closed systems) (CS107); fuel usage.	Ensure that the operation is carried out outdoors (E69) or (G9). Ensure an adequate standard of controlled ventilation (10 to 15 air changes per hour) (E40).
Equipment Cleaning and Maintenance (CS39). non-dedicated facility (CS82) e.g. repair of fuel pumps inside buildings.	Drain down and flush system prior to equipment break-in or maintenance (E55). Do not carry out activities involving potential exposure for more than 4 hours (OC28) or (G9). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Equipment Cleaning and Maintenance (CS39). non-dedicated facility (CS82) e.g. repair of fuel pumps outside buildings.	Drain down and flush system prior to equipment break-in or maintenance (E55). Do not carry out activities involving potential exposure for more than 4 hours (OC28) or (G9). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Storage (CS67); General Exposures (Closed Systems) (CS15)	No specific measures have been identified (EI18).

Section 2.2 Environmental Exposure Control		
Product characteristics		
Substance is a unique structure(PrC1); Predominantly hydrophobic (PrC4a); Readily biodegradable (PrC5a).		
Operational Conditions		
For external use (OOC1).		
Amounts used		
Average daily consumption for a dispersive use type (kg/day)		4.94
Frequency and duration of use		
Dispersive use (FD3)		
Emission days (days/year) (FD4)		365
Other operability conditions affecting environmental exposure		
Use in open systems		
Release fraction to air from highly dispersive use (regional only) (OOC7)		1.00e-2
Release fraction to wastewater from highly dispersive use (OOC8)		1.00E-05
Release fraction to water surface from highly dispersive use (regional only)		1.00E-04
Release fraction to soil from highly dispersive use (regional only) (OOC9)		1.00E-05
RMMs		
Technical conditions and measures at process level (source) to prevent release		
Common practices vary across sites thus conservative process release estimates used [TCS1].		
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil		
Air	No air emission control required; required removal efficiency is 0% (TCR5).	
Wastewater	Treat wastewater on-site (prior to discharge) to ensure the required removal efficiency >95% (TCR8).	
Soil	Treat emissions in such a way as to ensure a typical removal efficiency of (%) (TCR7).	
Organizational measures to prevent/limit release from the site (1286)		
Prevent the release of undissolved substances or their recovery from wastewater (OMS1).		
Conditions and measures related to municipal sewage treatment plant (1273)		
It is assumed that the output flow rate from the industrial wastewater treatment plant is 2000 m3/day.		
Conditions and measures related to external treatment of waste for disposal (1272)		
Not applicable		
Conditions and measures relating to external waste recovery (1271)		
Not applicable		
Other environmental control measures in addition to the above (1287)		
None		

5. Use of ETBE in fuels – Consumers

Section 1		
Title		
Use of ETBE in fuels; CAS NR 637-92-3		
Sector of use	Consumers (SU21)	
Use Descriptor	PC13	
Environmental release categories	ERC8d	
Specific environmental release categories	ESVOC30 SpERC	
Processes, tasks, activities covered		
Use of fuel for refueling in 2-stroke and 4-stroke engines.		
Section 2 Operational Conditions and Risk Management Measures		
Section 2.1 Control of worker exposure		
Product features		
Physical state of product	Liquid, vapor pressure > 10 kPa under standard conditions (OC5).	
Vapor pressure	170 hPa at 25°C	
Concentration of substance in product	Diesel fuel, containing < 15% of the substance	
Quantity used	Up to 60 litres for refuelling	
Frequency and duration of use/exposure	Up to 3 times a week	
Other operating conditions affecting exposure	Unless otherwise specified, use is assumed to occur at ambient temperature (ConsOC15).	
Exposure scenarios	**Specific risk management measures and operating conditions**	
PC13: Fuel	OC	Unless otherwise specified, includes concentrations up to 15% (ConsOC1); includes use up to 150 days/year (ConsOC3); includes frequencies of use up to once per day (ConsOC4); for each use, it includes exposures up to 15 minutes per event (ConsOC14).
	RMM	No specific RMM value developed beyond the reported OCs.
Section 2.2 Environmental Exposure Control		
Product characteristics		
Substance is a unique structure(PrC1); Predominantly hydrophobic (PrC4a); Readily biodegradable (PrC5a).		
Operating Conditions		
For indoor/outdoor use (OOC3).		
Amounts used		
Average daily consumption for a dispersive use type (kg/day)	4.94	
Frequency and duration of use		
Dispersive use (FD3)		
Emission days (days/year) (FD4)	365	
Other operability conditions affecting environmental exposure		
Use in open systems		
Release fraction to air from highly dispersive use (regional only) (OOC7)	1.00E-02	
Release fraction to wastewater from highly dispersive use (OOC8)	1.00E-05	
Release fraction to water surface from highly dispersive use (regional only)	1.00E-04	
Release fraction to soil from highly dispersive use (regional only) (OOC9)	1.00E-05	
RMMs		
Technical conditions and measures at process level (source) to prevent release		
Common practices vary across sites thus conservative process release estimates used [TCS1].		
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil		
Air	No air emission control required; required removal efficiency is 0% (TCR5).	
Wastewater	Treat wastewater on-site (prior to discharge) to ensure the required removal efficiency >95% (TCR8).	
Soil	Treat emissions in such a way as to ensure a typical removal efficiency of (%) (TCR7).	

Organizational measures to prevent/limit release from the site (1286)
Prevent the release of undissolved substances or their recovery from wastewater (OMS1).
Conditions and measures related to municipal sewage treatment plant (1273)
It is assumed that the output flow rate from the industrial wastewater treatment plant is 2000 m3/day.
Conditions and measures related to external treatment of waste for disposal (1272)
Not applicable
Conditions and measures relating to external waste recovery (1271)
Not applicable
Other environmental control measures in addition to the above (1287)
None

MTBE

1. Formulation of MTBE

Section 1	
Title	
Formulation of MTBE; CAS NR 1634-04-4	
Use Descriptor	
Sector of use	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 batch or continuous operations, including storage, material transfer, mixing, large and small-scale packaging, maintenance, and associated laboratory activities.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristics:	
Physical state of product	Liquid, vapor pressure > 10 kPa under standard conditions (OC5).
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) (G13).
Quantity used	Not applicable.
Frequency and duration of use/exposure	Covers daily exposure of up to 8 hours (unless otherwise specified) (G2).
Human factors not influenced by risk management	Not applicable.
Other operational conditions affecting exposure	Assumes use of the product at a temperature not exceeding 20°C above ambient temperature, unless otherwise specified (G15). Assumes the application of an adequate basic standard of hygiene in the workplace (G1).
Exposure scenarios	**Specific risk management measures and operating conditions**
General Measures (Skin Irritants) (G19)	Avoid direct contact with the skin. Identify potential areas of indirect skin contact. Wear protective gloves (tested according to EN374) if skin contact is likely. Eliminate contamination/spills as soon as they occur. Immediately remove any contamination from the skin. Provide basic training to personnel aimed at preventing/limiting exposure and report the onset of any dermatological problems (E3).
General Exposures (Closed Systems) (CS15)	No specific measures have been identified (EI18).
General exposures (closed systems) (CS15); with sampling (CS56).	Ensure an adequate standard of controlled ventilation (10 to 15 air changes per hour) (E40).
General exposures (closed systems) (CS15); Use in batch processes under containment (CS37); with sampling (CS56).	Provide extract ventilation to points where emissions occur (E54).

General exposures (open systems) (CS16). Batch process (CS55). With sampling (CS56). Filling/preparation of equipment from drums or containers (CS45).	Provide extract ventilation to points where emissions occur (E54).
General exposures (closed systems) (CS15); Batch processes at high temperatures (CS136); with sampling (CS56);	Formulate substances in closed or ventilated mixing containers (E46). Provide extract ventilation to points where emissions occur (E54).
In-process sampling (CS2)	Provide extract ventilation to points where emissions occur (E54).
Laboratory activities (CS36). Cleaning (CS47)	Handle in a fume cupboard or under extract ventilation (E83).
Bulk closed loading and unloading (CS501). Dedicated facility (CS81)	Ensure material transfers are under containment or extract ventilation. (E82).
Mixing operations (open systems) (CS30) ; Batch process (CS55).	Provide extract ventilation to points where emissions occur (E54).
Manual (CS34); Transfer/pouring from containers (CS22); non-dedicated facility (CS82).	Ensure material transfers are under containment or extract ventilation (E66).
Drum/batch transfers (CS8); Dedicated facility (CS81)	Use drum pumps (E53); Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings (E60).
Drums and small containers filling (CS6); Dedicated facility (CS81)	Fill containers/cans at dedicated fill points supplied with local extract ventilation (E51).
Equipment Cleaning and Maintenance (CS39); non-dedicated facility (CS82).	Drain down and flush system prior to equipment break-in or maintenance (E55). Do not carry out activities involving potential exposure for more than 4 hours (OC28). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Storage (CS67). General Exposures (Closed Systems) (CS15)	No specific measures have been identified (EI18).
Storage (CS67). General exposures (closed systems) (CS15). With sampling (CS56).	Do not carry out activities involving potential exposure for more than 4 hours (OC28). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Section 2.2 Environmental Exposure Control	
Product characteristics	
Substance is a unique structure(PrC1); Predominantly hydrophobic (PrC4a); Readily biodegradable (PrC5a).	
Operational Conditions	
For external use (OOC1).	
Amounts used	
Fraction of EU tonnage used in region (A1)	0.57
Regional tonnage (tonnes/year) (A2)	659,000
Fraction of regional tonnage used locally (A3)	0.05
Average daily site tonnage (kg/day)	109,833
Annual site tonnage (tons/year)	32,950
Frequency and duration of use	
Continuous release (FD2)	
Emission days (days/year) (FD4)	300
Other given operational conditions affecting environmental exposure	
Use in closed systems, in dry or wet processes.	
Release fraction to air from process	1.00E-03
Release fraction to wastewater from process	3.00E-04
Release fraction to soil from process (only regional)	1.00E-04
RMMs	

Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Air	No air emission control required; required removal efficiency is 0% (TCR5).
Wastewater	Treat wastewater on-site (prior to discharge) to ensure the required removal efficiency >99% (TCR8).
Soil	Treat emissions in such a way as to ensure a typical removal efficiency of (%) (TCR7).
Organizational measures to prevent/limit release from the site (1286)	
Prevent the release of undissolved substances or their recovery from wastewater (OMS1).	
Conditions and measures related to municipal sewage treatment plant (1273)	
It is assumed that the output flow rate from the industrial wastewater treatment plant is 2000 m3/day.	
Conditions and measures related to external treatment of waste for disposal (1272)	
Not applicable	
Conditions and measures relating to external waste recovery (1271)	
Not applicable	
Other environmental control measures in addition to the above (1287)	
None	

2. Use of MTBE as intermediate - Industrial

Section 1	
Title	
Use of MTBE as an intermediate; CAS NR 1634-04-4	
Use Descriptor	
Sector of use	Industrial (SU3)
Process categories	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC15
Environmental release categories	ERC6a
Processes, tasks, activities covered	
Use of substance as intermediate. Includes recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container)	
Section 2 Operating Conditions and Risk Management Measures	
Section 2.1 Control of worker exposure	
Product Characteristics	
Physical state of product	Liquid, vapor pressure > 10 kPa under standard conditions (OC5).
Concentration of substance in product	Covers a percentage of substance in the product up to 100% (unless otherwise stated) (G13).
Quantity used	Not applicable.
Frequency and duration of use/exposure	Covers daily exposure of up to 8 hours (unless otherwise specified) (G2).
Human factors not influenced by risk management	Not applicable
Other operational conditions affecting exposure	Assumes use of the product at a temperature not exceeding 20°C above ambient temperature, unless otherwise specified (G15). Assumes the application of an adequate basic standard of hygiene in the workplace (G1).
Exposure scenarios	**Specific measures for risk management and operational conditions**
General Measures (Skin Irritants) (G19)	Avoid direct contact with the skin. Identify potential areas of indirect skin contact. Wear protective gloves (tested according to EN374) if skin contact is likely. Eliminate contamination/spills as soon as they occur. Immediately remove any contamination from the skin. Provide basic training to personnel aimed at preventing/limiting exposure and report the onset of any dermatological problems (E3).
General Exposures (Closed Systems) (CS15)	No specific measures have been identified (EI18).
General exposures (closed systems) (CS15); with sampling (CS56).	Ensure that the operation is carried out outdoors (E69).
General exposures (closed systems) (CS15); Use in batch processes under containment (CS37); with sampling (CS56).	Provide extract ventilation to points where emissions occur (E54).

General exposures (open systems) (CS16). Batch process (CS55). With sampling (CS56). Filling/preparation of equipment from drums or containers (CS45).	Ensure material transfers are under containment or extract ventilation (E66).
In-process sampling (CS2); Dedicated facility (CS81)	Provide extract ventilation to points where emissions occur (E54).
Laboratory activities (CS36). Cleaning (CS47)	Handle in a fume cupboard or under extract ventilation (E83).
Bulk opened loading and unloading (CS503) non-dedicated facility (CS82).	Do not carry out activities involving potential exposure for more than 4 hours (OC28). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Bulk closed loading and unloading (CS501). Dedicated facility (CS81)	Do not carry out activities involving potential exposure for more than 4 hours (OC28). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Equipment Cleaning and Maintenance (CS39); non-dedicated facility (CS82).	Drain down and flush system prior to equipment break-in or maintenance (E55). Do not carry out activities involving potential exposure for more than 4 hours (OC28). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Storage (CS67). General Exposures (Closed Systems) (CS15)	No specific measures have been identified (EI18)
Storage (CS67). General exposures (closed systems) (CS15). With sampling (CS56).	Do not carry out activities involving potential exposure for more than 4 hours (OC28). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).

Section 2.2 Environmental Exposure Control		
Product characteristics		
Substance is a unique structure(PrC1); Predominantly hydrophobic (PrC4a); Readily biodegradable (PrC5a).		
Operational Conditions		
For external use (OOC1).		
Amounts used		
Fraction of EU tonnage used in region (A1)		0.01
Regional tonnage (tonnes/year) (A2)		8,030
Fraction of regional tonnage used locally (A3)		1
Average daily site tonnage (kg/day)		26,767
Annual site tonnage (tons/year)		8,030
Frequency and duration of use		
Continuous release (FD2)		
Emission days (days/year) (FD4)		300
Other given operational conditions affecting environmental exposure		
Use in closed systems, in dry or wet processes.		
Release fraction to air from process		5.00E-02
Release fraction to wastewater from process		8.00e-06
Release fraction to soil from process (only regional)		1.00E-04
RMMs		
Technical conditions and measures at process level (source) to prevent release		
Common practices vary across sites thus conservative process release estimates used [TCS1].		
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil		
Air	No air emission control required; required removal efficiency is 0% (TCR5).	
Wastewater	Treat wastewater on-site (prior to discharge) to ensure the required removal efficiency >90% (TCR8).	
Soil	No soil emission controls are required; the required removal efficiency is 0%	
Organizational measures to prevent/limit release from the site (1286)		
Prevent the release of undissolved substances or their recovery from wastewater (OMS1).		
Conditions and measures related to municipal sewage treatment plant (1273)		
It is assumed that the output flow rate from the industrial wastewater treatment plant is 2000 m3/day.		
Conditions and measures related to external treatment of waste for disposal (1272)		

Not applicable
Conditions and measures relating to external waste recovery (1271)
Not applicable
Other environmental control measures in addition to the above (1287)
None

3. Use of MTBE as Process Solvent and Extraction Agent - Industrial

Section 1	
Title	
Use of MTBE as process solvent and extraction agent; CAS NR 1634-04-4	
Usage descriptors	
Sector of use	Industrial (SU3, SU8, SU9)
Process categories	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC15
Environmental release categories	ERC4
Processes, tasks, activities covered	
Use of substance as process solvent and extraction agent. It includes recycling/recovery, material transfer, storage, sampling, laboratory activities, maintenance and loading operations (on boats/barges, wheeled or rail tank cars and bulk storage containers).	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristics	
Physical state of product	Liquid, vapor pressure > 10 kPa under standard conditions (OC5).
Concentration of substance in product	Covers percentage substance in the product up to 100% (unless stated differently) (G13).
Quantity used	Not applicable.
Frequency and duration of use/exposure	Covers a daily exposure of up to 8 hours (unless otherwise specified) (G2).
Human factors not influenced by risk management	Not applicable.
Other operational conditions affecting exposure	Assumes use of the product at a temperature not exceeding 20°C above ambient temperature, unless otherwise specified (G15). Assumes the application of an adequate basic standard of hygiene in the workplace (G1).
Exposure scenarios	**Specific risk management measures and operating conditions**
General Measures (Skin Irritants) (G19)	Avoid direct contact with the skin. Identify potential areas of indirect skin contact. Wear protective gloves (tested according to EN374) if skin contact is likely. Eliminate contamination/spills as soon as they occur. Immediately remove any contamination from the skin. Provide basic training to personnel aimed at preventing/limiting exposure and report the onset of any dermatological problems (E3).
General Exposures (Closed Systems) (CS15)	No specific measures have been identified (EI18).
General exposures (closed systems) (CS15); with sampling (CS56).	Ensure that the operation is carried out outdoors (E69).
General exposures (closed systems) (CS15); Use in batch processes under containment (CS37); with sampling (CS56).	Provide extract ventilation to points where emissions occur (E54).
General exposures (open systems) (CS16). Batch process (CS55). With sampling (CS56). Filling/preparation of equipment from drums or containers (CS45).	Ensure material transfers are under containment or extract ventilation (E66).
In-process sampling (CS2); Dedicated facility (CS81)	Provide extract ventilation to points where emissions occur (E54).
Laboratory activities (CS36). Cleaning (CS47)	Handle in a fume cupboard or under extract ventilation (E83).
Bulk opened loading and unloading (CS503) non-dedicated facility (CS82).	Do not carry out activities involving potential exposure for more than 4 hours (OC28). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).

Bulk closed loading and unloading (CS501). Dedicated facility (CS81)	Do not carry out activities involving potential exposure for more than 4 hours (OC28). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Equipment Cleaning and Maintenance (CS39); non-dedicated facility (CS82).	Drain down and flush system prior to equipment break-in or maintenance (E55). Do not carry out activities involving potential exposure for more than 4 hours (OC28). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Storage (CS67). General Exposures (Closed Systems) (CS15)	No specific measures have been identified (EI18)
Storage (CS67). General exposures (closed systems) (CS15). With sampling (CS56).	Do not carry out activities involving potential exposure for more than 4 hours (OC28). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).

Section 2.2 Environmental Exposure Control	
Product characteristics	
Substance is a unique structure(PrC1); Predominantly hydrophobic (PrC4a); Readily biodegradable (PrC5a).	
Operational Conditions	
For external use (OOC1).	
Amounts used	
Fraction of EU tonnage used in region (A1)	0.00
Regional tonnage (tonnes/year) (A2)	2,010
Fraction of regional tonnage used locally (A3)	0.3
Average daily site tonnage (kg/day)	1,834
Annual site tonnage (tons/year)	603
Frequency and duration of use	
Continuous release (FD2)	
Emission days (days/year) (FD4)	120
Other given operational conditions affecting environmental exposure	
Use in closed systems, in dry or wet processes.	
Release fraction to air from process	2.50E-01
Release fraction to wastewater from process	1.00E-01
Release fraction to soil from process (only regional)	1.00E-03

RMMs	
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Air	No air emission control required; required removal efficiency is 0% (TCR5).
Wastewater	Treat wastewater on-site (prior to discharge) to ensure the required removal efficiency >99% (TCR8).
Soil	No soil emission controls are required; the required removal efficiency is 0%
Organizational measures to prevent/limit release from the site (1286)	
Prevent the release of undissolved substances or their recovery from wastewater (OMS1).	
Conditions and measures related to municipal sewage treatment plant (1273)	
It is assumed that the output flow rate from the industrial wastewater treatment plant is 2000 m3/day.	
Conditions and measures related to external treatment of waste for disposal (1272)	
Not applicable	
Conditions and measures relating to external waste recovery (1271)	
Not applicable	
Other environmental control measures in addition to the above (1287)	
None	

4. Transport and Distribution of MTBE - Industrial

Section 1	
Title	
MTBE Transport & Distribution; CAS NR 1634-04-4	
Use Descriptor	
Sector of use	Industrial (SU3)
Process categories	PROC1, PROC2, PROC3, PROC4, PROC8A, PROC8B, PROC9, PROC15
Environmental release categories	ERC1, ERC2
Specific Environment Release Categories	ESVOC3 SpERC
Processes, tasks, activities covered	
Loading of substances (on ships/barges, tank trucks/railcars, and IBCs) in closed or contained systems, including accidental exposure during sampling, storage, unloading, maintenance, and associated laboratory activities (CGES1A_I).	
Section 2 Operational Conditions and Risk Management Measures	
Section 2.1 Control of worker exposure	
Product Characteristics	
Physical state of product	Liquid, vapor pressure > 10 kPa under standard conditions (OC5).
Concentration of substance in product	Covers a percentage of substance in the product up to 100% (unless otherwise stated) (G13).
Quantity used	Not applicable.
Frequency and duration of use/exposure	Covers a daily exposure of up to 8 hours (unless otherwise specified) (G2).
Human factors not influenced by risk management	Not applicable.
Other operational conditions affecting exposure	Assumes use of the product at a temperature not exceeding 20°C above ambient temperature, unless otherwise specified (G15). Assumes the application of an adequate basic standard of hygiene in the workplace (G1).
Exposure scenarios	**Specific risk management measures and operating conditions**
General Measures (Skin Irritants) (G19)	Avoid direct contact with the skin. Identify potential areas of indirect skin contact. Wear protective gloves (tested according to EN374) if skin contact is likely. Eliminate contamination/spills as soon as they occur. Immediately remove any contamination from the skin. Provide basic training to personnel aimed at preventing/limiting exposure and report the onset of any dermatological problems (E3).
General Exposures (Closed Systems) (CS15)	No specific measures have been identified (EI18).
General exposures (closed systems) (CS15); with sampling (CS56).	Ensure that the operation is carried out outdoors (E69).
General exposures (closed systems) (CS15); Use in Batch processes under containment (CS37); with sampling (CS56).	Ensure that the operation is carried out outdoors (E69). Do not carry out activities involving potential exposure for more than 4 hours (OC28). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
General exposures (open systems) (CS16). Batch process (CS55). With sampling (CS56). Filling/preparation of equipment from drums or containers (CS45).	Provide extract ventilation to points where emissions occur (E54). Ensure that samples are collected under containment or extraction ventilation conditions (E76).
In-process sampling (CS2)	Do not carry out activities involving potential exposure for more than 15 minutes (OC26). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Laboratory activities (CS36);	Handle in a fume cupboard or under extract ventilation (E83).

Cleaning (CS47)	
Bulk closed loading and unloading (CS501). Dedicated facility (CS81)	Ensure that the operation is carried out outdoors (E69). Do not carry out activities involving potential exposure for more than 1 hour (OC27). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Bulk opened loading and unloading (CS503); non-dedicated facility (CS82).	Ensure that material transfer is under containment or extraction ventilation conditions (E66) or (G9) Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Drums and small containers filling (CS6); dedicated facility (CS81).	Fill containers/cans at dedicated fill points supplied with local extract ventilation (E51).
Equipment Cleaning and Maintenance (CS39); non-dedicated facility (CS82).	Drain down and flush system prior to equipment break-in or maintenance (E55).
Storage (CS67) General Exposures (Closed Systems) (CS15)	No specific measures have been identified (EI18).
Storage (CS67) General exposures (closed systems) (CS15) with sampling (CS56).	Professional and domestic use of the product that leads to immersing the substances in a matrix (OC27). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).

Section 2.2 Environmental Exposure Control		
Product characteristics		
Substance is a unique structure(PrC1); Predominantly hydrophobic (PrC4a); Readily biodegradable (PrC5a).		
Transport and distribution		
Operational Conditions		
For external use (OOC1).		
Amounts used		
Fraction of EU tonnage used in region (A1)		0.57
Regional tonnage (tonnes/year) (A2)		659,000
Fraction of regional tonnage used locally (A3)		0.02
Average daily site tonnage (kg/day)		37,657
Annual site tonnage (tons/year)		13,180
Frequency and duration of use		
Continuous release (FD2)		
Emission days (days/year) (FD4)		350
Other given operational conditions affecting environmental exposure		
Use in closed systems, in dry or wet processes.		
Release fraction to air from process		1.00E-04
Release fraction to wastewater from process		1.00E-05
Release fraction to soil from process (only regional)		1.00E-05
RMMs		
Technical conditions and measures at process level (source) to prevent release		
Common practices vary across sites thus conservative process release estimates used [TCS1].		
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil		
Air	No air emission control required; required removal efficiency is 0% (TCR5).	
Wastewater	Treat wastewater on-site (prior to discharge) to ensure the required removal efficiency >95% (TCR8).	
Soil	No soil emission controls are required; the required removal efficiency is 0%	
Organizational measures to prevent/limit release from the site (1286)		
Prevent the release of undissolved substances or their recovery from wastewater (OMS1).		
Conditions and measures related to municipal sewage treatment plant (1273)		
It is assumed that the output flow rate from the industrial wastewater treatment plant is 2000 m3/day.		
Conditions and measures related to external treatment of waste for disposal (1272)		
Not applicable		
Conditions and measures relating to external waste recovery (1271)		
Not applicable		
Other environmental control measures in addition to the above (1287)		
None		

Storage	
Operational Conditions	
For external use (OOC1).	
Amounts used	
Fraction of EU tonnage used in region (A1)	0.57
Regional tonnage (tonnes/year) (A2)	659,000
Fraction of regional tonnage used locally (A3)	1
Average daily site tonnage (kg/day) (A4)	1,805,479
Annual site tonnage (tons/year) (A5)	659,000
Frequency and duration of use	
Continuous release (FD2)	
Emission days (days/year) (FD4)	365
Other given operational conditions affecting environmental exposure	
Use in closed systems, in dry or wet processes.	
Release from process waste water (Kg/day)	8.4
RMMs	
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Air	Emission controls are not applicable, as no direct release into the air is recorded (TCR2)
Wastewater	Treat wastewater on-site (prior to discharge) to ensure the required removal efficiency >99% (TCR8).
Soil	Soil emission controls are not applicable as there is no direct release to soil (TCR4).
Organizational measures to prevent/limit release from the site (1286)	
Prevent the release of undissolved substances or their recovery from wastewater (OMS1). Prevent leakages and spillages to soil.	
Conditions and measures related to municipal sewage treatment plant (1273)	
It is assumed that the output flow rate from the industrial wastewater treatment plant is 2000 m3/day.	
Conditions and measures related to external treatment of waste for disposal (1272)	
Not applicable	
Conditions and measures relating to external waste recovery (1271)	
Not applicable	
Other environmental control measures in addition to the above (1287)	
None	

5. Use of MTBE in Fuels - Industrial

Section 1	
Title	
Use of MTBE in fuels; CAS NR 1634-04-4	
Use Descriptor	
Sector of use	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 transfer, use, equipment maintenance and disposal of waste (GES12_I).	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristics	
Physical state of product	Liquid, vapor pressure > 10 kPa under standard conditions (OC5).
Concentration of substance in product	Covers up to 15% of the substance in the product.
Quantity used	Not applicable
Frequency and duration of use/exposure	Covers daily exposure of up to 8 hours (unless otherwise specified) (G2).
Human factors not influenced by risk management	Not applicable.
Other operational conditions affecting exposure	Assumes the application of an adequate basic standard of hygiene in the workplace (G1).
Exposure scenarios	**Specific risk management measures and operating conditions**
General Measures (Skin Irritants) (G19)	Avoid direct contact with the skin. Identify potential areas of indirect skin contact. Wear protective gloves (tested according to EN374) if skin contact is likely. Eliminate contamination/spills as soon as they occur. Immediately remove any contamination from the skin. Provide basic training to personnel aimed at preventing/limiting exposure and report the onset of any dermatological problems (E3).
Bulk product transfer (CS14); Batch process (CS55); with sampling (CS56); Filling/preparation of equipment from drums or containers (CS45).	Ensure material transfers are under containment or extract ventilation (E66).
Drum/batch transfers (CS8); Filling/preparation of equipment from drums or containers (CS45); Bulk product transfer (CS14); dedicated facility (CS81).	Use drum pumps (E53).
General Exposures (Closed Systems) (CS15)	No specific measures have been identified (EI18).
General exposures (closed systems) (CS15); with sampling (CS56).	No specific measures have been identified (EI18).
General exposures (closed systems) (CS15); Use in batch processes under containment (CS37); with sampling (CS56).	Do not carry out activities involving potential exposure for more than 4 hours (OC28). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
(closed systems) (CS107); fuel usage.	No specific measures have been identified (EI18).
(closed systems) (CS107); Discontinuous process (CS55).	Do not carry out activities involving potential exposure for more than 4 hours (OC28). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).

Equipment Cleaning and Maintenance (CS39); non-dedicated facility (CS82) e.g. repair of fuel pumps inside buildings.	Do not carry out activities involving potential exposure for more than 4 hours (OC28). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Storage (CS67); General Exposures (Closed Systems) (CS15)	No specific measures have been identified (EI18).
Storage (CS67); General exposures (closed systems) (CS15); with sampling (CS56).	Ensure that the operation is carried out outdoors (E69).

Section 2.2 Environmental Exposure Control		
Product features		
Substance is a unique structure(PrC1); Predominantly hydrophobic (PrC4a); Readily biodegradable (PrC5a).		
Transport and distribution		
Operational Conditions		
For external use (OOC1).		
Amounts used		
Fraction of EU tonnage used in region (A1)		0.57
Regional tonnage (tonnes/year) (A2)		659,000
Fraction of regional tonnage used locally (A3)		0.02
Average daily site tonnage (kg/day)		37,657
Annual site tonnage (tons/year)		13,180
Frequency and duration of use		
Continuous release (FD2)		
Emission days (days/year) (FD4)		350
Other given operational conditions affecting environmental exposure		
Use in closed systems, in dry or wet processes.		
Release fraction to air from process		1.00E-04
Release fraction to wastewater from process		1.00E-05
Release fraction to soil from process (only regional)		1.00E-05
RMMs		
Technical conditions and measures at process level (source) to prevent release		
Common practices vary across sites thus conservative process release estimates used [TCS1].		
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil		
Air	No air emission control required; required removal efficiency is 0% (TCR5).	
Wastewater	Treat wastewater on-site (prior to discharge) to ensure the required removal efficiency >95% (TCR8).	
Soil	No soil emission controls are required; the required removal efficiency is 0%	
Organizational measures to prevent/limit release from the site (1286)		
Prevent the release of undissolved substances or their recovery from wastewater (OMS1).		
Conditions and measures related to municipal sewage treatment plant (1273)		
It is assumed that the output flow rate from the industrial wastewater treatment plant is 2000 m3/day.		
Conditions and measures related to external treatment of waste for disposal (1272)		
Not applicable		
Conditions and measures relating to external waste recovery (1271)		
Not applicable		
Other environmental control measures in addition to the above (1287)		
None		

6. Use of MTBE in Fuels - Professional

Section 1	
Title	
Use of MTBE in fuels; CAS NR 1634-04-4	
Use Descriptor	
Sector of use	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 transfer, use, equipment maintenance and disposal of waste (GES12_I).	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of worker exposure	
Product Characteristics	
Physical state of product	Liquid, vapor pressure > 10 kPa under standard conditions (OC5).
Concentration of substance in product	Covers up to 15% of the substance in product
Quantity used	Not applicable
Frequency and duration of use/exposure	Covers daily exposure of up to 8 hours (unless otherwise specified) (G2).
Human factors not influenced by risk management	Not applicable.
Other operational conditions affecting exposure	Assumes the application of an adequate basic standard of hygiene in the workplace (G1).
Exposure scenarios	**Specific measures for risk management and operational conditions**
General Measures (Skin Irritants) (G19)	Avoid direct contact with the skin. Identify potential areas of indirect skin contact. Wear protective gloves (tested according to EN374) if skin contact is likely. Eliminate contamination/spills as soon as they occur. Immediately remove any contamination from the skin. Provide basic training to personnel aimed at preventing/limiting exposure and report the onset of any dermatological problems (E3).
Bulk product transfer (CS14); Batch process (CS55); Filling/preparation of equipment from drums or containers (CS45).	Ensure material transfers are under containment or extract ventilation (E66).
Drum/batch transfers (CS8); Filling/preparation of equipment from drums or containers (CS45); Bulk product transfer (CS14); dedicated facility (CS81).	Ensure material transfers are under containment or extract ventilation (E66).
Refueling (CS507)	Ensure an adequate standard of controlled ventilation (10 to 15 air changes per hour) (E40).
General exposures (closed systems) (CS15); with sampling (CS56).	No specific measures have been identified (EI18)
General exposures (closed systems) (CS15); Use in batch processes under containment (CS37); with sampling (CS56).	Ensure that the operation is carried out outdoors (E69).
Filling drums and small containers (CS6); Dedicated facility (CS81)	Use drum pumps or take particular care when pouring from containers (E64). Do not carry out activities involving potential exposure for more than 1 hour (OC27).

	Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
(closed systems) (CS107); fuel usage.	No specific measures have been identified (EI18).
Equipment Cleaning and Maintenance (CS39). non-dedicated facility (CS82) e.g. repair of fuel pumps inside buildings.	Drain down system prior to equipment break-in or maintenance (E65). Do not carry out activities involving potential exposure for more than 4 hours (OC28) or (G9). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Equipment Cleaning and Maintenance (CS39). non-dedicated facility (CS82) e.g. repair of fuel pumps outside buildings.	Drain the system before opening or servicing equipment (E65). Do not carry out activities involving potential exposure for more than 4 hours (OC28) or (G9). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Storage (CS67); General Exposures (Closed Systems) (CS15)	No specific measures have been identified (EI18).

Section 2.2 Environmental Exposure Control		
Product characteristics		
Substance is a unique structure(PrC1); Predominantly hydrophobic (PrC4a); Readily biodegradable (PrC5a).		
Operational Conditions		
For external use (OOC1).		
Amounts used		
Average daily consumption for a dispersive use type (kg/day)		3.61
Frequency and duration of use		
Dispersive use (FD3)		
Emission days (days/year) (FD4)		365
Other operability conditions affecting environmental exposure		
Use in open systems		
Release fraction to air from highly dispersive use (regional only) (OOC7)		1.00E-02
Release fraction to wastewater from highly dispersive use (OOC8)		1.00E-05
Release fraction to water surface from highly dispersive use (regional only)		1.00E-04
Release fraction to soil from highly dispersive use (regional only) (OOC9)		1.00E-05
RMMs		
Technical conditions and measures at process level (source) to prevent release		
Common practices vary across sites thus conservative process release estimates used [TCS1].		
Technical conditions on site and measures to reduce or limit discharges, air emissions and releases into the soil		
Air	No air emission control required; required removal efficiency is 0% (TCR5).	
Wastewater	Treat wastewater on-site (prior to discharge) to ensure the required removal efficiency >38% (TCR8).	
Soil	No soil emission controls are required; the required removal efficiency is 0%	
Organizational measures to prevent/limit release from the site (1286)		
Prevent the release of undissolved substances or their recovery from wastewater (OMS1).		
Conditions and measures related to municipal sewage treatment plant (1273)		
It is assumed that the output flow rate from the industrial wastewater treatment plant is 2000 m3/day.		
Conditions and measures related to external treatment of waste for disposal (1272)		
Not applicable		
Conditions and measures relating to external waste recovery (1271)		
Not applicable		
Other environmental control measures in addition to the above (1287)		
None		

7. Use of MTBE in fuels – Consumers

Section 1		
Title		
Use of MTBE in fuels; CAS NR 1634-04-4		
Usage descriptors		
Sector of use	Consumers (SU21)	
Process categories	PC13	
Environmental release categories	ERC8d	
Specific environmental release categories	ESVOC30 SpERC	
Processes, tasks, activities covered		
Use of fuel for refueling in 2-stroke and 4-stroke engines.		
Section 2 Operational Conditions and Risk Management Measures		
Section 2.1 Control of worker exposure		
Product features		
Physical state of product	Liquid, vapor pressure > 10 kPa under standard conditions (OC5).	
Vapor pressure	330 hPa at 25°C	
Concentration of substance in product	Diesel fuel, containing < 15% of the substance	
Quantity used	Up to 60 litres for refuelling	
Frequency and duration of use/exposure	Up to 3 times a week	
Other operating conditions affecting exposure	Unless otherwise specified, use is assumed to occur at ambient temperature (ConsOC15).	
Exposure scenarios	**Specific risk management measures and operating conditions**	
PC13: Fuel	OC	Unless otherwise specified, includes concentrations up to 15% (ConsOC1); includes use up to 150 days/year (ConsOC3); includes frequencies of use up to once per day (ConsOC4); for each use, it includes exposures up to 15 minutes per event (ConsOC14).
	RMM	No specific RMM value developed beyond the reported OCs.
Section 2.2 Environmental Exposure Control		
Product characteristics		
Substance is a unique structure(PrC1); Predominantly hydrophobic (PrC4a); Readily biodegradable (PrC5a).		
Product characteristics		
For external use (OOC1).		
Amounts used		
Average daily consumption for a dispersive use type (kg/day)		3.61
Frequency and duration of use		
Dispersive use (FD3)		
Emission days (days/year) (FD4)		365
Other operability conditions affecting environmental exposure		
Use in open systems		
Release fraction to air from highly dispersive use (regional only) (OOC7)		1.00E-02
Release fraction to wastewater from highly dispersive use (OOC8)		1.00E-05
Release fraction to water surface from highly dispersive use (regional only)		1.00E-04
Release fraction to soil from highly dispersive use (regional only) (OOC9)		1.00E-05
RMMs		
Technical conditions and measures at process level (source) to prevent release		
Common practices vary across sites thus conservative process release estimates used [TCS1].		
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil		
Air	No air emission control required; required removal efficiency is 0% (TCR5).	
Wastewater	Treat wastewater on-site (prior to discharge) to ensure the required removal efficiency >37% (TCR8).	
Soil	Treat emissions in such a way as to ensure a typical removal efficiency of (%) (TCR7).	

Organizational measures to prevent/limit release from the site (1286)
Prevent the release of undissolved substances or their recovery from wastewater (OMS1).
Conditions and measures related to municipal sewage treatment plant (1273)
It is assumed that the output flow rate from the industrial wastewater treatment plant is 2000 m3/day.
Conditions and measures related to external treatment of waste for disposal (1272)
Not applicable
Conditions and measures relating to external waste recovery (1271)
Not applicable
Other environmental control measures in addition to the above (1287)
None

TAME

1. Formulation of TAME

Section 1	Title of the exposure scenario
Title	**TAME formulation; CAS number 91995-60-7**
Use Descriptor	Sector of use: 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 batch or continuous operations, including storage, material transfer, mixing, large and small-scale packaging, maintenance, and associated laboratory activities.
Section 2	**Operational conditions and risk management measures**
Section 2.1	**Control of worker exposure**
Product Characteristics	
Physical state of product	Liquid, vapor pressure > 10 kPa under standard conditions (OC5)
Concentration of the substance in product	Covers up to 100% of the substance in the product (unless otherwise stated) (G13)
Quantity used	Not applicable
Frequency and duration of use/exposure	Covers daily exposure of up to 8 hours (unless otherwise specified) (G2)
Human factors not influenced by risk management	Not applicable
Other operational conditions affecting exposure	Assumes use of the product at a temperature not exceeding 20°C above ambient temperature, unless otherwise specified (G15). Assumes the application of an adequate basic standard of hygiene in the workplace (G1).
Scenario characteristics	**Specific measures for risk management**
General Exposures (Closed Systems) (CS15)	No specific measures have been identified (EI18).
General exposures (closed systems) (CS15). with sampling (CS56)	Ensure an adequate standard of general ventilation (no less than 3-5 air changes per hour) (E11). Do not carry out activities involving potential exposure for more than 4 hours (OC28).
General exposures (closed systems) (CS15) Use in batch processes under containment (CS37) with sampling (CS56)	Provide extract ventilation to points where emissions occur (E54).
General exposures (open systems) (CS16). Batch process (CS55). with sampling (CS56) Filling/preparation of equipment from drums or containers (CS45).	Provide extract ventilation to points where emissions occur (E54).
General exposures (closed systems) (CS15). Batch processes at high temperatures (CS136). with sampling (CS56)	Provide extract ventilation to points where emissions occur (E54).
In-process sampling (CS2)	Provide extract ventilation to points where emissions occur (E54).
Laboratory activities (CS36). Cleaning (CS47)	Handle in a fume cupboard or under extract ventilation (E83).
Bulk closed loading and unloading (CS501). Dedicated facility (CS81)	Ensure an extraction ventilation system at the material transfer points and other openings (E82).
Mixing Operations (Open Systems) (CS30) Batch Process (CS55)	Provide extract ventilation to points where emissions occur (E54).

Manual (CS34) Transfer/pouring from containers (CS22) non-dedicated facility (CS82).	Ensure material transfers are under containment or extract ventilation (E66).
Drum/batch transfers (CS8) dedicated facility (CS81)	Use drum pumps (E53) Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings (E60).
Drums and small containers filling (CS6) Dedicated facility (CS81)	Fill containers/cans at dedicated fill points supplied with local extract ventilation (E51). Remove spills immediately (C&H13) Close containers immediately after use (E9).
Equipment Cleaning & Maintenance (CS39) Non-Dedicated Facility (CS82)	Drain down and flush system prior to equipment break-in or maintenance (E55). Do not carry out activities involving potential exposure for more than 4 hours (OC28) or (G9). Wear a respirator conforming to EN140 with Type A filter or better (PPE22). Store drains in sealed containers pending disposal or subsequent recycling (ENVT4).
Storage (CS67) General Exposures (Closed Systems) (CS15)	No specific measures have been identified (EI18).
Storage (CS67) General exposures (closed systems) (CS15) with sampling (CS56).	Do not carry out activities involving potential exposure for more than 4 hours (OC28) or (G9). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Section 2.2	**Environmental exposure control**
Product characteristics	Substance is a unique structure(PrC1)
	Predominantly hydrophobic (PrC4a)
	Readily biodegradable (PrC5a)
Operational Conditions	For external use (OOC1).
Amounts used	
Fraction of EU tonnage used in region (A1)	1
Regional tonnage (tonnes/year) (A2)	790,000
Fraction of regional tonnage used locally (A3)	0.05
Average daily site tonnage (kg/day)	13,167
Annual site tonnage (tons/year)	39,500
Frequency and duration of use	
Release Type	Continuous release (FD2)
Emission days (days/year) (FD4)	300

Other operational conditions affecting environmental exposure	Use in closed systems
	In both dry and wet processes
Release fraction to air from process	1.00E-03
Release fraction to wastewater from process	3.00E-04
Release fraction to soil from process (only regional)	1.00E-04
RMMs	
Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites thus conservative process release estimates used [TCS1].
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Air	No air emission control required; required removal efficiency is 0% (TCR5).
Wastewater	In case of discharge to an urban wastewater treatment plant, no treatment is required (TCR9).
Soil	No control of emissions into the soil is required. The required removal efficiency is 0%.
Organizational measures to prevent/limit release from the site (1286)	Prevent the release of undissolved substances or their recovery from wastewater (OMS1).
Conditions and measures related to municipal sewage treatment plant (1273)	It is assumed that the output flow rate from the industrial wastewater treatment plant is 2000 m3/day.
Conditions and measures relating to the external treatment of waste for disposal (1272)	Not applicable
Conditions and measures relating to external waste recovery (1271)	Not applicable
Other environmental control measures in addition to the above	None

2. Transport and Distribution of TAME

Section 1	**Title of the exposure scenario**
Title	**Transportation and distribution of TAME; CAS number 91995-60-7**
Use Descriptor	Sector of use: 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 of bulk substances (on ships/barges, tank trucks/railcars, and IBCs) in closed or contained systems, including accidental exposure during sampling, storage, unloading, maintenance, and associated laboratory activities.
Section 2	**Operational conditions and risk management measures**
Section 2.1	**Worker Exposure Control**
Product Characteristics	
Physical state of product	Liquid, vapor pressure > 10 kPa under standard conditions (OC5)
Concentration of substance in product	Covers up to 100% of the substance in the product (unless otherwise stated) (G13)
Quantity used	Not applicable
Frequency and duration of use/exposure	Covers daily exposure of up to 8 hours (unless otherwise specified) (G2)
Human factors not influenced by risk management	Not applicable
Other operational conditions affecting exposure	Assumes use of the product at a temperature not exceeding 20°C above ambient temperature, unless otherwise specified (G15). Assumes the application of an adequate basic standard of hygiene in the workplace (G1).
Scenario characteristics	**Specific measures for risk management**
General Exposures (Closed Systems) (CS15)	No specific measures have been identified (EI18).
General exposures (closed systems) (CS15). with sampling (CS56)	Do not carry out activities involving potential exposure for more than 4 hours (OC28).
General exposures (closed systems) (CS15) Use in batch processes under containment (CS37) with sampling (CS56)	Provide extract ventilation to points where emissions occur (E54). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
General exposures (open systems) (CS16). Batch process (CS55). with sampling (CS56) Filling/preparation of equipment from drums or containers (CS45).	Ensure that samples are collected under containment or extraction ventilation conditions (E76).
(CS2) dedicated facility (CS81)	Provide extract ventilation to points where emissions occur (E54). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Laboratory activities (CS36). Cleaning (CS47)	Handle in a fume cupboard or under extract ventilation (E83).
Bulk opened loading and unloading (CS503); non-dedicated facility (CS82)	Ensure material transfers are under containment or extract ventilation (E66). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Bulk closed loading and unloading (CS501). Dedicated facility (CS81)	Ensure that the operation is carried out outdoors (E69). Do not carry out activities involving potential exposure for more than 1 hour (OC27). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).

Filling drums and small containers (CS6). Dedicated facility (CS81)	Ensure material transfers are under containment or extract ventilation (E66). Wear a respirator conforming to EN140 with Type A filter or better (PPE22).
Equipment Cleaning & Maintenance (CS39) Non-Dedicated Facility (CS82)	Drain down and flush system prior to equipment break-in or maintenance (E55). Store drains in sealed containers pending disposal or subsequent recycling (ENVT4).
Storage (CS67) General Exposures (Closed Systems) (CS15)	No specific measures have been identified (EI18).
Storage (CS67) General exposures (closed systems) (CS15) with sampling (CS56).	Do not carry out activities involving potential exposure for more than 4 hours (OC28) or (G9). Wear a respirator conforming to EN140 with Type A filter or better (PPE22). Avoid dip sampling (E42). Ensure that samples are collected under containment or extraction ventilation conditions (E76). Ensure that the operation is carried out outdoors (E69).
Section 2.2	**Environmental exposure control**
Product characteristics	Substance is a unique structure(PrC1)
	Predominantly hydrophobic (PrC4a)
	Readily biodegradable (PrC5a)
Operational Conditions	For external use (OOC1).
Amounts used	
Fraction of EU tonnage used in region (A1)	1
Regional tonnage (tonnes/year) (A2)	790,000
Fraction of regional tonnage used locally (A3)	0.02
Average daily site tonnage (kg/day)	52,667
Annual site tonnage (tons/year)	15,800
Frequency and duration of use	
Release Type	Continuous release (FD2)
Emission days (days/year) (FD4)	350

Other given operational conditions affecting environmental exposure	Use in closed systems
	In both dry and wet processes
Release fraction to air from process	1.00E-04
Release fraction to wastewater from process	1.00E-05
Release fraction to soil from process (only regional)	1.00E-05
RMMs	
Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites thus conservative process release estimates used [TCS1].
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Air	No air emission control required; required removal efficiency is 0% (TCR5).
Wastewater	Treat wastewater on-site (prior to discharge) to ensure the required removal efficiency >78% (TCR8).
Soil	No soil emission controls are required; the required removal efficiency is 0%
Organizational measures to prevent/limit release from the site (1286)	Prevent the release of undissolved substances or their recovery from wastewater (OMS1).
Conditions and measures related to municipal sewage treatment plant (1273)	It is assumed that the output flow rate from the industrial wastewater treatment plant is 2000 m3/day.
Conditions and measures related to external treatment of waste for disposal (1272)	Not applicable
Conditions and measures relating to external waste recovery (1271)	Not applicable
Other environmental control measures in addition to the above	None
Storage	
Operational Conditions	For external use (OOC1).
Amounts used	
Fraction of EU tonnage used in region (A1)	1
Regional tonnage (tonnes/year) (A2)	790,000
Fraction of regional tonnage used locally (A3)	1
Average daily site tonnage (kg/day)	2,164,383
Annual site tonnage (tons/year)	790,000
Frequency and duration of use	
Release Type	Continuous release (FD2)
Emission days (days/year) (FD4)	365
Other given operational conditions affecting environmental exposure	Use in closed systems
	in dry or wet processes.
Release into wastewater from the process	8,4
RMMs	
Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites thus conservative process release estimates used [TCS1].

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Air	Emission controls are not applicable, as no direct release into the air is recorded (TCR2)
Wastewater	Treat wastewater on-site (prior to discharge) to ensure the required removal efficiency >99% (TCR8).
Soil	Controls on soil emissions are not applicable, as there is no recorded direct release into the ground (TCR4).
Organizational measures to prevent/limit release from the site (1286)	Prevent the release of undissolved substances or their recovery from wastewater (OMS1).
Conditions and measures related to municipal sewage treatment plant (1273)	It is assumed that the output flow rate from the industrial wastewater treatment plant is 2000 m3/day.
Conditions and measures related to external treatment of waste for disposal (1272)	Not applicable
Conditions and measures relating to external waste recovery (1271)	Not applicable
Other environmental control measures in addition to the above (1287)	None

3. Use in fuels – Industrial

Section 1	Title of the exposure scenario
Title	**Use in fuels; CAS number 91995-60-7**
Use Descriptor	Sector of use: Industrial (SU3)
	Process categories: PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16.
	Environmental Release Categories: ERC8b
	Environmental Release Specific Categories: ESVOC3 SpERC
Processes, tasks, activities covered	Covers use as fuel additive, including activities associated with transfer, use, equipment maintenance and disposal of waste.
Section 2	**Operating conditions and risk management measures**
Section 2.1	**Control of worker exposure**
Product Characteristics	
Physical state of product	Liquid, vapor pressure > 10 kPa under standard conditions (OC5)
Concentration of substance in product	Includes percentages of the substance in the product up to 15% (Gnew)
Quantity used	Not applicable
Frequency and duration of use/exposure	Covers daily exposure of up to 8 hours (unless otherwise specified) (G2)
Human factors not influenced by risk management	Not applicable
Other operational conditions affecting exposure	Assumes the application of an adequate basic standard of hygiene in the workplace (G1).
Scenario characteristics	**Specific measures for risk management**
Bulk product transfer (CS14) Batch process (CS55) with sampling (CS56) Filling/preparation of equipment from drums or containers (CS45).	Ensure material transfers are under containment or extract ventilation (E66).
Drum/batch transfers (CS8) Filling/preparation of equipment from drums or containers (CS45). Bulk product transfer (CS14). dedicated facility (CS81).	Use drum pumps (E53)
General Exposures (Closed Systems) (CS15)	No specific measures have been identified (EI18).
General exposures (closed systems) (CS15). with sampling (CS56)	No specific measures have been identified (EI18).
General exposures (closed systems) (CS15) Use in batch processes under containment (CS37) with sampling (CS56)	No specific measures have been identified (EI18).
(closed systems) (107) Fuel usage	No specific measures have been identified (EI18).
(closed systems) (107). Batch process (CS55)	No specific measures have been identified (EI18).
Equipment cleaning and maintenance (CS39) non-dedicated facility (CS82) e.g. indoor repaired fuel pumps	Drain down and flush system prior to equipment break-in or maintenance (E55).
Storage (CS67) General Exposures (Closed Systems) (CS15)	No specific measures have been identified (EI18).

Storage (CS67) General exposures (closed systems) (CS15) with sampling (CS56).	No specific measures have been identified (EI18).
Section 2.2	**Environmental exposure control**
Product characteristics	Substance is a unique structure(PrC1)
	Predominantly hydrophobic (PrC4a)
	Readily biodegradable (PrC5a)
Operating Conditions	For external use (OOC1).
Amounts used	
Fraction of EU tonnage used in region (A1)	1
Regional tonnage (tonnes/year) (A2)	790,000
Fraction of regional tonnage used locally (A3)	0.02
Average daily site tonnage (kg/day)	52,667
Annual site tonnage (tons/year)	15,800
Frequency and duration of use	
Release Type	Continuous release (FD2)
Emission days (days/year) (FD4)	350
Other operating conditions affecting environmental exposure	Use in closed systems
	dry or wet processes
Release fraction to air from process	1.00E-04
Release fraction to wastewater from process	3.00e-05
Release fraction to soil from process (only regional)	1.00E-05
RMMs	
Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites thus conservative process release estimates used [TCS1].
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Air	No air emissions control required; required removal efficiency of 0% (TCR5)
Wastewater	Treat wastewater on-site (prior to discharge) to ensure the required removal efficiency >78%
Soil	No soil emission controls are required; the required removal efficiency is 0%
Organizational measures to prevent/limit release from the site (1286)	Avoid discharge of undissolved or recovered substances from wastewater. Sludge generated by industrial water treatment must be incinerated, kept under containment or treated (MDG3).
Conditions and measures related to municipal sewage treatment plant (1273)	It is assumed that the output flow rate from the industrial wastewater treatment plant is 2000 m3/day.
Conditions and measures related to external treatment of waste for disposal (1272)	Not applicable
Conditions and measures relating to external waste recovery (1271)	Not applicable
Other environmental control measures in addition to the above (1287)	None

4. Use in fuels - Professional

Section 1	Title of the exposure scenario
Title	Use in fuels; CAS number 91995-60-7
Use descriptors	Sector of use: Industrial (SU22)
	Process categories: PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC9, PROC16.
	Environmental Release Categories: ERC8b
	Environmental Release Specific Categories: SpERC ESVOC30
Processes, tasks, activities covered	Covers use as fuel additive, including activities associated with transfer, use, equipment maintenance and disposal of waste.
Section 2	**Operational conditions and risk management measures**
Section 2.1	**Worker Exposure Control**
Product Characteristics	
Physical state of product	Liquid, vapor pressure > 10 kPa under standard conditions (OC5)
Concentration of substance in product	Covers up to 15% of the substance in the product. (Gnew)
Quantity used	Not applicable
Frequency and duration of use/exposure	Covers daily exposure of up to 8 hours (unless otherwise specified) (G2)
Human factors not influenced by risk management	Not applicable
Other operational conditions affecting exposure	Assumes the application of an adequate basic standard of hygiene in the workplace (G1).
Scenario characteristics	**Specific measures for risk management**
Bulk product transfer (CS14) Batch process (CS55) with sampling (CS56) Filling/preparation of equipment from drums or containers (CS45).	Ensure material transfers are under containment or extract ventilation (E82).
Drum/batch transfers (CS8) Filling/preparation of equipment from drums or containers (CS45). Bulk product transfer (CS14). dedicated facility (CS81).	Ensure material transfers are under containment or extract ventilation (E82).
Refueling (CS507)	Ensure an adequate standard of controlled ventilation (10 to 15 air changes per hour) (E40)
General exposures (closed systems) (CS15). with sampling (CS56)	No specific measures have been identified (EI18).
General exposures (closed systems) (CS15) Use in batch processes under containment (CS37) with sampling (CS56)	No specific measures have been identified (EI18).
Filling drums and small containers (CS6). Dedicated facility (CS81)	Use drum pumps (E53). Ensure that the operation is carried out outdoors (E69). Use vapour recovery systems if necessary (A7).
(closed systems) (107) Fuel usage	No specific measures have been identified (EI18).
(closed systems) (107). Discontinuous process (CS55)	No specific measures have been identified (EI18).

Equipment cleaning and maintenance (CS39) non-dedicated facility (CS82) e.g. indoor repaired fuel pumps	Drain down system prior to equipment break-in or maintenance (E65) or (G9). Wear a respirator conforming to EN140 with Type A filter or better (PPE22). Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings (E60).
Cleaning and maintenance of equipment (CS39) non-dedicated facility (CS82) e.g. fuel pumps repaired outside	
Storage (CS67) General Exposures (Closed Systems) (CS15)	No specific measures have been identified (EI18).
Section 2.2	**Environmental exposure control**
Product characteristics	Substance is a unique structure(PrC1)
	Predominantly hydrophobic (PrC4a)
	Readily biodegradable (PrC5a)
Operational Conditions	For external use (OOC1).
Amounts used	
Average daily consumption for a dispersive use type (kg/day)	4.33
Frequency and duration of use	
Release Type	Continuous release (FD2)
Emission Days (days/year) (FD4)	365
Other operating conditions affecting environmental exposure	Use in open systems
Release fraction to air from highly dispersive use (regional only) (OOC7)	1.00E-02
Release fraction to wastewater from highly dispersive use (OOC8)	1.00E-05
Release fraction to water surface from highly dispersive use (regional only)	1.00E-04
Release fraction to soil from highly dispersive use (regional only) (OOC9)	1.00E-05
RMMs	
Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites thus conservative process release estimates used [TCS1].
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Air	No air emission control required; required removal efficiency is 0% (TCR5).
Wastewater	Treat wastewater on-site (prior to discharge) to ensure the required removal efficiency >37% (TCR8).
Soil	No soil emissions control required. The required removal efficiency is 0%.
Organizational measures to prevent/limit release from the site (1286)	Prevent the release of undissolved substances or their recovery from wastewater (OMS1).

Conditions and measures related to municipal sewage treatment plant (1273)	It is assumed that the output flow rate from the industrial wastewater treatment plant is 2000 m3/day.
Conditions and measures related to external treatment of waste for disposal (1272)	Not applicable
Conditions and measures relating to external waste recovery (1271)	Not applicable
Other environmental control measures in addition to the above (1287)	None

5. Use in fuels - Consumers

Section 1		**Title of the exposure scenario**
Title		**Use in TAME fuels; CAS number 91995-60-7**
Usage descriptors		Sector of use: Industrial (SU21)
		Process Categories: PC13
		Environmental Release Categories: ERC8d
		Specific Environmental Release Categories: ESVOC30 SpERC
Processes, tasks, activities covered		Use of fuel for refueling in 2-stroke and 4-stroke engines.
Section 2		**Operating conditions and risk management measures**
Section 2.1		**Worker Exposure Control**
Product Characteristics		
Physical state of product		330 hPa at 25°C
Concentration of the substance in product		Liquid, vapor pressure > 10 kPa under standard conditions (OC5)
Quantity used		Diesel fuel, containing < 15% of the substance
Frequency and duration of use/exposure		Up to 60 litres for refuelling
Human factors not influenced by risk management		Up to 3 times a week
Other operational conditions affecting exposure		Unless otherwise specified, use is assumed to occur at ambient temperature (ConsOC15).
Technical conditions and measures at process level (source) to prevent release		
Product categories		
PC13: Fuel	OC	Unless otherwise specified, includes concentrations up to 15% (ConsOC1); includes use up to 150 days/year (ConsOC3); includes frequencies of use up to once per day (ConsOC4); for each use, it includes exposures up to 15 minutes per event (ConsOC14).
	RMM	No specific RMM value developed beyond the reported OCs.
Section 2.2		**Environmental exposure control**
Product characteristics		Substance is a unique structure(PrC1)
		Predominantly hydrophobic (PrC4a)
		Readily biodegradable (PrC5a)
Operating Conditions		Indoor/outdoor use (OOC3)
Amounts used		
Average daily consumption for a dispersive use type (kg/day)		4.33
Frequency and duration of use		
Release Type		Distracting use. (FD3)
Emission Days (days/year) (FD4)		365
Other operating conditions affecting environmental exposure		Use in open systems
Release fraction to air from highly dispersive use (regional only) (OOC7)		1.00E-02
Release fraction to wastewater from highly dispersive use (OOC8)		1.00E-05
Release fraction to water surface from highly dispersive use (regional only)		1.00E-04
Release fraction to soil from highly dispersive use (regional only) (OOC9)		1.00E-05
RMMs		
Technical conditions and measures at process level (source) to prevent release		Common practices vary across sites thus conservative process release estimates used [TCS1].
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil		

Air	No air emission control required; required removal efficiency is 0% (TCR5).
Wastewater	Treat wastewater on-site (prior to discharge) to ensure the required removal efficiency >37% (TCR8).
Soil	Treat emissions in such a way as to ensure a typical removal efficiency of 0 (%) (TCR7).
Organizational measures to prevent/limit release from the site (1286)	Prevent the release of undissolved substances or their recovery from wastewater (OMS1).
Conditions and measures related to municipal sewage treatment plant (1273)	It is assumed that the output flow rate from the industrial wastewater treatment plant is 2000 m3/day.
Conditions and measures related to external treatment of waste for disposal (1272)	Not applicable
Conditions and measures relating to external waste recovery (1271)	Not applicable
Other environmental control measures in addition to the above (1287)	None

ETHANOL

1. Industrial distribution of Ethanol

Section 1 Exposure Scenario for Industrial Distribution of Ethanol		
Title Exposure scenario for the industrial production of Ethanol or its use as an intermediate or as a process chemical product		
Reference REACh Association for Ethanol n° ES2		
Systematic title based on usage descriptors	SU3, SU8, SU9, PROC8a, PROC8b, PROC9, ERC2	
Processes, assignments, activities held	Covers transfer of substance or preparation (loading/unloading) from/to ships/large containers to dedicated and non-dedicated facilities; loading (including boats/barges, tank trucks/railcars, and IBC containers); storage and repackaging (including batteries and small packages) of substance, including its distribution.	
Assessment methodology	Integrated model Ecetoc TRA version 2.	
Exposure scenarios		
Operating conditions and risk management measures		
Process Categories: Sampling, loading, filling, transfer, use of drums, bagging in non-dedicated facilities. Exposure to vapors, aerosols or spills, as well as equipment cleaning, are considered plausible. Environmental Release Categories: Mixing, dilution, transfer, filling, use of drums, and distribution activities of substances in all types of drums, distribution centers, and trading companies. This also includes the use of drums, filling and distribution activities in formulation industries such as paints and DIY products, pigment pastes, fuels, household products (cleaning agents), cosmetics, lubricants, etc.		
Number of sites using the substance: Widely used substance		
Assessment method		
Worker Exposure Control		
Product Characteristics (includes packaging design influencing the exhibition)	Physical state of product	Liquid
	Concentration of substance in product	Up to 100%
	Substance vapor pressure	5.73 kPa
Quantity used	n.a. in level 1 of the TRA model	
Frequency and duration of use/exposure	Exposure frequency (weekly)	> 4 days/week
	Frequency of exposure (annual)	240 days/year
	Duration of exposure	> 4 hours/day
Human factors not affected by risk management	Body parts potentially exposed	Two hands
	Skin surface exposed	960 cm2
Other operating conditions affecting exposure	Assumes the application of an adequate basic standard of hygiene in the workplace (G1).	
	Installation (indoor/outdoor)	External
Technical conditions and measures at process level (source) to prevent release	No specific technical prevention measures are required.	
Technical measures and conditions to control emissions at the source and prevent worker exposure.	Outside	No specific measures identified
	If indoors	Ensure that material transfer takes place under low or extracted ventilation conditions. Provide good ventilation at the points where emissions occur. Provide a good standard for general or controlled ventilation (5 to 15 air changes per hour).
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	No specific measures identified.	

Conditions and measures related to personal protection, hygiene and health assessment	Eye Protection – Appropriate eye protection should be used when handling the product if there is a risk of splashing. Wear gloves tested to EN374 standard during activities when skin contact is possible.	
Environmental exposure control		
Product categories	Physical state of product	Liquid
	Concentration of substance in product	Up to 100%
Amount used	Daily at point source	n.a.
	Annual at Point Source	75,000 tons/year (worst-case scenario at point source)
	Annual total	3,800,000 tons/year Total market
Frequency and duration of use/exposure	Release Model	Continuous: 300 days/year
Environmental factors not affected by risk management	Surface water receiving flow rate	18,000 m3/day (default)
Other operability conditions affecting environmental exposure	Processing settings (Indoor/Outdoor)	Outside
	Process Temperature	Environment
	Process pressure	Environment
Process-level (source) measures and technical conditions to prevent releases	Keep containers tightly closed. Store in a confined area. Do not discharge into drains or sewers. Generated waste and empty containers should be disposed of as hazardous waste in accordance with all regional and national regulations.	
Organizational measures to prevent/limit release from the site	Do not release wastewater directly into the environment.	Release of wastewater into the local or municipal wastewater treatment plant.
Conditions and measures relating to the municipal wastewater treatment plant	Size of the local sewage treatment plant	> 2000 m3/day
	Efficiency reduction	> 90% (for ethanol)
	Sludge treatment	Disposal or recovery
Conditions and measures relating to waste treatment	Incineration or disposal of hazardous waste for use in recycled fuels.	

Exposure estimation

The worker exposure estimate is calculated using the Ecetoc TRA v2 model. The exposure estimates reported below are based on the PROC, with the highest exposure level for this scenario being PROC8a.

Worker exposure	Exposure estimation	DNEL	Comments
Inhalation (mg/m3)	96.04	950 (OEL)	The results of PROC8a are the highest in this exposure scenario.
Skin (mg/Kg/day)	13.71	343	
Combined (mg/kg/day)	27.43	343	

The environmental exposure estimate is calculated using the Ecetoc TRA v2 model, including data from the TGD tables A & B (MC-Ib, IC-2, UC-48, main source fraction 0.1), and is based on the worst-case scenario with a production volume at the point source of 15,000 tpa. Ethanol is fully soluble in water, rapidly biodegradable, non-bioaccumulative, does not accumulate in sediments or soils, and is assumed to be 90% degraded in the local or municipal wastewater treatment plant under the evaluated conditions.			
Release time per year (days/year)	300	Local release in air (kg/day)	50
Fraction used at the main local source	0.1	Local release into wastewater (kg/day)	15
Amount used locally (Kg/day)	5000	Local release into soil (kg/day)	1
Environmental Exposure	PEC	NECP	**Comments**
In the wastewater treatment plant/untreated wastewater (mg/l)	4.66	580	-
In fresh water (mg/l)	0,52	0,96	-
In local soils	0.007 (mg/kg)	0.63 (mg/kg treated wastewater)	-
In local marine waters (mg/l)	0,0515	0,79	-
Total quantity released daily into the local environment		Negligible when compared to dietary intake and endogenous formation	
Guide for Downstream Users			
Worker exposure and environmental emissions have been calculated using the integrated use of the Ecetoc TRA version 2 and EUSES v2.0 tools, respectively. If local environmental emission conditions deviate significantly from the default values used, please use the algorithm below to estimate the corrected local emission and Risk Characterization Ratios (RCRs): Corrected PEC = Calculated PEC × Local emission factor × Fraction of local treated wastewater flow × Fraction of local river flow × Local wastewater treatment plant efficiency factor.			
Additional Recommendations Beyond Chemical Safety Assessment Note: The measures described in this section have not been considered in the exposure estimate related to the scenario above. They are not subject to the obligations of Article 37(4) of REACH.		Use specific measures to reduce the expected exposure beyond the level estimated based on the exposure scenario whenever possible.	

2. Industrial formulation and re-packaging of Ethanol and its mixtures

Section 1 Exposure Scenario for Industrial Formulation and Repackaging of Ethanol and Ethanol Blends		
Title Exposure scenario for the industrial formulation and re-packaging of Ethanol and its blends		
Reference REACh Association for Ethanol n° ES3		
Systematic title based on usage descriptors	SU3, SU10, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC14, ERC2	
Processes, assignments, activities held	It covers the industrial formulation, packaging, and repackaging of the substance and its mixtures in batch or continuous operations, including storage, material transfer, mixing, small- and large-scale packaging, and maintenance. It also includes the formulation of ethanol-containing fuels.	
Assessment methodology	Integrated model Ecetoc TRA version 2.	
Exposure scenarios		
Operating conditions and risk management measures		
Process Categories: production or formulation of chemical products or articles using technologies related to the mixing of solid and liquid materials, where the process is divided into stages and provides the opportunity for significant contact at each stage. Filling lines specifically designed to capture both vapor and aerosol emissions and minimize spills. Sampling, loading, filling, transfer, unloading, and bagging in dedicated and non-dedicated facilities with potential exposure to dust, vapor, aerosol, or spills, as well as equipment cleaning. Environmental Release Categories: production of organic and inorganic substances in the chemical, petrochemical, primary metals, and minerals industries, including intermediates and monomers, using batch or continuous processes applying dedicated or multifunctional equipment, both technically controlled or managed through manual interventions.		
Number of sites using the substance: Widely used substance		
Assessment method		
Worker Exposure Control		
Product Characteristics (includes packaging design influencing the exhibition)	Physical state of product	Liquid
	Concentration of substance in product	Up to 100%
	Substance vapor pressure	5.73 kPa
Amount used	n.a. in level 1 of the TRA model	
Frequency and duration of use/exposure	Exposure frequency (weekly)	> 4 days/week
	Frequency of exposure (annual)	240 days/year
	Duration of exposure	> 4 hours/day
Human factors not affected by risk management	Potentially exposed body parts	Two hands only the palm (automated processes/PROC3) Two coats (transfer, filling, etc./PROC8a,b)
	Exposed skin surface	480 cm2 (automated processes/PROC3) 960 cm2 (transfer, filling, etc./PROC8a,b)
Other operating conditions affecting exposure	Assumes the application of an adequate basic standard of hygiene in the workplace (G1).	
	Installation (indoor/outdoor)	External
Technical conditions and measures at process level (source) to prevent release	No specific technical prevention measures are required.	
Technical measures and conditions to control emissions at the source and prevent worker exposure.	Ensure that material transfer takes place under low or extracted ventilation conditions. Provide good ventilation at the points where emissions occur. Provide a good standard for general or controlled ventilation (5 to 15 air changes per hour).	
Technical onsite conditions and measures to reduce or limit	No specific measures identified.	

discharges, air emissions and releases to soil		
Conditions and measures related to personal protection, hygiene and health assessment	Eye Protection – Appropriate eye protection should be used when handling the product if there is a risk of splashing. Wear gloves tested to EN374 standard during activities when skin contact is possible.	
Environmental exposure control		
Product Characteristics	Physical state of the product	Liquid
	Concentration of the substance in the product	Up to 100%
Amount used	Daily at the point source	n.a.
	Annual at Point Source	280,000 tons/year (worst-case scenario at point source)
	Annual total	3,800,000 tons/year Total market
Frequency and duration of use/exposure	Release Model	Continuous: 300 days/year
Environmental factors not affected by risk management	Surface water reception range	18,000 m3/day (default)
Other operability conditions affecting environmental exposure	Feature Settings(Indoor/Outdoor)	Inside
	Process Temperature	Environment
	Process pressure	Environment
Technical conditions and measures at process level (source) to prevent release	Keep containers tightly closed. Store in a confined area. Do not discharge into sewers and drains. Waste produced and empty containers should be disposed of as hazardous waste in accordance with all regional and national laws. Formulation activities are considered to be mainly closed processes.	
Technical conditions on site and measures to reduce or limit discharges, air emissions and releases into the soil	Implement technical measures aimed at reducing and cleaning wastewater (wastewater treatment/local purification plant (e.g. biological treatments))	90% > effectiveness
Organizational measures to prevent/limit release from the site	Do not release waste water directly into the environment.	Release of wastewater into the local or municipal wastewater treatment plant.
Conditions and measures relating to the municipal wastewater treatment plant	Size of the local sewage treatment plant	> 2000 m3/day
	Decreased effectiveness	90% (for ethanol)
	Sludge treatment	Disposal or recovery
Conditions and measures relating to waste treatment	Incineration or disposal of hazardous waste for use in recycled fuels.	

Exposure estimation

The worker exposure estimate is calculated using the Ecetoc TRA v2 model. The exposure estimates reported below are based on the PROC, with the highest exposure level for this scenario being PROC8a.

Worker exposure	Exposure estimation	DNEL	Comments
Inhalation (mg/m3)	96.04	950	The results of PROC8a are the highest in this exposure scenario.
Skin (mg/Kg/day)	13.71	343	
Combined (mg/kg/day)	27.43	343	

The **Environmental exposure estimate** is calculated using the Ecetoc TRA v2 model, including data from the TGD tables A & B (MC-Ib, IC-2, UC-48, main source fraction 0.1), and is based on the worst-case scenario with a production volume at the point source of 15,000 tpa.
Ethanol is fully soluble in water, rapidly biodegradable, non-bioaccumulative, does not accumulate in sediments or soils, and is assumed to be 90% degraded in the local or municipal wastewater treatment plant under the evaluated conditions.

Release time by year (days/year)	300	Local release in air (kg/day)	469
Fraction used at the main local source	0.1	Local release into wastewater (kg/day)	28
Quantity used locally (Kg/day)	93.333	Local release into soil (kg/day)	9
Environmental Exposure	**PEC**	**NECP**	**Comments**

In the wastewater treatment plant/untreated wastewater (mg/l)	1.73	580	-
In fresh water (mg/l)	0,185	0,96	-
In local soils	0.0117 (mg/kg)	0.63 (mg/kg treated wastewater)	-
In local marine waters (mg/l)	0,0186	0,79	-
Total quantity released daily into the local environment		Negligible when compared to dietary intake and endogenous formation	
Guide for downstream users			
Worker exposure and environmental emissions have been calculated using the integrated use of the Ecetoc TRA version 2 and EUSES v2.0 tools, respectively. If local environmental emission conditions deviate significantly from the default values used, please use the algorithm below to estimate the corrected local emission and Risk Characterization Ratios (RCRs): Corrected PEC = Calculated PEC × Local emission factor × Fraction of local treated wastewater flow × Fraction of local river flow × Local wastewater treatment plant efficiency factor.			
Additional Recommendations Beyond Chemical Safety Assessment Note: The measures described in this section have not been considered in the exposure estimate related to the scenario above. They are not subject to the obligations of Article 37(4) of REACH.		Use specific measures to reduce the expected exposure beyond the level estimated based on the exposure scenario whenever possible.	

3. Use of Ethanol as a Automotive Fuel by Consumers

Section 1 Exposure Scenario for the Use of Ethanol as a Automotive Fuel by Consumers		
Title Exposure scenario for the use of ethanol as a fuel for automotive by consumers		
Reference REACh Association for Ethanol n° ES9a		
Systematic title based on usage descriptors	SU21, PC13, ERC9a, ERC9b	
Processes, assignments, activities covered	Covers the use of ethanol-containing fuel by consumers.	
Assessment Methodology	Integrated model Ecetoc TRA version 2, ConsExpo v 4.1	
Exposure scenarios		
Operational Conditions and Risk Management Measures		
Process Categories: Use of ethanol as automotive fuel (vehicles). Lower exposure to ethanol vapors is possible during refueling at service stations or transfers from portable fuel tanks. Exposure to ethanol during actual fuel use (engine operation) is not expected under normally foreseeable conditions of use, as the substance is combusted within (closed) engine systems. Environmental Release Categories: Highly dispersive outdoor use by the public. The use generally results in minor releases through accidental spills and evaporation during filling operations.		
Number of sites using the substance: Widely used substance		
Assessment Method		
Worker Exposure Control		
Content of the substance within the product	Concentration of the substance in the product	It can be more than 25%.
Amount used	Up to 100 litres	
Exposure/Release Fraction	0.001 (steam only and minor losses when filling the tank)	
Frequency and duration of use/exposure	Exposure frequency	weekly
	Duration of exhibition per event	< 5 minutes (only when filling the tank)
External settings and conditions during use	Outside	
Technical conditions of use (related to the product)	No specific measures are required	
Organisational consumer protection measures (e.g. recommendations and/or instructions for use for consumers, e.g. labelling	No specific measures are required	
Environmental exposure control		
Product features	Physical state of the product	Liquid
	Concentration of the substance in the product	Can be > 25%
Quantity used	Daily at the point source	n.a.
	Annual at Point Source	n.a. (highly dispersive use)
	Annual total	3,800,000 tons/year total market for industrial, professional and consumer use.
Frequency and duration of use/exposure	Release Model	Continuous: 365 days/year
Environmental factors not affected by risk management	Surface water reception range	18,000 m3/day
Other operability conditions affecting environmental exposure	Feature Settings(Indoor/Outdoor)	Outside
	Process Temperature	Environment
	Process pressure	Environment
Conditions and measures relating to the municipal sewage treatment plant	No release to wastewater is expected from this use. The only forms of environmental release from the use of ethanol as a fuel by consumers are related to evaporation during filling operations (< 0.01%, assuming that less than 10 grams of ethanol evaporate during the filling of a 75-liter tank over 2-3 minutes).	
Conditions and measures relating to the landfill of waste resulting from the use of the product	No waste is expected from this use.	

Conditions and measures relating to the recovery of waste from the use of the product	n.a.

Exposure estimation

The worker exposure estimate is only indicative for a specific Product Category (PC). Exposure estimates were calculated using the industrial model (draft version MasterCSA_8 April 2010) CSA for PC13 (Automobile, refueling with 100% concentration fuel).

Worker exposure	Exposure estimation	DNEL	Comments	
Skin (mg/Kg/day)	35,00	LTS 206		
Oral (mg/kg/day)	0,00	LTS 87		
Inhalation (mg/m3 for 24 hours a day)	1,54	LTS 144		
All, systemic way				

The **Environmental Exposure Estimation** is based on the Ecetoc TRA v2 model based on custom settings and a total use of 3,800,000 tpa.

Release time by year (days/year)	365	Local release in air (kg/day)	n.a. widely dispersive
Fraction used at the main local source	0.002	Local release into wastewater (kg/day)	n.a. widely dispersive
Quantity used locally (Kg/day)	n.a.	Local release into soil (kg/day)	n.a. widely dispersive
Environmental Exposure	PEC	NECP	**Comments**
In the wastewater treatment plant (mg/litre)	0,065	580	-
In fresh water (mg/litre)	0,0240	0,96	-
In local soil (mg/kg)	0,0273	0.63 (mg/kg treated wastewater)	-
In local marine waters	0,0034	0,79	-
Total quantity fed daily through the local environment		Negligible when compared to dietary intake and endogenous formation	
Additional Recommendations Beyond Chemical Safety Assessment Note The measures described in this section have not been considered in the exposure estimate related to the scenario above. They are not subject to the obligations of Article 37(4) of REACH.		Use specific measures to reduce the expected exposure beyond the level estimated based on the exposure scenario whenever possible.	