Methyl Tert-Butyl Ether

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

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

1.1 Product identifier

Product Name	Methyl tert-Butyl Ether
Chemical Name	MTBE, tert-Butyl methyl ether
Chemical Formula	$C_5H_{12}O$
CAS No.	1634-04-4
EC No.	216-653-1
REACH Registration No.	01-2119452786-27-XXXX

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

Identified Use(s)	• Formulation and (re)packing of substances and mixtures – Industrial • Use as an intermediate – Industrial • Use as a process chemical or extraction solvent – Industrial • Distribution of a substance – Industrial • Use as a fuel – Industrial • Use as a fuel – Professional • Use as a fuel – Consumer
Uses Advised Against	None known.

1.3 Details of the supplier of the safety data sheet

Company Identification	Qatar Fuel Additives Company Ltd.
Address	Mesaieed Industrial City, PO Box 22700, Doha, State of Qatar.
Telephone	(+) 974-4476-1805
E-mail	qafacproducts@qafac.com.qa

Only representative of a non-Community manufacturer

Company Identification	QatarEnergy Marketing B.V.(OR)
Address	23rd floor, Tower E, WTC, The Hague Prinses Margrietplantsoen 88, 2595BR The Hague, THE NETHERLANDS
Telephone	+31 70 205 5630
E-mail	reach@qatarenergy.qa
Website	www.qatarenergy.qa

1.4 Emergency telephone number

National Poisons Information Service (Birmingham Centre)	+44 111
For Spill, Leak, Fire, Exposure or Accident, Call CHEMTREC Day or Night	Within USA and Canada: 1-800-424-9300 Outside USA and Canada: +1 703-741-5970 and +1-703-527-3887 (collect calls accepted)

Methyl Tert-Butyl Ether

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Regulation (EC) No. 1272/2008 (CLP) Flam. Liq. 2 :Highly flammable liquid and vapour.
Skin Irrit. 2 :Causes skin irritation.

2.2 Label elements

According to Regulation (EC) No. 1272/2008 (CLP)

Product Name Methyl tert-Butyl Ether

Hazard Pictogram(s)


GHS02


GHS07

Signal Word(s) Danger

Hazard Statement(s)
H225: Highly flammable liquid and vapour.
H315: Causes skin irritation.

Precautionary Statement(s)
P210: P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P303+P361+P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P332+P313: If skin irritation occurs: Get medical advice/attention.
P370+P378: In case of fire: Use water spray or fog, alcohol resistant foam, dry chemical or carbon dioxide to extinguish.
P501: Dispose of contents in accordance with local, state or national legislation.

2.3 Other hazards

None known.

2.4 Additional Information

For full text of H/P Statements see section 16.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

HAZARDOUS INGREDIENT(S)	CAS No.	EC No. / REACH Registration No.	%W/W	Hazard Statement(s)	Hazard Pictogram(s)
tert-Butyl methyl ether	1634-04-4	216-653-1 01-2119452786-27-XXXX	≥99	Flam. Liq. 2 H225 Skin Irrit. 2 H315	GHS02 GHS07
Methanol	67-56-1	200-659-6 01-2119433307-44-XXXX	<0.04	Flam. Liq. 2 H225 Acute Tox. 3 H301 Acute Tox. 3 H311 Acute Tox. 3 H331 STOT SE 1 H370	GHS02 GHS06 GHS08

Methyl Tert-Butyl Ether

HAZARDOUS INGREDIENT(S)	CAS No.	Specific Concentration Limit		M-factor	ATE
Methanol	67-56-1	STOT SE 1	C>= 10.00 <= 100.00		Acute Tox. 3 (H301) : 100
		STOT SE 2	C>= 3.00 < 10.00		Acute Tox. 3 (H311) : 300
					Acute Tox. 3 (H331) : 3.000

Contains no non-classified vPvB substances or substances with a Union workplace exposure limit.
For full text of H/P Statements see section 16.

3.2 Mixtures

Not applicable.

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

Inhalation — If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.

Skin Contact — Take off immediately all contaminated clothing. Rinse skin with water. If skin irritation occurs: Get medical advice/attention.

Eye Contact — Flush eyes with water for at least 15 minutes while holding eyelids open. If symptoms persist, obtain medical attention.

Ingestion — Wash out mouth with water. If symptoms develop, obtain medical attention.

4.2 Most important symptoms and effects, both acute and delayed

Causes skin irritation.

4.3 Indication of any immediate medical attention and special treatment needed

Unlikely to be required but if necessary treat symptomatically.

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media — Use water spray or fog, alcohol resistant foam, dry chemical or carbon dioxide to extinguish.

Unsuitable extinguishing media — Do not use water jet.

5.2 Special hazards arising from the substance or mixture

Highly flammable liquid and vapour. Decomposes in a fire giving off toxic fumes: Carbon monoxide, Carbon dioxide.

5.3 Advice for firefighters

Fire fighters should wear complete protective clothing including self-contained breathing apparatus. Evacuate the area and keep personnel upwind. If it is safe to do so, containers should be removed from fire area because they are likely to rupture under fire conditions. Water spray should be used to cool containers.

Methyl Tert-Butyl Ether

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation. Remove all ignition sources. Wear appropriate personal protective equipment, avoid direct contact. Take off immediately all contaminated clothing and wash it before reuse. Wash hands and exposed skin thoroughly after handling.

6.2 Environmental precautions

Do not allow to enter drains, sewers or watercourses.

6.3 Methods and material for containment and cleaning up

Shut off leaks if without risk. Adsorb spillages onto sand, earth or any suitable adsorbent material. Transfer to a lidded container for disposal or recovery.

6.4 Reference to other sections

See Also Section 8, 13.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use explosion-proof electrical/ventilating/lighting/equipment. Use non-sparking tools. Take action to prevent static discharges. Avoid contact with skin. Wear protective gloves/protective clothing/eye protection/face protection. Wash hands and exposed skin thoroughly after handling. Do not eat, drink or smoke at the work place.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed. Store in a well-ventilated place. Keep cool.

Storage temperature	Ambient.
Storage life	Stable under normal conditions.
Incompatible materials	Strong oxidising agents.

7.3 Specific end use(s)

- Formulation and (re)packing of substances and mixtures – Industrial
- Use as an intermediate – Industrial
- Use as a process chemical or extraction solvent – Industrial
- Distribution of a substance – Industrial
- Use as a fuel – Industrial
- Use as a fuel – Professional
- Use as a fuel – Consumer

Methyl Tert-Butyl Ether

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

8.1.1 Occupational Exposure Limits

SUBSTANCE	CAS No.	LTEL (8 hr TWA ppm)	LTEL (8 hr TWA mg/m³)	STEL (ppm)	STEL (mg/m³)	Note
tert-Butyl methyl ether	1634-04-4	50	183.5	100	367	
Methanol	67-56-1	200	266	250	333	Sk

Region	Source
United Kingdom	UK Workplace Exposure Limits EH40/2005 (Fourth edition, published 2020)

Remark	Notes
Sk	Can be absorbed through the skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity.

8.1.2 Biological limit value — Not established.

8.1.3 PNECs and DNELs

DNEL / DMEL	Oral	Inhalation	Dermal
Industry - Long Term - Local effects			
Industry - Long Term - Systemic effects		178.5 mg/m³	5100 mg/kg bw/day
Industry - Short term - Local effects		357 mg/m³	
Industry - Short term - Systemic effects			
Consumer - Long Term - Local effects			
Consumer - Long Term - Systemic effects	7.1 mg/kg bw/day	53.6 mg/m³	3570 mg/kg bw/day
Consumer - Short term - Local effects		214 mg/m³	
Consumer - Short term - Systemic effects			

Environment	PNEC
Aquatic Compartment (including sediment)	Fresh water: 5.1 mg/l Intermittent release: 47.2 mg/l Sea water: 0.26 mg/l Fresh water (Sediment): 23 mg/kg dw Sea water (Sediment): 1.17 mg/kg dw
Terrestrial Compartment	Sewage Treatment Plant: 71 mg/l
Atmospheric Compartment	Soil: 1.56 mg/kg dw

8.2 Exposure controls

8.2.1. Appropriate engineering controls — Use non-sparking ventilation systems, approved explosion-proof equipment, and intrinsically safe electrical systems. Ensure adequate ventilation. A washing facility/water for eye and skin cleaning purposes should be present.

8.2.2. Personal protection equipment

Eye Protection — Wear protective eye glasses for protection against liquid splashes.

Skin protection — Wear suitable protective clothing and gloves.
Breakthrough time of the glove material: refer to the information provided by the gloves' producer.

Respiratory protection — Wear suitable respiratory protection.

Thermal hazards — Not applicable.

8.2.3. Environmental Exposure Controls — Do not allow to enter drains, sewers or watercourses.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Physical state	Liquid.
Colour	Clear, Colourless.
Odour	Terpenes odour (Ethereal)
Melting point/freezing point	Not available.
Boiling point or initial boiling point and boiling range	55°C
Flammability	Highly flammable liquid and vapour.
Lower and upper explosion limit	1.65-8.4 Vol-%
Flash Point	-10°C [Closed cup]
Auto-ignition temperature	435°C
Decomposition Temperature	Not available.
pH	Not available.
Kinematic Viscosity	Not available.
Solubility	Solubility (Water) : Soluble (4.3% @ 20°C) Solubility (Other) : Not known.
Partition coefficient n-octanol/water (log value)	Log Pow: 1.24
Vapour pressure	0.4 kPa @ room temperature
Density and/or relative density	0.746 @ 15°C
Relative vapour density	0.2 (Air = 1)
Particle characteristics	Not applicable.

9.2 Other information

None.

Methyl Tert-Butyl Ether

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Stable under normal conditions.

10.2 Chemical Stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

No hazardous reactions known if used for its intended purpose.

10.4 Conditions to avoid

Keep away from heat, sources of ignition and direct sunlight.

10.5 Incompatible materials

Strong oxidising agents.

10.6 Hazardous decomposition products

No hazardous decomposition products known.

SECTION 11: TOXICOLOGICAL INFORMATION

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

Acute toxicity - Ingestion	Low oral toxicity.
Acute toxicity - Skin Contact	Low acute toxicity.
Acute toxicity - Inhalation	Low acute toxicity.
	LC50 (rat): 85000 mg/m³
Skin corrosion/irritation	Causes skin irritation. No data.
Serious eye damage/irritation	Not classified.
Skin sensitization data	It is not a skin sensitiser.
Respiratory sensitization data	Not classified.
Germ cell mutagenicity	There is no evidence of mutagenic potential.
Carcinogenicity	No evidence of carcinogenicity.
Reproductive toxicity	No evidence of reproductive effects.
Lactation	Not classified.
STOT - single exposure	None anticipated.
STOT - repeated exposure	None anticipated.
Aspiration hazard	Not classified.

11.2 Information on other hazards

Not known.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity - Aquatic invertebrates	Low toxicity to invertebrates.
	Acute: EC50 (Daphnia magna)(48 hour): 472 mg/l
	Chronic: NOEC (Daphnia magna): 51 mg/l
Toxicity - Fish	Low toxicity to fish.
	Acute: LC50 (Pimephales promelas)(96 hour): 672 mg/l
	Chronic: NOEC (Pimephales promelas): 62 mg/l
Toxicity - Algae	Low toxicity to algae.
	LC50 (96 hour): 491 mg/l
	NOEC (96 hour): 103 mg/l

Toxicity - Sediment Compartment	Not classified.
Toxicity - Terrestrial Compartment	Not classified.

12.2 Persistence and degradability

This substance is not readily biodegradable.

12.3 Bioaccumulative potential

The substance has low potential for bioaccumulation.
Bioconcentration factor (BCF): 1.5

12.4 Mobility in soil

Soluble in water. The substance is predicted to have high mobility in soil.

12.5 Results of PBT and vPvB assessment

Not classified as PBT or vPvB.

12.6 Endocrine disrupting properties

None known.

12.7 Other adverse effects

Not known.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Dispose of this material and its container as hazardous waste. Dispose of empty containers and wastes safely. Decontaminate empty containers before recycling. Send to a licensed recycler, reclaimer or incinerator.

13.2 Additional Information

Disposal should be in accordance with local, state or national legislation.

SECTION 14: TRANSPORT INFORMATION

14.1 UN number or ID number

UN No.	2398

14.2 UN proper shipping name

UN proper shipping name	METHYL tert-BUTYL ETHER

14.3 Transport hazard class(es)

ADR/RID

ADR/RID Class	3
ADR Classification Code	F1
Limited Quantities	1 L
Excepted Quantities	E2
Emergency Action Code	•3YE
Mixed Packing Instructions for Packages	P001 IBC02 R001
Mixed Packing Instructions for Packages	MP19
Packing Instructions for Portable Tanks	T7
Special Provisions for Portable Tanks	TP1
Tank Code for Tanks	LGBF
Vehicle for Tank Carriage	FL
ADR Transport Category	2
Tunnel Restriction Code	D/E
Special Provisions for Carriage - Operation	S2 S20

Methyl Tert-Butyl Ether

ADR HIN	33
IMDG	
IMDG Class	3
Limited Quantities	1 L
Excepted Quantities	E2
Mixed Packing Instructions for Packages	P001 IBC02 R001
Packing Instructions for Portable Tanks	T7
Special Provisions for Portable Tanks	TP1
IMDG EMS	F-E, S-D
Stowage and Handling	Category E
ICAO/IATA	
IATA Proper Shipping Name	METHYL tert-BUTYL ETHER
Excepted Quantities	E2
Passenger and Cargo Aircraft Limited Quantities Packing Instructions	Y341
Passenger and Cargo Aircraft Limited Quantities Max net Qty	1L
Passenger and Cargo Aircraft Packing Instructions	353
Passenger and Cargo Aircraft Max net Qty	5L
Cargo Aircraft Packing Instructions	364
Cargo Aircraft Max net Qty	60L
Emergency Response Guidebook (ERG) Code	3L
Labels	
Labels	3

14.4 Packing group

Packing group	II

14.5 Environmental hazards

Environmental hazards	Not classified as a Marine Pollutant.

14.6 Special precautions for user

Special precautions for user	Not known.

14.7 Maritime transport in bulk according to IMO instruments

No information available

Methyl Tert-Butyl Ether

SECTION 15: REGULATORY INFORMATION

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

European Regulations - Authorisations and/or Restrictions On Use

Candidate List of Substances of Very High Concern for Authorisation	Not listed
REACH: ANNEX XIV list of substances subject to authorisation	Not listed
REACH: Annex XVII Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles	tert-Butyl methyl ether (1634-04-4), Methanol (67-56-1)
Community Rolling Action Plan (CoRAP)	tert-Butyl methyl ether (1634-04-4), Methanol (67-56-1)
Regulation (EU) N° 2019/1021 of the European Parliament and of the Council on persistent organic pollutants	Not listed
Regulation (EC) N° 1005/2009 on substances that deplete the ozone layer	Not listed
Regulation (EU) N° 649/2012 of the European Parliament and of the Council concerning the export and import of hazardous chemicals	Not listed
National regulations	
Other	Not known.

15.2 Chemical Safety Assessment

A REACH chemical safety assessment has been carried out.

SECTION 16: OTHER INFORMATION

The following sections contain revisions or new statements: 1-16

LEGEND

Hazard Pictogram(s)

GHS02

GHS07

GHS06: GHS: Skull and crossbones

GHS08: GHS: Health hazard

Hazard classification

Flam. Liq. 2 : Flammable liquid, Category 2

Acute Tox. 3 : Acute toxicity, Category 3

Skin Irrit. 2 : Skin corrosion/irritation, Category 2

STOT SE 1 : Specific target organ toxicity — single exposure, Category 1

Methyl Tert-Butyl Ether

Hazard Statement(s)	H225: Highly flammable liquid and vapour. H301: Toxic if swallowed. H311: Toxic in contact with skin. H315: Causes skin irritation. H331: Toxic if inhaled. H370: Causes damage to organs.
Precautionary Statement(s)	P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P233: Keep container tightly closed. P240: Ground and bond container and receiving equipment. P241: Use explosion-proof electrical/ventilating/lighting/equipment. P242: Use non-sparking tools. P243: Take action to prevent static discharges. P264: Wash hands and exposed skin thoroughly after handling. P280: Wear protective gloves/protective clothing/eye protection/face protection. P302+P352: IF ON SKIN: Wash with plenty of water. P303+P361+P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. P321: Specific treatment (see Medical Advice on this label). P332+P313: If skin irritation occurs: Get medical advice/attention. P362+P364: Take off contaminated clothing and wash it before reuse. P370+P378: In case of fire: Use water spray or fog, alcohol resistant foam, dry chemical or carbon dioxide to extinguish. P403+P235: Store in a well-ventilated place. Keep cool. P501: Dispose of contents in accordance with local, state or national legislation.
Acronyms	ADR : European Agreement concerning the International Carriage of Dangerous Goods by Road ATE : Acute Toxicity Estimate CAS : Chemical Abstracts Service CLP : Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures DNEL : Derived No Effect Level EC : European Community IATA : International Air Transport Association IBC : Intermediate Bulk Container ICAO : International Civil Aviation Organization IMDG : International Maritime Dangerous Goods LTEL : Long term exposure limit PBT : Persistent, Bioaccumulative and Toxic PNEC : Predicted No Effect Concentration REACH : Registration, Evaluation, Authorisation and Restriction of Chemicals RID : Regulations concerning the International Carriage of Dangerous Goods by Rail STEL : Short term exposure limit

Methyl Tert-Butyl Ether

STOT : Specific Target Organ Toxicity
UN : United Nations
vPvB : very Persistent and very Bioaccumulative

Key literature references and sources for data used to compile the SDS	Regulation (EC) No. 1272/2008 (CLP)
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Methyl Tert-Butyl Ether

Table of Contents

Methyl Tert-Butyl Ether

1. Exposure Scenario 1: Formulation and (re)packing of substances and mixtures – Industrial

SECTION 1:	
Title of exposure scenario	Formulation and (re)packing of substances and mixtures
Sectors of use [SU]	Industrial (SU3)
Environmental release categories [ERC]	ERC2 (ESVOC SpERC 2.2v1)
Process category [PROC]	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15
Processes, tasks, activities covered	Formulation, packing and re-packing of the substances and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tableting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities
Assessment method	Health: ECETOC TRA model Environment: EUSES model, ESVOC SpERC #4
SECTION 2:	Operational conditions and risk management measures
2.1. Control of environmental exposure	
Product characteristics	
Substance is a unique structure. Predominantly hydrophobic. Readily biodegradable.	
Regional tonnage of MTBE	
659000 tonnes/year (2,197,125 kg/day)	
Fraction of EU production volume for region	
0.25	
Fraction of tonnage for application	
0.985	
Fraction of chemical in formulation	
0.15	
Frequency and duration of use	
Continuous process. 300 days/year of operation	
Environment factors not influenced by risk management	
Local freshwater dilution factor: 10 Local marine water dilution factor: 100	
Other given operational conditions affecting environmental exposure	
No special measures are required.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Conditions given in SpERC fact sheet give rise to following releases fractions: ERC2, ESVOC SpERC 2.2v1. Release fraction to air from process (initial release prior to RMM): 0.025 Release fraction to wastewater from process (initial release prior to RMM): 0.005	

Release fraction to soil from process (initial release prior to RMM): 0.0001 Fraction of main source: 0.05 No air emission controls required; required removal efficiency: 0% Soil emission controls are not applicable as there is no direct release to soil. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency: >= 99% Assumed industrial wastewater treatment plant flow: 2000 m³/d
Organisation measures to prevent/limit release from site
Prevent discharge of undissolved substance to or recover from onsite wastewater.
Conditions and measures related to municipal sewage treatment plant
Estimated substance removal from wastewater via domestic sewage treatment: 99% Assumed domestic sewage treatment plant flow: 2000 m³/d
Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste
External recovery and recycling of waste should comply with applicable local and/or national regulations.
Other environmental control measures additional to above
None.
2.2. Control of worker exposure
Product characteristics
Physical form of the product: Liquid. Vapour pressure: > 10 kPa @ 0 °C
Concentration of substance in product
Covers percentage substance in the product up to: 100% (unless stated differently).
Amounts used
Not applicable.
Frequency and duration of use
Covers daily exposures up to: 8 hour(s) (unless stated differently). Continuous process.
Human factors not influenced by risk management
None.
Other given operational conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Outdoor use.
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical conditions and measures to control dispersion from source towards the worker

Common practices vary across sites thus conservative process release estimates used.
2.3. Contributing scenario of risk management measures
General measures (Skin irritants).
Avoid direct contact with the substance. Identify potential areas for indirect skin contact. Wear impervious gloves (EN374). Clean up spill immediately. After contact with skin, wash immediately with plenty of water. Provide basic employee training to prevent /minimise exposures and to report any skin problems that may develop.
PROC1 General exposures (Closed system(s)).
No special measures are required.
PROC2 General exposures (Closed system(s)) with sample collection.
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
PROC3 General exposures (Closed system(s)). Use in contained batch processes with sample collection.
Provide extract ventilation to points where emissions occur.
PROC4 General exposures (Open system(s)). Batch process with sample collection. Filling/Preparation of equipment from drums or containers.
Provide extract ventilation to points where emissions occur.
PROC3 General exposures (Open system(s)). Batch processes at elevated temperatures with sample collection.
Provide extract ventilation to points where emissions occur. Formulate in enclosed or ventilated mixing vessels.
PROC3 Process sampling.
Provide extract ventilation to points where emissions occur. Avoid carrying out activities involving exposure for: > 15 minutes. Wear: Half-face mask (DIN EN 140). A suitable mask with filter type A may be appropriate.
PROC15 Laboratory activities. Cleaning. Wiping. Rolling. Brushing.
Use fume cupboard. Use with local exhaust ventilation.
PROC8b Bulk transfers. Dedicated facility (eg road/railcar bottom loading/unloading, marine vessel/barge loading/unloading).
Provide extract ventilation to material transfer points and other openings.
PROC5 Mixing operations (Open system(s)). Batch process.
Provide extract ventilation to points where emissions occur.
PROC8a Manual. Transfer from/pouring from containers. Non-dedicated facility.
Ensure material transfers are under containment or extract ventilation. Avoid carrying out activities involving exposure for: > 1 hour(s). Wear: Half-face mask (DIN EN 140). A suitable mask with filter type A may be appropriate.
PROC8b Drum/Batch transfer. Dedicated facility.
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Avoid carrying out activities involving exposure for: > 1 hour(s). Wear: Half-face mask (DIN EN 140). A suitable mask with filter type A may be appropriate. Use drum pumps.
PROC9 Drum and small package filling. Dedicated facility.
Fill containers/cans at dedicated fill points supplied with local extract ventilation. Use drum pumps.

PROC8a Equipment cleaning and maintenance. Non-dedicated facility.		
Avoid carrying out activities involving exposure for: > 4 hour(s). Wear: Half-face mask (DIN EN 140). A suitable mask with filter type A may be appropriate. Drain down and flush system prior to equipment break-in or maintenance.		
PROC1 Storage. General exposures (Closed system(s)).		
No special measures are required.		
PROC2 Storage. General exposures (Closed system(s)) with sample collection.		
Avoid carrying out activities involving exposure for: > 4 hour(s). Wear: Half-face mask (DIN EN 140). A suitable mask with filter type A may be appropriate.		
SECTION 3:	Exposure estimation	
3.1. Environment		
Protection target	Exposure concentration	Risk quantification (RCR)
Microorganisms (Sewage Treatment Plant)	PEC: 0.0101 mg/l	1.42E-04
Surface water	Local PEC: 0.00185 mg/l	3.63E-04
Sedimentation (Fresh water)	Local PEC: 0.00177 mg/kg	3.54E-04
Sea water (Emission)	Local PEC: 0.000211 mg/l	8.12E-04
Sedimentation (Sea water)	Local PEC: 0.000201 mg/kg	8.04E-04
Agricultural soil	Local PEC: 0.0995 mg/kg	7.21E-02
Grassland	Local PEC: 0.106 mg/kg	7.68E-02
3.2. Health		
PROC1 General exposures (Closed system(s)).		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	0.01 ppm	<0.01
Inhalation (Vapour), Short term	0.04 ppm	<0.01
Dermal	0.03 mg/kg/day	<0.001
PROC2 General exposures (Closed system(s)) with sample collection.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	18 ppm	0.35
Inhalation (Vapour), Short term	35 ppm	0.35
Dermal	0.27 mg/kg/day	<0.001
PROC3 General exposures (Closed system(s)). Use in contained batch processes with sample collection.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	5 ppm	0.1
Inhalation (Vapour), Short term	20 ppm	0.2
Dermal	0.013 mg/kg/day	<0.001

Methyl Tert-Butyl Ether

PROC4 General exposures (Open system(s)). Batch process with sample collection. Filling/Preparation of equipment from drums or containers.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	10 ppm	0.2
Inhalation (Vapour), Short term	40 ppm	0.4
Dermal	0.13 mg/kg/day	<0.001
PROC3 General exposures (Open system(s)). Batch processes at elevated temperatures with sample collection.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	5 ppm	0.1
Inhalation (Vapour), Short term	20 ppm	0.2
Dermal	0.013 mg/kg/day	<0.001
PROC3 Process sampling.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	0.5 ppm	0.01
Inhalation (Vapour), Short term	20 ppm	0.2
Dermal	0.0013 mg/kg/day	<0.001
PROC15 Laboratory activities. Cleaning. Wiping. Rolling. Brushing.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	5 ppm	0.1
Inhalation (Vapour), Short term	20 ppm	0.2
Dermal	0.0068 mg/kg/day	<0.001
PROC8b Bulk transfers. Dedicated facility (eg road/railcar bottom loading/unloading, marine vessel/barge loading/unloading).		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	7.5 ppm	0.15
Inhalation (Vapour), Short term	30 ppm	0.3
Dermal	0.13 mg/kg/day	<0.001
PROC5 Mixing operations (Open system(s)). Batch process.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	25 ppm	0.5
Inhalation (Vapour), Short term	50 ppm	0.5
Dermal	0.27 mg/kg/day	<0.001
PROC8a Manual. Transfer from/pouring from containers. Non-dedicated facility.		
Exposure route	Exposure estimate	Risk quantification (RCR)

Inhalation (Vapour), Long Term	5 ppm	0.1
Inhalation (Vapour), Short term	50 ppm	0.5
Dermal	0.054 mg/kg/day	<0.001
PROC8b Drum/Batch transfer. Dedicated facility.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	0.3 ppm	<0.01
Inhalation (Vapour), Short term	6 ppm	<0.01
Dermal	0.027 mg/kg/day	<0.001
PROC9 Drum and small package filling. Dedicated facility.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	4 ppm	0.08
Inhalation (Vapour), Short term	16 ppm	0.16
Dermal	0.13 mg/kg/day	<0.001
PROC8a Equipment cleaning and maintenance. Non-dedicated facility.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	15 ppm	0.3
Inhalation (Vapour), Short term	50 ppm	0.5
Dermal	1.6 mg/kg/day	<0.001
PROC1 Storage. General exposures (Closed system(s)).		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	0.01 ppm	<0.01
Inhalation (Vapour), Short term	0.04 ppm	<0.01
Dermal	0.03 mg/kg/day	<0.001
PROC2 Storage. General exposures (Closed system(s)) with sample collection.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	15 ppm	0.3
Inhalation (Vapour), Short term	50 ppm	0.5
Dermal	0.16 mg/kg/day	<0.001
SECTION 4:	Guidance to check compliance with the exposure scenario	
Environment		
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling could be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use, additional RMMs or a site-specific chemical safety assessment is required. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html)		

Methyl Tert-Butyl Ether

Health

2. Exposure Scenario 2: Use as an intermediate – Industrial

SECTION 1:	
Title of exposure scenario	Use as an intermediate
Sectors of use [SU]	Industrial (SU3)
Environmental release categories [ERC]	ERC6a (ESVOC SpERC 6.1a.v1)
Process category [PROC]	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15
Processes, tasks, activities covered	Use of substance as intermediate (not related to Strictly Controlled Conditions). Includes recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container)
Assessment method	Health: ECETOC TRA model Environment: EUSES model, ESVOC SpERC #2
SECTION 2:	Operational conditions and risk management measures
2.1. Control of environmental exposure	
Product characteristics	
Substance is a unique structure. Predominantly hydrophobic. Readily biodegradable.	
Regional tonnage of MTBE	
8030 tonnes/year (26767 kg/day)	
Fraction of EU production volume for region	
0.25	
Fraction of tonnage for application	
0.012	
Fraction of chemical in formulation	
1	
Frequency and duration of use	
Continuous process. 300 days/year of operation	
Environment factors not influenced by risk management	
Local freshwater dilution factor: 10 Local marine water dilution factor: 100	
Other given operational conditions affecting environmental exposure	
No special measures are required.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Conditions given in SpERC fact sheet give rise to following releases fractions: ERC6a, ESVOC SpERC 2 Release fraction to air from process (initial release prior to RMM): 0.005 Release fraction to wastewater from process (initial release prior to RMM): 0.01 Release fraction to soil from process (initial release prior to RMM): 0.001	

Fraction of main source: 1.0 No air emission controls required; required removal efficiency: 0% Soil emission controls are not applicable as there is no direct release to soil. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency: >= 90% Assumed industrial wastewater treatment plant flow: 2000 m³/d
Organisation measures to prevent/limit release from site
Prevent discharge of undissolved substance to or recover from onsite wastewater.
Conditions and measures related to municipal sewage treatment plant
Estimated substance removal from wastewater via domestic sewage treatment: 90% Assumed domestic sewage treatment plant flow: 2000 m³/d
Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste
External recovery and recycling of waste should comply with applicable local and/or national regulations.
Other environmental control measures additional to above
None.
2.2. Control of worker exposure
Product characteristics
Physical form of the product: Liquid. Vapour pressure: > 10 kPa @ 0 °C
Concentration of substance in product
Covers percentage substance in the product up to: 100% (unless stated differently).
Amounts used
Not applicable.
Frequency and duration of use
Covers daily exposures up to: 8 hour(s) (unless stated differently). Continuous process.
Human factors not influenced by risk management
None.
Other given operational conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Outdoor use.
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical conditions and measures to control dispersion from source towards the worker

Common practices vary across sites thus conservative process release estimates used.		
2.3. Contributing scenario of risk management measures		
General measures (Skin irritants).		
Avoid direct contact with the substance. Identify potential areas for indirect skin contact. Wear impervious gloves (EN374). Clean up spill immediately. After contact with skin, wash immediately with plenty of water. Provide basic employee training to prevent /minimise exposures and to report any skin problems that may develop.		
PROC1 General exposures (Closed system(s)).		
No special measures are required.		
PROC2 General exposures (Closed system(s)) with sample collection.		
Ensure operation is undertaken outdoors.		
PROC3 General exposures (Closed system(s)). Use in contained batch processes with sample collection.		
Provide extract ventilation to points where emissions occur.		
PROC4 General exposures (Open system(s)). Batch process with sample collection. Filling/Preparation of equipment from drums or containers.		
Ensure material transfers are under containment or extract ventilation.		
PROC8b Process sampling. Dedicated facility.		
Provide extract ventilation to points where emissions occur. Avoid carrying out activities involving exposure for: > 1 hour(s).		
PROC15 Laboratory activities. Cleaning. Wiping. Rolling. Brushing.		
Use fume cupboard. Use with local exhaust ventilation.		
PROC8b Bulk closed loading and unloading. Dedicated facility.		
Avoid carrying out activities involving exposure for: > 4 hour(s). Wear: Half-face mask (DIN EN 140). A suitable mask with filter type A may be appropriate.		
PROC8a Equipment cleaning and maintenance. Non-dedicated facility.		
Drain down and flush system prior to equipment break-in or maintenance. Avoid carrying out activities involving exposure for: > 4 hour(s). Wear: Half-face mask (DIN EN 140). A suitable mask with filter type A may be appropriate.		
PROC1 Storage. Bulk transfers.		
No special measures are required.		
PROC2 Storage. General exposures (Closed system(s)). Batch process.		
Avoid carrying out activities involving exposure for: > 4 hour(s). Wear: Half-face mask (DIN EN 140). A suitable mask with filter type A may be appropriate.		
SECTION 3:	Exposure estimation	
3.1. Environment		
Protection target	Exposure concentration	Risk quantification (RCR)
Microorganisms (Sewage Treatment Plant)	PEC: 0.0101 mg/l	1.42E-04
Surface water	Local PEC: 0.00185 mg/l	3.63E-04

Sedimentation (Fresh water)	Local PEC: 0.00177 mg/kg	3.63E-04
Sea water (Emission)	Local PEC: 0.000211 mg/l	8.12E-04
Sedimentation (Sea water)	Local PEC: 0.0002 mg/kg	8.00E-04
Agricultural soil	Local PEC: 0.00514 mg/kg	3.72E-03
Grassland	Local PEC: 0.00522 mg/kg	3.78E-03
3.2. Health		
PROC1 General exposures (Closed system(s)).		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	0.01 ppm	<0.01
Inhalation (Vapour), Short term	0.04 ppm	<0.01
Dermal	0.03 mg/kg/day	<0.001
PROC2 General exposures (Closed system(s)) with sample collection.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	18 ppm	0.35
Inhalation (Vapour), Short term	35 ppm	0.35
Dermal	0.27 mg/kg/day	<0.001
PROC3 General exposures (Closed system(s)). Use in contained batch processes with sample collection.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	5 ppm	0.1
Inhalation (Vapour), Short term	20 ppm	0.2
Dermal	0.013 mg/kg/day	<0.001
PROC4 General exposures (Open system(s)). Batch process with sample collection. Filling/Preparation of equipment from drums or containers.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	10 ppm	0.2
Inhalation (Vapour), Short term	40 ppm	0.4
Dermal	0.13 mg/kg/day	<0.001
PROC8b Process sampling. Dedicated facility.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	1.5 ppm	0.03
Inhalation (Vapour), Short term	30 ppm	0.3
Dermal	0.13 mg/kg/day	<0.001
PROC15 Laboratory activities. Cleaning. Wiping. Rolling. Brushing.		

Methyl Tert-Butyl Ether

Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	5 ppm	0.1
Inhalation (Vapour), Short term	20 ppm	0.2
Dermal	0.0068 mg/kg/day	<0.001
PROC8b Bulk closed loading and unloading. Dedicated facility.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	27 ppm	0.54
Inhalation (Vapour), Short term	49 ppm	0.49
Dermal	1.6 mg/kg/day	<0.001
PROC8a Equipment cleaning and maintenance. Non-dedicated facility.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	15 ppm	0.3
Inhalation (Vapour), Short term	50 ppm	0.5
Dermal	1.6 mg/kg/day	<0.001
PROC1 Storage. Bulk transfers.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	0.01 ppm	<0.01
Inhalation (Vapour), Short term	0.04 ppm	<0.01
Dermal	0.03 mg/kg/day	<0.001
PROC2 Storage. General exposures (Closed system(s)). Batch process.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	15 ppm	0.3
Inhalation (Vapour), Short term	50 ppm	0.5
Dermal	0.16 mg/kg/day	<0.001
SECTION 4:	Guidance to check compliance with the exposure scenario	
Environment		
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling could be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use, additional RMMs or a site-specific chemical safety assessment is required. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html)		
Health		
No data.		

3. Exposure Scenario 3: Use as a process chemical or extraction solvent – Industrial

SECTION 1:	
Title of exposure scenario	Use as a process chemical or extraction solvent
Sectors of use [SU]	Industrial (SU3)
Environmental release categories [ERC]	ERC4 (ESVOC SpERC 4.24.v1)
Process category [PROC]	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15
Processes, tasks, activities covered	Covers the use of a process chemical or extraction solvent, including exposures during use (including product transfer, mixing and preparation plus manual and automated application) and equipment cleaning.
Assessment method	Health: ECETOC TRA model Environment: EUSES model, ESIG SpERC #38
SECTION 2:	Operational conditions and risk management measures
2.1. Control of environmental exposure	
Product characteristics	
Substance is a unique structure. Predominantly hydrophobic. Readily biodegradable.	
Regional tonnage of MTBE	
2010 tonnes/year (6692 kg/day)	
Fraction of EU production volume for region	
0.25	
Fraction of tonnage for application	
0.003	
Fraction of chemical in formulation	
1	
Frequency and duration of use	
Continuous process. 20 days/year of operation	
Environment factors not influenced by risk management	
Local freshwater dilution factor: 10 Local marine water dilution factor: 100	
Other given operational conditions affecting environmental exposure	
No special measures are required.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Conditions given in SpERC fact sheet give rise to following releases fractions: ERC4, ESVOC SpERC 38 Release fraction to air from process (initial release prior to RMM): 0.025 Release fraction to wastewater from process (initial release prior to RMM): 0.02 Release fraction to soil from process (initial release prior to RMM): 0.0001	

Fraction of main source: 0.3 No air emission controls required; required removal efficiency: 0% Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency: >= 99% Assumed industrial wastewater treatment plant flow: 2000 m³/d
Organisation measures to prevent/limit release from site
Prevent discharge of undissolved substance to or recover from onsite wastewater.
Conditions and measures related to municipal sewage treatment plant
Estimated substance removal from wastewater via domestic sewage treatment: 99% Assumed domestic sewage treatment plant flow: 2000 m³/d
Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste
External recovery and recycling of waste should comply with applicable local and/or national regulations.
Other environmental control measures additional to above
None.
2.2. Control of worker exposure
Product characteristics
Physical form of the product: Liquid. Vapour pressure: > 10 kPa @ 0 °C
Concentration of substance in product
Covers percentage substance in the product up to: 100% (unless stated differently).
Amounts used
Not applicable.
Frequency and duration of use
Covers daily exposures up to: 8 hour(s) (unless stated differently). Continuous process.
Human factors not influenced by risk management
None.
Other given operational conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Outdoor use.
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical conditions and measures to control dispersion from source towards the worker
Common practices vary across sites thus conservative process release estimates used.

2.3. Contributing scenario of risk management measures
General measures (Skin irritants).
Avoid direct contact with the substance. Identify potential areas for indirect skin contact. Wear impervious gloves (EN374). Clean up spill immediately. After contact with skin, wash immediately with plenty of water. Provide basic employee training to prevent /minimise exposures and to report any skin problems that may develop.
PROC1 General exposures (Closed system(s)).
No special measures are required.
PROC2 General exposures (Closed system(s)) with sample collection.
Ensure operation is undertaken outdoors.
PROC3 General exposures (Closed system(s)). Use in contained batch processes with sample collection.
Provide extract ventilation to points where emissions occur.
PROC4 General exposures (Open system(s)). Batch process with sample collection. Filling/Preparation of equipment from drums or containers.
Ensure material transfers are under containment or extract ventilation.
PROC8b Process sampling. Dedicated facility.
Provide extract ventilation to points where emissions occur. Avoid carrying out activities involving exposure for: > 1 hour(s).
PROC15 Laboratory activities. Cleaning. Wiping. Rolling. Brushing.
Use fume cupboard. Use with local exhaust ventilation.
PROC8b Bulk closed loading and unloading. Dedicated facility.
Avoid carrying out activities involving exposure for: > 4 hour(s). Wear: Half-face mask (DIN EN 140). A suitable mask with filter type A may be appropriate.
PROC8a Equipment cleaning and maintenance. Non-dedicated facility.
Drain down and flush system prior to equipment break-in or maintenance. Avoid carrying out activities involving exposure for: > 4 hour(s). Wear: Half-face mask (DIN EN 140). A suitable mask with filter type A may be appropriate.
PROC1 Storage. General exposures (Closed system(s)).
No special measures are required.
PROC2 Storage. General exposures (Closed system(s)) with sample collection.
Avoid carrying out activities involving exposure for: > 4 hour(s). Wear: Half-face mask (DIN EN 140). A suitable mask with filter type A may be appropriate.

SECTION 3:	Exposure estimation

3.1. Environment		
Protection target	Exposure concentration	Risk quantification (RCR)
Microorganisms (Sewage Treatment Plant)	PEC: 0.0101 mg/l	1.42E-04
Surface water	Local PEC: 0.00185 mg/l	3.63E-04
Sedimentation (Fresh water)	Local PEC: 0.00177 mg/kg	3.54E-04

Sea water (Emission)	Local PEC: 0.00021 mg/l	8.08E-04
Sedimentation (Sea water)	Local PEC: 0.0002 mg/kg	8.00E-04
Agricultural soil	Local PEC: 0.00199 mg/kg	1.44E-03
Grassland	Local PEC: 0.00198 mg/kg	1.43E-03
3.2. Health		
PROC1 General exposures (Closed system(s)).		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	0.01 ppm	<0.01
Inhalation (Vapour), Short term	0.04 ppm	<0.01
Dermal	0.03 mg/kg/day	<0.001
PROC2 General exposures (Closed system(s)) with sample collection.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	18 ppm	0.35
Inhalation (Vapour), Short term	35 ppm	0.35
Dermal	0.27 mg/kg/day	<0.001
PROC3 General exposures (Closed system(s)). Use in contained batch processes with sample collection.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	5 ppm	0.1
Inhalation (Vapour), Short term	20 ppm	0.2
Dermal	0.013 mg/kg/day	<0.001
PROC4 General exposures (Open system(s)). Batch process with sample collection. Filling/Preparation of equipment from drums or containers.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	10 ppm	0.2
Inhalation (Vapour), Short term	40 ppm	0.4
Dermal	0.13 mg/kg/day	<0.001
PROC8b Process sampling. Dedicated facility.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	1.5 ppm	0.03
Inhalation (Vapour), Short term	30 ppm	0.3
Dermal	0.13 mg/kg/day	<0.001
PROC15 Laboratory activities. Cleaning. Wiping. Rolling. Brushing.		
Exposure route	Exposure estimate	Risk quantification (RCR)

Inhalation (Vapour), Long Term	5 ppm	0.1
Inhalation (Vapour), Short term	20 ppm	0.2
Dermal	0.0068 mg/kg/day	<0.001
PROC8b Bulk closed loading and unloading. Dedicated facility.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	27 ppm	0.54
Inhalation (Vapour), Short term	49 ppm	0.49
Dermal	1.6 mg/kg/day	<0.001
PROC8a Equipment cleaning and maintenance. Non-dedicated facility.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	15 ppm	0.3
Inhalation (Vapour), Short term	50 ppm	0.5
Dermal	8.2 mg/kg/day	<0.002
PROC1 Storage. General exposures (Closed system(s)).		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	0.01 ppm	<0.01
Inhalation (Vapour), Short term	0.04 ppm	<0.01
Dermal	0.006 mg/kg/day	<0.001
PROC2 Storage. General exposures (Closed system(s)) with sample collection.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	15 ppm	0.3
Inhalation (Vapour), Short term	50 ppm	0.5
Dermal	0.82 mg/kg/day	<0.001
SECTION 4:	Guidance to check compliance with the exposure scenario	
Environment		
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling could be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use, additional RMMs or a site-specific chemical safety assessment is required. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html)		
Health		
No data.		

4. Exposure Scenario 4: Distribution of a substance – Industrial

SECTION 1:	
Title of exposure scenario	Distribution of a substance
Sectors of use [SU]	Industrial (SU3)
Environmental release categories [ERC]	ERC1, ERC2 (ESVOC SpERC 1.1b.v1)
Process category [PROC]	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15
Processes, tasks, activities covered	Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading distribution and associated laboratory activities
Assessment method	Health: ECETOC TRA model Environment: EUSES model, ESVOC SpERC #3
SECTION 2:	Operational conditions and risk management measures
2.1. Control of environmental exposure	
Product characteristics	
Substance is a unique structure. Predominantly hydrophobic. Readily biodegradable.	
Regional tonnage of MTBE	
Transport: 659000 tonnes/year (2,197,125 kg/day) Storage: 8.4 kg/day	
Fraction of EU production volume for region	
Transport: 0.25	
Fraction of tonnage for application	
Transport: 0.985	
Fraction of chemical in formulation	
Transport: 0.15	
Frequency and duration of use	
Continuous process. 300 days/year of operation	
Environment factors not influenced by risk management	
Local freshwater dilution factor: 10 Local marine water dilution factor: 100	
Other given operational conditions affecting environmental exposure	
No special measures are required.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
<u>Transport</u> Conditions given in SpERC fact sheet give rise to following releases fractions: ERC1, ERC2, ESVOC SpERC 3. Release fraction to air from process (initial release prior to RMM): 0.0001	

Release fraction to wastewater from process (initial release prior to RMM): 0.00001 Release fraction to soil from process (initial release prior to RMM): 0 Fraction of main source: 0.05 <u>Bulk product storage</u> Assessment of storage conditions give rise to the following release estimates: Local release to air: 0 kg/day Local release to water: 8.4 kg/day Local release to soil: 0 kg/day Fraction of main source: 1.0 No air emission controls required; required removal efficiency: 0% Soil emission controls are not applicable as there is no direct release to soil. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency: Transport: >= 95%, Storage: >= 99% Assumed industrial wastewater treatment plant flow: 2000 m³/d
Organisation measures to prevent/limit release from site
Prevent discharge of undissolved substance to or recover from onsite wastewater.
Conditions and measures related to municipal sewage treatment plant
Estimated substance removal from wastewater via domestic sewage treatment: Transport: 95%, Storage: 99% Assumed domestic sewage treatment plant flow: 2000 m³/d
Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste
External recovery and recycling of waste should comply with applicable local and/or national regulations.
Other environmental control measures additional to above
None.
2.2. Control of worker exposure
Product characteristics
Physical form of the product: Liquid. Vapour pressure: > 10 kPa @ 0 °C
Concentration of substance in product
Covers percentage substance in the product up to: 100% (unless stated differently).
Amounts used
Not applicable.
Frequency and duration of use
Covers daily exposures up to: 8 hour(s) (unless stated differently). Continuous process.

Human factors not influenced by risk management
None.
Other given operational conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Outdoor use.
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical conditions and measures to control dispersion from source towards the worker
Common practices vary across sites thus conservative process release estimates used.
2.3. Contributing scenario of risk management measures
General measures (Skin irritants).
Avoid direct contact with the substance. Identify potential areas for indirect skin contact. Wear impervious gloves (EN374). Clean up spill immediately. After contact with skin, wash immediately with plenty of water. Provide basic employee training to prevent /minimise exposures and to report any skin problems that may develop.
PROC1 General exposures (Closed system(s)).
No special measures are required.
PROC2 General exposures (Closed system(s)) with sample collection.
Ensure operation is undertaken outdoors.
PROC3 General exposures (Closed system(s)). Use in contained batch processes with sample collection.
Ensure operation is undertaken outdoors. Avoid carrying out activities involving exposure for: > 4 hour(s). Wear: Half-face mask (DIN EN 140). A suitable mask with filter type A may be appropriate.
PROC4 General exposures (Open system(s)). Batch process with sample collection. Filling/Preparation of equipment from drums or containers.
Provide extract ventilation to points where emissions occur. Ensure samples are obtained under containment or extract ventilation.
PROC3 Process sampling.
Ensure operation is undertaken outdoors. Avoid carrying out activities involving exposure for: > 15 minutes. Wear: Half-face mask (DIN EN 140). A suitable mask with filter type A may be appropriate.
PROC15 Laboratory activities. Cleaning. Wiping. Rolling. Brushing.
Use fume cupboard. Use with local exhaust ventilation.
PROC8b Bulk closed loading and unloading. Dedicated facility.
Ensure operation is undertaken outdoors. Avoid carrying out activities involving exposure for: > 1 hour(s). Wear: Half-face mask (DIN EN 140). A suitable mask with filter type A may be appropriate.
PROC8a Bulk open loading and unloading. Non-dedicated facility.
Ensure material transfers are under containment or extract ventilation. Wear: Half-face mask (DIN EN 140). A suitable mask

with filter type A may be appropriate.		
PROC9 Drum and small package filling. Dedicated facility.		
Use drum pumps. Fill containers/cans at dedicated fill points supplied with local extract ventilation.		
PROC8a Equipment cleaning and maintenance. Non-dedicated facility.		
Drain down and flush system prior to equipment break-in or maintenance.		
PROC1 Storage. General exposures (Closed system(s)).		
No special measures are required.		
PROC2 Storage. General exposures (Closed system(s)) with sample collection.		
Ensure operation is undertaken outdoors.		
SECTION 3:	Exposure estimation	
3.1. Environment		
Transport		
Protection target	Exposure concentration	Risk quantification (RCR)
Microorganisms (Sewage Treatment Plant)	PEC: 0.00964 mg/l	1.36E-04
Surface water	Local PEC: 0.00181 mg/l	3.55E-04
Sedimentation (Fresh water)	Local PEC: 0.00173 mg/kg	3.46E-04
Sea water (Emission)	Local PEC: 0.00542 mg/l	2.08E-02
Sedimentation (Sea water)	Local PEC: 0.00531 mg/kg	2.12E-02
Agricultural soil	Local PEC: 0.00164 mg/kg	1.19E-03
Grassland	Local PEC: 0.000520 mg/kg	3.77E-04
Bulk product storage		
Protection target	Exposure concentration	Risk quantification (RCR)
Microorganisms (Sewage Treatment Plant)	PEC: 0.00978 mg/l	1.38E-04
Surface water	Local PEC: 0.00182 mg/l	3.57E-04
Sedimentation (Fresh water)	Local PEC: 0.00174 mg/kg	3.48E-04
Sea water (Emission)	Local PEC: 0.000208 mg/l	8.00E-04
Sedimentation (Sea water)	Local PEC: 0.000198 mg/kg	7.92E-04
Agricultural soil	Local PEC: 0.00902 mg/kg	6.54E-03
Grassland	Local PEC: 0.00062 mg/kg	4.49E-04
3.2. Health		
PROC1 General exposures (Closed system(s)).		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	0.01 ppm	<0.01

Inhalation (Vapour), Short term	0.04 ppm	<0.01
Dermal	0.03 mg/kg/day	<0.001
PROC2 General exposures (Closed system(s)) with sample collection.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	18 ppm	0.35
Inhalation (Vapour), Short term	35 ppm	0.35
Dermal	0.27 mg/kg/day	<0.001
PROC3 General exposures (Closed system(s)). Use in contained batch processes with sample collection.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	21 ppm	0.42
Inhalation (Vapour), Short term	35 ppm	0.35
Dermal	0.082 mg/kg/day	<0.001
PROC4 General exposures (Open system(s)). Batch process with sample collection. Filling/Preparation of equipment from drums or containers.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	10 ppm	0.2
Inhalation (Vapour), Short term	40 ppm	0.4
Dermal	0.13 mg/kg/day	<0.001
PROC3 Process sampling.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	3.4 ppm	0.07
Inhalation (Vapour), Short term	35 ppm	0.35
Dermal	0.013 mg/kg/day	<0.001
PROC15 Laboratory activities. Cleaning. Wiping. Rolling. Brushing.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	5 ppm	0.1
Inhalation (Vapour), Short term	20 ppm	0.2
Dermal	0.0068 mg/kg/day	<0.001
PROC8b Bulk closed loading and unloading. Dedicated facility.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	21 ppm	0.42
Inhalation (Vapour), Short term	49 ppm	0.49
Dermal	0.54 mg/kg/day	<0.001

PROC8a Bulk open loading and unloading. Non-dedicated facility.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	25 ppm	0.5
Inhalation (Vapour), Short term	50 ppm	0.5
Dermal	0.27 mg/kg/day	<0.001
PROC9 Drum and small package filling. Dedicated facility.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	4 ppm	0.08
Inhalation (Vapour), Short term	16 ppm	0.16
Dermal	0.13 mg/kg/day	<0.001
PROC8a Equipment cleaning and maintenance. Non-dedicated facility.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	25 ppm	0.5
Inhalation (Vapour), Short term	50 ppm	0.5
Dermal	2.7 mg/kg/day	<0.001
PROC1 Storage. General exposures (Closed system(s)).		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	0.01 ppm	<0.01
Inhalation (Vapour), Short term	0.04 ppm	<0.01
Dermal	0.03 mg/kg/day	<0.001
PROC2 Storage. General exposures (Closed system(s)) with sample collection.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	18 ppm	0.35
Inhalation (Vapour), Short term	35 ppm	0.35
Dermal	0.27 mg/kg/day	<0.001
SECTION 4:	Guidance to check compliance with the exposure scenario	
Environment		
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling could be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use, additional RMMs or a site-specific chemical safety assessment is required. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html)		
Health		
No data.		

5. Exposure Scenario 5: Use as a fuel – Industrial

SECTION 1:	
Title of exposure scenario	Use as a fuel
Sectors of use [SU]	Industrial (SU3)
Environmental release categories [ERC]	ERC6b (ESVOC SpERC 7.12a.v1)
Process category [PROC]	PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16
Processes, tasks, activities covered	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste
Assessment method	Health: ECETOC TRA model Environment: EUSES model, ESVOC SpERC #28
SECTION 2:	Operational conditions and risk management measures
2.1. Control of environmental exposure	
Product characteristics	
Substance is a unique structure. Predominantly hydrophobic. Readily biodegradable.	
Regional tonnage of MTBE	
659000 tonnes/year (2,197,125 kg/day)	
Fraction of EU production volume for region	
0.25	
Fraction of tonnage for application	
0.985	
Fraction of chemical in formulation	
0.15	
Frequency and duration of use	
Continuous process. 365 days/year of operation	
Environment factors not influenced by risk management	
Local freshwater dilution factor: 10 Local marine water dilution factor: 100	
Other given operational conditions affecting environmental exposure	
No special measures are required.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Conditions given in SpERC fact sheet give rise to following releases fractions: ERC7, ESVOC SpERC 28 Release fraction to air from process (initial release prior to RMM): 0.0025 Release fraction to wastewater from process (initial release prior to RMM): 0.00001 Release fraction to soil from process (initial release prior to RMM): 0 Fraction of main source: 0.02	

No air emission controls required; required removal efficiency: 0% Soil emission controls are not applicable as there is no direct release to soil. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency: >= 95% Assumed industrial wastewater treatment plant flow: 2000 m³/d
Organisation measures to prevent/limit release from site
Prevent discharge of undissolved substance to or recover from onsite wastewater.
Conditions and measures related to municipal sewage treatment plant
Estimated substance removal from wastewater via domestic sewage treatment: 95% Assumed domestic sewage treatment plant flow: 2000 m³/d
Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste
External recovery and recycling of waste should comply with applicable local and/or national regulations.
Other environmental control measures additional to above
None.
2.2. Control of worker exposure
Product characteristics
Physical form of the product: Liquid. Vapour pressure: > 10 kPa @ 0 °C
Concentration of substance in product
Limit the substance in product to: 15%
Amounts used
Not applicable.
Frequency and duration of use
Covers daily exposures up to: 8 hour(s) (unless stated differently). Continuous process.
Human factors not influenced by risk management
None.
Other given operational conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Outdoor use.
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical conditions and measures to control dispersion from source towards the worker
Common practices vary across sites thus conservative process release estimates used.

2.3. Contributing scenario of risk management measures
General measures (Skin irritants).
Avoid direct contact with the substance. Identify potential areas for indirect skin contact. Wear impervious gloves (EN374). Clean up spill immediately. After contact with skin, wash immediately with plenty of water. Provide basic employee training to prevent /minimise exposures and to report any skin problems that may develop.
PROC8b Bulk transfers. Batch process with sample collection. Filling/Preparation of equipment from drums or containers.
Use vapour recovery units when necessary. Ensure material transfers are under containment or extract ventilation.
PROC8b Drum/Batch transfer. Filling/Preparation of equipment from drums or containers. Bulk transfers. Dedicated facility.
Use drum pumps.
PROC1 General exposures (Closed system(s)).
No special measures are required.
PROC2 General exposures (Closed system(s)) with sample collection.
No special measures are required.
PROC3 General exposures (Closed system(s)). Use in contained batch processes with sample collection.
Avoid carrying out activities involving exposure for: > 4 hour(s). Wear: Half-face mask (DIN EN 140). A suitable mask with filter type A may be appropriate.
PROC16 Use as a fuel (Closed system(s)).
No special measures are required.
PROC3 Batch process. (Closed system(s)).
Avoid carrying out activities involving exposure for: > 4 hour(s). Wear: Half-face mask (DIN EN 140). A suitable mask with filter type A may be appropriate.
PROC8a Equipment cleaning and maintenance. Non-dedicated facility. For example: Fuel pump repair. Indoor.
Avoid carrying out activities involving exposure for: > 4 hour(s). Wear: Half-face mask (DIN EN 140). A suitable mask with filter type A may be appropriate. Drain down and flush system prior to equipment break-in or maintenance.
PROC1 Storage. General exposures (Closed system(s)).
No special measures are required.
PROC2 Storage. General exposures (Closed system(s)) with sample collection.
Ensure operation is undertaken outdoors.

SECTION 3:	Exposure estimation

3.1. Environment		
Protection target	Exposure concentration	Risk quantification (RCR)
Microorganisms (Sewage Treatment Plant)	PEC: 0.00943 mg/l	1.33E-04
Surface water	Local PEC: 0.00178 mg/l	3.49E-04
Sedimentation (Fresh water)	Local PEC: 0.00171 mg/kg	3.42E-04
Sea water (Emission)	Local PEC: 0.000204 mg/l	7.85E-04

Sedimentation (Sea water)	Local PEC: 0.000194 mg/kg	7.76E-04
Agricultural soil	Local PEC: 0.00442 mg/kg	3.20E-03
Grassland	Local PEC: 0.00418 mg/kg	3.03E-03
3.2. Health		
PROC8b Bulk transfers. Batch process with sample collection. Filling/Preparation of equipment from drums or containers.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	18 ppm	0.36
Inhalation (Vapour), Short term	50 ppm	0.5
Dermal	1.6 mg/kg/day	<0.001
PROC8b Drum/Batch transfer. Filling/Preparation of equipment from drums or containers. Bulk transfers. Dedicated facility.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	18 ppm	0.36
Inhalation (Vapour), Short term	50 ppm	0.5
Dermal	1.6 mg/kg/day	<0.001
PROC1 General exposures (Closed system(s)).		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	0.006 ppm	<0.01
Inhalation (Vapour), Short term	0.024 ppm	<0.01
Dermal	0.018 mg/kg/day	<0.001
PROC2 General exposures (Closed system(s)) with sample collection.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	15 ppm	0.3
Inhalation (Vapour), Short term	15 ppm	0.15
Dermal	0.16 mg/kg/day	<0.001
PROC3 General exposures (Closed system(s)). Use in contained batch processes with sample collection.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	18 ppm	0.36
Inhalation (Vapour), Short term	15 ppm	0.15
Dermal	0.082 mg/kg/day	<0.001
PROC16 Use as a fuel (Closed system(s)).		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	15 ppm	0.3
Inhalation (Vapour), Short term	15 ppm	0.15

Dermal	0.04 mg/kg/day	<0.001
PROC3 Batch process. (Closed system(s)).		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	18 ppm	0.36
Inhalation (Vapour), Short term	15 ppm	0.15
Dermal	0.082 mg/kg/day	<0.001
PROC8a Equipment cleaning and maintenance. Non-dedicated facility. For example: Fuel pump repair. Indoor.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	18 ppm	0.36
Inhalation (Vapour), Short term	30 ppm	0.3
Dermal	1.6 mg/kg/day	<0.001
PROC1 Storage. General exposures (Closed system(s)).		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	0.006 ppm	<0.01
Inhalation (Vapour), Short term	0.024 ppm	<0.01
Dermal	0.018 mg/kg/day	<0.001
PROC2 Storage. General exposures (Closed system(s)) with sample collection.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	11 ppm	0.21
Inhalation (Vapour), Short term	42 ppm	0.42
Dermal	0.16 mg/kg/day	<0.001
SECTION 4:	Guidance to check compliance with the exposure scenario	
Environment		
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling could be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use, additional RMMs or a site-specific chemical safety assessment is required. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html)		
Health		
No data.		

6. Exposure Scenario 6: Use as a fuel – Professional

SECTION 1:	
Title of exposure scenario	Use as a fuel
Sectors of use [SU]	Professional (SU22)
Environmental release categories [ERC]	ERC8b. ERC8e (ESVOC SpERC 29)
Process category [PROC]	PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC9, PROC16
Processes, tasks, activities covered	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste
Assessment method	Health: ECETOC TRA model Environment: EUSES model, ESIG SpERCs
SECTION 2:	Operational conditions and risk management measures
2.1. Control of environmental exposure	
Product characteristics	
Substance is a unique structure. Predominantly hydrophobic. Readily biodegradable.	
Regional tonnage of MTBE	
659000 tonnes/year (2,197,125 kg/day)	
Fraction of EU production volume for region	
0.25	
Fraction of tonnage for application	
0.985	
Fraction of chemical in formulation	
0.15	
Frequency and duration of use	
Continuous process. 365 days/year of operation	
Environment factors not influenced by risk management	
Local freshwater dilution factor: 10 Local marine water dilution factor: 100	
Other given operational conditions affecting environmental exposure	
No special measures are required.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Conditions given in SpERC fact sheet give rise to following releases fractions: ERC8b, ERC8e, ESVOC SpERC 29 Release fraction to air from process (initial release prior to RMM): 0.01 Release fraction to wastewater from process (initial release prior to RMM): 0.00005 Release fraction to soil from process (initial release prior to RMM): 0.00005 Fraction of main source: 6.24E-04	

No air emission controls required; required removal efficiency: 0% Soil emission controls are not applicable as there is no direct release to soil. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency: >= 37% Assumed industrial wastewater treatment plant flow: 2000 m³/d
Organisation measures to prevent/limit release from site
Prevent discharge of undissolved substance to or recover from onsite wastewater.
Conditions and measures related to municipal sewage treatment plant
Estimated substance removal from wastewater via domestic sewage treatment: 37% Assumed domestic sewage treatment plant flow: 2000 m³/d
Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste
External recovery and recycling of waste should comply with applicable local and/or national regulations.
Other environmental control measures additional to above
None.
2.2. Control of worker exposure
Product characteristics
Physical form of the product: Liquid. Vapour pressure: > 10 kPa @ 0 °C
Concentration of substance in product
Limit the substance in product to: 15%
Amounts used
Not applicable.
Frequency and duration of use
Covers daily exposures up to: 8 hour(s) (unless stated differently). Continuous process.
Human factors not influenced by risk management
None.
Other given operational conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented. Assumes use at not more than 20°C above ambient temperature, unless stated differently. Outdoor use.
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical conditions and measures to control dispersion from source towards the worker
Common practices vary across sites thus conservative process release estimates used.

Methyl Tert-Butyl Ether

2.3. Contributing scenario of risk management measures
General measures (Skin irritants).
Avoid direct contact with the substance. Identify potential areas for indirect skin contact. Wear impervious gloves (EN374). Clean up spill immediately. After contact with skin, wash immediately with plenty of water. Provide basic employee training to prevent /minimise exposures and to report any skin problems that may develop.
PROC8b Bulk transfers. Batch process. Filling/Preparation of equipment from drums or containers.
Use vapour recovery units when necessary. Ensure material transfers are under containment or extract ventilation.
PROC8b Drum/Batch transfer. Filling/Preparation of equipment from drums or containers. Bulk transfers. Dedicated facility.
Use vapour recovery units when necessary. Ensure material transfers are under containment or extract ventilation.
PROC8b Refuelling vehicles.
Ensure operation is undertaken outdoors.
PROC2 General exposures (Closed system(s)) with sample collection.
No special measures are required.
PROC3 General exposures (Closed system(s)). Use in contained batch processes with sample collection.
Ensure operation is undertaken outdoors.
PROC9 Drum and small package filling. Dedicated facility.
Avoid carrying out activities involving exposure for: > 1 hour(s). Wear: Half-face mask (DIN EN 140). A suitable mask with filter type A may be appropriate. Use drum pumps./Carefully pour from container.
PROC16 Use as a fuel (Closed system(s)).
Ensure operation is undertaken outdoors.
PROC8a Equipment cleaning and maintenance. Non-dedicated facility. For example: Fuel pump repair. Indoor.
Avoid carrying out activities involving exposure for: > 4 hour(s). Wear: Half-face mask (DIN EN 140). A suitable mask with filter type A may be appropriate. Drain down and flush system prior to equipment break-in or maintenance.
PROC8a Equipment cleaning and maintenance. Non-dedicated facility. For example: Fuel pump repair. Outdoor.
Avoid carrying out activities involving exposure for: > 4 hour(s). Wear: Half-face mask (DIN EN 140). A suitable mask with filter type A may be appropriate. Drain down and flush system prior to equipment break-in or maintenance.
PROC1 Storage. General exposures (Closed system(s)).
No special measures are required.

SECTION 3:	Exposure estimation

3.1. Environment		
Protection target	Exposure concentration	Risk quantification (RCR)
Microorganisms (Sewage Treatment Plant)	PEC: 0.00000294 mg/l	4.14E-08
Surface water	Local PEC: 0.000844 mg/l	1.65E-04
Sedimentation (Fresh water)	Local PEC: 0.000783 mg/kg	1.57E-04
Sea water (Emission)	Local PEC: 0.000109 mg/l	4.19E-04

Sedimentation (Sea water)	Local PEC: 0.000102 mg/kg	4.08E-04
Agricultural soil	Local PEC: 0.000121 mg/kg	8.77E-05
Grassland	Local PEC: 0.0000357 mg/kg	2.59E-05
3.2. Health		
PROC8b Bulk transfers. Batch process. Filling/Preparation of equipment from drums or containers.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	0.39 ppm	<0.01
Inhalation (Vapour), Short term	16 ppm	<0.01
Dermal	1.6 mg/kg/day	<0.001
PROC8b Drum/Batch transfer. Filling/Preparation of equipment from drums or containers. Bulk transfers. Dedicated facility.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	0.39 ppm	<0.01
Inhalation (Vapour), Short term	16 ppm	<0.01
Dermal	1.6 mg/kg/day	<0.001
PROC8b Refuelling vehicles.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	0.4 ppm	<0.01
Inhalation (Vapour), Short term	16 ppm	<0.01
Dermal	1.6 mg/kg/day	<0.001
PROC2 General exposures (Closed system(s)) with sample collection.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	0.8 ppm	0.02
Inhalation (Vapour), Short term	17 ppm	0.17
Dermal	0.16 mg/kg/day	<0.001
PROC3 General exposures (Closed system(s)). Use in contained batch processes with sample collection.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	0.8 ppm	0.02
Inhalation (Vapour), Short term	17 ppm	0.17
Dermal	0.082 mg/kg/day	<0.001
PROC9 Drum and small package filling. Dedicated facility.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	6 ppm	0.12
Inhalation (Vapour), Short term	30 ppm	0.3

Dermal	0.16 mg/kg/day	<0.001
PROC16 Use as a fuel (Closed system(s)).		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	21 ppm	0.42
Inhalation (Vapour), Short term	21 ppm	0.21
Dermal	0.04 mg/kg/day	<0.001
PROC8a Equipment cleaning and maintenance. Non-dedicated facility. For example: Fuel pump repair. Indoor.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	12 ppm	0.25
Inhalation (Vapour), Short term	25 ppm	0.25
Dermal	0.98 mg/kg/day	<0.001
PROC8a Equipment cleaning and maintenance. Non-dedicated facility. For example: Fuel pump repair. Outdoor.		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	6.5 ppm	0.13
Inhalation (Vapour), Short term	13.2 ppm	0.13
Dermal	0.98 mg/kg/day	<0.001
PROC1 Storage. General exposures (Closed system(s)).		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Long Term	0.006 ppm	<0.01
Inhalation (Vapour), Short term	0.024 ppm	<0.01
Dermal	0.018 mg/kg/day	<0.001
SECTION 4:	Guidance to check compliance with the exposure scenario	
Environment		
Not applicable for wide dispersive use.		
Health		
No data.		

7. Exposure Scenario 7: Use as a fuel – Consumer

SECTION 1:	
Title of exposure scenario	Use as a fuel
Sectors of use [SU]	Consumer (SU21)
Environmental release categories [ERC]	ERC8b. ERC8e (ESVOC SpERC 30)
Use descriptor	PC13
Processes, tasks, activities covered	Covers consumer uses in liquid fuels
Assessment method	Health: Based on ESIG GES Consumer with refined exposure modifiers from SCEDS Environment: EUSES model
SECTION 2:	Operational conditions and risk management measures
2.1. Control of consumer exposure	
Product characteristics	
Substance is a unique structure. Predominantly hydrophobic. Readily biodegradable.	
Regional tonnage of MTBE	
659000 tonnes/year (2,197,125 kg/day)	
Fraction of EU production volume for region	
0.25	
Fraction of tonnage for application	
0.985	
Fraction of chemical in formulation	
0.15	
Frequency and duration of use	
Continuous process. 365 days/year of operation	
Environment factors not influenced by risk management	
Local freshwater dilution factor: 10 Local marine water dilution factor: 100	
Other given operational conditions affecting environmental exposure	
No special measures are required.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Conditions given in SpERC fact sheet give rise to following releases fractions: ERC8b, ERC8e, ESVOC SpERC 30 Release fraction to air from process (initial release prior to RMM): 0.01 Release fraction to wastewater from process (initial release prior to RMM): 0.00005 Release fraction to soil from process (initial release prior to RMM): 0.00005 Fraction of main source: 6.24E-04	

No air emission controls required; required removal efficiency: 0% Soil emission controls are not applicable as there is no direct release to soil. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency: >= 37% Assumed industrial wastewater treatment plant flow: 2000 m³/d
Organisation measures to prevent/limit release from site
Prevent discharge of undissolved substance to or recover from onsite wastewater.
Conditions and measures related to municipal sewage treatment plant
Estimated substance removal from wastewater via domestic sewage treatment: 37% Assumed domestic sewage treatment plant flow: 2000 m³/d
Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations.
Conditions and measures related to external recovery of waste
External recovery and recycling of waste should comply with applicable local and/or national regulations.
Other environmental control measures additional to above
None.
2.2. Control of environmental exposure
Product characteristics
Substance is a unique structure. Non-hydrophobic. Readily biodegradable.
Amounts used
See contributing scenarios above.
Frequency and duration of use
See contributing scenarios above.
Environment factors not influenced by risk management
Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other operational conditions of use
Assumes use at not more than 20°C above ambient temperature, unless stated differently.
Conditions and measures related to municipal sewage treatment plant
Assumed domestic sewage treatment plant flow: 2000 m³/d Estimated substance removal from wastewater via domestic sewage treatment: 95%
Conditions and measures related to external treatment of waste for disposal
This substance is consumed during use and no waste of the substance is generated.
Conditions and measures related to external recovery of waste
None.
2.3. Control of worker exposure

Methyl Tert-Butyl Ether

Product characteristics
Physical form of the product: Liquid. Vapour pressure: > 10 kPa @ 0 °C
Concentration of substance in product
Limit the substance in product to: 15%
Amounts used
Not applicable.
2.4. Contributing scenario controlling worker exposure
PC13 Fuels – Liquid: Automotive refuelling
Covers percentage substance in the product up to: 15% Amounts used per event: 37500 g Covers use up to: 1 times/week(s), 3 minutes/event Covers skin contact area up to: 210 cm² Outdoor use.
PC13 Fuels – Liquid: Garden equipment-refuelling
Covers percentage substance in the product up to: 15% Amounts used per event: 750 g Covers use up to: 26 times/Year(s), 2 minutes/event Covers skin contact area up to: 420 cm² Outdoor use.
PC13 Fuels – Liquid: Scooter refuelling
Covers percentage substance in the product up to: 15% Amounts used per event: 3750 g Covers use up to: 1 times/week(s), 2 minutes/event Covers skin contact area up to: 210 cm² Outdoor use.
PC13 Fuels – Refuelling of boats
Covers percentage substance in the product up to: 15% Amounts used per event: 225000 g Covers use up to: 1 times/week(s), 18 minutes/event Covers skin contact area up to: 210 cm² Outdoor use.
PC13 Fuels – Refuelling of boats
Covers percentage substance in the product up to: 15% Amounts used per event: 127500 g Covers use up to: 1 times/week(s), 12 minutes/event Covers skin contact area up to: 210 cm² Outdoor use.

SECTION 3:	Exposure estimation

Methyl Tert-Butyl Ether

3.1. Environment		
Protection target	Exposure concentration	Risk quantification (RCR)
Microorganisms (Sewage Treatment Plant)	PEC: 0.00000294 mg/l	4.14E-08
Surface water	Local PEC: 0.000844 mg/l	1.65E-04
Sedimentation (Fresh water)	Local PEC: 0.000783 mg/kg	1.57E-04
Sea water (Emission)	Local PEC: 0.000109 mg/l	4.19E-04
Sedimentation (Sea water)	Local PEC: 0.000102 mg/kg	4.08E-04
Agricultural soil	Local PEC: 0.000121 mg/kg	8.77E-05
Grassland	Local PEC: 0.0000357 mg/kg	2.59E-05
3.2. Health		
PC13 Fuels – Liquid: Automotive refuelling		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Short term	32.6 mg/m³	0.152
Dermal, Chronic, Systemic effects	0.0105 mg/kg/day	0.00000294
Oral	Not applicable	Not applicable
PC13 Fuels – Liquid: Garden equipment-refuelling		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Short term	28.6 mg/m³	0.133
Dermal, Chronic, Systemic effects	10.5 mg/kg/day	0.00294
Oral	Not applicable	Not applicable
PC13 Fuels – Liquid: Scooter refuelling		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Short term	32.8 mg/m³	0.153
Dermal, Chronic, Systemic effects	5.25 mg/kg/day	0.00147
Oral	Not applicable	Not applicable
PC13 Fuels – Refuelling of boats		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Short term	182 mg/m³	0.85
Dermal, Chronic, Systemic effects	0.0105 mg/kg/day	0.00000294
Oral	Not applicable	Not applicable
PC13 Fuels – Refuelling of boats		
Exposure route	Exposure estimate	Risk quantification (RCR)
Inhalation (Vapour), Short term	107 mg/m³	0.5

Dermal, Chronic, Systemic effects	0.0105 mg/kg/day	0.00000294
Oral	Not applicable	Not applicable

SECTION 4:	Guidance to check compliance with the exposure scenario

Environment
Not applicable for wide dispersive use.
Health
Not applicable.