



SAFETY DATA SHEET TERT-BUTYL METHYL ETHER

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

1.1. Product identifier

Product name	TERT-BUTYL METHYL ETHER
Product number	3485
Synonyms; trade names	TERTIARY BUTYL METHYL ETHER, MTBE, DYNALEAF, METHYL TERTIARY BUTYL ETHER HP, DYNALEAF HP-MTBE
REACH registration number	01-2119452786-27-XXXX
CAS number	1634-04-4
EU index number	603-181-00-X
EC number	216-653-1

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

Identified uses	Fuel additive. Industrial Solvent Industrial Pharmaceuticals For further information, see attached Exposure Scenario.
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1.3. Details of the supplier of the safety data sheet

Supplier	Univar Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 sds@univar.com
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1.4. Emergency telephone number

Emergency telephone	SGS - +32 (0)3 575 55 55 (24h)
Sds No.	3485

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (EC 1272/2008)

Physical hazards	Flam. Liq. 2 - H225
Health hazards	Skin Irrit. 2 - H315
Environmental hazards	Not Classified

2.2. Label elements

EC number	216-653-1
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TERT-BUTYL METHYL ETHER

Pictogram



Signal word

Danger

Hazard statements

H225 Highly flammable liquid and vapour.
H315 Causes skin irritation.

Precautionary statements

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P243 Take action to prevent static discharges.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P302+P352 IF ON SKIN: Wash with plenty of water.

2.3. Other hazards

This product does not contain any substances classified as PBT or vPvB.

SECTION 3: Composition/information on ingredients

3.1. Substances

Product name	TERT-BUTYL METHYL ETHER
REACH registration number	01-2119452786-27-XXXX
EU index number	603-181-00-X
CAS number	1634-04-4
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SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation	Move affected person to fresh air at once. Get medical attention if any discomfort continues.
Ingestion	Remove affected person from source of contamination. Rinse mouth thoroughly with water. Give plenty of water to drink. Get medical attention.
Skin contact	Remove contaminated clothing immediately and wash skin with soap and water. Get medical attention if any discomfort continues.
Eye contact	Rinse immediately with plenty of water. Remove any contact lenses and open eyelids wide apart. Continue to rinse for at least 15 minutes. Get medical attention immediately. Continue to rinse.

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

Inhalation	May cause an asthma-like shortness of breath.
Ingestion	May cause stomach pain or vomiting.
Skin contact	Skin irritation.
Eye contact	Irritation of eyes and mucous membranes.

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

Notes for the doctor	No specific recommendations. If in doubt, get medical attention promptly.
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SECTION 5: Firefighting measures

5.1. Extinguishing media

TERT-BUTYL METHYL ETHER

Suitable extinguishing media Extinguish with alcohol-resistant foam, carbon dioxide, dry powder or water fog.

Unsuitable extinguishing media Do not use water jet as an extinguisher, as this will spread the fire.

5.2. Special hazards arising from the substance or mixture

Specific hazards Oxides of the following substances: Carbon. The product is highly flammable.

Hazardous combustion products Oxides of carbon. Thermal decomposition or combustion may liberate carbon oxides and other toxic gases or vapours.

5.3. Advice for firefighters

Protective actions during firefighting Cool containers exposed to heat with water spray and remove them from the fire area if it can be done without risk. Contain and collect extinguishing water.

Special protective equipment for firefighters Wear positive-pressure self-contained breathing apparatus (SCBA) and appropriate protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions Follow precautions for safe handling described in this safety data sheet. Take precautionary measures against static discharges. Avoid inhalation of vapours and contact with skin and eyes. Provide adequate ventilation.

6.2. Environmental precautions

Environmental precautions Spillages or uncontrolled discharges into watercourses must be reported immediately to the Environmental Agency or other appropriate regulatory body.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up Absorb spillage with inert, damp, non-combustible material. Flush contaminated area with plenty of water. Collect and place in suitable waste disposal containers and seal securely. For waste disposal, see Section 13.

6.4. Reference to other sections

Reference to other sections Wear protective clothing as described in Section 8 of this safety data sheet.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Usage precautions Read and follow manufacturer's recommendations. Avoid contact with skin and eyes. Keep away from heat, sparks and open flame. Provide adequate ventilation. Storage tanks and other containers must be earthed.

7.2. Conditions for safe storage, including any incompatibilities

Storage precautions Keep away from heat, sparks and open flame. Store in tightly-closed, original container in a dry, cool and well-ventilated place. Do not use containers made of the following materials:
Plastics

Storage class Flammable liquid storage.

7.3. Specific end use(s)

Specific end use(s) The identified uses for this product are detailed in Section 1.2.

SECTION 8: Exposure Controls/personal protection

8.1. Control parameters

Occupational exposure limits

TERT-BUTYL METHYL ETHER

Long-term exposure limit (8-hour TWA): WEL 25 ppm 92 mg/m³

Short-term exposure limit (15-minute): WEL 75 ppm 275 mg/m³

WEL = Workplace Exposure Limit

DNEL

Industry - Inhalation; Short term local effects: 357 mg/m³

Industry - Dermal; Long term : 5100 mg/kg/day

Consumer - Inhalation; Long term : 53.6 mg/m³

Industry - Inhalation; Long term systemic effects: 178.5 mg/m³

Consumer - Inhalation; Short term local effects: 214 mg/m³

Consumer - Dermal; Long term systemic effects: 3570 mg/kg/day

Consumer - Oral; Long term systemic effects: 7.1 mg/kg/day

PNEC

- Fresh water; 5.1 mg/l

- Sediment; 23 mg/l

- Marine water; 0.26 mg/l

- Intermittent release; 4.72 mg/l

- Sediment (Freshwater); 23 mg/kg

- Sediment (Marinewater); 1.17 mg/kg

- Soil; 1.43 mg/kg

- STP; 71 mg/l

8.2. Exposure controls

Protective equipment



Appropriate engineering controls

Provide adequate general and local exhaust ventilation. Observe any occupational exposure limits for the product or ingredients.

Eye/face protection

The following protection should be worn: Chemical splash goggles. EN 166

Hand protection

The most suitable glove should be chosen in consultation with the glove supplier/manufacturer, who can provide information about the breakthrough time of the glove material. The selected gloves should have a breakthrough time of at least 2 hours. Nitrile rubber. glove thickness 0.4mm EN 374

Other skin and body protection

Wear rubber apron. Wear rubber footwear.

Hygiene measures

Provide eyewash station. Promptly remove any clothing that becomes contaminated. Wash promptly if skin becomes contaminated. Wash contaminated clothing before reuse. Eating, smoking and water fountains prohibited in immediate work area.

Respiratory protection

If ventilation is inadequate, suitable respiratory protection must be worn. EN 136/140/141/145/143/149

SECTION 9: Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

Appearance

Clear liquid.

Colour

Colourless.

Odour

Hydrocarbons.

Odour threshold

No information available.

pH

No information available.

TERT-BUTYL METHYL ETHER

Melting point	-109°C
Initial boiling point and range	55°C @ 760 mm Hg
Flash point	-28°C Setaflash closed cup.
Evaporation rate	No information available.
Evaporation factor	No information available.
Flammability (solid, gas)	No information available.
Upper/lower flammability or explosive limits	Lower flammable/explosive limit: ~2.5 Upper flammable/explosive limit: ~15.1
Other flammability	No information available.
Vapour pressure	245 mm Hg
Vapour density	3
Relative density	0.74 @ 20°C
Bulk density	No information available.
Solubility(ies)	Insoluble in water.
Partition coefficient	: -0.8 - 1.33
Auto-ignition temperature	~460°C
Decomposition Temperature	No information available.
Viscosity	0.3 mPa s @ 25°C
Explosive properties	No information available.
Explosive under the influence of a flame	No information available.
Oxidising properties	No information available.
<u>9.2. Other information</u>	
Refractive index	No information available.
Particle size	No information available.
Molecular weight	88.15
Volatility	No information available.
Saturation concentration	No information available.
Critical temperature	No information available.
Volatile organic compound	No information available.

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity Oxygen. Oxidising materials. Strong alkalis. Acids. Plastics

10.2. Chemical stability

Stability Stable at normal ambient temperatures and when used as recommended.

10.3. Possibility of hazardous reactions

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Possibility of hazardous reactions Oxygen. Will not polymerise.

10.4. Conditions to avoid

Conditions to avoid Avoid excessive heat for prolonged periods of time. Avoid heat, flames and other sources of ignition.

10.5. Incompatible materials

Materials to avoid Strong acids. Strong oxidising agents. Strong alkalis.

10.6. Hazardous decomposition products

Hazardous decomposition products Oxides of the following substances: Carbon.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity - oral

Acute toxicity oral (LD₅₀ mg/kg) 2,000.0

Species Rat

Acute toxicity - dermal

Acute toxicity dermal (LD₅₀ mg/kg) 2,000.0

Species Rat

Acute toxicity - inhalation

Acute toxicity inhalation (LC₅₀ vapours mg/l) 85.0

Species Rat

ATE inhalation (vapours mg/l) 85.0

Skin corrosion/irritation

Animal data No information available.

Serious eye damage/irritation

Serious eye damage/irritation No information available.

Respiratory sensitisation

Respiratory sensitisation No information available.

Skin sensitisation

Skin sensitisation No information available.

Germ cell mutagenicity

Genotoxicity - in vitro No information available.

Carcinogenicity

Carcinogenicity No information available.

Reproductive toxicity

Reproductive toxicity - fertility No information available.

Specific target organ toxicity - single exposure

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STOT - single exposure No information available.

Specific target organ toxicity - repeated exposure

STOT - repeated exposure No information available.

Aspiration hazard

Aspiration hazard No information available.

Inhalation Gas or vapour in high concentrations may irritate the respiratory system. Symptoms following overexposure may include the following: Coughing. Vapours have a narcotic effect. Symptoms following overexposure may include the following: Headache. Fatigue. Dizziness. Nausea, vomiting.

Ingestion Gastrointestinal symptoms, including upset stomach.

Skin contact Irritating to skin.

Eye contact Irritating to eyes.

Target organs Skin Liver Kidneys

SECTION 12: Ecological Information

Ecotoxicity The product components are not classified as environmentally hazardous. However, large or frequent spills may have hazardous effects on the environment.

12.1. Toxicity

Toxicity Not considered toxic to fish.

Acute aquatic toxicity

Acute toxicity - fish LC50, 96 hours: 574 mg/l, Pimephales promelas (Fat-head Minnow)

Acute toxicity - aquatic invertebrates EC₅₀, 48 hours: 472 mg/l, Daphnia magna

Acute toxicity - aquatic plants EC₅₀, 96 hours: 491 mg/l, Selenastrum capricornutum

12.2. Persistence and degradability

Persistence and degradability The product is not biodegradable.

12.3. Bioaccumulative potential

Bioaccumulative potential The product is not bioaccumulating.

Partition coefficient : -0.8 - 1.33

12.4. Mobility in soil

Mobility The product is miscible with water and may spread in water systems. The product contains volatile organic compounds (VOCs) which will evaporate easily from all surfaces.

Surface tension 18.1 mN/m @ 40°C

12.5. Results of PBT and vPvB assessment

Results of PBT and vPvB assessment This product does not contain any substances classified as PBT or vPvB.

12.6. Other adverse effects

Other adverse effects Not applicable.

SECTION 13: Disposal considerations

TERT-BUTYL METHYL ETHER

13.1. Waste treatment methods

General information	Do not puncture or incinerate, even when empty. Materials such as cleaning rags and paper wipes that are contaminated with flammable liquids may self-ignite after use and should be stored in designated fireproof containers with tight-fitting, self-closing lids. Waste is classified as hazardous waste.
Disposal methods	Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Disposal Authority.

SECTION 14: Transport information

General	Wear protective clothing as described in Section 8 of this safety data sheet.
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14.1. UN number

UN No. (ADR/RID)	2398
UN No. (IMDG)	2398
UN No. (ICAO)	2398
UN No. (ADN)	2398

14.2. UN proper shipping name

Proper shipping name (ADR/RID)	METHYL tert-BUTYL ETHER
Proper shipping name (IMDG)	METHYL tert-BUTYL ETHER
Proper shipping name (ICAO)	METHYL tert-BUTYL ETHER
Proper shipping name (ADN)	METHYL tert-BUTYL ETHER

14.3. Transport hazard class(es)

ADR/RID class	3
ADR/RID classification code	F1
ADR/RID label	3
IMDG class	3
ICAO class/division	3
ADN class	3

Transport labels



14.4. Packing group

ADR/RID packing group	II
IMDG packing group	II
ADN packing group	II
ICAO packing group	II

14.5. Environmental hazards

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Environmentally hazardous substance/marine pollutant

No.

14.6. Special precautions for user

EmS F-E, S-D

ADR transport category 2

Emergency Action Code •3YE

Hazard Identification Number 33
(ADR/RID)

Tunnel restriction code (D/E)

14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code

Transport in bulk according to Not applicable.

Annex II of MARPOL 73/78
and the IBC Code

SECTION 15: Regulatory information

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

EU legislation Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (as amended).
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 (as amended).
Commission Regulation (EU) No 2015/830 of 28 May 2015.
This product may impact SEVESO storage regulations.

15.2. Chemical safety assessment

A chemical safety assessment has been carried out.

SECTION 16: Other information

TERT-BUTYL METHYL ETHER

Abbreviations and acronyms used in the safety data sheet

ATE: Acute Toxicity Estimate.
 ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road.
 ADN: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways.
 CAS: Chemical Abstracts Service.
 DNEL: Derived No Effect Level.
 IATA: International Air Transport Association.
 IMDG: International Maritime Dangerous Goods.
 Kow: Octanol-water partition coefficient.
 LC₅₀: Lethal Concentration to 50 % of a test population.
 LD₅₀: Lethal Dose to 50% of a test population (Median Lethal Dose).
 PBT: Persistent, Bioaccumulative and Toxic substance.
 PNEC: Predicted No Effect Concentration.
 REACH: Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006.
 RID: European Agreement concerning the International Carriage of Dangerous Goods by Rail.
 vPvB: Very Persistent and Very Bioaccumulative.
 IARC: International Agency for Research on Cancer.
 MARPOL 73/78: International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978.
 cATpE: Converted Acute Toxicity Point Estimate.
 BCF: Bioconcentration Factor.
 BOD: Biochemical Oxygen Demand.
 EC₅₀: 50% of maximal Effective Concentration.
 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.
 LOEC: Lowest Observed Effect Concentration.
 DMEL: Derived Minimal Effect Level.
 EL50: Exposure Limit 50
 hPa: Hectopascal
 LL50: Lethal Loading fifty
 OECD: Organisation for Economic Co-operation and Development
 POW: Octanol-water partition coefficient
 SCBA: self-contained breathing apparatus
 STP: Sewage Treatment Plant
 VOC: Volatile Organic Compounds

Classification abbreviations and acronyms

Acute Tox. = Acute toxicity
 Aquatic Acute = Hazardous to the aquatic environment (acute)
 Aquatic Chronic = Hazardous to the aquatic environment (chronic)

Key literature references and sources for data

ECHA Disseminated REACH Dossier

Revision comments

NOTE: Lines within the margin indicate significant changes from the previous revision.

Revision date

02/08/2018

Version number

3.000

Supersedes date

23/11/2016

SDS number

3485

TERT-BUTYL METHYL ETHER

SDS status	Approved.
Hazard statements in full	H225 Highly flammable liquid and vapour. H315 Causes skin irritation.
Signature	Jitendra Panchal



Exposure scenario

Manufacture of substance

Identification

Product name	TERT-BUTYL METHYL ETHER
REACH registration number	01-2119452786-27-XXXX
CAS number	1634-04-4
EC number	216-653-1
Supplier	Univar Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 sds@univar.com

1. Title of exposure scenario

Main title	Manufacture of substance
Process scope	Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling/recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities.
Main sector	SU3 Industrial uses
<u>Environment</u>	
Environmental release category	ERC1 Manufacture of substances.
<u>Worker</u>	
Process category	PROC1 Use in closed process, no likelihood of exposure. PROC2 Use in closed, continuous process with occasional controlled exposure PROC3 Use in closed batch process (synthesis or formulation). PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises. PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities. PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. PROC15 Use as laboratory reagent.

2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Physical state	Liquid, vapour pressure > 10 kPa at STP
Concentration details	Covers concentrations up to 100 %.

Manufacture of substance

Substance is a unique structure. Predominantly hydrophobic. Readily biodegradable.

Amounts used

Fraction of EU tonnage used in region: 0.25
 Regional use tonnage: 290000 tonnes/year
 Fraction of Regional tonnage used locally: 0.4
 Daily amount per site: 386667 kg
 Annual site tonnage: 116000 tonnes

Frequency and duration of use

Emission days: 300 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air Release fraction to air from process (initial release prior to RMM): 0.001
Emission factor - water Release fraction to wastewater from process (initial release prior to RMM): 0.0003
Emission factor - soil Release fraction to soil from process (initial release prior to RMM): 0.0001

Risk management measures

Good practice Common practices vary across sites, thus conservative process release estimates used.
STP details Assumed domestic sewage treatment plant flow: 2000 m³/day

Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

Air No air emission controls required; required removal efficiency is 0%.
Water Typical onsite wastewater treatment technology provides removal efficiency of 99%. Prevent discharge of undissolved substance to or recover from onsite waste water.
Soil Not applicable - no direct release to soil.

2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state Liquid, vapour pressure > 10 kPa at STP
Concentration details Covers concentrations up to 100 %.

Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

Other given operational conditions affecting workers exposure

Temperature Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures at process level (source) to prevent release

Technical protective measures Provide extract ventilation to points where emissions occur. Ensure material transfers are under containment or extract ventilation. Drain or remove substance from equipment prior to break-in or maintenance. PROC15 Use as laboratory reagent. Handle in a fume cupboard or under extract ventilation.

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop.

Risk management measures

Manufacture of substance

Wear a respirator conforming to EN140 with Type A filter or better.

, or:

Avoid carrying out activities involving exposure for more than 4 hours.

Assumes a good basic standard of occupational hygiene is implemented.

3. Exposure estimation (Environment 1)

The use is assessed to be safe.

4. Guidance to check compliance with the exposure scenario (Environment 1)

Predicted exposures are not expected to exceed the applicable exposure limits (given in Section 8 of the SDS) when the operational conditions/risk management measures given in Section 2 are implemented.

3. Exposure estimation (Health 1)

The use is assessed to be safe.

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.



Exposure scenario Formulation

Identification

Product name	TERT-BUTYL METHYL ETHER
REACH registration number	01-2119452786-27-XXXX
CAS number	1634-04-4
EC number	216-653-1
Supplier	Univar Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 sds@univar.com

1. Title of exposure scenario

Main title	Formulation
Process scope	Formulation, packing and re-packing of the substance 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.
Main sector	SU3 Industrial uses
<u>Environment</u>	
Environmental release category	ERC2 Formulation of preparations.
<u>Worker</u>	
Process category	PROC1 Use in closed process, no likelihood of exposure. PROC2 Use in closed, continuous process with occasional controlled exposure PROC3 Use in closed batch process (synthesis or formulation). PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises. PROC5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact). PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities. PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing). PROC15 Use as laboratory reagent.

2. Conditions of use affecting exposure (Industrial - Environment 1)

Formulation

Product characteristics

Physical state	Liquid, vapour pressure > 10 kPa at STP
Concentration details	Covers concentrations up to 100 %.
	Substance is a unique structure. Predominantly hydrophobic. Readily biodegradable.

Amounts used

Fraction of EU tonnage used in region: 0.57
 Regional use tonnage: 659000 tonnes/year
 Fraction of Regional tonnage used locally: 0.05
 Daily amount per site: 109833 kg
 Annual site tonnage: 32950 tonnes

Frequency and duration of use

Emission days: 300 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air	Release fraction to air from process (initial release prior to RMM): 0.001
Emission factor - water	Release fraction to wastewater from process (initial release prior to RMM): 0.0003
Emission factor - soil	Release fraction to soil from process (initial release prior to RMM): 0.0001

Risk management measures

Good practice	Common practices vary across sites, thus conservative process release estimates used.
STP details	Assumed domestic sewage treatment plant flow: 2000 m ³ /day

Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

Air	No air emission controls required; required removal efficiency is 0%.
Water	Typical onsite wastewater treatment technology provides removal efficiency of 99%. Prevent discharge of undissolved substance to or recover from onsite waste water.
Soil	Not applicable - no direct release to soil.

2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state	Liquid, vapour pressure > 10 kPa at STP
Concentration details	Covers concentrations up to 100 %.

Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

Other given operational conditions affecting workers exposure

Temperature	Assumes use at not more than 20°C above ambient temperature, unless stated differently.
Ventilation rate	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Technical conditions and measures at process level (source) to prevent release

Technical protective measures	Provide extract ventilation to points where emissions occur. Formulate in enclosed or ventilated mixing vessels. Ensure material transfers are under containment or extract ventilation. Drain or remove substance from equipment prior to break-in or maintenance. Drum and small package filling Use drum pumps. Fill containers/cans at dedicated fill points supplied with local extract ventilation. PROC15 Use as laboratory reagent. Handle in a fume cupboard or under extract ventilation.
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Formulation

Organisational measures to prevent/limit releases, dispersion and exposure

Organisational measures

Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop.

Risk management measures

Avoid carrying out activities involving exposure for more than 4 hours.

, or:

Wear a respirator conforming to EN140 with Type A filter or better.

Assumes a good basic standard of occupational hygiene is implemented.

3. Exposure estimation (Environment 1)

The use is assessed to be safe.

4. Guidance to check compliance with the exposure scenario (Environment 1)

Predicted exposures are not expected to exceed the applicable exposure limits (given in Section 8 of the SDS) when the operational conditions/risk management measures given in Section 2 are implemented.

3. Exposure estimation (Health 1)

The use is assessed to be safe.

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.



Exposure scenario Use as intermediate

Identification

Product name	TERT-BUTYL METHYL ETHER
REACH registration number	01-2119452786-27-XXXX
CAS number	1634-04-4
EC number	216-653-1
Supplier	Univar Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 sds@univar.com

1. Title of exposure scenario

Main title	Use as intermediate
Process scope	Use of substance as an 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).
Main sector	SU3 Industrial uses
<u>Environment</u>	
Environmental release category	ERC6a Industrial use resulting in manufacture of another substance (use of intermediates).
<u>Worker</u>	
Process category	PROC1 Use in closed process, no likelihood of exposure. PROC2 Use in closed, continuous process with occasional controlled exposure PROC3 Use in closed batch process (synthesis or formulation). PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises. PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities. PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. PROC15 Use as laboratory reagent.

2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Physical state	Liquid, vapour pressure > 10 kPa at STP
Concentration details	Covers concentrations up to 100 %.

Use as intermediate

Substance is a unique structure. Predominantly hydrophobic. Readily biodegradable.

Amounts used

Fraction of EU tonnage used in region: 0.01
 Regional use tonnage: 8030 tonnes/year
 Fraction of Regional tonnage used locally: 1
 Daily amount per site: 26767 kg
 Annual site tonnage: 8030 tonnes

Frequency and duration of use

Emission days: 300 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air Release fraction to air from process (initial release prior to RMM): 0.05
Emission factor - water Release fraction to wastewater from process (initial release prior to RMM): 0.000008
Emission factor - soil Release fraction to soil from process (initial release prior to RMM): 0.0001

Risk management measures

Good practice Common practices vary across sites, thus conservative process release estimates used.
STP details Assumed domestic sewage treatment plant flow: 2000 m³/day

Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

Air No air emission controls required; required removal efficiency is 0%.
Water Prevent discharge of undissolved substance to or recover from onsite waste water. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of 90%.
Soil Not applicable - no direct release to soil.

2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state Liquid, vapour pressure > 10 kPa at STP
Concentration details Covers concentrations up to 100 %.

Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

Other given operational conditions affecting workers exposure

Temperature Assumes use at not more than 20°C above ambient temperature, unless stated differently.
Ventilation rate Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Technical conditions and measures at process level (source) to prevent release

Technical protective measures Provide extract ventilation to points where emissions occur. Formulate in enclosed or ventilated mixing vessels. Ensure material transfers are under containment or extract ventilation. Drain or remove substance from equipment prior to break-in or maintenance.
 PROC15 Use as laboratory reagent. Handle in a fume cupboard or under extract ventilation.

Organisational measures to prevent/limit releases, dispersion and exposure

Use as intermediate

Organisational measures

Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop.

Risk management measures

Avoid carrying out activities involving exposure for more than 4 hours.

, or:

Wear a respirator conforming to EN140 with Type A filter or better.

Assumes a good basic standard of occupational hygiene is implemented.

3. Exposure estimation (Environment 1)

The use is assessed to be safe.

4. Guidance to check compliance with the exposure scenario (Environment 1)

Predicted exposures are not expected to exceed the applicable exposure limits (given in Section 8 of the SDS) when the operational conditions/risk management measures given in Section 2 are implemented.

3. Exposure estimation (Health 1)

The use is assessed to be safe.

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.



Exposure scenario

Use as a process solvent or extraction agent

Identification

Product name	TERT-BUTYL METHYL ETHER
REACH registration number	01-2119452786-27-XXXX
CAS number	1634-04-4
EC number	216-653-1
Supplier	Univar Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 sds@univar.com

1. Title of exposure scenario

Main title	Use as a process solvent or extraction agent
Process scope	Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling/recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities.
Main sector	SU3 Industrial uses
Sector of use	SU8 Manufacture of bulk, large-scale chemicals (including petroleum products) SU9 Manufacture of fine chemicals

Environment

Environmental release category	ERC4 Industrial use of processing aids in processes and products, not becoming part of articles.
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Worker

Process category	PROC1 Use in closed process, no likelihood of exposure. PROC2 Use in closed, continuous process with occasional controlled exposure PROC3 Use in closed batch process (synthesis or formulation). PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises. PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities. PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. PROC15 Use as laboratory reagent.
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2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Physical state	Liquid, vapour pressure > 10 kPa at STP
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Use as a process solvent or extraction agent

Concentration details

Covers concentrations up to 100 %.

Substance is a unique structure. Predominantly hydrophobic. Readily biodegradable.

Amounts used

Fraction of EU tonnage used in region: 0

Regional use tonnage: 2010 tonnes/year

Fraction of Regional tonnage used locally: 0.3

Daily amount per site: 1834 kg

Annual site tonnage: 603 tonnes

Frequency and duration of use

Emission days: 120 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air Release fraction to air from process (initial release prior to RMM): 0.05

Emission factor - water Release fraction to wastewater from process (initial release prior to RMM): 0.000008

Emission factor - soil Release fraction to soil from process (initial release prior to RMM): 0.0001

Risk management measures

Good practice Common practices vary across sites, thus conservative process release estimates used.

STP details Assumed domestic sewage treatment plant flow: 2000 m³/day

Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

Air No air emission controls required; required removal efficiency is 0%.

Water Prevent discharge of undissolved substance to or recover from onsite waste water. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of 99%.

Soil Not applicable - no direct release to soil.

2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state Liquid, vapour pressure > 10 kPa at STP

Concentration details Covers concentrations up to 100 %.

Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

Other given operational conditions affecting workers exposure

Temperature Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Ventilation rate Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Technical conditions and measures at process level (source) to prevent release

Technical protective measures Provide extract ventilation to points where emissions occur. Formulate in enclosed or ventilated mixing vessels. Ensure material transfers are under containment or extract ventilation. Drain or remove substance from equipment prior to break-in or maintenance.
PROC15 Use as laboratory reagent. Handle in a fume cupboard or under extract ventilation.

Organisational measures to prevent/limit releases, dispersion and exposure

Use as a process solvent or extraction agent

Organisational measures

Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop.

Risk management measures

Avoid carrying out activities involving exposure for more than 4 hours.

, or:

Wear a respirator conforming to EN140 with Type A filter or better.

Assumes a good basic standard of occupational hygiene is implemented.

3. Exposure estimation (Environment 1)

The use is assessed to be safe.

4. Guidance to check compliance with the exposure scenario (Environment 1)

Predicted exposures are not expected to exceed the applicable exposure limits (given in Section 8 of the SDS) when the operational conditions/risk management measures given in Section 2 are implemented.

3. Exposure estimation (Health 1)

The use is assessed to be safe.

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.



Exposure scenario Distribution

Identification

Product name	TERT-BUTYL METHYL ETHER
REACH registration number	01-2119452786-27-XXXX
CAS number	1634-04-4
EC number	216-653-1
Supplier	Univar Aquarius House 6 Mid Point Business Park Bradford BD3 7AY +44 1274 267300 +44 1274 267306 sds@univar.com

1. Title of exposure scenario

Main title	Distribution
Process scope	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.
Main sector	SU3 Industrial uses

Environment

Environmental release category	ERC1 Manufacture of substances. ERC2 Formulation of preparations.
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Worker

Process category	PROC1 Use in closed process, no likelihood of exposure. PROC2 Use in closed, continuous process with occasional controlled exposure PROC3 Use in closed batch process (synthesis or formulation). PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises. PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities. PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing). PROC15 Use as laboratory reagent.
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2. Conditions of use affecting exposure (Industrial - Environment 1)

Product characteristics

Physical state	Liquid, vapour pressure > 10 kPa at STP
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Distribution

Concentration details Covers concentrations up to 100 %.

Substance is a unique structure. Predominantly hydrophobic. Readily biodegradable.

Amounts used

Fraction of EU tonnage used in region: 0.57
 Regional use tonnage: 659000 tonnes/year
 Fraction of Regional tonnage used locally: 1
 Daily amount per site: 1805479 kg
 Annual site tonnage: 659000 tonnes

Frequency and duration of use

Emission days: 365 days/year

Other given operational conditions affecting environmental exposure

Emission factor - air Release fraction to air from process (initial release prior to RMM): 0.001

Emission factor - water Release fraction to wastewater from process (initial release prior to RMM): 0.00001

Emission factor - soil Release fraction to soil from process (initial release prior to RMM): 0.0001

Risk management measures

Good practice Common practices vary across sites, thus conservative process release estimates used.

STP details Assumed domestic sewage treatment plant flow: 2000 m³/day

Technical onsite conditions and measures to reduce or limit discharges to air, water and soil

Air No air emission controls required; required removal efficiency is 0%.

Water Prevent discharge of undissolved substance to or recover from onsite waste water. If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of 99%.

Soil Not applicable - no direct release to soil.

2. Conditions of use affecting exposure (Workers - Health 1)

Product characteristics

Physical state Liquid, vapour pressure > 10 kPa at STP

Concentration details Covers concentrations up to 100 %.

Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

Other given operational conditions affecting workers exposure

Temperature Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Ventilation rate Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Technical conditions and measures at process level (source) to prevent release

Technical protective measures Provide extract ventilation to points where emissions occur. Ensure material transfers are under containment or extract ventilation. Drain or remove substance from equipment prior to break-in or maintenance. PROC15 Use as laboratory reagent. Handle in a fume cupboard or under extract ventilation.

Organisational measures to prevent/limit releases, dispersion and exposure

Distribution

Organisational measures

Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop.

Risk management measures

Avoid carrying out activities involving exposure for more than 4 hours.

, or:

Wear a respirator conforming to EN140 with Type A filter or better.

Process sampling

Avoid carrying out activities involving exposure for more than 15 minutes.

, or:

Wear a respirator conforming to EN140 with Type A filter or better.

Assumes a good basic standard of occupational hygiene is implemented.

3. Exposure estimation (Environment 1)

The use is assessed to be safe.

4. Guidance to check compliance with the exposure scenario (Environment 1)

Predicted exposures are not expected to exceed the applicable exposure limits (given in Section 8 of the SDS) when the operational conditions/risk management measures given in Section 2 are implemented.

3. Exposure estimation (Health 1)

The use is assessed to be safe.

4. Guidance to check compliance with the exposure scenario (Health 1)

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.