

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

### 1.1. Product identifier

Product form	: Substance
Trade name	: MTBE (tert-butyl methyl ether)
CAS No	: 1634-04-4
Formula	: C <sub>5</sub> H <sub>12</sub> O
Synonyms	: methyl-tert-butyl ether (MTBE) / methyl 1,1-dimethylethyl ether / 1,1-dimethylethyl methyl ether / 2-methoxy-2-methylpropane / 2-methyl-2-methoxypropane

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

Use of the substance/mixture	: Booster for fuel
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### 1.3. Details of the supplier of the safety data sheet

Braskem S.A.  
5100 Westheimer Rd - Suite 495  
Houston, 77056 - USA

Manufacturer:  
Braskem S.A.  
Rua Eteno, 1561, Polo Petroquímico de Camaçari  
Camaçari, BA, CEP: 42810-000, Brasil

Braskem S.A.  
BR 386 – Rodovia Tabai-Canoas, km 419, Via do Contorno, 850  
Triunfo, RS, CEP: 95853-000, Brasil

Contact Email : productsafety@braskem.com  
Emergency Telephone Number (CHEMTREC) : 1-800-424-9300

## SECTION 2: Hazards identification

### 2.1. Classification of the substance or mixture

#### GHS-US classification

Flam. Liq. 2 H225  
Skin Irrit. 2 H315  
Asp. Tox. 1 H304

Full text of H-statements: see section 16

### 2.2. Label elements

#### GHS-US labelling

Hazard pictograms (GHS-US)



GHS02

GHS07

GHS08

Signal word (GHS-US)

: Danger

Hazard statements (GHS-US)

: H225 - Highly flammable liquid and vapour  
H304 - May be fatal if swallowed and enters airways  
H315 - Causes skin irritation

Precautionary statements (GHS-US)

: P210 - Keep away from heat, sparks, open flames, hot surfaces, No smoking. - No smoking  
P233 - Keep container tightly closed  
P240 - Ground/bond container and receiving equipment  
P241 - Use explosion-proof electrical, lighting, ventilating equipment  
P242 - Use only non-sparking tools  
P243 - Take precautionary measures against static discharge  
P264 - Wash hands thoroughly after handling  
P280 - Wear eye protection, protective clothing, protective gloves  
P301+P310 - If swallowed: Immediately call a POISON CENTER  
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/shower  
 P321 - Specific treatment (see ... on this label)  
 P331 - Do NOT induce vomiting  
 P332+P313 - If skin irritation occurs: Get medical advice/attention  
 P362 - Take off contaminated clothing and wash before reuse  
 P370+P378 - In case of fire: Use dry extinguishing powder, carbon dioxide (CO<sub>2</sub>), alcohol resistant foam to extinguish  
 P403+P235 - Store in a well-ventilated place. Keep cool  
 P405 - Store locked up  
 P501 - Dispose of contents/container to comply with applicable local, national and international regulation.

## 2.3. Other hazards

other hazards which do not result in classification : Vapours can travel considerable distances to a source of ignition where they can ignite, flash back, or explode. Absorbed through the skin. May cause minor eye irritation. Central nervous system depression. This substance does not meet the criteria for classification as PBT or vPvB.

## 2.4. Unknown acute toxicity (GHS-US)

Not applicable

## SECTION 3: Composition/information on ingredients

### 3.1. Substance

Substance type : Mono-constituent  
 Name : tert-butyl methyl ether, MTBE, 2-methoxy-2-methylpropane  
 CAS No : 1634-04-4

### 3.2. Mixture

Not applicable

### 4.1. Description of first aid measures

First-aid measures general : Avoid : Vomiting. No direct artificial respiration to be given by first aider. Do not rub the skin and eyes after direct contact with the product.  
 First-aid measures after inhalation : Remove victim to fresh air. Do not apply mouth-to-mouth resuscitation. Delayed fatal pulmonary oedema possible. In case of irregular breathing or respiratory arrest provide artificial respiration. Seek medical advice (show the label where possible).  
 First-aid measures after skin contact : Rinse immediately with plenty of water for 15 minutes. Do not rub the skin and eyes after direct contact with the product. Remove contaminated clothing and shoes. Discard contaminated clothing. If skin irritation persists, seek medical attention.  
 First-aid measures after eye contact : Rinse immediately and thoroughly, pulling the eyelids well away from the eye (15 minutes minimum). Remove contact lenses, if present and easy to do. Continue rinsing. Do not rub the skin and eyes after direct contact with the product. Seek medical advice (show the label where possible).  
 First-aid measures after ingestion : Do not induce vomiting. Give water to drink if victim completely conscious/alert. Never give anything by mouth to an unconscious person. Immediately get medical attention.

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

Symptoms/injuries after inhalation : May cause irritation to the respiratory tract. Excessive concentrations may cause nervous system depression, headache, and weakness leading to unconsciousness.  
 Symptoms/injuries after skin contact : Irritating to skin. Absorbed through the skin.  
 Symptoms/injuries after eye contact : redness, itching, tears.  
 Symptoms/injuries after ingestion : May be fatal if swallowed and enters airways. May cause gastric irritation. Depression of the central nervous system, headaches, dizziness, drowsiness, loss of coordination.  
 Chronic symptoms : Excessive concentrations may cause nervous system depression, headache, and weakness leading to unconsciousness. Prolonged/repetitive skin contact may cause skin defatting or dermatitis.

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

Use personal protective equipment as required. Refer to section 8. Excessive concentrations may cause nervous system depression, headache, and weakness leading to unconsciousness.

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

Suitable extinguishing media : carbon dioxide (CO<sub>2</sub>), dry chemical powder, foam. Water fog.  
 Unsuitable extinguishing media : Do not use a solid water stream as it may scatter and spread fire.

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

- Fire hazard : Flammable liquid. Exposed to ignition source, vapours can burn in open / explode if confined. This material can accumulate static charge by flow or agitation and can be ignited by static discharge. The vapours are heavier than air and can accumulate in high concentrations on the ground, in cavities, channels and cellars. Vapours can travel considerable distances to a source of ignition where they can ignite, flash back, or explode. Combustion generates : Carbon monoxide. Carbon dioxide. May form explosive peroxides.
- Explosion hazard : Prolonged exposure to fire may cause containers to rupture/explode. Do not allow to enter drains and sewers as this will create a potential explosive hazard. If this occurs inform local authorities immediately.
- Reactivity : May react violently with oxidants. May react violently with acids.

## 5.3. Advice for firefighters

- Firefighting instructions : Cool closed containers exposed to fire with water spray. Fight fire with normal precautions from a reasonable distance. Do not approach fire except upwind and only with proper skin and respiratory protection (supplied air only).
- Protective equipment for firefighters : Wear recommended personal protective equipment. In case of fire: Wear self-contained breathing apparatus. Refer to section 8.

## SECTION 6: Accidental release measures

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

- General measures : Eliminate all ignition sources if safe to do so.
- 6.1.1. For non-emergency personnel**
- Protective equipment : Use personal protective equipment as required. Refer to section 8.
- Emergency procedures : Eliminate all ignition sources if safe to do so. Stop leak if safe to do so.
- 6.1.2. For emergency responders**
- Protective equipment : Wear suitable protective clothing. In case of fire: Wear self-contained breathing apparatus. Refer to section 8.
- Emergency procedures : Evacuate unnecessary personnel. Eliminate ignition sources. Stop leak if safe to do so.

### 6.2. Environmental precautions

Use water spray jet to minimise or disperse vapours. Prevent entry to sewers and public waters. Prevent spread over a wide area (e.g. by containment or oil barriers). Take up liquid spill into inert absorbent material, e.g.: sand, earth, vermiculite or powdered limestone.

### 6.3. Methods and material for containment and cleaning up

- For containment : Prevent spread over a wide area (e.g. by containment or oil barriers). Suppress gases/vapours/mists with water spray jet.
- Methods for cleaning up : Absorb with liquid-binding material (e.g. sand, diatomaceous earth, acid- or universal binding agents), zeolites. Sweep or shovel spills into appropriate container for disposal.

### 6.4. Reference to other sections

No additional information available

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

- Precautions for safe handling : Avoid producing mist or vapors by heating of opened recipient. Keep container closed when not in use. Ground/bond container and receiving equipment. Use only non-sparking tools. When handling product, avoid contact with oxidation agents and combustible products. Do not re-use empty containers. Do not pressurize, cut, weld, braze solder, drill, grind, or expose containers to flames, sparks, heat, or other potential ignition sources. Handle in accordance with good industrial hygiene and safety procedures.
- Hygiene measures : Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.

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

- Technical measures : Keep away from sources of ignition - No smoking. Proper grounding procedures to avoid static electricity should be followed. Use only antistatically equipped (spark-free) tools. Use explosion-proof electrical equipment. Use explosion-proof lighting equipment. Use explosion-proof ventilating equipment. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.
- Storage conditions : Protect containers against damage. Keep stored the least quantity possible. Keep in original containers closed. Store in dry, cool, well-ventilated area. Keep away from ignition sources (including static discharges).
- Incompatible materials : Oxidizing agents, strong. Strong acid.

Packaging materials : PVC (Polyvinyl chloride). Carbon steel. stainless steel. This material may attack some forms of plastics, rubbers and coatings.

### 7.3. Specific end use(s)

No additional information available

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

MTBE (tert-butyl methyl ether) (1634-04-4)		
DNEL	DNEL	178.8 mg/m <sup>3</sup> Worker/Long-Term - systemic effects (Inhalation)
PNEC	PNEC	5.1 mg/l PNEC aqua - freshwater
tert-butyl methyl ether, MTBE, 2-methoxy-2-methylpropane (1634-04-4)		
ACGIH	ACGIH TWA (ppm)	50 ppm

### 8.2. Exposure controls

Appropriate engineering controls : Mechanical ventilation is recommended. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use only non-sparking tools. Use explosion-proof ventilating equipment.

Personal protective equipment : An approved organic vapour respirator/supplied air or self-contained breathing apparatus must be used when vapour concentration exceeds applicable exposure limits. Gloves. Protective goggles. Protective clothing.



Materials for protective clothing : PVC (Polyvinyl chloride). PVA (Polyvinyl alcohol). Avoid : NR (Natural rubber (caoutchouc), Natural latex). Butyl caoutchouc (butyl rubber).

Hand protection : Protective gloves made of PVC. PVA (Polyvinyl alcohol). Nitrile-rubber protective gloves.

Eye protection : if necessary: tightly fitting safety goggles.

Skin and body protection : Wear suitable protective clothing. Boots made of PVC. PVA (Polyvinyl alcohol).

Respiratory protection : An approved organic vapour respirator/supplied air or self-contained breathing apparatus must be used when vapour concentration exceeds applicable exposure limits.

Environmental exposure controls : Avoid release to the environment.

## SECTION 9: Physical and chemical properties

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

Physical state	: Liquid
Colour	: colourless
Odour	: Terpene-like.
Odour threshold	: No data available
pH	: not applicable
Relative evaporation rate (butyl acetate=1)	: 8.5
Relative evaporation rate (ether=1)	: 1.6
Melting point	: No data available
Freezing point	: -109 °C
Boiling point	: 55.2 °C
Flash point	: -28 °C (closed cup)
Auto-ignition temperature	: 224 °C
Decomposition temperature	: No data available
Flammability (solid, gas)	: No data available
Vapour pressure	: 201 mmHg @ 20°C
Relative vapour density at 20 °C	: 3.1 Relative vapour density at 20 °C (air=1):
Relative density	: No data available
Density	: 0.741 g/ml @ 20°C

Solubility	: Insoluble in: Ethanol. Water: Moderate. Ethanol: Soluble in ethanol
Log Pow	: 1.06 (@ 23 °C)
Log Kow	: No data available
Viscosity, kinematic	: 0.47 mm <sup>2</sup> /s @ 20°C
Viscosity, dynamic	: 0.35 mPa.s @ 20°C
Explosive properties	: No data available
Oxidising properties	: No data available
Explosive limits	: 1.6 - 8.4 vol %

## 9.2. Other information

No additional information available

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

May react violently with oxidants. May react violently with acids.

### 10.2. Chemical stability

Stable under normal conditions.

### 10.3. Possibility of hazardous reactions

No polymerization.

### 10.4. Conditions to avoid

Direct sunlight. heat. Open flame. Sparks. Incompatible materials.

### 10.5. Incompatible materials

oxidizing agents. Strong acid.

### 10.6. Hazardous decomposition products

Decomposition may form toxic and explosive gases. Carbon oxides (CO, CO<sub>2</sub>).

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

Acute toxicity : Not classified  
(Based on available data, the classification criteria are not met)

MTBE (tert-butyl methyl ether) ( f )1634-04-4	
LD50 dermal rat	> 2000 mg/kg
LD50 dermal rabbit	> 10000 mg/kg
LC50 inhalation rat (ppm)	85 ppm/4h Approximately
ATE US (gases)	85.000 ppmv/4h

Skin corrosion/irritation	: Causes skin irritation. pH: not applicable
Serious eye damage/irritation	: Not classified (Based on available data, the classification criteria are not met) pH: not applicable
Respiratory or skin sensitisation	: Not classified (Based on available data, the classification criteria are not met)
Germ cell mutagenicity	: Not classified (Based on available data, the classification criteria are not met)
Carcinogenicity	: Not classified (Based on available data, the classification criteria are not met)
Reproductive toxicity	: Not classified (Based on available data, the classification criteria are not met)
Specific target organ toxicity (single exposure)	: Not classified (Based on available data, the classification criteria are not met)

Specific target organ toxicity (repeated exposure)	: Not classified (Based on available data, the classification criteria are not met)
Aspiration hazard	: May be fatal if swallowed and enters airways.
Potential Adverse human health effects and symptoms	: Causes skin irritation. May cause respiratory irritation. May cause minor eye irritation. Central nervous system depression. Prolonged/repetitive skin contact may cause skin defatting or dermatitis.
Symptoms/injuries after inhalation	: May cause irritation to the respiratory tract. Excessive concentrations may cause nervous system depression, headache, and weakness leading to unconsciousness.
Symptoms/injuries after skin contact	: Irritating to skin. Absorbed through the skin.
Symptoms/injuries after eye contact	: redness, itching, tears.
Symptoms/injuries after ingestion	: May be fatal if swallowed and enters airways. May cause gastric irritation. Depression of the central nervous system, headaches, dizziness, drowsiness, loss of coordination.
Chronic symptoms	: Excessive concentrations may cause nervous system depression, headache, and weakness leading to unconsciousness. Prolonged/repetitive skin contact may cause skin defatting or dermatitis.

## SECTION 12: Ecological information

### 12.1. Toxicity

Ecology - air	: Contributes to the formation of photochemical smog by degradation in the atmosphere through photochemical reactions to form photochemical oxidants and interfering with the photochemical cycle of nitrogen oxides.
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MTBE (tert-butyl methyl ether) (1634-04-4)	
LC50 fish 2	574 mg/l 96h Menidia beryllina
ErC50 (algae)	491 mg/l 96h Psuedokirchneriella subcapitata

### 12.2. Persistence and degradability

MTBE (tert-butyl methyl ether) (1634-04-4)	
Persistence and degradability	Inherently biodegradable.

### 12.3. Bioaccumulative potential

MTBE (tert-butyl methyl ether) (1634-04-4)	
BCF fish 1	1.5
Log Pow	1.06 Log Kow
Bioaccumulative potential	Low bioaccumulation potential.

### 12.4. Mobility in soil

MTBE (tert-butyl methyl ether) (1634-04-4)	
Ecology - soil	Very mobile.

### 12.5. Other adverse effects

Effect on ozone layer	:
Effect on the global warming	: No additional information available

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

Waste disposal recommendations	: Disposal through controlled incineration or authorised waste dump. Consult the appropriate local waste disposal expert about waste disposal.
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## SECTION 14: Transport information

### Classification for LAND transport: DOT

UN Number	: UN2398
Proper Shipping Name	: Methyl tert-butyl ether
Class	: 3 – Flammable liquid
Packing group	: II
Reportable quantity	: Not applicable



## Safety Data Sheet

According to the federal final rule of hazard communication revised on 2012 (HazCom 2012)

Product: MTBE (tert-butyl methyl ether)

Revision date: 05/Oct/2017 Version: 2.1

### Classification for SEA transport: IMO - IMDG

UN Number : UN2398  
Proper Shipping Name : METHYL tert-BUTYL ETHER  
Class : 3 - Flammable liquid  
Packing group : II  
Marine pollutant : Not considered marine pollutant based on available data

### Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code:

Product name : Methyl tert-butyl ether

### Classification for AIR transport: IATA - ICAO

UN Number : UN2398  
Proper Shipping Name : Methyl tert-butyl ether  
Class : 3  
Packing group : II

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product and it should not be considered exhaustive. Consult US DOT, IMDG and IATA regulations before transporting the product. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

## SECTION 15: Regulatory information

### 15.1. US Federal regulations

#### MTBE (tert-butyl methyl ether) (1634-04-4)

RQ (Reportable quantity, section 304 of EPA's List of Lists)	1000 lb
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#### tert-butyl methyl ether, MTBE, 2-methoxy-2-methylpropane (1634-04-4)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

### 15.2. International regulations

#### CANADA

#### tert-butyl methyl ether, MTBE, 2-methoxy-2-methylpropane (1634-04-4)

Listed on the Canadian DSL (Domestic Substances List)

WHMIS Classification	Class B Division 2 - Flammable Liquid Class D Division 2 Subdivision B - Toxic material causing other toxic effects
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#### EU-Regulations

#### tert-butyl methyl ether, MTBE, 2-methoxy-2-methylpropane (1634-04-4)

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

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

No additional information available

#### Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]

No additional information available

#### 15.2.2. National regulations

#### tert-butyl methyl ether, MTBE, 2-methoxy-2-methylpropane (1634-04-4)

Listed on the AICS (Australian Inventory of Chemical Substances)  
Listed on NZIoC (New Zealand Inventory of Chemicals)  
Listed on the Korean ECL (Existing Chemicals List)  
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory

### 15.3. US State regulations

No additional information available

## SECTION 16: Other information

Sources of Key data : SDS.



## Safety Data Sheet

According to the federal final rule of hazard communication revised on 2012 (HazCom 2012)

Product: MTBE (tert-butyl methyl ether)

Revision date: 05/Oct/2017 Version: 2.1

Abbreviations and acronyms

: CAS (Chemical Abstracts Service) number. CLP - Classification, Labelling and Packaging..  
SDS - Safety Data Sheet.

Full text of H-statements:

-----	Asp. Tox. 1	Aspiration hazard, Category 1
-----	Flam. Liq. 2	Flammable liquids Category 2
-----	Skin Irrit. 2	Skin corrosion/irritation Category 2
-----	H225	Highly flammable liquid and vapour
-----	H304	May be fatal if swallowed and enters airways
-----	H315	Causes skin irritation

Braskem - SDS US

*This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product. It warns that the handling of any chemical substance requires the previous knowledge of its hazards for the user. It is up to the user of the product company providing this SDS to and promote the training of its employees about possible risks come upon of the product. The information contained herein is not absolute, but only general information on the use of the chemical and indication of safety and security measures.*