

SDS of Methyl Tertiary Butyl Ether (MTBE)

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1. Identification of the substance and of the supplier

1.1 Trade Name : METHYL-TERT-BUTYLEETHER
1.2 Molecular Formula : $(\text{CH}_3)_3\text{COCH}_3$
1.3 Manufacturer /Import : Bangkok synthetics Company Limited
1.4 Address : 5, I-7 Rd. Maptaphut Industrial Estate, Muang District, Rayong 21150
Phone number : (+66) 3869 8698
Fax : (+66) 3869 8699

Emergency Phone number : (+66) 3869 8601 (Mutual Aid Coordinator Center)

1.5 Relevant identified uses of the substance or mixture and uses advised against : Keep away from heat, sparks and no smoking.

1.6 Identified uses : To sell and used as a additive for unleaded gasolines to improve combustion.

2. Hazards Identification

2.1 Classification of the mixture according to Globally Harmonized System (GHS) standards (GHS hazard statements and category)

Physical Hazard :

Flammable liquid Category 2

Health Hazard :

Skin corrosion/irritation Category 2

Environmental Hazard :

Not available

Others hazard :

Not available

2.2 GHS label elements

Hazard Pictogram :



Signal Word :

Danger

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Hazard Statement :

H225 Highly Flammable liquid and vapor

H315 Causes skin irritation

Precautionary Statement :

P210 Keep away from heat, hot surface, sparks, open flames and other ignition sources. No smoking.

P233 Keep container tightly closed.

P240 Ground/bond container and receiving equipment.

P241 Use explosion-proof equipment.

P242 Use only non-sparking tools.

P243 Take precautionary measures against static discharge.

P264 Wash hands 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 [or shower].

P332+P317 If skin irritation occurs: Get medical help.

P362+P364 Take off contaminated clothing and wash it before reuse.

P403+P235 Store in a well-ventilated place. Keep cool.

2.3 There hazards which do not result in classification : Not available

3. Composition/ Information on Ingredients

- 3.1 Chemical type (Substance/Mixture) :** Substance
- 3.2 Chemical identity :** METHYL-TERT-BUTYL ETHER
- 3.3 Common name and synonym :** Tert-Butyl-Methylether 2, 2-Methoxy-2-methyl propane,
Methyl-1, 1-dimethylethyl ether
- 3.4 CAS number :** 1634-04-4
- 3.5 EC number :** 216-653-1
- 3.6 Impurities and stabilizing additives :** Not available

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3.7 Ingredient :

Substances	CAS No.	EC No.	% by weight
METHYL-TERT-BUTYLETHER	1634-04-4	216-653-1	98%
Methyl sec-butylether	6795-87-5	-	0.2-0.7%
Tert-butyl alcohol	75-65-0	200-889-7	0.1-0.3%
Diisobutylene	25167-70-8	246-690-9	0.001-0.6%
Methanol	67-56-1	200-659-6	0.1-0.6%
Water	-	-	0.001-0.05%
Other	-	-	0.001-0.5%

4. First Aid Measures

4.1 Description of first aid measures

Skin : Rinse skin with water/shower for at least 15 minutes while take off Immediately all contaminated clothing.

Eyes : Rinse cautiously with water for at least 15 minutes. Immediately call Poison Center or Physician

Inhalation : Remove victim for fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Immediately call Poison Center or Physician.

Ingestion : Rinse mouth. Give a slurry of activated charcoal in water to drink. Do NOT induce vomiting. Refer for medical attention.

4.2 Most important symptoms and effects, both acute and delayed

Potential acute health effects : The substance is irritating to the skin. If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. Exposure far above the OEL could cause lowering of consciousness.

Potential Chronic health effects : High concentrations of MTBE vapor resulted in mild signs of liver and kidney damage.

4.3 Indication of any immediate medical attention and special treatment needed Notes to :

Not available

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5. Fire Fighting Measures

5.1 Extinguishing Media

Suitable Extinguishing Media : Use water spray, alcohol-resistant foam, dry chemical or Carbon Dioxide.

Unsuitable Extinguishing Media : Not available

5.2 Special Exposure Hazards :

Hazards from the Substance or Mixture :

- **HIGHLY FLAMMABLE:** Will be easily ignited by heat, sparks or flames.
- Vapors may form explosive mixtures with air.
- Vapors may travel to source of ignition and flash back.
- Most vapors are heavier than air. They will spread along the ground and collect in low or confined areas (sewers, basements, tanks, etc.).
- Runoff to sewer may create fire or explosion hazard.
- Containers may explode when heated.

Hazardous De-Combustion Products : Toxic carbon monoxide may be given off during combustion

5.3 Advice for Firefighters

Special Fire-Fighting Procedures :

- Water spray, fog or alcohol-resistant foam.
- Avoid aiming straight or solid streams directly onto the product.
- If it can be done safely, move undamaged containers away from the area around the fire.
- Fight fire from maximum distance or use unmanned master stream devices or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- **ALWAYS** stay away from tanks in direct contact with flames.
- For massive fire, use unmanned master stream devices or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

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Special Protective Equipment for Firefighters : In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

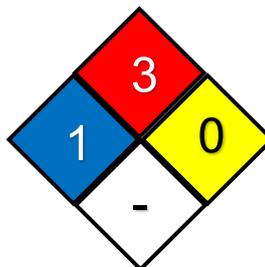
5.4 NFPA 704 Diamond

Health hazard (Blue) : 1

Fire hazard (Red) : 3

Reactivity (Yellow) : 0

Specific hazard (White) : -



5.5 Fire and explosion protection : Not available

6. Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures :

- Wear personal protective equipment (PPE)
- Evacuate personnel to safe areas.
- Avoid breathing vapors, mist or gas.
- ELIMINATE all ignition sources (no smoking, flares, sparks or flames) from immediate area.
- All equipment used when handling the product must be grounded.
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.

6.2 Environmental precautions : Do not allow to enter water courses/sewers or soil. Avoid penetration into drainage system/Underground voids due to danger of explosion.

6.3 Methods and materials for containment and cleaning up :

- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- Use clean, non-sparking tools to collect absorbed material.
- Dike far ahead of liquid spill for later disposal.
- Water spray may reduce vapor, but may not prevent ignition in closed spaces.

6.4 Spill Management : Incinerate or dispose of in a landfill.

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7. Handling and Storage

7.1 Precautions for safe handling :

- Keep container tightly closed when not in use.
- Extinguish all ignition sources.
- Wear recommended personal protective equipment.
- Ground/bond container and receiving equipment.
- All electrical equipment should be grounded and conform to applicable electric codes and regulatory requirements.
- Check atmosphere for explosiveness and oxygen deficiencies.
- Ensure adequate ventilation.
- Observe precautions pertaining to confined space entry.
- Use only non-sparking tools.
- Carefully vent any internal pressure before removing closure.
- Isolate, vent, drain, wash and purge systems or equipment before maintenance or repair.
- Handle empty containers with care; vapor/residue may be flammable.
- Avoid contact with incompatible agents.
- Keep away from sources of ignition - No smoking.
- Take measures to prevent the build up of electrostatic charge.

7.2 Conditions for safe storage, including any incompatibilities :

Requirements for storage areas and containers :

- Store only in tightly closed, properly vented containers away from heat, sparks, open flame and
- strong oxidizing agents.
- Carbon steel; avoid most plastics, Viton and Flourel.
- Store closed drums with bung in up position.
- Vapor space above stored liquid may be flammable/explosive unless blanketed with inert gas.
- Store in a well-ventilated place.
- Electrical installations / working materials must comply with the technological safety standards.
- No smoking.

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- Store in cool place.
- Do not pressurize, cut, weld, braze solder, drill, or grind on containers.
- Do not puncture or incinerate containers.
- Empty pressure vessels should be returned to the supplier.

Container Advice :

- Carbon steel; avoid most plastics, Viton and Flourel.

8. Exposure Controls/ Personal Protection

8.1 Control parameters

TLV-TWA (ACGIH) : 50 ppm

8.2 Personal protective equipment

Respirators : In the case of dusts/vapors/aerosols being formed, especially in excess of the occupational exposure limits, respiratory equipment with a suitable filter (may be specified for the particular exposure situation) or self-contained breathing apparatus may be necessary.

Skin : Chemical-resistant protective gloves (may be specified for the particular exposure situation) should be worn, such as nitrile or polyvinyl alcohol. Also, depending on conditions, apron, boots, head and face protection should be worn.

Eyes : Face shield and safety glasses. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

Other Protection : Impervious clothing. Flame retardant antistatic protective clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

8.3 Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

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9. Physical and chemical properties

9.1 General information Appearance

Physical State : Liquid

Color : Colorless

9.2 Odor : Terpene like

9.3 Odor threshold limit : Not available

9.4 pH : Not available

9.5 Melting point : -108 °C (-162.4 °F)

9.6 Freezing point : -108 °C (-162.4 °F)

9.7 Boiling point : 65.5 °C (131 °F)

9.8 Flash point : -28 °C (Closed cup)

9.9 Evaporation rate : Not available

9.10 Flammability (solid, gas) : Flammable liquids

9.11 Lower Flammability/Explosive limits (LFL/LEL) : 1.5%

9.12 Upper Flammability/Explosive limits (UFL/UEL) : 8.5%

9.13 Vapor pressure : 27 kPa (20°C)

9.14 Vapor density : 3

9.15 Relative density : 0.74 (20°C)

9.16 Solubility : 42 g/l at 20 °C in water, Easily Soluble in ethyl alcohol, ether, mixing with organic solvents.

9.17 Partition coefficient : n-octanol/water : 1.06

9.18 Auto-ignition temperature : 375 °C

9.19 Decomposition temperature : > 200 °C

9.20 Viscosity : 0.56 mPa.s (20 °C)

9.21 Molecular Weight : 88.15 g/mol

9.22 Specific gravity : Not available

9.23 Surface Tension : Not available

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10. Stability and reactivity

10.1 Reactivity : It's a reactive substance. Risk of ignition. Vapors may form explosive mixtures with air.

10.2 Chemical stability : Stable under normal storage conditions.

10.3 Possibility of hazardous reactions : React with strong oxidizing agent. Polymerization under heat.

10.4 Condition to avoid : Heat, sparks, open flame, other ignition sources, and oxidizing conditions.

10.5 Incompatible materials : Oxidizing agents, Strong acids, Strong base

10.6 Hazardous decomposition products : Explosive peroxides, CO, CO₂, formic acid, butyl formate, methyl radicals, acetone.

11. Toxicological information

11.1 Information on toxicological effects

Skin : Moderately irritating

Eyes : Slightly irritating

Inhalation : Inhalation of high vapor concentrations can cause CNS-depression and narcosis

Ingestion : Abdominal pain. Nausea. Vomiting.

11.2 Potential Chronic health effects :

Chronic Effects : Affects the hepatic, urinary, ocular

11.3 Routes of Entry : Inhalation, Ingestion

11.4 Acute toxicity

11.4.1 LD50

Oral (mg/kg) : LD50 (Mouse-Oral): 5960 uL/kg

LD50 (Rat-Oral): 4 gm/kg

Dermal (mg/kg) : LD50 (Mouse-Intraperitoneal): 1,700 uL/kg

11.4.2 LC50

Inhalation (ppm, mg/m³) : LC50 (Rat-Inhalation): 23,576 ppm/4hrs

LC50 (Mouse-Inhalation): 141 gm/m³/15min

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11.5 Carcinogenicity/Germ cell mutagenicity (GHS or IARC) :

- IARC : Group 2B; Probably carcinogenic to humans
- ACGIH : Group A3; Confirmed animal carcinogen with unknown relevance to humans.

12. Ecological Information

12.1 Eco-Toxicity :

- LC 50 fishes > 110 mg/l 96 hours ; Very low toxicity.
- LC50; Species: Nitocra spinipes (Harpacticoid copepod); Conditions: saltwater, static, salinity 7 ppt; Concentration: >1000000 ug/L for 96 hr /formulation/
- LC50; Species: Alburnus alburnus (Bleak); Conditions: saltwater, static, salinity 7 ppt; Concentration: >1000000 ug/L for 96 hr /formulation/

12.2 Persistence and Degradability : Photodegradation half-life (Direct Photolysis) 3-6 day.

12.3 Bioaccumulative potential : This material is not expected to bio-accumulate.

12.4 Mobility in soil : Do not allow to enter into soil/subsoil. If product enters soil, it will be mobile and may contaminate ground water.

12.5 Other adverse effects : Affect ozone layer

13. Disposal considerations

13.1 Waste and safe handling information :

- Contaminated product, soil or water may be hazardous waste due to potentially low flash point.
- Dispose of in compliance with respective national and local regulations.
- Assure effluent complies with applicable regulations.
- Landfill solids at permitted sites.
- Use registered transporters.
- Burn concentrated liquids in systems designed for low flash point material.
- Avoid flame-outs.
- Assure emissions comply with applicable regulations.
- Avoid overloading/poisoning plant biomass.
- Dilute aqueous waste may biodegrade.

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13.2 Waste treatment methods : Disposal of waste containing MTBE needs to be in accordance with the relevant regulations, for example advise may include :

- Dispose of to suitable waste incineration plant.
- When handling waste containing MTBE, the hazards need to be assessed and the necessary precautions applied to prevent exposure and environmental emissions.

13.3 Contaminated containers/Packages : Not available

14. Transport information

14.1 UN number : UN 2398
14.2 UN proper shipping name : METHYL TERT-BUTYL ETHER
14.3 Transport hazard class : 3
14.4 Packing group : II
14.5 Marine pollutant : Not available
14.6 Transport in bulk according to annex II of MARPOL73/78 and the ICB code : Not available
14.7 Special precautions : Not available
14.8 Further information : Not available



15. Regulatory Information

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

15.1.1 Thailand Regulation

Ministry of Labour : Department of Labour Protection and Welfare Announcement
on the List of Hazardous Chemicals (December 20, 2013)

Ministry of Industry : Not available

Ministry of Public Health : Not available

Ministry of Natural Resources and Environment : Not available

Ministry of Transport : Not available

Further information : Not available

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15.1.2 Federal and State Regulations (Foreign country) :

OSHA : Material is not listed in appendix A of 29 CFR 1910.119 as highly hazardous chemical.

TSCA : Material is not listed

EU REACH (EC Regulation 1907/2006)

Restrictions relating to the product or contained substances pursuant to Annex XVII to EC Regulation 1907/2006 : Material is not listed

Substances in Candidate List (Art. 59 REACH) : Material is not listed

Substances subject to authorization (Annex XIV REACH) : Material is not listed

16. Other information

16.1 Manufacturer's Recommendation : Users of the chemical shall conduct a comprehensive risk assessment of all production processes or activities involving the substance to identify and control potential hazards to personnel, property, and the environment. Appropriate preventive and control measures shall be implemented and maintained throughout all stages of handling, including transportation, storage, use, and final disposal.

16.2 References :

1. MSDS of Cornell University
2. <http://www.pcd.go.th>.
3. <http://www.ilo.org>.
4. http://www.soils.wisc.edu/virtual_museum/mtbe/mtbe.wrl
5. <http://msds.pcd.go.th/searchName.asp?vID=164>
6. <http://ull.chemistry.uakron.edu/erd/Compatibility.html>
7. MSDS Sheet Search from Scott Specialty Gases.html
8. <https://pubchem.ncbi.nlm.nih.gov/compound/15413>
9. <https://www.erg4thai.com/web/#/guide/search/1520>
10. <https://cameochemicals.noaa.gov/chemical/7091>
11. <https://echa.europa.eu/registration-dossier/-/registered-dossier/15543/9>

16.3 Key or legend to abbreviations and acronyms used in the safety data sheet :

ACGIH : American Conference of Government Industrial Hygienists

NFPA : National Fire Protection Agency

NIOSH : National Institute for Occupational Safety & Health

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OSHA : Occupational Safety & Health Administration

IARC : International Agency for Research on Cancer

LD50 : Lethal Dose 50%

CNS : Central Nervous System NTP National Toxicology Program

EC50 : Effective Concentration NOAEL No Observable Adverse Effect Level

EC50 : Effective Concentration 50% NOEC No Observed Effect Concentration

PEL : Permissible Exposure Limit

STEL : Short-term Exposure Limit

TLV : Threshold Limit Value

TWA : Time Weighted Average

16.4 Further information : Protect containers from physical damage. Do not damage containers or labels.