1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Trade Name: MTBE

Chemical Name : METHYL-TERT-BUTYLETHER

Synonyms : Tert-Butyl-Methylether 2, 2-Methoxy-2-methyl propane, Methyl-1, 1-dimethylethyl ether

Molecular Formula : $(CH_3)_3COCH_3$

1.2 Use : gasoline blending component.

1.3 Max. Quantity Storage : 3,000 ton

1.4 Manufacturer/Import : Bangkok synthetics Company Limited

1.5 Address : 5, I-7 Rd. Maptaphut Industrial Estate, Muang District, Rayong 21150

Tel. : 0-3869-8698 **Fax. :** 0-3869-8690

2. HAZARD IDENTIFICATION

2.1 Classification of Substance or Mixture :

Physical Hazard : Highly Flammable (Category 2)

Human Health Hazards :

Acute toxicity (Oral)	Category 5
Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2B
Carcinogenicity	Category 2
Specific target organ toxicity - Single exposure	Category 3(drowsiness and dizziness, respiratory irritation)
Aspiration hazard	Category 1

Environment Hazards : Not Classified

2.2 Label Elements :

1) <u>Hazard Symbol or Symbol</u> :

2.) Signal Word : Danger

3) Hazards Statement :

Highly flammable liquid and vapour

May be harmful if swallowed

Causes skin irritation

Causes eye irritation

Suspected of causing cancer

May be fatal if swallowed and enters airways

May cause respiratory irritation May cause drowsiness or dizziness

4) Precautionary Statements

Prevention:

Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Keep away from heat/sparks/open flames/hot surfaces. No smoking.

Ground/bond container and receiving equipment.

Use explosion-proof electrical/ventilating/lighting/equipment.

Use only non-sparking tools.

Take precautionary measures against static discharge.

Avoid breathing mist/vapours/spray.

Wash hands thoroughly after handling.

Use only outdoors or in a well-ventilated area.

Wear protective gloves/protective clothing/eye protection/face protection.

Use ventilation system or personal protective equipment as required.

Response:

IF SWALLOWED: Rinse mouth. Immediately call a POISON CENTER or doctor/physician.

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/physician.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.

If skin irritation occurs: Get medical advice/attention.

If eye irritation persists: Get medical advice/attention.

Take off contaminated clothing and wash before reuse.

In case of fire: Use appropriate extinction.

Storage:

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

Disposal:

Dispose of contents/container in accordance with local/regional/ national/international regulations.

2.3 Effect of Short-term Overexposure : : Irrating to skin, eye and respiration

2.4 Effect of Long-term Overexposure : High concentrations of MTBE vapor resulted in mild signs of liver and kidney damage

2.5 TLV.-TWA. : 50 ppm (ACGIH)

3.COMPOSITION/INFORMATION ON INGREDIENTS

Trade Name : MTBE

Synonyms : Tert-Butyl-Methylether 2, 2-Methoxy-2-methyl propane, Methyl-1, 1-dimethylethyl ether

Chemical Name	Concentration	CAS.No.
METHYL-TERT-BUTYLETHER	98 %	1634-04-4
Methyl sec-butylether	0.2-0.7%	6795-87-5
Tert-butyl alcohol	0.1-0.3%	75-65-0
Diisobutylene	0.001-0.6%	25167-70-8
Methanol	0.1-0.6%	67-56-1
Water	0.001-0.05%	Not data available
Other	0.001-0.5%	Not data available

4. First - aid measures

4.1Description of first aid measures

Skin : Take off Immediately all contaminated clothing . Rinse skin with water/shower .

Eye : Rinse cautiously with water for several minutes. Immediately call Poison Center or Physician

Inhalation : Remove victim for fresh air and keep at rest in a position comfortable for breathing. Immediately call Poison Center or Physician .

Ingestion : Rinse mouth.Immediately call Poison Center or Physician.

4.2 Potential acute health effects : : Irrating to skin, eye and respiration

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

Carcinogenicity : Group A2 (Not Classifiable as a human Carcinogen) ; defined by IARC

4.4 Notes to physician : No specific treatment . Treat symptomatically.

5. FIRE FIGHTING MEASURES

5.1 5.1 Extinguishing media

Suitable Extinguishing media : Dry Chemical Powder, CO_2, Water Spray, and Foam

Unsuitable Extinguishing media : None known

5.2 Special Hazards arising from the substance or mixture

Hazards from the substance or mixture : Highly Flammable. A warming may also be given indicated in MTBE can form explosive mixtures with air.

Hazardous de-combustion products : Toxic carbon monoxide may be given off during combustion

5.3 Advice for Firefighters

Special precautions for fire fighter : Remove source of ignition. Use water spray to keep fire-exposed containers cool and reduce vapor spread.

Special protective equipment for fire-fighters : 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 Flash Point : -28 $^{\circ}$C (Closed cup)

5.5 Explosion Limits :

- LEL% : 1.5 - UEL% : 8.5

5.6 Auto ignition Temperature : 375°C

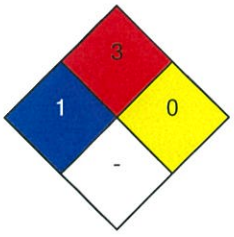
5.7 NFPA Hazard Classification:

5.6.1 Health Hazard: Level 2

5.6.2 Flammable: Level 3

5.6.3 Reactivity: Level 0

5.6.4 Special data: -



6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precaution :

- Avoid contact with skin and eyes , wear personal protective equipment
- Evacuate people upwind from the spill area
- keep away from sources of ignition – no smoking
- Vapor heavier than air – Prevent vapour accumulating in ground hollow and confined spaces
- Ensure adequate ventilation.

Protective equipment and emergency procedure :

- Wear suitable protective clothing , gloves , Organic Filter Respirator and eye/face protection .

In case of fire: Wear self contained breathing apparatus

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 Method and materials for containment and cleaning up.

Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13) Keep away from heat/sparks /open flames/ hot surfaces . - No smoking.

7. Handling and Storage

7.1 Precaution for safe handling :

- keep away from heat / spark / open flame / hot surface . No smoking.
- Ground/bond container and receiver equipment.
- Use explosion – proof electrical / lighting / ventilating equipment.
- Use only no-sparking tools.
- Avoid breathing mist / vapour / spray.
- Avoid source of ignition such as static discharge.

7.2 Condition for safe storage , including any incompatibilities

Technical measures : Should be taken to prevent product spills into drain or ground water.

Incompatible materials : Most plastic , Viton and fluorel.

Storage area : Store in a well ventilated place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control Parameter

Exposure limit value :

ACGIH (2012) ; TLV-TWA 50 ppm

OSHA ; Not data available

Thailand Regulation ; Not data available

8.2 Engineer Exposure Control

- keep away from heat / spark / open flame / hot surface . No smoking.
- Ground/bond container and receiver equipment.
- Use explosion – proof electrical / lighting / ventilating equipment.
- Use only no-sparking tools.
- Avoid breathing mist / vapour / spray.
- Avoid source of ignition such as static discharge.

8.3 personal protection measure

Respiratory protection :

In the case of dusts/vapours/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.

Protective Gloves / 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.

Eye Protection :

Closed Goggles Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 General information Appearance

Physical State : Liquid

Colour : Colourless

Odour : terpene like

9.2 Odour treshold limit : no data

9.3 pH : Not data available

9.4 Melting Point / Freezing point : -108 oC

9.5 Initial boiling point and boiling range : 55 oC (Boiling point)

9.6 Flash point : Closed cup : -28 °C (Closed cup)

9.7 Evaporation Rate (Butyl acetate=1) : Not data available

9.8 Flammability (Solid/Gas): Liquid

9.9 Upper Flammability/Explosive limits : 8.5

Lower Flammability/Explosive limits : 1.5

9.10 Vapor Pressure : 27 kPa(at 20°C),

9.11 Vapor density : 3

9.12 Relative vapour density: 0.7

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

9.14 partition Coefficien : n-octanol / water : 1.06

9.15 Auto ignition temperature : 375°C

9.16 Decomposition temperature : above 200 oC

9.17 Viscosity: 0.36 mPa.s (20 oC)

9.18 Molecular Weight : 32.04

9.19 Specific Gravity (Air=1) : : Not data available

10. STABILITY AND REACTIVITY

10.1 Reactivity : React with strong oxidizing agent

10.2 Stability: Flamable liquid , polymerization in strong acid.

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

10.4 Conditions to Avoid : Heat,

10.5 Incompatible material: Strong oxidizing reagents.

10.6 Hazardous Decomposition Products : Toxic carbon monoxide, carbon dioxide,

11. TOXICOLOGICAL INFORMATION

11.1 Potential acute health effects

Skin : Moderately irritating

Eye Slightly irritating

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

Ingestion : may be harmful if swallowed.

11.2 Potential Chronic health effects.

Chronic effects :

Mutagenicity assessment: Not classified as mutagenic

Reproduction toxicity: Not classified as a reproductive toxicant

Repeated dose toxicity :

Repeated exposures of rodents to high levels of MTBE results in effects in both liver and kidney. The 'no observed adverse effect level' derived from these studies is higher than foreseeable human exposures.

Carcinogenicity :

It was classified into the group 3 in IARC (Unclassifiable as to Carcinogenicity in Humans) but it was classified into A3 in ACGIH (Confirmed animal carcinogen with unknown relevance to humans)

11.3 Acute Toxicity Level :.

Acute oral toxicity : LD 50 (Oral, rat) 3.87 mg/Kg

Acute dermal toxicity : LD 50 (Dermal, rabbit) >10 mg/kg

Acute inhalation toxicity : LC50 (Rat) = 85-120 mg / l /4 hr

11.4 NIOSH (1997) : IDLH = Not data available

12. ECOLOGICAL INFORMATION

12.1 Toxicity:

Ecology - general : Product is easily volatile

LC 50 fishes > 500 mg /l 96 hours ; Very low toxicity.

EC 50 Daphnia > 340 mg /l 48 hours ; Very low toxicity.

NOEC (acute) : Not data available

NOEC (chronic) : Not data available

ErC 50 (algae) > 800 mg/l 72 hours ; Very low toxicity.

ErC 50 (other aquatic plants) : Not data available

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 effect : No data available

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13. DISPOSAL CONSIDERATIONS

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

o Dispose of to suitable waste incineration plant.

o When handling waste containing MTBE, the hazards need to be assessed and the necessary precautions applied to prevent exposure and environmental emissions.

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14. TRANSPORT INFORMATION

14.1 UN No. : 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 pollutants : 3 - Flammable liquids

14.6 Transport in bulk according to annex II of MARPOL73/78 and the ICB code : Not available

14.7 Special precautions for user/Additional information :

15. REGULATORY INFORMATION

15.1 Thailand Regulation

- No data available.

15.2 CLP Regulation : Labelling according to EU Regulations: Statutory basis/list According to Directive 67/548/EEC

Symbol(s): F Highly flammable
Xi Irritant

R-phrase(s): R11 Highly flammable
R38 Irritating to skin

S-phrase(s): S9 Keep container in a well ventilated space
S16 Keep away from sources of ignition –No smoking
S24 Avoid contact with skin

15.3 REACH Regulation : Material is listed in Annex XVII

15.4 TSCA : Material is listed in TSCA inventory

16. OTHER INFORMATION

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

OSHA : Occupational Safety & Health Administration

IARC : International Agency for Research on Cancer

SARA : Superfund Amendments and Reauthorization Act.

GHS : Globally Harmonized System

TSCA : Toxic Substance Control Act

WHMIS : Workplace Hazardous Materials Information System

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

Remark

Additional Information Available from

Name: Bangkok Synthetics Company Limited

Address: 5, I-7 Road. Maptaphut Industrial Estate, Muang District, Rayong 21150

Tel.: 038-698698 Fax.: 038-698690