

# Safety Data Sheet



## 1. Identification of the Substance/Mixture and the Supplier

Supplier : National Institute of Advanced Industrial Science and Technology (AIST)  
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 Emergency Contact : Same as above

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 ID Number : 4058001

Identity of Substance/Mixture : Certified reference material: NMIJ CRM 4058-a  
*tert*-butyl methyl ether(MTBE)  
 Recommended Use of the Chemical and Restriction on Use : This reference material can be used for calibration of analysis equipment as well as quality control of equipment and validation of analysis method/equipment. Do not use this reference material for other purposes than testing/research.  
 This CRM is a reference material (specified in the Japanese Industrial Standard (JIS) Q 0030).

## 2. Hazards Identification

GHS Classification: Flammable liquid : Hazard Category 2  
 Acute toxicity (Oral) : Hazard Category 5  
 Skin corrosion/irritation : Hazard Category 2  
 Serious eye damage/ Eye irritation : Hazard Category 2B  
 Carcinogenicity : Hazard Category 2  
 Specific target organ toxicity/Systemic toxicity (Single exposure) : Hazard Category 3 (Airway irritation, Narcotic effects)  
 Aspiration Toxicity to Respiratory Organ : Hazard Category 1

GHS Label Element:



Signal Word: Danger  
 Hazards Statement: Highly flammable liquid and vapor  
 May be harmful if swallowed  
 Skin irritation  
 Eye irritation  
 Suspected of causing cancer

Other Hazards

Statement:

Precautionary

Statement:

May cause respiratory irritation  
May cause drowsiness or dizziness  
May be fatal if swallowed and enters airways

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[Precaution]

Obtain special instruction before use.  
Do not handle until all safety precautions have been read and understood.  
Keep away from ignition sources such as heat/sparks/open flames/hot surfaces. – No smoking.  
Ground container and receiving equipment.  
Use explosion-proof electrical/ventilating/lighting equipment.  
Use only non-sparking tools.  
Take precautionary measures against static discharge.  
Do not breathe mist/vapors/spray.  
Wash hands thoroughly after handling.  
Use only outdoors or in a well-ventilated area.  
Wear protective gloves/protective clothing/eye protector/face protection.  
Use necessary ventilation system/personal protective equipment.

[Action]

If swallowed: Rinse mouth. Get medical advice/attention immediately.  
If on skin (or hair): Remove/Take off all immediately contaminated clothing. Rinse skin with water/shower.  
If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical advice/attention immediately.  
If in eyes: Rinse cautiously with clean water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention immediately.  
If skin irritation occurs: Get medical advice/attention. Monitor victim over time.  
If eye irritation persists: Get medical advice/attention. Monitor victim over time.  
Remove/Take off contaminated clothing and wash before reuse.  
In case of fire, use appropriate extinguishing method.

[Storage]

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

[Disposal]

Comply with applicable legislation and local government ordinance. Entrust disposal of this reference material to a professional waste disposal company licensed by prefectural governor.

The other hazards than the above do not result in classification or are not classifiable.

### 3. Composition/Information on Ingredients

Substance or mixture	: Substance
Chemical name	: <i>tert</i> -butyl methyl ether
Synonym	: 2-methoxy-2-methyl propane
Content	: 99 % or more

Chemical or structural formula :  $(\text{CH}_3)_3\text{COCH}_3$   
 Molecular weight : 88.15  
 Reference Number in Gazetted List in Japan : Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : (2)–3220  
 Industrial Safety and Health Act : 2-12-134  
 CAS Number : 1634-04-4  
 Hazardous Ingredient : *tert*-butyl methyl ether

#### 4. First-aid Measures

If in eyes : Rinse with clean water for at least 15 minutes first. Get medical advice/attention immediately.  
 If on skin : Wash with soap and plenty of water.  
 If symptoms occur: Get medical advice/attention as necessary.  
 If inhaled : Remove victim to fresh air and keep him/her warm and at rest.  
 Get medical advice/attention.  
 If swallowed : Rinse mouth thoroughly with water. Call a doctor/physician.  
 Expected Acute and Delayed Symptom : -  
 Most Critical : -  
 Characteristic and Symptom : -  
 Protection of First-Aid Responder : Use personal protective equipment.

#### 5. Fire-fighting Measures

Extinguishing Media : Dry chemical extinguisher, Foam extinguishing agent, Carbon dioxide, Sand  
 Fire-Specific Hazards : In case of fire, may emit irritating or toxic fume (or gas).  
 Specific Fire-Fighting Method : Eliminate ignition sources at the origin of a fire and put out fire by using extinguishing media. Remove movable containers promptly to a safe place. In the case of immovable containers, cool their surroundings with sprayed water.  
 Protection of Fire-Fighters : Carry out fire-fighting from the windward in order to avoid breathing hazardous gas. Use personal protective equipment such as fireproof clothing, heat-resistant clothing, protective clothing, compressed air open-circuit self-contained breathing apparatus, compressed oxygen closed-circuit self-contained breathing apparatus, rubber gloves and rubber boots.

#### 6. Accidental Release Measures

Personal Precaution : Remove potential ignition sources from the vicinity promptly.  
 Personal Protective Equipment and : Get fire-fighting kit ready to be prepared for ignition.  
 Ventilate the affected areas thoroughly, if it is in an indoor

Emergency Procedures	environment, until the clean-up operation is completed. Use appropriate personal protective equipment during the operation to avoid skin contact of splash etc. and inhalation of dust and gas.
Environmental Precautions	: Take precautions to prevent spillage from draining into rivers etc. to adversely impact the environment. Make it sure to appropriately treat contaminated wastewater in order to prevent untreated wastewater from being released into the surrounding environment.
Recovery and Neutralization	: Collect spillage in containers which can be tightly closed by getting it adsorbed to wiping cloth, rag or earth and sand, etc. Rinse away the remains with plenty of water.
Prevention of Secondary Disaster	: Mark the restricted area with rope etc. to keep out unauthorized people. Carry out the clean-up operation from the windward and make people on the leeward side evacuate.

## 7. Handling and Storage

### Handling

Engineering Precautions	: Strict ban on fire. Keep away from hot surfaces/sparks. Avoid contact with strong oxidizers.
Local and General Ventilation	: Keep container tightly closed and use local ventilation system if vapor/mist is generated.
Precautions for Safe Handling	: Avoid rough handling such as turning over, dropping, giving a shock to or dragging containers. Prevent spill, overflow and scattering, and avoid vapor generation. Keep container tightly closed after use. Wash hands, face etc. thoroughly and gargle after handling this reference material. Restrict drinking, eating and smoking to a designated area. Do not bring gloves and other contaminated personal protective equipment into staff room. Make a place handling this reference material a restricted area to keep out unauthorized people. Use appropriate personal protective equipment to avoid inhalation and contact with eyes, skin and clothing. Use local ventilation system in indoor handling area.

### Storage

Appropriate Storage Conditions	: Protect from sunlight. Store in tightly-closed container in a well-ventilated and cool place. Store locked up.
Incompatible Materials	: Do not store in the vicinity of strong oxidizers or ignition sources.
Safe Container	: Glass

Packaging Material

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## 8. Exposure Controls/Personal Protection

Threshold Limit Value

Not specified

Permissible Concentration

- ACGIH TLV-TWA : TWA 50 ppm
- Value recommended by Japan Society for Occupational Health : Not specified
- OSHA PEL TWA : Not specified

Engineering Controls

- Ventilation/Exhaust : Local ventilation system or General ventilation system
- Safety Control/  
Gas Detection : Measuring equipment, Detecting tube
- Storage Precaution : Ventilated along floor surface. Tightly closed. Keep away from combustible materials and strong oxidizers. Use explosion-proof equipment. Take precautionary measures against static discharge.

Personal Protective Equipment (PPE)

- Respiratory System : Gas mask for organic gases
- Hands : Impervious protective gloves
- Eyes : Eye protector with side plates (Goggle type or full face protection as necessary)
- Skin and Body : Work wear with long sleeves

Hygiene Controls

Replace adsorbents of masks etc. regularly or before use.

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## 9. Physical and Chemical Properties

- Appearance, etc. : Liquid
- Color : Colorless
- Odor : Slight irritating odor
- pH : No data
- Melting point : -109 °C
- Boiling point : 55.2 °C
- Flashing point : -28 °C
- Explosive range : No data
- Vapor pressure : 32.59 kPa (25 °C)
- Relative vapor density(Air=1) : 3.1 (Air= 1)
- Specific gravity or bulk specific gravity : 0.741 (20/4 °C)
- Solubility : Insoluble in water. Soluble in most organic solvents.
- *n*-Octanol/water partition : No data

coefficient (Log Po/w)

- Auto-ignition temperature : 460 °C

## 10. Stability and Reactivity

### ◇Stability

- Stable in alkaline and neutral conditions

### ◇Reactivity

- Get decomposed in dilute sulfuric acid to produce isobutylene. Get decomposed and polymerized in concentrated sulfuric acid to produce poly-isobutylene.

### ◇Conditions to Avoid

- Sunlight, Heat, Open flames, High temperature, Sparks, Static electricity, Other ignition sources

### ◇Hazardous Decomposition Products

- Carbon monoxide

## 11. Toxicological Information

Acute Toxicity	<p>Oral Rat LD50:4 g/kg          Oral Mouse LD50:5960 µl/kg          Inhalation Rat LC50:23576 ppm/4 hours          Inhalation Mouse LC50:141 g/m<sup>3</sup>/15 minutes          Intravenous Rat LC50:148 mg/kg          Abdominal cavity Mouse LD50:1700 µl/kg</p>
Skin Corrosion/ Irritation	In the test in which this reference material is applied to rabbit skin for four hours, moderate to severe edema and moderate erythema were observed.
Serious Eye Damage/ Eye Irritation	In the test in which this reference material is applied to rabbit eye, changes indicating eye irritation were observed and they disappeared within seven days.
Carcinogenicity	<p>Classified Group 3 by IARC but Group A3 by ACGIH.          Classified Hazard Category 2 in accordance with ACGIH which is more recent evaluation document.          IARC: Group 3 (Not classifiable as to carcinogenicity to humans)          ACGIH: A3 (Animal carcinogen)</p>
Specific Target Organ Toxicity/Systemic Toxicity (Single Exposure)	<p>In the inhalation exposure test using rats or mice, effects indicating airway irritation, such as drop of respiration rate, were observed. In the inhalation exposure test and the oral administration test using rats, symptoms indicating transient central nervous depression, such as ataxia, drop of activity and decrease in muscle tone, were observed.          Classified Hazard Category 3 (Airway irritation, Narcotic effects), based on these results.          For effects on humans, some people exposed to this reference material reported extremely mild symptoms such as feeling heavy-headed.</p>

Toxicity to Respiratory Organ (Aspiration)      When liquid form of this reference material swallowed, it may be aspirated to lungs to induce chemical pneumonia.

## 12. Ecological Information

Persistence and Degradability

- Not biodegradable
- 0 % by BOD

Bioaccumulative Potential

- No data available

Ecotoxicity

- No data available

## 13. Disposal Considerations

Residual Waste      : Dispose in accordance with applicable regional, national and local laws and regulations.

Contaminated Container and Package      : Dispose in accordance with applicable regional, national and local laws and regulations.

## 14. Transport Information

UN Number      : 2398

UN      : Class 3 (Flammable liquid)

Classification

Shipping Name      : Methyl tertiary-butyl ether

Packing Group      : PG II

ICAO/IATA      : Glass 3 Grade II

Marine      : Not applicable

Pollutant

Precautions      : Transport this reference material carefully while keeping it away from direct sunlight and fire and preventing accidental release due to falling, overturning, etc.

## 15. Regulatory Information

◇Fire Service Act

- Type 4 Hazardous Substance, Class 1 Petroleum (Water-insoluble), Danger Rating 2

◇Industrial Safety and Health Law

- Article 57-2 (Enforcement Order: Article 18) Hazardous substance whose name, etc. must be labeled.
- Article 57-2 (Enforcement Order: Article 18-2): Hazardous substances whose name, etc. must be notified No.580
- Appendix 4: Flammable Material

◇Ship Safety Law (Dangerous Goods Rule)

- Flammable Liquid (Dangerous Goods Rule: Article 3, Dangerous Goods Publication

Appendix 1)

- ◇Civil Aeronautics Act
  - Flammable Liquid (Enforcement Order: Article 194, Dangerous Goods Publication Appendix 1)
- ◇Act for the Prevention of Marine Pollution and Maritime Disasters
  - Enforcement Order Appendix 1 Hazardous Liquid Substance Class Z Substance
- ◇Air Pollution Control Act
  - Hazardous Air Pollutant

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## 16. Other Information

### Others

The information in this document is not intended to be exhaustive and is based on currently available information and data. The measures given in this document are applicable only to normal handling conditions. When handling this reference material under special conditions etc., it is recommended to take safety measures appropriate to each specific application and context of use. This document is intended to provide information and not intended to guarantee anything in handling this reference material.

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