



SIGMA-ALDRICH

Material Safety Data Sheet

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Version 1.40

Section 1 - Product and Company Information

Product Name	TERT-BUTYL METHYL ETHER, 99+%, A.C.S. REAGENT
Product Number	443808
Brand	Aldrich Chemical
Company	Sigma-Aldrich
Street Address	3050 Spruce Street
City, State, Zip, Country	SAINT LOUIS, MO 63103 US
Technical Phone:	314 771 5765
Fax:	800 325 5052
Emergency Phone:	414 273 3850 Ext. 5996

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
METHYL TERT BUTYL ETHER	1634-04-4	Yes
Formula	CSH12O	
Synonyms	tert-Butoxymethane, tert-Butyl methyl ether, 1,1-Dimethylethyl methyl ether, 2-Methoxy-2-methylpropane, Methyl tert-butyl ether (ACGIH), Methyl 1,1-dimethylethyl ether, Propane, 2-methoxy-2-methyl- (9CI)	

Section 3 - Hazards Identification

Emergency Overview
Flammable (USA) Highly Flammable (EU), Harmful
Irritating to eyes, respiratory system, and skin. Limited evidence of carcinogenic effect.
Possible Carcinogen (US), Target organ(s): Kidneys, Nerves.

HMIS Rating	Flammability: 3	Reactivity: 0
Health: 2*		
NFPA Rating	Flammability: 3	Reactivity: 0
Health: 2		

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

Oral Exposure
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

Inhalation Exposure
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

Dermal Exposure
In case of contact, immediately wash skin with soap and copious amounts of water.

Eye Exposure

In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measures

Flammable Hazards: Yes

Explosion Hazards

Vapor may travel considerable distance to source of ignition and flash back.
Container explosion may occur under fire conditions.
Forms explosive mixtures in air.

Flash Point: -27 °F -33 °C

Explosion Limits: Lower: 1.6 % Upper: 15.1 %

Autoignition Temp: 374 °C **Flammability:** Yes

Extinguishing Media

Suitable
Carbon dioxide, dry chemical powder, or appropriate foam.

Unsuitable

Water may be effective for cooling, but may not effect extinguishment.

Firefighting

Protective Equipment

Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Specific Hazard(s)

Flammable liquid.

Specific Method(s) of Fire Fighting

Use water spray to cool fire-exposed containers.

Section 6 - Accidental Release Measures

Procedure to be Followed in Case of Leak or Spill
Evacuate area. Shut off all sources of ignition.

Procedure(s) of Personal Precaution(s)

Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

Methods for Cleaning Up

Cover with an activated carbon adsorbent, take up and place in closed containers. Transport outdoors. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

Handling

User Exposure

Avoid breathing vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

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Storage

Suitable
Keep container closed. Keep away from heat, sparks, and open flame. Store in a cool dry place.

Section 8 - Exposure Controls / PPE

Engineering Controls

Safety shower and eye bath. Use nonsparking tools. Mechanical exhaust required.

Personal Protective Equipment

Respiratory

Government approved respirator.

Hand

Compatible chemical-resistant gloves.

Eye

Chemical safety goggles.

General Hygiene Measures

Wash thoroughly after handling. Wash contaminated clothing before reuse.

Exposure Limits, RTECS

Country	Source	Type	Value
USA	ACGIH	TWA	40 PPM

Section 9 - Physical/Chemical Properties

Appearance

Physical State

Liquid

Molecular Weight: 88.15 AMU

Property	Value	At Temperature or Pressure
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pH	N/A	
BP/MP Range	55 - 56 °C	760 mmHg
MP/MP Range	N/A	
Freezing Point	N/A	
Vapor Pressure	209.385 mmHg	20 °C
Vapor Density	3.1 g/l	
Saturated Vapor Conc.	N/A	
SG/Density	0.74 g/cm3	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatiles	100 %	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Partition Coefficient	Log Kow: 0.94	
Decomposition Temp.	N/A	
Flash Point °F	-27 °F	Method: closed cup
Flash Point °C	-33 °C	Method: closed cup
Explosion Limits	Lower: 1.6 % Upper: 15.1 %	
Flammability	N/A	
Autoignition Temp	374 °C	
Refractive Index	1.369	

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Solubility

Other Solvents: VERY SOLUBLE IN ETHANOL, ETHYL ETHER.

N/A = not available

Section 10 - Stability and Reactivity

Stability

Stable

Stable

Materials to Avoid

Oxidizing agents, Strong acids.

Hazardous Decomposition Products

Hazardous Decomposition Products

Carbon monoxide, Carbon dioxide.

Hazardous Polymerization

Will not occur.

Section 11 - Toxicological Information

Route of Exposure

Skin Contact

Causes skin irritation.

Skin Absorption

May be harmful if absorbed through the skin.

Eye Contact

Causes eye irritation.

Inhalation

May be harmful if inhaled. Vapor or mist is irritating to the mucous membranes and upper respiratory tract.

Ingestion

May be harmful if swallowed. Rapidly absorbed following oral exposure.

Target Organ(s) or System(s)

Kidneys. Central nervous system.

Signs and Symptoms of Exposure

Exposure can cause: Nausea. Vomiting. Dizziness. CNS depression. Aspiration or inhalation may cause chemical pneumonitis. MTBE (methyl-tert-butyl ether) is reported to metabolize to tert-butyl alcohol and formaldehyde by microsomal demethylation. According to an article in Toxicology and Industrial Health, volume 11, number 2, pages 119-149, 1995; MTBE (methyl-tert-butyl ether) should be considered a "potential human carcinogen" due to "an increase in Leydig interstitial cell tumors of testes in male rats" and an "increase in lymphomas, leukemias, and uterine sarcomas" in female rats. In another unpublished study MTBE was shown to be carcinogenic due to "increased incidence of a rare type of kidney tumor" in male rats and an "increase in the incidence of hepatocellular adenomas" in female mice. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

RTECS Number: KN5250000

Toxicity Data

Oral - Rat: 4,000 mg/kg (LD50)

Inhalation - Rat: 23,576 ppm (LC50)

Oral - Mouse: 5960 UL/KG (LD50)

Inhalation - Mouse: 141,000 mg/m3 (LC50)

Remarks: Behavioral/General anesthetic.

Intraperitoneal - Mouse: 1700 UL/KG (LD50)

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Irritation Data

Eyes - Rabbit:
Remarks: Mild irritation effect

Chronic Exposure Carcinogen

Result: This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

IARC Carcinogen List

Rating:
Group 3

ACGIH Carcinogen List

Rating:
A3

Chronic Exposure - Teratogen

Species	Dose	Route of Application	Exposure Time
Mouse	4000 PPM/6H	Inhalation	(6-15D PREG)

Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).
Specific Developmental Abnormalities: Musculoskeletal system.

Chronic Exposure - Reproductive Hazard

Species	Dose	Route of Application	Exposure Time
Rat	8000 PPM/6H	Inhalation	(MULTIGENERATION)

Result: Effects on Newborn: Viability index (e.g., # alive at day 4 per # born alive). Effects on Newborn: Growth statistics (e.g., reduced weight gain).

Species	Dose	Route of Application	Exposure Time
Mouse	6 GM/KG	Oral	(5D MALE)

Result: Paternal Effects: Testes, epididymis, sperm duct.

Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).
Specific Developmental Abnormalities: Craniofacial (including nose and tongue). Specific Developmental Abnormalities: Musculoskeletal system.

Section 12 - Ecological Information

Acute Ecotoxicity Tests

Test Type	Value
LC50 Fish	
Species	Pimephales promelas (Fathead minnow)
Time:	96.0 h
Value:	672 mg/l
Test Type	
LC50 Fish	
Species	other fish
Time:	96.0 h
Value:	> 1,000 mg/l

Section 13 - Disposal Considerations

Appropriate Method of Disposal or Preparation

Contact a licensed professional waste disposal service to dispose of this material.
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable.
Observe all federal, state, and local environmental regulations.

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Section 14 - Transport Information

DOT

Proper Shipping Name: Methyl tert-butyl ether
UN#: 2398
Class: 3
Packing Group: Packing Group II
Hazard Label: Flammable liquid
PIH: Not PIH

IATA

Proper Shipping Name: METHYL TERT-BUTYL ETHER
IATA UN Number: 2398
Hazard Class: 3
Packing Group: II

Section 15 - Regulatory Information

EU Additional Classification

Symbol of Danger: F
Indication of Danger:
Highly Flammable.
Risk Statements:
R: 11
Highly flammable.

US Classification and Label Text

Indication of Danger:
Flammable (USA) Highly Flammable (EU). Harmful.

Risk Statements

Irritating to eyes, respiratory system, and skin. Limited evidence of carcinogenic effect.

Safety Statements

Keep away from sources of ignition - no smoking. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing.

US Statements

Possible Carcinogen (US). Target organ(s): Kidneys. Nerves.

United States Regulatory Information

SARA Listed: Yes
Deminitis: 1 %
Notes: This product is subject to SARA section 313 reporting requirements.

TSCA Inventory Item: Yes

Canada Regulatory Information

WHMIS Classification

This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

DSL: Yes

NDSL: No

Section 16 - Other Information

Disclaimer

For R&D use only. Not for drug, household or other uses.

Warranty

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. Sigma-Aldrich Inc. shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2004 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.

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1/9/04

MSDS Address Confirmation

Our records indicate your MSDS address as:

Acct.# 0049487708
SCHOOLCRAFT COLLEGE
18600 HAGGERTY RD
LIVONIA, MI 48152-3932
US

Address Correction:

Telephone: _____

Comments(if necessary):

Please read and sign below if your organization does not wish to receive any further MSDS mailings from Sigma Aldrich.

*I hereby certify that my organization meets all 29 CFR 1910.1200 OSHA HAZCOMM requirements by alternative means, electronic or otherwise, and do not require Sigma-Aldrich to send me a paper copy of MSDS' for any and all products ordered from Sigma-Aldrich Corporation.

Signature of Corporate Product Safety Director _____

Date _____

Please fax completed confirmation to our CMMG department at 877-380-2660 or 314-286-8083 or e-mail address [changes to cmmg@sial.com](mailto:changes@cmmg@sial.com).