

MSDS Number: **T1816** * * * * * Effective Date: **09/14/09** * * * * * Supercedes: **07/03/07**

MSDS Material Safety Data Sheet	24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300
	National Response in Canada CANUTEC: 613-996-6666
From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865	Outside U.S. and Canada Chemtrec: 703-527-3887
	NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2637) for assistance.

TETRAMETHYLAMMONIUM HYDROXIDE

1. Product Identification

Synonyms: Tetramethylammonium hydroxide 20% in methanol; TMAH 25%; Methanaminium; Ammonium Tetramethyl Hydroxide
CAS No.: 75-59-2
Molecular Weight: 91.18
Chemical Formula: (CH₃)₄NOH
Product Codes:
 J.T. Baker: V645
 Mallinckrodt: 7967

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Tetramethylammonium Hydroxide	75-59-2	20 - 25%	Yes
Methyl Alcohol	67-56-1	50 - 85%	Yes
Water	7732-18-5	0 - 30%	No

3. Hazards Identification

Emergency Overview

POISON! DANGER! CORROSIVE. MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. CAUSES BURNS TO ANY AREA OF CONTACT. VAPOR HARMFUL. FLAMMABLE LIQUID AND VAPOR. MAY CAUSE BLINDNESS. CANNOT BE MADE NONPOISONOUS.

SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)
 Flammability Rating: 3 - Severe (Flammable)
 Reactivity Rating: 1 - Slight
 Contact Rating: 4 - Extreme (Corrosive)
 Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
 Storage Color Code: Red (Flammable)

Potential Health Effects

Exposure may result in intense burning of the eyes, nose, throat, lungs and skin. Experimental studies have indicated that TMAH is a weak inhibitor of acetylcholinesterase and acts as a cholinergic (muscarinic and nicotinic) agonist. Depending on the level and duration of exposure, signs and symptoms may include blurred or double vision; pinpoint pupils; changes in heart rate and blood pressure; abdominal cramping, nausea and vomiting; diarrhea, excessive salivation sweating or bronchial secretions; urinary incontinence; muscle twitching, tremors or convulsions. Other symptoms consistent with cholinergic activity may also be observed.

Inhalation:

Extremely destructive to tissues of the mucous membranes and upper respiratory tract. May produce upper airway edema, respiratory failure, pulmonary edema and pneumonia. Symptoms may include burning, wheezing, laryngitis, shortness of breath. Toxic effects from the Methanol component are exerted upon nervous system, particularly the optic nerve. Once absorbed into the body, it is very slowly eliminated. Symptoms of overexposure may include headache, drowsiness, nausea, vomiting, blurred vision, blindness, coma, and death. A person may get better but then worse again up to 30 hours later.

Ingestion:

Corrosive. Swallowing can cause severe burns of the mouth, throat, and stomach. Can cause sore throat, vomiting and diarrhea. Methanol component is Toxic. Symptoms parallel inhalation. Can intoxicate and cause blindness. Usual fatal dose: 100-125 milliliters.

Skin Contact:

Corrosive. Symptoms of redness, pain, and severe burn can occur. Methanol component is a defatting agent and may cause skin to become dry and cracked. Skin absorption can occur; symptoms may parallel inhalation exposure.

Eye Contact:

Corrosive. Contact can cause blurred vision, redness, pain and severe tissue burns.

Chronic Exposure:

Marked impairment of vision has been reported. Repeated or prolonged exposure may cause skin irritation.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders or eye problems or impaired liver or kidney function may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Ingestion:

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Skin Contact:

Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:

Flash point: 12C (54F) CC

Autoignition temperature: 470C (878F)

Flammable limits in air % by volume:

lcl: 6.7; ucl: 36

Flammable Liquid and Vapor!

Explosion:

Above the flash point, explosive vapor-air mixtures may be formed. Sealed containers may rupture when heated. Contact with strong oxidizers may cause fire. Sensitive to static discharge.

Fire Extinguishing Media:

Water spray, dry chemical, alcohol foam, or carbon dioxide. Water may be ineffective.

Special Information:

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. Use water spray to blanket fire, cool fire exposed containers, and to flush non-ignited spills or vapors away from fire. Vapors can flow along surfaces to distant ignition source and flash back.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

For Methyl Alcohol:

- OSHA Permissible Exposure Limit (PEL):

200 ppm (TWA)

- ACGIH Threshold Limit Value (TLV):

200 ppm (TWA), 250 ppm (STEL) skin

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. Breathing air quality must meet the requirements of the OSHA respiratory protection standard (29CFR1910.134).

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

Colorless to straw-colored liquid.

Odor:

Strong ammonia-like odor.

Solubility:

100% in water.

Specific Gravity:

0.92

pH:

A very strong base.

% Volatiles by volume @ 21C (70F):

100

Boiling Point:

60 - 65C (140 - 149F)

Melting Point:

63C (145F)

Vapor Density (Air=1):

No information found.

Vapor Pressure (mm Hg):

No information found.

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage. Readily absorbs CO₂ from the air.

Hazardous Decomposition Products:

Carbon oxides, nitrogen oxides and formaldehyde gas form when heated to decomposition.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Strong acids and oxidizing agents; attacks many plastics and rubber. May react with metallic aluminum and generate hydrogen gas.

Conditions to Avoid:

Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

For Methanol: oral rat LD₅₀: 5628 mg/kg; inhalation rat LC₅₀: 64000 ppm/4H; skin rabbit: 15800 mg/kg; investigated as a tumorigen, mutagen, reproductive effector.

For Tetramethylammonium hydroxide: Skin guinea pig LD₅₀ = 25 mg/kg Preliminary results from an experimental study in rats demonstrated lethality following one or more skin applications of tetramethylammonium hydroxide at dose levels of 30 mg/kg and higher.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Tetramethylammonium Hydroxide (75-59-2)	No	No	None
Methyl Alcohol (67-56-1)	No	No	None
Water (7732-18-5)	No	No	None

12. Ecological Information

Environmental Fate:

The following statements refer to the environmental fate of methanol. When released into the soil, this material is expected to readily biodegrade. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released into water, this material is expected to readily biodegrade. When released into the water, this material is expected to have a half-life between 1 and 10 days. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to be readily removed from the atmosphere by wet deposition. When released into the air, this material is expected to exist in the aerosol phase with a short half-life. When released into air, this material is expected to have a half-life between 10 and 30 days.

Environmental Toxicity:

The methanol portion is expected to be slightly toxic to aquatic life.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: FLAMMABLE LIQUIDS, CORROSIVE, N.O.S. (METHANOL, TETRAMETHYLAMMONIUM HYDROXIDE)

Hazard Class: 3, 8

UN/NA: UN2924

Packing Group: II

Information reported for product/size: 500ML

International (Water, I.M.O.)

Proper Shipping Name: FLAMMABLE LIQUIDS, CORROSIVE, N.O.S. (METHANOL, TETRAMETHYLAMMONIUM HYDROXIDE)
Hazard Class: 3, 8
UN/NA: UN2924
Packing Group: II
Information reported for product/size: 500ML

International (Air, I.C.A.O.)

Proper Shipping Name: FLAMMABLE LIQUIDS, CORROSIVE, N.O.S. (METHANOL, TETRAMETHYLAMMONIUM HYDROXIDE)
Hazard Class: 3, 8
UN/NA: UN2924
Packing Group: II
Information reported for product/size: 500ML

15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----

Ingredient	TSCA	EC	Japan	Australia
Tetramethylammonium Hydroxide (75-59-2)	Yes	Yes	Yes	Yes
Methyl Alcohol (67-56-1)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----

Ingredient	--Canada--			
	Korea	DSL	NDSL	Phil.
Tetramethylammonium Hydroxide (75-59-2)	Yes	Yes	No	Yes
Methyl Alcohol (67-56-1)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----

Ingredient	-SARA 302-		-SARA 313-	
	RQ	TPQ	List	Chemical Catg.
Tetramethylammonium Hydroxide (75-59-2)	No	No	No	No
Methyl Alcohol (67-56-1)	No	No	Yes	No
Water (7732-18-5)	No	No	No	No

-----\Federal, State & International Regulations - Part 2\-----

Ingredient	-RCRA-		-TSCA-
	CERCLA	261.33	8(d)
Tetramethylammonium Hydroxide (75-59-2)	No	No	No
Methyl Alcohol (67-56-1)	5000	U154	No
Water (7732-18-5)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
Reactivity: No (Mixture / Liquid)

Australian Hazchem Code: None allocated.

Poison Schedule: S6

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 3 Flammability: 3 Reactivity: 0

Label Hazard Warning:

POISON! DANGER! CORROSIVE. MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. CAUSES BURNS TO ANY AREA OF CONTACT. VAPOR HARMFUL. FLAMMABLE LIQUID AND VAPOR. MAY CAUSE BLINDNESS. CANNOT BE MADE NONPOISONOUS.

Label Precautions:

Do not breathe vapor or mist.
Do not get in eyes, on skin, or on clothing.
Keep container closed.
Keep away from heat, sparks and flame.
Use only with adequate ventilation.
Wash thoroughly after handling.

Label First Aid:

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. In all cases get medical attention immediately.

Product Use:

Laboratory Reagent.

Revision Information:

No Changes.

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