Tetramethylammonium Hydroxide, 25% (Aqueous solution)

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Tetramethylammonium Hydroxide, 25% (Aqueous solution)

Synonyms: TMAH 25 W

UN-No: 1835

Recommended Use: Catalyst, laboratory chemicals, stripping solution, For use in industrial installations only,

Contact Manufacturer:
- SACHEM Americas
  2311 Pipeline Road
  Cleburne, Texas 76031
  Tel: 817-202-3200
  Fax: 817-641-5637
- SACHEM Asia Co., Ltd.
  5-6-27 Mizuhai
  Higashi Osaka 578-0921 Japan
  TEL 81-729-64-4300
  FAX 81-729-64-4301
- SACHEM
  No.116 Meiyu Road
  Wuxi National Hi-Tech Industrial Development Zone
  P.R.China 214028
  Phone: 0086-510-88556461

Supplier:
- SACHEM Asia Co., Ltd.
  Sakaisuji Inabata Bldg. 5F
  1-15-14 Minamisemba
  Chuo-ku, Osaka 542-0081 Japan
  TEL 81-6-6268-0145
  FAX 81-6-6268-0181
- SACHEM Americas
  2311 Pipeline Road
  Cleburne, Texas 76031
  Tel: 817-202-3200
  Fax: 817-641-5637
- SACHEM Europe BV
  Van Voordenpark 15
  5301 KP Zaltbommel
  The Netherlands
  Telephone: 0031-4186-82000
  E-mail: reach@sachemeurope.nl

Emergency Telephone Number:
- CHEMTREC: 1-800-424-9300 for US/ 703-527-3887 outside US
- 1-512-421-4900 from 8 a.m. - 5 p.m. Central Time or 1-817-202-3200
- Higashi Osaka Japan 81-729-64-4300
- SACHEM Europe 0031-6537-70227
- SACHEM Wuxi China 0086-532-83889090
2. HAZARDS IDENTIFICATION

DANGER!

**Emergency Overview**
Strong bases
May be fatal if inhaled, absorbed through skin, or swallowed
Destruction of skin tissue as a result of more than 3 minutes exposure
Avoid contact with skin, eyes and clothing
Avoid release to the environment

**Appearance** Colorless, Light yellow.  **Physical State of a Mixture** liquid.  **Odor** Slight, Amines.

**OSHA Regulatory Status**
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

**Potential Health Effects**

**Principle Routes of Exposure**
Eye contact, Skin contact, Inhalation.

**Acute Effects**

- **Eyes** Corrosive. Causes severe caustic burns to skin and eyes. Large exposures may be fatal.
- **Skin.** Corrosive. Causes burns. May be fatal if absorbed through skin.
- **Inhalation** Corrosive. Causes severe burns. May be fatal if inhaled.
- **Ingestion** Corrosive. Can burn mouth, throat, and stomach. May be fatal if swallowed.

**Chronic Effects**

- **Chronic Toxicity** Repeated contact may cause allergic reactions in very susceptible persons.

  See Section 11 for additional Toxicological information.

**Main Symptoms**
Liquid, aerosols and vapors of this product are irritating and can cause pain, tearing, reddening and swelling accompanied by a stinging sensation and/or a feeling like that of fine dust in the eyes. Breathing difficulties. If coughing, difficult breathing or other symptoms of poisoning occur, even after several hours, call a physician immediately. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. May cause irregular heartbeats, especially under conditions of stress. blurred vision.

**Aggravated Medical Conditions**
No information available.

**Interactions with Other Chemicals**
No information available.

**Potential Environmental Effects**
Harmful to aquatic organisms.
3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Family: Quaternary ammonium compound

Formula: C4H12N.HO

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>75</td>
</tr>
<tr>
<td>Tetramethylammonium Hydroxide</td>
<td>75-59-2</td>
<td>25</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

General advice
Do not get in eyes, on skin, or on clothing
Take off contaminated clothing and shoes immediately
In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)
Show this safety data sheet to the doctor in attendance

Eye contact
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician immediately.

Skin contact
Wash off immediately with plenty of water for at least 15 minutes. IF ON SKIN (or hair):
Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
Remove and wash contaminated clothing before re-use. Call a physician immediately.

Inhalation
Immediate medical attention is required. Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Consult a physician.

Ingestion
Immediate medical attention is required. Never give anything by mouth to an unconscious person. Rinse mouth with water. Drink 1 or 2 glasses of water. Do not induce vomiting without medical advice. Call a physician or Poison Control Centre immediately.

Notes to physician
Treat symptomatically. May cause respiratory arrest.

Protection of First-aiders
Avoid contact with skin, eyes and clothing.
5. FIRE-FIGHTING MEASURES

Flammable Properties
The product is not flammable. Heating can release vapors which can be ignited.

Suitable Extinguishing Media
Use: Water spray, Carbon dioxide (CO2), Foam, Dry chemical,

Hazardous Combustion Products
Carbon monoxide, Nitrogen oxides (NOx).

Explosion Data

Specific Hazards Arising from the Chemical
Causes severe burns. Hazardous combustion products. Carbon monoxide. Nitrogen oxides (NOx). May be fatal if inhaled, absorbed through skin, or swallowed.

Protective Equipment and Precautions for Firefighters
In the event of fire and/or explosion do not breathe fumes. In the event of fire, wear self contained breathing apparatus. Wear personal protective equipment. Avoid contact with skin, eyes and clothing.

Recommended NFPA
Health 4
Flammability 1
Instability 0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
P233 - Keep container tightly closed. Do not breathe vapors or spray mist. Do not ingest. Do not get in eyes, on skin, or on clothing. Wear personal protective equipment.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained. Do not flush into surface water or sanitary sewer system.

Methods for containment
Contain and collect spillage with non-combustible absorbent material, (e.g. sand, earth, diatomaceus earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

Methods for Clean-up
Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Prevent product from entering drains. Keep in suitable and closed containers for disposal.
7. HANDLING AND STORAGE

Handling
- Wear personal protective equipment
- Remove and wash contaminated clothing before re-use
- Do not breathe vapours or spray mist
- In case of insufficient ventilation, wear suitable respiratory equipment
- Do not ingest
- Do not eat, drink or smoke when using this product
- Ensure that eyewash stations and safety showers are close to the workstation location
- Do not get in eyes, on skin, or on clothing

Storage
- Keep container tightly closed
- Keep away from heat
- Store in accordance with local regulations
- To avoid thermal decomposition, do not overheat
- Polyethylene containers
- Stainless steel

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Measures
- Ensure adequate ventilation, especially in confined areas
- Exhaust ventilation equipped with scrubbers
- Skin and body protection
- Avoid formation of aerosol
- Do not breathe vapours or spray mist

Personal Protective Equipment

Eye/face Protection
- Do not get in eyes, on skin, or on clothing. Tightly fitting safety goggles. Face-shield. Causes severe caustic burns to skin and eyes.

Skin Protection
- Wear protective gloves/clothing. Chemical resistant apron. Impervious clothing. Nitrile rubber. Neoprene gloves. Long sleeve gloves. Destruction of skin tissue as a result of more than 3 minutes exposure.

Hand Protection

Respiratory protection
- In case of mist, spray or aerosol exposure wear suitable personal respiratory protection and protective suit. In case of insufficient ventilation wear suitable respiratory equipment.

Other Protective Equipment
- Ensure that eyewash stations and safety showers are close to the workstation location.

General Hygiene Considerations
- Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing before re-use. Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and immediately after handling the product.
9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Colorless. Light yellow.</td>
</tr>
<tr>
<td>Odor</td>
<td>Slight Amines</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>No information available.</td>
</tr>
<tr>
<td>Physical State of a Mixture</td>
<td>liquid</td>
</tr>
<tr>
<td>pH</td>
<td>&gt;13</td>
</tr>
<tr>
<td>Flash Point</td>
<td>&gt;95 °C;</td>
</tr>
<tr>
<td>Autoignition Temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>-25 °C;</td>
</tr>
<tr>
<td>Boiling point/boiling range</td>
<td>Ca. 102 °C;</td>
</tr>
<tr>
<td>Melting Point/Range</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability Limits in Air</td>
<td>Upper No data available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>No information available.</td>
</tr>
<tr>
<td>Oxidizing Properties</td>
<td>None known</td>
</tr>
<tr>
<td>Vapor Pressure @20°C (kPa)</td>
<td>16.0 mm Hg @ 25 C</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>No information available.</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>1.014 @ 20 C</td>
</tr>
<tr>
<td>Bulk Density</td>
<td>No data available</td>
</tr>
<tr>
<td>Water Solubility</td>
<td>Miscible with water</td>
</tr>
<tr>
<td>Partition coefficient:</td>
<td>-2.47</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>3.13 centipoise @ 19 C</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>91.15</td>
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</table>

10. STABILITY AND REACTIVITY

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Stability</td>
<td>Stable under normal conditions. Hazardous polymerisation does not occur.</td>
</tr>
<tr>
<td>Conditions to Avoid</td>
<td>Temperatures above 100°C. Heating can release hazardous gases. To avoid thermal decomposition, do not overheat.</td>
</tr>
<tr>
<td>Incompatible Materials</td>
<td>Strong oxidizing agents. Strong acids. PVDF.</td>
</tr>
<tr>
<td>Hazardous Decomposition Products</td>
<td>Amines. Methanol.</td>
</tr>
<tr>
<td>Hazardous Reactions</td>
<td>None under normal processing</td>
</tr>
</tbody>
</table>
11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Product Information

May be fatal if inhaled, absorbed through skin, or swallowed
Causes severe caustic burns to skin and eyes

Component Information

<table>
<thead>
<tr>
<th>Component</th>
<th>LD50 Oral</th>
<th>LD50 Dermal</th>
<th>LC50 Inhalation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tetramethylammonium Hydroxide</td>
<td>34-50 mg/kg rat</td>
<td>112 mg/kg (rat)</td>
<td>25 mg/kg (guinea pig) for 50% (reported in RTECS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No information available.</td>
</tr>
</tbody>
</table>

Chronic Toxicity

Carcinogenicity

There are no known carcinogenic chemicals in this product.

Legend:
ACGIH: (American Conference of Governmental Industrial Hygienists)
IARC: (International Agency for Research on Cancer)
NTP: (National Toxicity Program)
OSHA: (Occupational Safety & Health Administration)
RTECS: (Registry of Toxic Effects of Chemical Substances)

Other Toxicity Information:

Additional information may be found in RTECS.
RTECS No: PA0875000

Corrosivity.
Causes severe burns.

Mutagenic Effects
Not mutagenic in AMES Test.

Target Organ Effects
Skin, Eyes, Respiratory system, Heart, Nervous system.
12. ECOLOGICAL INFORMATION

Ecotoxicity
Acute aquatic toxicity testing has shown this compound to be highly toxic to the ceriodaphnia dubia (water flea).

Ecotoxicity Effects
Harmful to aquatic organisms...

<table>
<thead>
<tr>
<th>Component</th>
<th>Freshwater Algae</th>
<th>Freshwater Fish</th>
<th>Microtox</th>
<th>Water Flea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetramethylammonium Hydroxide</td>
<td>Pseudokirchneriella subcatitata: 72h = 96 mg/l</td>
<td>LC50 Pimephales promelas/96h = 462 mg/l (TMAC)</td>
<td>No information available.</td>
<td>Daphnia magna EC50/48h = 13.9 mg/l Ceriodaphnia dubia LC50/48h = 1.3-1.5 mg/l Ceriodaphnia dubia LC50/96h = 0.4 mg/l</td>
</tr>
</tbody>
</table>

Persistence and Degradability
Expected to be biodegradable.

Bioaccumulation
Not likely to bioaccumulate.

Mobility
Will likely be mobile in the environment due to its water solubility

Water
Log Pow: No data available
Tetramethylammonium Hydroxide
Log Pow: 0.9

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods
Can be incinerated, when in compliance with local regulations. Can be disposed as waste water, when in compliance with local regulations. Dispose of contents/container in accordance with local regulation. Neutralization is normally necessary before waste water is discharged into water treatment plants.

Contaminated packaging
Triple rinse containers. Treat rinsing as for product disposal.

Waste from Residues / Unused Products
Dispose of in accordance with local regulations. Can be incinerated, when in compliance with local regulations. Neutralization is normally necessary before waste water is discharged into water treatment plants. Solutions with high pH-value must be neutralized before discharge.

US EPA Waste Number
D002
Would be considered as a characteristic hazardous waste under RCRA if disposed in the form as shipped from SACHEM
### 14. TRANSPORT INFORMATION

#### DOT

<table>
<thead>
<tr>
<th>Proper shipping name</th>
<th>UN1835-Tetramethylammonium hydroxide solution, 8, PGII</th>
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</thead>
<tbody>
<tr>
<td>UN-No</td>
<td>1835</td>
</tr>
<tr>
<td>Hazard class</td>
<td>8</td>
</tr>
<tr>
<td>Packing Group</td>
<td>PGII</td>
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<tr>
<td>Description</td>
<td>UN1835, Tetramethylammonium hydroxide solution, 8, PGII</td>
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</table>

#### IATA

<table>
<thead>
<tr>
<th>IATA Proper Shipping Name</th>
<th>1835 - Tetramethylammonium hydroxide solution</th>
</tr>
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<tbody>
<tr>
<td>UN-No</td>
<td>1835</td>
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<td>Description</td>
<td>UN1835, Tetramethylammonium hydroxide solution, 8, PGII</td>
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#### IMDG/IMO

<table>
<thead>
<tr>
<th>IMDG/IMO Proper Shipping Name</th>
<th>1835 - Tetramethylammonium hydroxide solution</th>
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<td>UN-No</td>
<td>1835</td>
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<tr>
<td>Hazard class</td>
<td>8</td>
</tr>
<tr>
<td>Packing Group</td>
<td>PGII</td>
</tr>
<tr>
<td>Description</td>
<td>UN1835, Tetramethylammonium hydroxide solution, 8, PGII</td>
</tr>
</tbody>
</table>
15. REGULATORY INFORMATION

USA

Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and and Title 40 of the Code of Federal Regulations, Part 372.

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>Weight %</th>
<th>SARA 313 - Threshold Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>75</td>
<td>-</td>
</tr>
<tr>
<td>Tetramethylammonium Hydroxide</td>
<td>75-59-2</td>
<td>25</td>
<td>-</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazardous Categorization

<table>
<thead>
<tr>
<th></th>
<th>Traditional Hazard</th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Chronic Health Hazard</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Acute Health Hazard</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fire Hazard</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Sudden Release of Pressure Hazard</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Reactive Hazard</td>
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<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Clean Water Act

<table>
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<tr>
<th>Component</th>
<th>CAS-No</th>
<th>Weight %</th>
<th>HAPS data</th>
<th>VOC Chemicals</th>
<th>Class 1 Ozone Depleters</th>
<th>Class 2 Ozone Depleters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>75</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tetramethylammonium Hydroxide</td>
<td>75-59-2</td>
<td>25</td>
<td>-</td>
<td>-</td>
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</table>

CERCLA

not applicable

Listed on the New Jersey Right to Know Hazardous Substances List.

<table>
<thead>
<tr>
<th>Component</th>
<th>Massachusetts</th>
<th>New Jersey</th>
<th>Pennsylvania</th>
<th>Illinois</th>
<th>Rhode Island</th>
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<tbody>
<tr>
<td>Tetramethylammonium Hydroxide</td>
<td></td>
<td>Listed</td>
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</tbody>
</table>

International Regulations

International Inventories

<table>
<thead>
<tr>
<th>Component</th>
<th>ENCS</th>
<th>PICCS</th>
<th>DSL</th>
<th>TSCA</th>
<th>CHINA</th>
<th>AICS</th>
<th>KECL</th>
<th>NDSL</th>
<th>EINECS</th>
<th>ELINCS</th>
<th>EC-No</th>
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</thead>
<tbody>
<tr>
<td>Water</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>231-791-2</td>
<td>-</td>
<td>231-791-2</td>
</tr>
</tbody>
</table>
Tetramethylammonium Hydroxide, 25% (Aqueous solution)

TSCA

- All components of this product are listed on the TSCA Chemical Inventory.

16. OTHER INFORMATION

<table>
<thead>
<tr>
<th>Health Hazard</th>
<th>Fire Hazard</th>
<th>Reactivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Issuing Date: 28/04/2011
Revision Date: 11/11/2011

Revision Note

(M)SDS sections updated; 2; 3; 12; 16;

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. In case of any questions, please refer to the official document in English and contact us in your region.

End of Safety Data Sheet