**SECTION 1: Identification of the substance/mixture and of the company/undertaking**

1.1 Product identifier

**Trade name** Tetramethylammonium hydroxide, 25% w/w aqueous solution, Electronic Grade

1.2 Relevant identified uses of the substance or mixture and uses advised against.

**Identified use:** SU24 Scientific research and development

1.3 Details of the supplier of the safety data sheet

**Manufacturer/Supplier:**
Alfa Aesar
Avocado Research Chemicals, Ltd.
Shore Road
Port of Heysham Industrial Park
Heysham Lancashire LA3 2XY
United Kingdom

**Office Tel:** +44 (0) 1524 850506
**Office Fax:** +44 (0) 1524 850608
**Email:** uktech@alfa.com
**www.alfa.com**

**Informing department:** Product safety department.

1.4 Emergency telephone number:
Call Carechem 24 at +44 (0) 1865 407333 (English only); +44 (0) 1235 239670 (Multi-language)

**SECTION 2: Hazards identification**

2.1 Classification of the substance or mixture

**Classification according to Regulation (EC) No 1272/2008**

- GHS06 skull and crossbones
  - Acute Tox. 2 H300 Fatal if swallowed.
  - Acute Tox. 2 H310 Fatal in contact with skin.

- GHS08 health hazard
  - STOT SE 1 H370 Causes damage to the central nervous system.
  - STOT RE 1 H372 Causes damage to the liver and the thymus system through prolonged or repeated exposure. Route of exposure: Dermal.

- GHS05 corrosion
  - Skin Corr. 1B H314 Causes severe skin burns and eye damage.

- GHS09 environment
  - Aquatic Chronic 2 H411 Toxic to aquatic life with long lasting effects.

2.2 Label elements

**Labelling according to Regulation (EC) No 1272/2008**
The product is classified and labelled according to the CLP regulation.

**Hazard pictograms**

- GHS06 GHS08 GHS09

**Signal word** Danger

**Hazard-determining components of labelling:**
Tetramethylammonium hydroxide

**Hazard statements**
H300 Fatal if swallowed.
H310 Fatal in contact with skin.
H314 Causes severe skin burns and eye damage.
H370 Causes damage to the central nervous system.
H372 Cause damage to the liver and the thymus system through prolonged or repeated exposure. Route of exposure: Dermal.
H411 Toxic to aquatic life with long lasting effects.

**Precautionary statements**
- P260 Do not breathe dust/fume/gas/mist/vapours/spray.
- P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/doctor/…
- P303+P351+P338 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
- P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P361 Take off immediately all contaminated clothing.
- P405 Store locked up.
- P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3 Other hazards

**Results of PBT and vPvB assessment**

**PBT:** Not applicable.
**vPvB:** Not applicable.

**SECTION 3: Composition/information on ingredients**

3.2 Mixtures

**Dangerous components:**

- CAS: 7732-18-5  
  - Water 75.0%
- CAS: 75-59-2  
  - Tetramethylammonium hydroxide 25.0%

**EINECS:** 200-882-9
- Acute Tox. 2, H300; Acute Tox. 1, H310; STOT SE 1, H370; STOT RE 1, H372; Skin Corr. 1B, H314; Aquatic Chronic 2, H411

**Additional information** None known.

**Non-Hazardous Ingredients**

- CAS: 7732-18-5  
  - Water 75.0%
- **EINECS:** 231-791-2

(Contd. on page 2)
Trade name: Tetramethylammonium hydroxide, 25% w/w aqueous solution, Electronic Grade

SECTION 4: First aid measures

4.1 Description of first aid measures

General information
Instantly remove any clothing soiled by the product.
In case of irregular breathing or respiratory arrest provide artificial respiration.

After inhalation
Supply fresh air. If required, provide artificial respiration. Keep patient warm. Consult doctor if symptoms persist. Seek immediate medical advice.

After skin contact
Instantly wash with water and soap and rinse thoroughly. Seek immediate medical advice.

After eye contact
Rinse opened eye for several minutes under running water. Then consult doctor. After eye contact. Seek immediate medical advice.

After swallowing
Do not induce vomiting; instantly call for medical help.

4.2 Most important symptoms and effects, both acute and delayed

Causes severe skin burns.
Causes serious eye damage.

4.3 Indication of any immediate medical attention and special treatment needed
No further relevant information available.

SECTION 5: Firefighting measures

5.1 Extinguishing media
Suitable extinguishing agents: CO2, extinguishing powder or water jet. Fight larger fires with water jet or alcohol-resistant foam.

5.2 Special hazards arising from the substance or mixture
If this product is involved in a fire, the following can be released:
Carbon monoxide and carbon dioxide
Nitrogen oxides (NOx)
Hydrogen chloride (HCl)
Ammonia

5.3 Advice for firefighters
Protective equipment:
Wear full protective suit.
Wear self-contained breathing apparatus.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear protective equipment. Keep unprotected persons away. Ensure adequate ventilation.

6.2 Environmental precautions:
Do not allow material to be released to the environment without proper governmental permits.

6.3 Methods and clean-up material for containment and clean up:
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust). Use neutralizing agent.

Disposal of contaminated material as waste according to section 13. Ensure adequate ventilation.

Prevention of secondary hazards: No special measures required.

6.4 Reference to other sections
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for information on disposal.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Handle under dry protective gas. Keep containers tightly sealed.

Store in cool, dry place in tightly closed containers.

Ensure good ventilation/exhaustion at the workplace.

Information about protection against explosions and fires: No information known.

7.2 Conditions for safe storage, including any incompatibilities
Storage
Requirements to be met by storerooms and containers: No special requirements.

Information about storage in one common storage facility:
Store away from air.
Do not store together with acids.
Store away from oxidising agents.

Water reacts with many metals to give hydrogen, often violently. Water also reacts violently with many reactive organic and inorganic chemicals.

Further information about storage conditions:
Store under dry inert gas.
This product is air sensitive.
Keep container tightly sealed.

Store in cool, dry conditions in well sealed containers.

Store in a locked cabinet or with access restricted to technical experts or their assistants.

7.3 Specific end use(s) No further relevant information available.

SECTION 8: Exposure controls/personal protection

Additional information about design of technical systems:
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

8.1 Control parameters
Components with critical values that require monitoring at the workplace:
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.

Additional information: No data.

8.2 Exposure controls
Personal protective equipment
General protective and hygienic measures
The usual precautionary measures should be adhered to in handling the chemicals.
Keep away from foodstuffs, beverages and food.
Instantly remove any soiled and impregnated garments.

Wash hands during breaks and at the end of the work.

Store protective clothing separately.
Do not inhale dust / smoke / mist.

Avoid contact with the eyes and skin.
Maintain an ergonomically appropriate working environment.

Breathing equipment:
Use breathing protection with high concentrations.

Recommended filter device for short term use:
Use a respirator with organic vapor/acid gas cartridges as a backup to engineering controls. Risk assessment should be performed to determine if air-purifying respirators are appropriate. Only use equipment tested and approved under appropriate government standards such as NIOSH (USA) or CEN (EU).

Protection of hands:
Check protective gloves prior to each use for their proper condition.
Safety Data Sheet
according to 1907/2006/EC, Article 31

Trade name: Tetramethyldiammonium hydroxide, 25% w/w aqueous solution, Electronic Grade

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

Material of gloves: Nitrile rubber, NBR
Penetration time of glove material (in minutes): Not determined
Eye protection: Tightly sealed safety glasses.
Full face protection: Not applicable.
Body protection: Protective work clothing.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties
General Information
Appearance: Liquid
Form: Formless
Colour: Colourless to pale yellow
Smell: Not determined
Odour threshold: Not determined.

Change in condition
Melting point/Melting range: Not determined
Boiling point/Boiling range: 102 °C (ca)
Sublimation temperature / start: Not determined
Inflammability (solid, gaseous): Not applicable.
Ignition temperature: Not determined
Decomposition temperature: Not determined
Self-inflammability: Product is not selfigniting.

Danger of explosion: Not determined.
Critical values for explosion:
Lower: Not determined
Upper: Not determined
Steam pressure at 20 °C: 23 hPa
Density at 20 °C: 1.014 g/cm³
Relative density: Not determined.
Vapour density: Not determined.
Evaporation rate: Not determined.
Solubility in / Miscibility with:
Water: Fully miscible
Partition coefficient (n-octanol/water): Not determined.

Solvent content:
Organic solvents: 0.0 %
Solids content: 25.0 %

9.2 Other information
No further relevant information available.

SECTION 10: Stability and reactivity

10.1 Reactivity
No information known.

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Water reacts violently with alkali metals.
Reacts with alkaline earth metals
Reacts with strong oxidising agents
Water reacts with many metals to give hydrogen, often violently. Water is also incompatible with many reactive organic and inorganic chemicals.

10.4 Conditions to avoid
No further relevant information available.

10.5 Incompatible materials:
Acids
Air
Oxidising agents

10.6 Hazardous decomposition products:
Nitrogen oxides (NOx)
Carbon monoxide and carbon dioxide
Ammonia
Hydrogen chloride (HCl)

SECTION 11: Toxicological information

11.1 Information on toxicological effects
Acute toxicity:
Danger by skin resorption.
Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach.
The Registry of Toxic Effects of Chemical Substances (RTECS) contains acute toxicity data for components in this product.
Dermal: LD50: 25 mg/kg (guinea pig)

LD/LC50 values that are relevant for classification:

75-59-2 Tetramethyldiammonium hydroxide

Dermal: LD50 25 mg/kg (guinea pig)

Skin irritation or corrosion: Causes severe skin burns.
Eye irritation or corrosion: Causes serious eye damage.

Sensitization: No sensitizing effect known.
Germ cell mutagenicity: No effects known.
Carcinogenicity: No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.
Reproductive toxicity: No effects known.
Specific target organ system toxicity - repeated exposure: Causes damage to the liver and the thymus system through prolonged or repeated exposure. Route of exposure: Dermal.
Specific target organ system toxicity - single exposure: Causes damage to the central nervous system.
Aspiration hazard: No effects known.
Subacute to chronic toxicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains multiple dose toxicity data for this substance.
Additional toxicological information:
To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
The product shows the following dangers according to the calculation method of the General EC Classification Guidelines for Preparations as issued in the latest version:
Toxic
Corrosive
SECTION 12: Ecological information

12.1 Toxicity
Aquatic toxicity: No further relevant information available.
12.2 Persistence and degradability No further relevant information available.
12.3 Mobility in soil No further relevant information available.

Additional ecological information:
General notes:
Do not allow product to reach ground water, water bodies or sewage system.
Do not allow material to be released to the environment without proper governmental permits.
Water danger class 3 (Self-assessment): extremely hazardous for water.
Do not allow product to reach ground water, water bodies or sewage system, even in small quantities.
Danger to drinking water if even extremely small quantities leak into soil.
Also poisonous for fish and plankton in water bodies.

Toxic to aquatic life.
May cause long lasting harmful effects to aquatic life.
Avoid transfer into the environment.

12.4 Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.
12.6 Other adverse effects No further relevant information available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods
Recommendation
Hand over to disposers of hazardous waste.
Must be specially treated under adherence to official regulations.
Consult state, local or national regulations for proper disposal.
Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.
Recommended cleaning agent: Water, if necessary with cleaning agent.

SECTION 14: Transport information

UN-Number
ADR, IMDG, IATA UN1835

14.2 UN proper shipping name
ADR 1835 TETRAMETHYLAMMONIUM HYDROXIDE SOLUTION
IMDG, IATA TETRAMETHYLAMMONIUM HYDROXIDE SOLUTION

14.3 Transport hazard class(es)
ADR

Class 8 (C7) Corrosive substances.
Label 8

IMDG, IATA

Class 8 Corrosive substances.
Label 8

Packing group
ADR, IMDG, IATA II

14.5 Environmental hazards:
Marine pollutant: No

14.6 Special precautions for user
Kemler Number: 80
EMS Number: F-A, S-B
Segregation groups: Ammonium compounds, alkalis

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
Not applicable.

Transport/Additional information:
ADR

Exceptional quantities (EQ): E2
Limited quantities (LQ): 1L
Transport category: 2
Tunnel restriction code: E

UN "Model Regulation": UN1835, TETRAMETHYLAMMONIUM HYDROXIDE SOLUTION, 8, II

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
Australian inventory of Chemical Substances
All ingredients are listed.

Standard for the Uniform Scheduling of Drugs and Poisons
None of the ingredients is listed.

National regulations
Information about limitation of use:
Employment restrictions concerning young persons must be observed.
For use only by technically qualified individuals.
Classification according to VbF: Not applicable

Technical instructions (air):

<table>
<thead>
<tr>
<th>Water</th>
<th>Share in %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>75.0</td>
</tr>
<tr>
<td></td>
<td>25.0</td>
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</tbody>
</table>

Water hazard class: Water danger class 3 (Self-assessment): extremely hazardous for water.
Other regulations, limitations and prohibitive regulations

ELINCS (European List of Notified Chemical Substances)

None of the ingredients is listed.

Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006.

None of the ingredients are listed.

The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed.

None of the ingredients is listed.

Annex XIV of the REACH Regulations (requiring Authorisation for use)

None of the ingredients is listed.

15.2 Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Relevant phrases

H300 Fatal if swallowed.
H310 Fatal in contact with skin.
H314 Causes severe skin burns and eye damage.
H370 Causes damage to the central nervous system.
H372 Causes damage to the liver and the thymus system through prolonged or repeated exposure. Route of exposure: Dermal.
H411 Toxic to aquatic life with long lasting effects.

Department issuing SDS: Global Marketing Department

Abbreviations and acronyms:

RID: Règlement International concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organization
ADR: Accord européen sur le transport des marchandises dangereuses par route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
VbF: Verordnung über brennbare Flüssigkeiten, Österreich (Ordinance on the storage of combustible liquids, Austria)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
vPvB: very Persistent and very Bioaccumulative
ACGIH: American Conference of Governmental Industrial Hygienists (USA)
OSHA: Occupational Safety and Health Administration (USA)
NTP: National Toxicology Program (USA)
IARC: International Agency for Research on Cancer
EPA: Environmental Protection Agency (USA)