Material Safety Data Sheet

Section 1 - Product and Company Identification

Product name： Tetramethyl Ammonium Hydroxide
Other names：--
Product use：Strong organic base, polarographic testing supporting liquid, Etchant in the Electrical Industry
Supplier's name：San Fu Chemical Co., Ltd., Shan Hua Plant
Supplier's address：340 Hsiao Hsin Li, Shan Hua Town, Tainan Hsien, Taiwan, R.O.C.
Supplier's phone：06-5837608 Emergency phone：06-5837608
FAX.：06-5839498

Section 2 - Hazards Identification

Classification：

1.	Acute Toxicity	Category 1 (skin)
2.	Skin Corrosion/Irritation	Category 1
3.	Serious Eye Damage/Irritation	Category 1

The Most Important Hazards and effect

Label element：

- Hazard symbol： Skull and crossbones, Corrosive

- Signal word：Danger

Hazard statement：

1. Fatal if contact skin
2. Cause Serious skin burn and eye damage
3. Cause serious eye damage

Precautionary statement：

1. If contact with eyes, flush with large amount of water immediately seek medical attention.
2. Take off the contaminated cloth immediately
3. Wear suitable protective clothing, gloves, goggles/ face shield.

Others Hazard：--

Section 3 - Composition/Information On Ingredients

pure substance：

Chemical name：Tetramethyl Ammonium Hydroxide
Synonyms：Tetramethyl Ammonium Hydroxide
CAS No.：75-59-2
Ingredient contributing to the hazard(%)：2.37%

Section 4 - First Aid Measures

The First-aid Information：

- Inhalation：

1. While patient is encounter the dyspnea move the patient to an air-circulated place immediately.
2. Don't' use the mouth to mouth Artificial Respiration; suggest using pocket mask with one way valve design or other supportive tools.
3. If the person is not breathing give Artificial Respiration immediately.
4. Seek medical attention immediately.

■ Skin Contact：

1. Remove the contaminated clothes and shoes. Immediately wash the injured skin with water and shop above 15 minutes.
2. Seek medical attention immediately
3. Destructing the contaminated shoes.

■ Eye Contact：

1. Immediately flush the contaminated eyes with water above 15 minutes.
2. Seek medical attention immediately

■ Ingestion：

1. Don't induce vomit
2. If the patient lost of consciousness, don't induce vomit and give any liquid.
3. Give patient large amount of water and milk.
4. If the patient vomits spontaneity, lean forward the patient to prevent inhalation of the vomit.
5. If the patient is lost of consciousness, move the head sideward.
6. Seek medical attention immediately

The Most Important Symptoms and Hazardous Effects： Potentially cause death with skin contact, respiratory tract burn, skin burn, eye burn and mucosa burn.

Protection of First-aiders：Wear category C protective equipments to practice the first aid in the safety area.

Notes to a Physician：

1. Consider providing the oxygen if patient inhaled.
2. Consider checking with Esophagoscopy if patient swallowed to avoid Gastric lavage.

Section 5 - Fire Fighting Measures

Extinguishing Media：

1. Foam, water spray, chemical powder, CO_2
2. Large fire: Use water spray and water bubbles to control the fire.

Specific Hazards when Fire-fight：If fire accident happens, it is ranked to the light fire hazard.

Specific Fire-fighting Procedure：

1. Cool tanks or containers with water spray, till the fire is extinguished.
2. If safe to do so, move the undamaged containers from fire area.
3. Away from the end of the storage.

Specific Protection of Firefighters： Fireman must wear full chemical protective clothing and self-contained breathing apparatus (SCBA). (wear aluminum mirage protecting coat if necessary)

Section 6 - Accidental Release Measures

Personal Precautions：

1. Isolate the danger area, and restrict no entry for non-related staffs.

2. Stay in the upwind area and away from the low-lying.
Environmental Precautions： 1. Avoid heat, flame, spark and other source of ignition. 2. Extinguish or move the source of ignition from the area.
Methods for Cleaning up： 1. Do not touch spilled material. 2. If safe to do so, try to prevent or reduce leakage. Small Spill: 1. Absorb or cover with Dry sand, soil or other non-combustible material. Move into the container. 2. Recycle the contaminated materials and place in the proper label container with cover. 3. Wash the contaminated area with water. Large spill: After the embanking surrounds, waste disposal manage.

Section 7 - Handling and Storage

Handling： 1. Processing in the well ventilated place. 2. Avoid contact incompatible material. 3. Avoid contact incompatible material. 4. Ensure the container is tightly closed. 5. No drinking, eating or smoking during operation.
Storage： 1. Label the container clearly. 2. Store separately with precaution of acid and chlorine organic solvent. 3. Store in the original container. 4. Keep the container tightly closed. 5. Store in the cool, dry and well ventilated area. 6. Store away from the incompatibles. 7. Avoid physical damage of the container and leak detecting regularly.

Section 8 - Exposure Controls & Personal Protection

Engineering measures：			
Control parameters			
TWA	STEL	Ceiling	Biological standards

Personal protective equipment：

■ Respiratory Protection：

1. If repeated overexposure, appropriate personal respiratory protective equipment is highly recommended.
2. Different equipments are required when exposure in different concentration.
3. Confirm the warning notice before using.
4. Unknown concentration or under condition of endanger to healthy and life: Wear any NIOSH approved full-face piece self-contained breathing apparatus and positive pressure demand.

■ Hand Protection： Wear chemical protective gloves.

■ Eye Protection：

1. Splash protective goggles 2. Face shield 3. Provide the emergency eye washing equipments or speedily shower equipments. ■ Skin and Body Protection：Wear Category C protective equipments to or other proper protective equipments.
Hygiene measures： 1. Remove contaminated clothes, clean thoroughly before reuse or disposal. Must advise the danger to the laundry worker. 2. Smoking, eating and drinking are prohibited in work area. 3. Wash hands thoroughly after handing this substance. 4. Maintain a clean working environment.

Section 9 - Physical & Chemical Properties

Appearance：liquid	Odor：ammonia odor
Color：Transparent	Melting Point: --
pH value：12.75	Boiling point/boiling range： about 100℃
Flammability: --	Flash point：/
Decomposition temp：--	Test method：/
Auto ignition temp：--	Explosion properties：/
Vapor pressure：--	Vapor density：--
Density：1.02 g/cm^3	Solubility：water soluble
log Kow：--	Evaporation Rate：--

Section 10 - Stability & Reactivity Data

Stability：Stable under normal temperatures and pressures.
Possible hazardous reactions under specific conditions： 1. Strong oxidizers with fire and explosion hazard. 2. Acid: violent reaction. 3. Metal: corrosive.
Conditions to avoid： 1. Heat, flame, spark and other ignition sources. 2. Endanger gases may accumulate in the limited space. 3. May ignite or explode with contact of inflammable materials.
Materials to avoid：Strong acid, metal, oxidizer
Hazardous decomposition products：Ammonia, nitrogen oxides

Section 11 - Toxicological Information

Route of exposure：Skin, inhalation, ingestion, eyes
Symptoms： Serious burn, coughing, Asphyxia, nose and mouth pain, sore throat, mucous burn, chest tightness, dyspnea, bubble Sputum, cyanosis, and dizziness.
Immediate Toxicity：

■ Skin：

1. Cause severe pain, burn and brown color dye with direct contact. Cause tissue softness, gel like and necrosis, deep tissue damage in the corrosive area.
2. Potentially cause lethal danger with skin contact.

■ Inhalation：

1. May cause respiratory irritation syndrome, include coughing, asphyxia, nose, mouse and sore throat, burn of the mucous membrane.
2. If inhalation with large amount, may develop into pulmonary edema. Incubation period is 5-72 hours. The symptoms include chest tightness, dyspnea, bubble sputum, cyanosis and dizziness. Physiological appearances include weakness; speed up pulse rate, hypotension, and blood concentrate sweat blister.

■ Eye：

1. Cause pain and burn seriously with direct contact.
2. The injury condition depends on the concentration and the period of the contact. May cause edema, upper skin tissue damage, blurred cornea and iritis. While the injury lesser, the symptoms will be lesser.
3. Serious burning condition, the complete injury won't be appeared immediately. The complications include edema, blood vessel form in cornea, scar, permanent blurry, staphyloma, and cataract.

■ Ingestion：

1. Cause immediate pain, mouth burn and mucous membrane corrosion. First the injure area becomes white, blister then turns into brown, edema and ulcer.
2. May increase the saliva and difficulty in swallowing and speaking.
3. Even though there's no obvious burn mark, but the esophagus and stomach may be burned, with vomit and diarrhea. The vomit is sticky with mucous and contains lightly with blood and sweat.
4. Epiglottis edema may cause painful breathing and asphyxia.
5. May cause hypotension shock, weakness, speed-up in pulse rate, shallow breathing, cold and wet skin. Circulation collapse may cause repeatedly. If there's no adjustment, may cause kidney failure.
6. The most serious condition comes with gastric perforation, the second is esophageal perforation, finally may cause peritonitis with fever and stiffness in stomach.
7. The first few weeks may cause the restriction of the esophagus, stomach and pylorus. These symptoms may be delayed to several months or years.
8. Asphyxia, circulation collapse or reverse inhalation of this chemical may cause death in very short times. The origin of the death may come from the complication of the perforation, pneumonia, and the restriction of the esophagus, stomach and pylorus.

- LD_{50}: 25mg/kg (guinea pig，skin)
- LC_{50}: --

Specific effects：The exposure period and the concentration may affect the results. Long term or repeat exposure may cause the inflammation and ulceration of the mouth. May also effect the bronchus, gastrointestinal function, come with dermatitis, conjunctivitis, the cause of the acute exposure influences.

Section 12 - Ecological Information

Ecotoxicology：

■ LC_{50}(fish)：--

■ EC_{50}(Aquatic Invertebrates)：--   ■ Bioconcentration factor (BCF)：--
Persistence and degradability：   ■ Half-Life (Air)：--   ■ Half-Life (Water surface)：--   ■ Half-Life (Groundwater)：--   ■ Half-Life (Soil)：--
Bioaccumulative potential：--
Mobility in soil：--
Other adverse effects：--

Section 13 - Disposal Considerations

Methods of disposal：   1. Refer to the related regulation   2. Recycle any unused portion of the material for its approved use or return it to the manufacturer or supplier.   3. Incinerate in the certified incineration furnace or volatile the disposal.   4. If possible, recycle the containers or dispose in the certified landfill.

Section 14 - MSDS Transport Information

UN classification number：1835
Proper D.O.T Shipping Name：Tetramethyl Ammonium Hydroxide
Hazard Class：8
Packing Group：Ⅱ
Marine pollution：no
Specific precautionary transport measures and conditions：--

Section 15 - Regulatory Information

Regulations：   1. Regulations for Labor Safety and Health Installations   2. Regulations for Chemical Hazard Communication   3. Road Traffic Safety Regulations   4. Industrial Waste Storage and Disposal Regulations and Facility Standards

Section 16 - Other Information

Literature references	1. RTECS Database，TOMES PLUS Disc，Vol.68 ，2006 2. ChemWatch Database，2006-1 3. OHS MSDS Database，2006 4. HSDB Database，TOMES PLUS Disc，Vol.68 ，2006
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Remarks	Symbols Explanations: "--" No information is available at this time. "/" Not applicable to this substance.		

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