MATERIAL SAFETY DATA SHEET

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURER: TRANSENE COMPANY, INC.
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WWW.TRANSENE.COM
EMERGENCY NO. 1-800-424-9300 CHEMTREC

MATERIAL NAME: TITANIUM ETCHANT TFTN
REVISED: March 2009
CHEMICAL FAMILY: Aqueous Acid Solution
SYNONYMS: Chlorohydric Acid, Hydrogen Chloride, Muriatic Acid

SECTION 2. HEALTH HAZARD INFORMATION

GHS Classifications

Oxidizing liquids: Not classified
Corrosive to Metals: Category 1
Acute toxicity Oral: Category 1
Acute toxicity Inhalation: Category 2
Skin corrosion / Skin irritation: Category 1B
Serious eye damage / Eye irritation: Category 1
Respiratory or skin sensitization: Not classified
Special target organ systemic toxicity single exposure: Category 3
Special target organ systemic toxicity repeated exposure: Not classified
Acute aquatic environmental hazards: Not classified
Chronic aquatic environmental hazards: Not classified

Pictograms or Hazard symbols

⚠️ Warning: May be corrosive to metals

☠️ Danger: Fatal if swallowed. Toxic if inhaled.

☠️💀 Danger: Causes severe skin burns and eye damage. Causes serious eye damage.
Precautionary Statement Prevention
Use only in a well-ventilated area. Do not eat, drink or smoke when using this product. Do not breathe fume/gas/mist/vapors/spray.
Wear protective gloves/protective clothing /eye protection/face protection.
Wash hands thoroughly after handling.
Avoid release to the environment

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Material</th>
<th>Wt %</th>
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<tbody>
<tr>
<td>Hydrochloric Acid</td>
<td>20-30</td>
</tr>
<tr>
<td>Water</td>
<td>70-80</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
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</tbody>
</table>

SECTION 4. FIRST AID MEASURES
EFFECTS OF OVEREXPOSURE
FIRST AID:
Eye Contact: Corrosive to naked eye; in case of contact flush eyes well for 15 minutes, lifting the lower and upper eyelids occasionally. May cause permanent eye damage or blindness. Seek medical attention.
Skin Contact: Obtain medical attention: Corrosive to exposed skin. Flush skin well with water for 15 minutes, wash with soap and water. Remove affected clothing, get medical attention. May cause deep, penetrating burns.
Inhalation: If inhaled, remove to fresh air. If not breathing give artificial respiration. Seek medical attention. Inhalation of vapors may cause coughing, choking, inflammation of the nose, throat, and upper respiratory tract. In severe cases, may pulmonary edema, circulatory failure, and death.
Ingestion: Will cause severe burns to the mouth and severe and permanent damage to the digestive tract. Causes gastrointestinal burns and perforation of the digestive tract. Get Medical Attention immediately. Do not induce vomiting; give large quantities of water.

SECTION 5. FIRE FIGHTING MEASURES
Flash Point and Method: non-flammable
Autoignition Temp. NA
Flammability Limits In Air
LOWER NA UPPER NA

Extinguishing media: Water spray. Neutralize with soda ash or slaked lime.

SECTION 6. ACCIDENTAL RELEASE MEASURES
SPILLS, LEAKS: Ventilate area of leak or spill. Stop leak if possible to do so without risk. Clean-up personnel should wear protective clothing and NIOSH approved respirator. Dike and cover the contaminated areas with absorbent, non-combustible material such as earth, sand, or vermiculite. Neutralize with alkaline material such as soda ash or lime. Do not use combustibles. Do not flush to sewer.
**SECTION 7. HANDLING AND STORAGE**

Wash thoroughly after handling. Remove contaminated clothing and wash before re-use. Do not breathe mist or vapor. Do not expose eyes, skin, or clothing. Keep container closed tightly. Avoid contact with combustibles. Do not use with metal tools or items. Use with adequate ventilation or respiratory protection. Do not store near combustibles or in direct sunlight. Store in a cool, dry, well-ventilated area away from incompatible substances. Separate from metals, alkali, and organics. Residue in empty containers may still be hazardous.

**SECTION 8. EXPOSURE CONTROL/PERSONAL PROTECTION**

**Respiratory protection:** Wear NIOSH/MESA approved full or half face piece (with goggles) respiratory protective equipment to avoid exposure to iodine vapors above 0.1ppm. A respiratory protection program complying with requirements of 29CFR 1910.134 is recommended.

**Ventilation:** Where adequate ventilation is not available, use NIOSH approved vapor respirator with dust, fume and mist filters. Local ventilation through fume hoods or laminar flow stations is also preferred. Keep fumes away from strong bases.

**Protective gloves:** Skin contact should be minimized through use of rubber gloves.

**Other protective equipment:** Steel tipped shoes/eye wash station/chemical safety chemical retardant clothing.

**Eye protection:** Safety goggles / face shield

**SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**

**Form:** Liquid

**Appearance:** Colorless

**Odor:** Acrid, pungent

**pH:** < 1

**Melting point:** -74 °C

**Boiling point/Boiling range:** 109 °C

**Flash point:** Non-flammable.

**Ignition point:** Will not ignite.

**Danger of explosion:** Product is not explosive

**Decomposition temperature:** > 150 °C

**Vapor density (Air = 1):** No information

**Volatiles, %:** 80-85

**Vapor pressure at 15° C, mm Hg:** 190 mm Hg at 25 °C

**Specific gravity:** 1.12

**Solubility in / Miscibility:** Completely miscible in water

**Evap. Rate (Water = 1):** No information found

**SECTION 10. STABILITY AND REACTIVITY**

**Stability:** Stable X Conditions to avoid: Excess heat, sunlight, confined spaces

**Incompatible with:**

Most common metals, strong bases, metal oxides, amines, hydroxides, cyanides, sulfides, sulfites, formaldehyde, and carbonates.

**Hazardous decomposition products:** Hydrogen chloride fumes, hydrogen gas

**Hazardous polymerization:** May occur Conditions to avoid: Excess heat, direct sunlight.

**polymerization:** Will not occur X
SECTION 11. TOXICOLOGICAL INFORMATION

ACUTE:
Inhalation rat LC50: 4500 ppm/1 hr
Oral rabbit LD50: 1350 mg/kg
Investigated as a tumorigen, mutagen, reproductive effector
Carcinogenicity: NTP: No  IARC: No  Z List: No  OSHA reg: No
IARC Category 3

OTHER DATA:
Strongly corrosive. Vapor inhalation burns mucous membranes; causes coughing, dyspnoea.

SECTION 12. ECOLOGICAL INFORMATION

Bioaccumulation: When released into the soil, this material is not expected to biodegrade. When released into the soil, this material may leach into groundwater.

Environmental Toxicity: This material is expected to be toxic to aquatic life.

SECTION 13. DISPOSAL CONSIDERATIONS

DISPOSAL: Dispose of in accordance with all federal state and local regulations. Send waste to an approved waste disposal facility.

SECTION 14. TRANSPORTATION INFORMATION

Class 8
PG II
UN1789
Shipping Name: Hydrochloric Acid Solution

SECTION 15. REGULATORY

Symbol: C, Corrosive
R-Phrase: 35, causes severe burns
S-Phrases: 23-36/37/39-45 Do not breathe vapor. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

SECTION 16. OTHER INFORMATION

NFPA Codes:
Health: 3
Flammability: 0
Reactivity: 0
R35: Causes severe burns.
Ingredients are TSCA listed.