MATERIAL SAFETY DATA SHEET

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION
Prepared January 2008
Emergency # Chemtrec: 1-800-424-9300

TRANSENE COMPANY INC
DANVERS INDUSTRIAL PARK
10 ELECTRONICS AVENUE
DANVERS, MA 01923
TEL: 978-777-7860 FAX: 978-739-5640
www.transene.com

Fluorinated Tin Oxide Etchant FTO 100-FBA5
Product Names: FTO Etchant
CAS No.: Mixture (see below)
Product Codes: FTO 100-FBA5

SECTION 2- COMPOSITION/INFORMATION ON INGREDIENTS

Components: % CAS#
Ferric Chloride FeCl₃: 30% 7705080
Hydrogen Chloride: 3-4% 7647-01-0
Fluoboric Acid 3-5% 16872-11-0

SECTION 3- HEALTH HAZARD DATA:

Effects of Overexposure: Inhalation of vapors may cause pulmonary edema, circulatory system collapse, damage to upper respiratory system, collapse. Inhalation of vapors may cause coughing and difficult breathing. Liquid may cause severe burns to skin and eyes.
Effects of Ingestion: Ingestion is harmful and may be fatal. May cause severe burning to mouth and stomach. May cause nausea and vomiting.
Medical Conditions Generally Aggravated By Exposure: None identified.
Routes of Entry: Ingestion, inhalation, skin contact and eye contact.

SECTION 4- FIRST AID MEASURES

Emergency and First Aid Procedures: CALL A PHYSICIAN. If swallowed do not induce vomiting; If conscious, give water, milk or milk of magnesia. If inhaled remove to fresh air. If not breathing give artificial respiration. If breathing is difficult give oxygen. 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 re-use.
Toxicity test results and safety and health effects are based on the solute.

SECTION 5- FIRE FIGHTING MEASURES
Flash Point: N/A NFPA 704M Rating: 3-0-0
Flammable Limits: Upper - N/A%  Lower- N/A%
Fire Extinguishing Media: Use extinguishing media appropriate for surrounding fire.
Special Fire Fighting Procedures: Firefighters should wear proper protective equipment and self-contained (positive pressure if available) breathing apparatus with full-face piece. Move exposed containers from fire area, if it can be done without risk. Use water to keep exposed containers cool; do not get water inside containers.
Unusual Fire & Explosion Hazards: Closed containers exposed to heat may explode.

SECTION 6- ACCIDENTAL RELEASE MEASURES

Steps to be taken in event of spill or discharge: Wear self-contained breathing apparatus and full protective clothing. Stop leak if you can do so without risk. Ventilate area. Neutralize spill with soda ash or lime. With clean shovel, carefully place material into clean, dry container and cover; remove from area. Flush spill area with water.

SECTION 7- HANDLING AND STORAGE

Special Precautions: Keep container tightly closed. Store on corrosion-proof area.

SECTION 8- EXPOSURE CONTROL/PERSONAL PROTECTION

Ventilation: Use general or local exhaust ventilation to meet TLV requirements.
Respiratory Protection: Respiratory required if airborne concentration exceeds TLU. Pt concentrations up to 100 ppm, a chemical cartridge respirator with acid cartridge is recommended. Above this level, a self-contained breathing apparatus is recommended.
Eye/Skin Protection: Safety goggles and face shield, uniform, protective suit and acid-resistant gloves are recommended.

SECTION 9- PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point: N/A  Melting Point: N/A
Vapor Pressure (mmHg): N/A  Vapor Density(air=l): 1.3
Specific Gravity: 1.19 (CE200); 1.33 (CE100)
Evaporation Rate: N/A
Solubility (H₂O): Complete (in all portions)
% Volatiles by Volume: 100
Appearance & Odor: Dark amber-brown liquid with hydrogen chloride odor.

SECTION 10- STABILITY AND REACTIVITY

Stability: Stable  Hazardous Polymerization: Will not occur
Incompatibles: Most common metals, strong bases, metal oxides, amines and carbonates.
Decomposition Products: Hydrogen chloride.

SECTION 11- TOXICOLOGICAL INFORMATION

PEL and TLV listed denote ceiling limit.
Threshold Limit Value (TLV/TWA):
Ferric Chloride (TLV/TWA) 900 mg/M$^3$ (FeCl$_3$)

Hydrochloric Acid (TLV/TWA) 7 mg/M$^3$ (5ppm) (HCl)

Permissible Exposure Limit (PEL): 7 mg/M$^3$ (5ppm) (HCl)

Toxicity: $LD_{50}$ (ipr-mouse) (mg/kg) -40 (HCl)
           $LD_{50}$ (oral-rabbit) (mg/kg) -900 (HCl)
           $LC_{50}$ (inhl-rat-lH) (ppm) -3124 (HCl)

Carcinogenicity: NTP: No  IARC: No  Z List: No  OSHA reg: No

SECTION 12- ECOLOGICAL INFORMATION

No data found for product.

SECTION 13- DISPOSAL CONSIDERATIONS

Disposal Procedure: Dispose in accordance with all applicable federal, state and local environmental regulations. EPP Hazardous waste number: D002 (corrosive waste).

SECTION 14- TRANSPORTATION INFORMATION

Proper Shipping Name: Ferric Chloride Solution

Hazard Class: 8

UN/NA: UN2582    PG III

Labels: Corrosive

Reportable Quantity: 5000 lbs.

INTERNATIONAL (I.M.O.)
Proper Shipping Name: Ferric Chloride Solution

Hazard Class: 8

UN/NA: UN 2582

Labels: Corrosive

SECTION 15- REGULATORY INFORMATION

Health – 3
Reactivity – 2
Flammability – 0
Contact – 3

SECTION 16- OTHER INFORMATION

N/A- Not Applicable or Not Available

The information published in this Material Safety Data Sheet has been compiled from our experience and data presented in various technical publications. It is the user's responsibility to determine the suitability of this information for the adoption of necessary safety precautions. We reserve the right to revise Material Safety Data Sheets periodically as new information becomes available.