MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATHESON TRI-GAS, INC.
150 Allen Road Suite 302
Basking Ridge, New Jersey 07920
Information: 1-800-416-2505

Emergency Contact:
CHEMTREC 1-800-424-9300
Calls Originating Outside the US:
703-527-3887 (Collect Calls Accepted)

SUBSTANCE: NITROGEN TRIFLUORIDE

TRADE NAMES/SYNONYMS:
MTG MSDS 146; NITROGEN FLUORIDE (NF3); PERFLUOROAMMONIA; TRIFLUORAMINE;
TRIFLUOROAMMONIA; TRIFLUORAMINE; TRIFLUORAMMONIA; UN 2451; F3N; MAT16650;
RTECS QX1925000

CHEMICAL FAMILY: halogens

PRODUCT USE: industrial

CREATION DATE: Jan 24 1989
REVISION DATE: Dec 11 2008

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: NITROGEN TRIFLUORIDE
CAS NUMBER: 7783-54-2
PERCENTAGE: 100.0

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=1  FIRE=0  REACTIVITY=0

EMERGENCY OVERVIEW:
COLOR: colorless
PHYSICAL FORM: gas
ODOR: damp, moldy odor
MAJOR HEALTH HAZARDS: blood damage
PHYSICAL HAZARDS: Containers may rupture or explode if exposed to heat. Strong oxidizer. Contact with combustible material may cause fire.
POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: harmful if inhaled, irritation, nausea, vomiting, difficulty breathing, irregular heartbeat, headache, drowsiness, dizziness, bluish skin color, lung congestion, blood disorders, convulsions, coma
LONG TERM EXPOSURE: blood disorders, kidney damage, liver damage
SKIN CONTACT:
LONG TERM EXPOSURE: no information on significant adverse effects
EYE CONTACT:
LONG TERM EXPOSURE: no information on significant adverse effects
INGESTION:
SHORT TERM EXPOSURE: ingestion of a gas is unlikely
LONG TERM EXPOSURE: ingestion of a gas is unlikely

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

SKIN CONTACT: If frostbite or freezing occur, immediately flush with plenty of lukewarm water (105-115 F; 41-46 C). DO NOT USE HOT WATER. If warm water is not available, gently wrap affected parts in blankets. Get immediate medical attention.

EYE CONTACT: Immediately flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: If a large amount is swallowed, get medical attention.

ANTIDOTE: methylene blue, intravenous; ascorbic acid, intravenous.

NOTE TO PHYSICIAN: For inhalation, consider oxygen.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Oxidizer. May ignite or explode on contact with combustible materials.

EXTINGUISHING MEDIA: water

Large fires: Flood with water. Apply water from a protected location or from a safe distance.

FIRE FIGHTING: Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool
containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Flood with water. Cool containers with water spray until well after the fire is out. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Evacuate if fire gets out of control or containers are directly exposed to fire. Evacuation radius: 800 meters (1/2 mile).

FIRE FIGHTING PROTECTIVE EQUIPMENT: Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure.

FLASH POINT: Not available
LOWER FLAMMABLE LIMIT: Not available
UPPER FLAMMABLE LIMIT: Not available
AUTOIGNITION: Not available

6. ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:
Avoid contact with combustible materials. Do not touch spilled material. Small dry spills: Move containers away from spill to a safe area. Small liquid spills: Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Large spills: Dike for later disposal. Keep unnecessary people away, isolate hazard area and deny entry.

7. HANDLING AND STORAGE


8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
NITROGEN TRIFLUORIDE:
10 ppm (29 mg/m3) OSHA TWA
10 ppm ACGIH TWA
10 ppm (29 mg/m3) NIOSH recommended TWA 10 hour(s)

VENTILATION: Provide local exhaust ventilation system. Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.
EYE PROTECTION: Wear chemical safety goggles. A faceshield is recommended. For the liquid: Wear splash resistant safety goggles. Contact lenses should not be worn. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing. For the liquid: Wear appropriate protective, cold insulating clothing.

GLOVES: Wear chemical resistant, insulated gloves.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.

**100 ppm**
Any air-purifying half-mask respirator equipped with cartridge(s) providing protection against the compound of concern.
Any supplied-air respirator.

**250 ppm**
Any supplied-air respirator operated in a continuous-flow mode.
Any powered, air-purifying respirator with cartridge(s) providing protection against this substance.

**500 ppm**
Any air-purifying respirator with a full facepiece and a canister providing protection against this substance.
Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted canister providing protection against the compound of concern.
Any powered, air-purifying respirator with a tight-fitting facepiece and cartridge(s) providing protection against this substance.
Any supplied-air respirator with a tight-fitting facepiece that is operated in a continuous-flow mode.
Any self-contained breathing apparatus with a full facepiece.
Any supplied-air respirator with a full facepiece.

**1000 ppm**
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode.
Emergency or planned entry into unknown concentrations or IDLH conditions -
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.

Escape -
Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted canister providing protection against the compound of concern.
Any appropriate escape-type, self-contained breathing apparatus.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: gas
COLOR: colorless
ODOR: damp, moldy odor
MOLECULAR WEIGHT: 71.00
MOLECULAR FORMULA: F3-N
BOILING POINT: -200 to -184 F (-129 to -120 C)
FREEZING POINT: -359 to -341 F (-217 to -207 C)
DECOMPOSITION POINT: Not available
VAPOR PRESSURE: 1500 mmHg @ -119 C
VAPOR DENSITY (air=1): 2.46
SPECIFIC GRAVITY: Not applicable
DENSITY: 2.96 g/L @ 20 C
WATER SOLUBILITY: slightly soluble
PH: Not applicable
VOLATILITY: Not applicable
ODOR THRESHOLD: Not available
EVAPORATION RATE: Not applicable
VIScosity: 0.018 cP @ 25 C
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not applicable

10. STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: Avoid contact with combustible materials. May ignite or explode on contact with combustible materials. Keep out of water supplies and sewers.

INCOMPATIBILITIES: combustible materials, bases, reducing agents, metals

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: halogenated compounds

POLYMERIZATION: Will not polymerize.

11. TOXICOLOGICAL INFORMATION

NITROGEN TRIFLUORIDE:
TOXICITY DATA: 6700 ppm/1 hour(s) inhalation-rat LC50
ACUTE TOXICITY LEVEL:
Toxic: inhalation
TARGET ORGANS: blood
kidneys, liver
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: blood system disorders, liver disorders, kidney disorders
12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA:
FISH TOXICITY: No data available.

INVERTEBRATE TOXICITY: No data available.

ALGAL TOXICITY: No data available.

FATE AND TRANSPORT:
BIODEGRADATION: No data available.

13. DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: Nitrogen trifluoride
ID NUMBER: UN2451
HAZARD CLASS OR DIVISION: 2.2
LABELING REQUIREMENTS: 2.2; 5.1

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:
SHIPPING NAME: Nitrogen trifluoride, compressed
UN NUMBER: UN2451
CLASS: 2.2; 5.1

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4): Not regulated.


SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370 Subparts B and C):
ACUTE: Yes
CHRONIC: Yes
FIRE: Yes
REACTIVE: No
SUDDEN RELEASE: Yes


OSHA PROCESS SAFETY (29 CFR 1910.119):
NITROGEN TRIFLUORIDE: 5000 LBS TQ

STATE REGULATIONS:
California Proposition 65: Not regulated.

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: A, D1A.

NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

CANADA INVENTORY (DSL/NDSL): Not determined.

16. OTHER INFORMATION

MSDS SUMMARY OF CHANGES
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