# 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 DIOXIDE, LIQUID**

**TRADE NAMES/SYNONYMS:**
MTG MSDS 68; NITROGEN DIOXIDE LIQUID; NITROGEN OXIDE (NO2); NITRITE RADICAL; NITRITO; NITRO; NITROGEN DIOXIDE; NITROGEN DIOXIDE (NO2); NITROGEN PEROXIDE; DINITROGEN TETRAOXIDE; RCRA P078; UN 1067; NO2; MAT16630; RTECS QW9800000

**CHEMICAL FAMILY:** inorganic, liquid

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

## 2. COMPOSITION, INFORMATION ON INGREDIENTS

**COMPONENT:** NITROGEN DIOXIDE, LIQUID
**CAS NUMBER:** 10102-44-0
**PERCENTAGE:** 100

## 3. HAZARDS IDENTIFICATION

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


**EMERGENCY OVERVIEW:**
**COLOR:** yellow or brown
**PHYSICAL FORM:** liquid
**ODOR:** pungent odor, irritating odor
**MAJOR HEALTH HAZARDS:** potentially fatal if inhaled, respiratory tract burns, skin burns, eye burns, mucous membrane burns
**PHYSICAL HAZARDS:** Containers may rupture or explode if exposed to heat. May ignite combustibles.

**POTENTIAL HEALTH EFFECTS:**
**INHALATION:**

**SHORT TERM EXPOSURE:** burns, cough, fatigue, nausea, stomach pain, difficulty breathing, irregular heartbeat, headache, dizziness, bluish skin color, lung congestion, lung damage, unconsciousness, death
**LONG TERM EXPOSURE:** burns, tooth decay, cough, headache, dizziness, skin disorders, difficulty breathing, digestive disorders, lung damage
**SKIN CONTACT:**
**SHORT TERM EXPOSURE:** burns, frostbite
**LONG TERM EXPOSURE:** burns
**EYE CONTACT:**
**SHORT TERM EXPOSURE:** burns, frostbite, blurred vision, eye damage
**LONG TERM EXPOSURE:** burns, blurred vision, eye damage
**INGESTION:**
**SHORT TERM EXPOSURE:** burns, frostbite, nausea, vomiting, stomach pain
**LONG TERM EXPOSURE:** burns

## 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:** Contact with liquid: Immediately flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

**INGESTION:** If swallowed, drink plenty of water, do NOT induce vomiting. Get immediate medical attention.

**NOTE TO PHYSICIAN:** For inhalation, consider oxygen. Avoid gastric lavage or emesis.

## 5. FIRE FIGHTING MEASURES

**FIRE AND EXPLOSION HAZARDS:** Negligible fire hazard. Oxidizer. May ignite or explode on contact with combustible materials. Containers may rupture or explode if exposed to heat.

**EXTINGUISHING MEDIA:** water

Do not use dry chemicals, carbon dioxide or halogenated extinguishing agents. Large fires: Flood with fine water spray.

**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: If

this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. For small fires, contain and let burn. Use extinguishing agents appropriate for surrounding fire. 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. Stay upwind and keep out of low areas. Evacuation radius: 800 meters (1/2 mile).

## 6. ACCIDENTAL RELEASE MEASURES

**AIR RELEASE:**
Reduce vapors with water spray. Collect runoff for disposal as potential hazardous waste.

**SOIL RELEASE:**
Trap spilled material at bottom in deep water pockets, excavated holding areas or within sand bag barriers. Dike for later disposal. Absorb with sand or other non-combustible material. Add an alkaline material (lime, crushed limestone, sodium bicarbonate, or soda ash).

**WATER RELEASE:**
Add an alkaline material (lime, crushed limestone, sodium bicarbonate, or soda ash). Collect spilled material using mechanical equipment.

**OCCUPATIONAL RELEASE:**
Stop leak if possible without personal risk. Avoid contact with combustible materials. Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

## 7. HANDLING AND STORAGE

**STORAGE:** Store and handle in accordance with all current regulations and standards. Store in a cool, dry place. Store in a well-ventilated area. NFPA 430 Code for the Storage of Liquid and Solid Oxidizing Materials. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101. Notify State Emergency Response Commission for storage or use at amounts greater than or equal to the TPQ (U.S. EPA SARA Section 302). SARA Section 303 requires facilities storing a material with a TPQ to participate in local emergency response planning (U.S. EPA 40 CFR 355 Part B). Keep separated from incompatible substances.

**HANDLING:** Subject to handling regulations: U.S. OSHA 29 CFR 1910.119.

## 8. EXPOSURE CONTROLS, PERSONAL PROTECTION

**EXPOSURE LIMITS:**
**NITROGEN DIOXIDE, LIQUID:**
**NITROGEN DIOXIDE:**

5 ppm (9 mg/m3) OSHA ceiling
1 ppm (1.8 mg/m3) OSHA STEL (vacated by 58 FR 35338, June 30, 1993)
3 ppm ACGIH TWA
5 ppm ACGIH STEL
1 ppm (1.8 mg/m3) NIOSH recommended STEL

**VENTILATION:** Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

**EYE PROTECTION:** For the gas: Eye protection not required, but 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:** For the gas: Protective clothing is not required. For the liquid: Wear appropriate protective, cold insulating clothing.

**GLOVES:** Wear insulated gloves.

**RESPIRATOR:** The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.
**20 ppm**
Any supplied-air respirator operated in a continuous-flow mode.
Any self-contained breathing apparatus with a full facepiece.
Any supplied-air respirator with a full facepiece.
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.
Only non-oxidizable sorbents are allowed (not charcoal).
Any appropriate escape-type, self-contained breathing apparatus.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**PHYSICAL STATE:** gas
**COLOR:** yellow or brown
**PHYSICAL FORM:** liquid
**ODOR:** pungent odor, irritating odor
**MOLECULAR WEIGHT:** 46.01
**MOLECULAR FORMULA:** N-O2
**BOILING POINT:** 70 F (21 C)
**FREEZING POINT:** 12 F (-11 C)

**VAPOR PRESSURE:** 720 mmHg @ 20 C
**VAPOR DENSITY (air=1):** 1.58
**SPECIFIC GRAVITY (water=1):** 1.449
**WATER SOLUBILITY:** decomposes
**PH:** Not applicable
**VOLATILITY:** Not applicable
**ODOR THRESHOLD:** 5 ppm
**EVAPORATION RATE:** Not applicable
**VISCOSITY:** 0.42 cP @ 20 C
**COEFFICIENT OF WATER/OIL DISTRIBUTION:** Not applicable
**SOLVENT SOLUBILITY:**
**Soluble:** concentrated sulfuric acid, nitric acid, carbon disulfide, chloroform, alkali

## 10. STABILITY AND REACTIVITY

**REACTIVITY:** Stable at normal temperatures and pressure.

**CONDITIONS TO AVOID:** Avoid contact with combustible materials. Minimize contact with material. Avoid inhalation of material or combustion by-products. Keep out of water supplies and sewers.

**INCOMPATIBILITIES:** combustible materials, metals, bases, metal oxides, reducing agents, metal carbide, halo carbons, halogens, oxidizing materials, metal salts, amines, acids, fluorine, ammonia

**HAZARDOUS DECOMPOSITION:**
Thermal decomposition products: oxides of nitrogen

**POLYMERIZATION:** Will not polymerize.

## 11. TOXICOLOGICAL INFORMATION

**NITROGEN DIOXIDE, LIQUID:**
**TOXICITY DATA:** 88 ppm/4 hour(s) inhalation-rat LC50
**CARCINOGEN STATUS:** ACGIH: A4 -Not Classifiable as a Human Carcinogen
**LOCAL EFFECTS:**
Corrosive: inhalation, skin, eye
**ACUTE TOXICITY LEVEL:**
Highly Toxic: inhalation
**TUMORIGENIC DATA:** Available.
**MUTAGENIC DATA:** Available.
**REPRODUCTIVE EFFECTS DATA:** Available.

## 12. ECOLOGICAL INFORMATION

**ECOTOXICITY DATA:**
**FISH TOXICITY:** 3000 ug/L 24 hour(s) (Hematological) Red drum (Sciaenops ocellatus)

**INVERTEBRATE TOXICITY:** 30330 ug/L 144 hour(s) LC50 (Mortality) Redtail prawn (Penaeus penicillatus)

## 13. DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations. Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): P078.

## 14. TRANSPORT INFORMATION


**U.S. DOT 49 CFR 172.101:**
**PROPER SHIPPING NAME:** Dinitrogen tetroxide
**ID NUMBER:** UN1067
**HAZARD CLASS OR DIVISION:** 2.3
**LABELING REQUIREMENTS:** 2.3; 5.1; 8
**QUANTITY LIMITATIONS:**
**PASSENGER AIRCRAFT OR RAILCAR:** Forbidden
**CARGO AIRCRAFT ONLY:** Forbidden
**ADDITIONAL SHIPPING DESCRIPTION:** Toxic-Inhalation Hazard Zone A

**CANADIAN TRANSPORTATION OF DANGEROUS GOODS:**
**SHIPPING NAME:** Nitrogen dioxide
**UN NUMBER:** UN1067
**CLASS:** 2.3; 5.1; 8

## 15. REGULATORY INFORMATION

**U.S. REGULATIONS:**
**CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):**
**NITROGEN DIOXIDE:** 10 LBS RQ (exemption <1000 lbs/24 hr to air of NO2 resulting from combustion activities)

**SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355 Subpart B):**
**NITROGEN DIOXIDE:** 100 LBS TPQ

**SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355 Subpart C):**
**NITROGEN DIOXIDE:** 10 LBS RQ (exemption <1000 lbs/24 hr to air of NO2 resulting from combustion activities)

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

**SARA TITLE III SECTION 313 (40 CFR 372.65):** Not regulated.

**OSHA PROCESS SAFETY (29 CFR 1910.119):**
**NITROGEN DIOXIDE:** 250 LBS TQ

**STATE REGULATIONS:**
**California Proposition 65:** Not regulated.

**CANADIAN REGULATIONS:**
**WHMIS CLASSIFICATION:** A, C, D1A, D2B, E

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

**TSCA 12(b) EXPORT NOTIFICATION:** Not listed.

**CANADA INVENTORY (DSL/NDSL):** Listed on DSL.

## 16. OTHER INFORMATION



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