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: CARBON MONOXIDE

TRADE NAMES/SYNONYMS:
MTG MSDS 18; CARBON OXIDE; CARBONIC OXIDE; CARBON OXIDE (CO); FLUE GAS; UN 1016; CO; MAT04290; RTECS FG3500000

CHEMICAL FAMILY: inorganic, gas

PRODUCT USE: industrial

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

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: CARBON MONOXIDE
CAS NUMBER: 630-08-0
PERCENTAGE: 100

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=3 FIRE=4 REACTIVITY=0

EMERGENCY OVERVIEW:
COLOR: colorless
PHYSICAL FORM: gas
ODOR: odorless
MAJOR HEALTH HAZARDS: harmful if inhaled, blood damage, difficulty breathing
PHYSICAL HAZARDS: Flammable gas. May cause flash fire.

POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: changes in body temperature, changes in blood pressure, nausea, vomiting, chest pain, difficulty breathing, irregular heartbeat, headache, drowsiness, fatigue, dizziness, disorientation, hallucinations, pain in extremities, tremors, loss of coordination, hearing loss, visual disturbances, eye damage, bluish skin color, suffocation, blood disorders, convulsions, coma
LONG TERM EXPOSURE: nausea, vomiting, loss of appetite, headache, dizziness, visual disturbances, blood disorders, heart disorders, heart damage, nerve damage, reproductive effects, birth defects, brain damage
SKIN CONTACT:
SHORT TERM EXPOSURE: blisters, frostbite
LONG TERM EXPOSURE: no information is available
EYE CONTACT:
SHORT TERM EXPOSURE: frostbite, blurred vision
LONG TERM EXPOSURE: no information is available
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: Contact with liquid: 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.

NOTE TO PHYSICIAN: For inhalation, consider oxygen.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Severe fire hazard. Vapor/air mixtures are explosive. Containers may rupture or explode if exposed to heat.

EXTINGUISHING MEDIA: carbon dioxide, regular dry chemical

Large fires: Use regular foam or 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: 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. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck: Evacuation radius: 800 meters (1/2 mile). Do not attempt to extinguish fire unless flow of material can be stopped first. Flood with fine water spray. Cool containers with water. 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.

**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:** &ge;12.5 % by volume  
**UPPER FLAMMABLE LIMIT:** 74 % by volume  
**AUTOIGNITION:** 1292 F (700 C)

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6. **ACCIDENTAL RELEASE MEASURES**

**WATER RELEASE:**  
Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Keep out of water supplies and sewers.

**OCCUPATIONAL RELEASE:**  
Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk. Reduce vapors with water spray. Keep unnecessary people away, isolate hazard area and deny entry. Remove sources of ignition.

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7. **HANDLING AND STORAGE**


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8. **EXPOSURE CONTROLS, PERSONAL PROTECTION**

**EXPOSURE LIMITS:**

**CARBON MONOXIDE:**

50 ppm (55 mg/m3) OSHA TWA  
35 ppm (40 mg/m3) OSHA TWA (vacated by 58 FR 35338, June 30, 1993)  
200 ppm (229 mg/m3) OSHA ceiling (vacated by 58 FR 35338, June 30, 1993)  
25 ppm ACGIH TWA  
35 ppm (40 mg/m3) NIOSH recommended TWA 10 hour(s)
200 ppm (229 mg/m³) NIOSH recommended ceiling

**VENTILATION:** Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. 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.
- **350 ppm**
  Any supplied-air respirator.
- **875 ppm**
  Any supplied-air respirator operated in a continuous-flow mode.
- **1200 ppm**
  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.
  End of service life indicator required (ESLI).
  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.
  End of service life indicator required (ESLI).
  Any appropriate escape-type, self-contained breathing apparatus.

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**9. PHYSICAL AND CHEMICAL PROPERTIES**

**PHYSICAL STATE:** gas
**COLOR:** colorless
**ODOR:** odorless
**TASTE:** tasteless
**MOLECULAR WEIGHT:** 28.01
MOLECULAR FORMULA: C-O
BOILING POINT: -312.7 F (-191.5 C)
FREEZING POINT: -337 F (-205 C)
DECOMPOSITION POINT: Not available
VAPOR PRESSURE: 760 mmHg @ -191 C
VAPOR DENSITY (air=1): 0.968
SPECIFIC GRAVITY: Not applicable
DENSITY: 1.250 g/L @ 0 C
WATER SOLUBILITY: 2.3% @ 20 C
PH: Not applicable
VOLATILITY: Not applicable
ODOR THRESHOLD: Not available
EVAPORATION RATE: Not applicable
VISCOITY: 0.01657 cP @ 0 C
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not applicable
SOLVENT SOLUBILITY:
Soluble: alcohol, benzene, acetic acid, ethyl acetate, chloroform, cuprous chloride solutions

10. STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition. Minimize contact with material. Avoid inhalation of material or combustion by-products. Keep out of water supplies and sewers.

INCOMPATIBILITIES: oxidizing materials, halogens, metal oxides, metals, combustible materials, lithium

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: oxides of carbon

POLYMERIZATION: Will not polymerize.

11. TOXICOLOGICAL INFORMATION

CARBON MONOXIDE:
TOXICITY DATA: 1807 ppm/4 hour(s) inhalation-rat LC50
ACUTE TOXICITY LEVEL:
Toxic: inhalation
TARGET ORGANS: blood, heart, nervous system
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: blood system disorders, heart or cardiovascular disorders, hormonal disorders, respiratory disorders
REPRODUCTIVE EFFECTS DATA: Available.
ADDITIONAL DATA: Alcohol may enhance the toxic effects. May cross the placenta. Smoking may enhance the toxic effects.

12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA:
FISH TOXICITY: 75000 ug/L 1 day(s) LC100 (Mortality) Orangespotted sunfish (Lepomis humilis)

INVERTEBRATE TOXICITY: No data available.

ALGAL TOXICITY: No data available.

PHYTOTOXICITY: Absorbed and metabolized by plants in varying rates dependent on ecological conditions.

FATE AND TRANSPORT:
BIODEGRADATION: Oxidation to carbon dioxide in aerobic conditions found to vary between bacteria species.

ATMOSPHERIC PROCESSES: Degraded by photochemical reactions in atmosphere.

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: Carbon monoxide, compressed
ID NUMBER: UN1016
HAZARD CLASS OR DIVISION: 2.3
LABELING REQUIREMENTS: 2.3; 2.1
QUANTITY LIMITATIONS:
PASSENGER AIRCRAFT OR RAILCAR: Forbidden
CARGO AIRCRAFT ONLY: 25 kg
ADDITIONAL SHIPPING DESCRIPTION: Toxic-Inhalation Hazard Zone D

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:
SHIPPING NAME: Carbon monoxide, compressed
UN NUMBER: UN1016
CLASS: 2.3; 2.1
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


STATE REGULATIONS:
California Proposition 65:
Known to the state of California to cause the following:
Carbon monoxide
Developmental toxicity (Jul 01, 1989)

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: A, B1, D1A, D2A.

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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