

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

GT&S, INC
(FORMERLY MG INDUSTRIES)
5275 TILGHMAN STREET
ALLENTOWN, PENNSYLVANIA 18104
PHONE: 610-398-2211
FAX: 610-398-9242

EMERGENCY CONTACT:
CHEMTREC:
1-800-424-9300

SUBSTANCE: CARBON DIOXIDE, GAS

TRADE NAMES/SYNONYMS:
CARBONIC ACID GAS; CARBONIC ANHYDRIDE; CARBON DIOXIDE; CARBON OXIDE; STCC
4904535; UN 1013; CO₂; MGIO4260; RTECS FF6400000

CHEMICAL FAMILY: oxides of carbon

CREATION DATE: May 04 1990
REVISION DATE: Sep 13 2007

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: CARBON DIOXIDE, GAS
CAS NUMBER: 124-38-9
EC NUMBER (EINECS): 204-696-9
PERCENTAGE: 100

3. HAZARDS IDENTIFICATION

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

EMERGENCY OVERVIEW:

PHYSICAL DESCRIPTION: Colorless, odorless gas, with a slight acidic taste.
MAJOR HEALTH HAZARDS: difficulty breathing
PHYSICAL HAZARDS: Containers may rupture or explode if exposed to heat.

POTENTIAL HEALTH EFFECTS:

INHALATION:

SHORT TERM EXPOSURE: ringing in the ears, nausea, irregular heartbeat,
headache, drowsiness, dizziness, tingling sensation, visual disturbances,
suffocation, convulsions, coma
LONG TERM EXPOSURE: no information on significant adverse effects

SKIN CONTACT:

SHORT TERM EXPOSURE: blisters, frostbite
LONG TERM EXPOSURE: no information on significant adverse effects

EYE CONTACT:

SHORT TERM EXPOSURE: irritation, blurred vision
LONG TERM EXPOSURE: no information on significant adverse effects

INGESTION:

SHORT TERM EXPOSURE: frostbite
LONG TERM EXPOSURE: no information is available

CARCINOGEN STATUS:

OSHA: No
NTP: No
IARC: No

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: Flush eyes with plenty of water.

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: Negligible fire hazard.

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 tank, rail car or tank truck, evacuation radius: 800 meters (1/2 mile). 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. Do not get water directly on material. Reduce vapors with water spray. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Consider downwind evacuation if material is leaking.

6. ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:

Do not touch spilled material. Stop leak if possible without personal risk. Keep unnecessary people away. Isolate hazard area and deny entry. Ventilate closed spaces before entering.

7. HANDLING AND STORAGE

STORAGE: Cylinder temperature should not exceed 125 F (52 C).
 29 CFR Subpart "H" - Hazardous Materials.
 National Fire Protection Association publication #55, "Standard for the Storage, Use and Handling of Compressed and Liquefied Gases in Portable Cylinders."
 Compressed Gas Association publication P-1, "Safe Handling of Compressed Gases in Containers."
 Store and handle in accordance with current regulations and standards:
 OSHA 29 CFR 1910.101

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:

CARBON DIOXIDE, GAS:

CARBON DIOXIDE:
 5000 ppm (9000 mg/m³) OSHA TWA
 10000 ppm (18000 mg/m³) OSHA TWA (vacated by 58 FR 35338, June 30, 1993)
 30000 ppm (54000 mg/m³) OSHA STEL (vacated by 58 FR 35338, June 30, 1993)
 5000 ppm ACGIH TWA
 30000 ppm ACGIH STEL
 5000 ppm (9000 mg/m³) NIOSH recommended TWA 10 hour(s)
 30000 ppm (54000 mg/m³) NIOSH recommended STEL
 9100 mg/m³ (5000 ml/m³) DFG MAK (peak limitation category - II, with excursion factor of 2)
 9000 mg/m³ (5000 ppm) EC OEL TWA (IOELV)
 5000 ppm (9150 mg/m³) UK WEL TWA
 15000 ppm (27400 mg/m³) UK WEL STEL

MEASUREMENT METHOD: NIOSH IV # 6603; OSHA ID172

VENTILATION: Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Eye protection not required, but recommended.

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.

40,000 ppm
 Any supplied-air respirator.
 Any self-contained breathing apparatus 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 appropriate escape-type, self-contained breathing apparatus.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DESCRIPTION: Colorless, odorless gas, with a slight acidic taste.

MOLECULAR WEIGHT: 44.01
 MOLECULAR FORMULA: C-O₂
 BOILING POINT: Not available
 FREEZING POINT: -71 F (-57 C) @ 4000 mmHg
 SUBLIMATION POINT: -110 F (-79 C)
 VAPOR PRESSURE: 43700 mmHg @ 21 C
 VAPOR DENSITY (air=1): 1.5
 SPECIFIC GRAVITY (water=1): 1.522 @ 21 C
 WATER SOLUBILITY: soluble
 PH: acidic in solution
 VOLATILITY: Not applicable
 ODOR THRESHOLD: Not applicable
 EVAPORATION RATE: Not applicable
 COEFFICIENT OF WATER/OIL DISTRIBUTION: Not applicable
 SOLVENT SOLUBILITY:
 Soluble: alcohol, acetone, hydrocarbons, organic solvents

10. STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: Protect from physical damage and heat. Containers may rupture or explode if exposed to heat. Avoid contact with water or moisture.

INCOMPATIBILITIES: combustible materials, oxidizing materials, metal salts, reducing agents, metal carbide, metals, bases

CARBON DIOXIDE:
 ACRYLALDEHYDE: Exothermic polymerization.
 BARIUM PEROXIDE: Incandescent reaction.
 CESIUM OXIDE: Ignition.
 DIETHYL MAGNESIUM: Ignition.
 ETHYLENEIMINE: Explosive polymerization.
 HYDRAZINE: Decomposition.
 METAL ACETYLIDES: Ignition or incandescence.
 METAL HYDRIDES: Reduction reaction.
 METALS: Dusts of many metals suspended in carbon dioxide atmospheres are ignitable and explosive; some bulk metals will burn in the gas at elevated temperatures.
 POTASSIUM: Mixtures of the solids are impact-sensitive.
 POTASSIUM-SODIUM ALLOY: Mixtures of the solids are impact-sensitive.
 SODIUM: Mixtures of the solids are impact-sensitive.
 SODIUM PEROXIDE: Highly exothermic reaction; may be explosive in the presence of metals.

POLYMERIZATION: Will not polymerize.

11. TOXICOLOGICAL INFORMATION

CARBON DIOXIDE, GAS:

TOXICITY DATA: 9 pph/5 minute(s) inhalation-human LC50: 90000 ppm/5 minute(s)
 inhalation-mammal LC50: 20 pph inhalation-mouse TCLO: 21 pph/1 hour(s)
 inhalation-rat TCLO: 11 pph/2 hour(s) inhalation-mammal TCLO: 70 pph
 inhalation-mammal TCLO: 5 pph/5 hour(s) inhalation-rabbit TCLO: 3 pph/7
 day(s) inhalation-rabbit TCLO: 5 pph inhalation-dog TCLO: 10 pph
 inhalation-dog TCLO: 11 pph inhalation-human LC50: 0.25 pph inhalation-human
 TCLO: 2.5 pph inhalation-human TCLO: 7 pph inhalation-human TCLO: 0.1 pph/20
 minute(s) inhalation-rabbit TCLO: 7 pph/20 minute(s) inhalation-human TCLO:
 361 gm/m3/2 hour(s) inhalation-mouse LC50: 200000 ppm/2 hour(s)
 inhalation-mouse LC50: 470000 ppm/30 minute(s) inhalation-rat LC50: 10000
 ppm/24 hour(s)-30 day(s) continuous inhalation-rat TCLO: 27000 ppm/24
 hour(s)-30 day(s) continuous inhalation-rabbit TCLO: 4 pph/1 hour(s)-7
 day(s) intermittent inhalation-dog TCLO

ACUTE TOXICITY LEVEL:

Relatively Non-toxic: inhalation
 MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: heart or cardiovascular disorders,
 respiratory disorders

REPRODUCTIVE EFFECTS DATA: 6 pph inhalation-rat TCLO/24 hour(s) 10 day(s)
 pregnant female continuous; 55 pph inhalation-mouse TCLO/2 hour(s) 3 day(s)
 male; 55 pph inhalation-mouse TCLO/4 hour(s) 6 day(s) male; 2 pph
 inhalation-mouse TCLO/8 hour(s) 10 day(s) pregnant female continuous; 13 pph
 inhalation-rabbit TCLO/4 hour(s) 9-12 day(s) pregnant female continuous

HEALTH EFFECTS:

INHALATION:

ACUTE EXPOSURE:

CARBON DIOXIDE: In the solid or liquid form carbon dioxide is very
 volatile, readily releasing the gas. At concentrations from 2-10% it may
 cause acidic taste, dyspnea, headache, vertigo, nausea, labored breathing,
 weakness, drowsiness, mental confusion, and increase in blood pressure,
 pulse and respiratory rate. Exposure to 10% for a few minutes has been
 reported to cause visual disturbances, tinnitus, tremors, profuse
 perspiration, restlessness, paresthesias, general feeling of discomfort,
 loss of consciousness, and coma. Concentrations of 25-30% may cause coma
 and convulsions within one minute. Tachycardia and arrhythmias are
 possible. Concentrations of 50% may cause symptoms of hypocalcemia
 including carpopedal spasms. Excessive carbon dioxide for a time period of
 not more than 5 minutes was reported to cause effects on vision with
 constriction of visual fields, enlargement of blind spots, photophobia,
 loss of convergence and accommodation, and deficient dark adaptation as
 well as headache, insomnia, and personality changes, largely depression
 and irritability. Even when there is sufficient oxygen present to prevent
 simple asphyxiation by carbon dioxide, high concentrations may cause
 adverse effects by interfering with its normal elimination from the body.
 Initially, exposure to increased carbon dioxide concentrations results in
 a compensatory increase in both rate and depth of ventilation. Beyond a
 certain point, however, this may reverse to hypoventilation resulting in
 respiratory acidosis. Death from asphyxia may occur if the concentration
 and duration of exposure are sufficient. Reproductive effects have been
 reported in animals.

CHRONIC EXPOSURE:

CARBON DIOXIDE: It has been reported that persons may tolerate 1.5% in
 inhaled air for prolonged periods without adverse effects, but
 calcium/phosphorus metabolism may be affected with serum levels of calcium
 and urinary phosphorus progressively falling. At 2% concentration,
 deepened respiration may occur. At 3% impairment of performance has been
 noted. It has, however, been demonstrated that the development of

tolerance may occur during prolonged exposure to low levels. Reproductive
 effects have been reported in animals.

SKIN CONTACT:

ACUTE EXPOSURE:

CARBON DIOXIDE: No adverse effects have been reported from exposure to the
 gas. Due to rapid evaporation, the liquid or solid may cause frostbite
 with redness, tingling, pain, or numbness. In more severe cases, the skin
 may become hard, white, and blistered.

CHRONIC EXPOSURE:

CARBON DIOXIDE: No adverse effects are expected from exposure at low
 levels.

EYE CONTACT:

ACUTE EXPOSURE:

CARBON DIOXIDE: At high concentrations in air, carbon dioxide may cause a
 stinging sensation of the eyes. Exposure to 200,000 ppm (20%) of the gas
 may cause irritation. Due to rapid evaporation, the liquid or solid may
 cause frostbite with redness, pain, and blurred vision.

CHRONIC EXPOSURE:

CARBON DIOXIDE: No adverse effects are expected from exposure to low
 levels.

INGESTION:

ACUTE EXPOSURE:

CARBON DIOXIDE: Ingestion of a gas is unlikely. If the liquid or solid is
 swallowed, frostbite damage to the lips, mouth, and mucous membranes may
 occur.

CHRONIC EXPOSURE:

CARBON DIOXIDE: No data available.

12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA:

FISH TOXICITY: 150000 ug/L 48 day(s) (Mortality) Brown trout (Salmo trutta)

13. DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations.

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:

PROPER SHIPPING NAME: Carbon dioxide

ID NUMBER: UN1013

HAZARD CLASS OR DIVISION: 2.2

LABELING REQUIREMENTS: 2.2

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:

SHIPPING NAME: Carbon dioxide
UN NUMBER: UN1013
CLASS: 2.2

LAND TRANSPORT ADR:
PROPER SHIPPING NAME: Carbon dioxide
UN NUMBER: UN1013
CLASS: 2
CLASSIFICATION CODE: 2A
LABELS: 2.2

LAND TRANSPORT RID:
PROPER SHIPPING NAME: Carbon dioxide
UN NUMBER: UN1013
CLASS: 2
CLASSIFICATION CODE: 2A
LABELS: 2.2; (+13)

AIR TRANSPORT IATA:
PROPER SHIPPING NAME: Carbon dioxide
UN/ID NUMBER: UN1013
CLASS OR DIVISION: 2.2
HAZARD LABELS: 2.2

AIR TRANSPORT ICAO:
PROPER SHIPPING NAME: Carbon dioxide
UN NUMBER: UN1013
CLASS OR DIVISION: 2.2
LABELS: 2.2

MARITIME TRANSPORT IMDG:
PROPER SHIPPING NAME: Carbon dioxide
UN NUMBER: UN1013
CLASS OR DIVISION: 2.2

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4): Not regulated.
SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30):
Not regulated.
SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40):
Not regulated.
SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):
ACUTE: Yes
CHRONIC: No
FIRE: No
REACTIVE: No
SUDDEN RELEASE: Yes
SARA TITLE III SECTION 313 (40 CFR 372.65): Not regulated.
OSHA PROCESS SAFETY (29CFR1910.119): Not regulated.

STATE REGULATIONS:
California Proposition 65: Not regulated.
CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: Not determined.
EUROPEAN REGULATIONS:
EC CLASSIFICATION (CALCULATED): Not determined.
GERMAN REGULATIONS:
WATER HAZARD CLASS (WGK):
STATE OF CLASSIFICATION: VwVwS
CLASSIFICATION UNDER HAZARD TO WATER: 0
NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): Listed on inventory.
TSCA 12(b) EXPORT NOTIFICATION: Not listed.

16. OTHER INFORMATION

MSDS SUMMARY OF CHANGES
11. TOXICOLOGICAL INFORMATION

Copyright 1984-2007 MDL Information Systems, Inc. All rights reserved.

THIS MSDS IS SUPPLIED PURSUANT TO OSHA REGULATIONS. OTHER GOVERNMENT REGULATIONS MUST BE REVIEWED FOR APPLICABILITY TO THIS PRODUCT. WE BELIEVE THE INFORMATION SOURCE IS RELIABLE AND THE INFORMATION IS ACCURATE AS OF THE DATE HEREOF. HOWEVER, ACCURACY OR COMPLETENESS IS NOT GUARANTEED AND NO WARRANTY OF ANY TYPE IS GRANTED. THE INFORMATION RELATES ONLY TO THIS SPECIFIC PRODUCT. IF COMBINED WITH OTHER MATERIALS, ALL COMPONENT PROPERTIES MUST BE CONSIDERED.