

**Carbon Dioxide**  
**Material Safety**  
**Data Sheet**

**BOGGS GASES**

620 Main Street  
 Titusville, FL 32796  
 Phone: (321) 267-4110  
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<b>EMERGENCY PHONE #:</b> Chemtrec: 1-800-424-9300		<b>Created:</b> January 01, 2003   <b>Revised:</b> January 01, 2007			
<b>MANUFACTURER'S NAME:</b> BOGGS GASES 620 Main Street Titusville, FL 32796-3488 Ph: (321) 267-4110 FAX: (321) 267-7171		<b>TRADE NAME AND SYNONYMS:</b> Carbon Dioxide (Gas) Dry Ice (Solid Only)		<b>CHEMICAL NAME AND SYNONYMS:</b> Carbon Dioxide, Carbonic Anhydride, Carbonic Acid Gas	
		<b>FORMULA</b> CO2 MW: 44.01		<b>CHEMICAL FAMILY:</b> Nonmetallic Oxides CAS #124-38-9	
<b>HEALTH HAZARD DATA</b>					
<b>EXPOSURE LIMITS:</b> ACGIH/OSHA PEL = 5000 ppm. Short term exposure limit = 30,000 ppm. Carbon dioxide is no listed as a carcinogen by IARC, NTP, or OSHA.					
<b>SYMPTOMS IF INGESTED, CONTACTED WITH SKIN, OR VAPOR INHALED:</b> Carbon Dioxide does not support life and may produce immediately hazardous atmospheres. At a concentration in excess of 1.5%, carbon dioxide may produce hyperventilation, headaches, visual disturbances, tremor, loss of consciousness and death. Symptoms of exposure in the concentration ranges of 1.5-5% may be highly variable, but typically symptoms of carbon dioxide intoxication include the following:					
CO2 Concentration		Symptoms			
3-6%		Headaches, dyspnea, perspiration			
6-10%		Headaches, dyspnea, perspiration, tremors, visual disturbance, unconsciousness			
Over 10%		Unconsciousness			
If the concentration of carbon dioxide exceeds 10%, unconsciousness can occur without warning, preventing self-rescue. At much higher concentrations, carbon dioxide displaces the oxygen in air below levels necessary to support life.					
<b>TOXICOLOGICAL PROPERTIES:</b> Carbon Dioxide is a minor but important constituent of the atmosphere, averaging about 0.03% or 300 ppm by volume. At higher concentrations it affects the respiratory rate. Additional symptoms are described above.					
<b>RECOMMENDED FIRST AID TREATMENT</b> Persons suffering from the toxic effect of carbon dioxide should be moved to areas with normal atmospheres. SELF-CONTAINED BREATHING APPARATUS MAY BE REQUIRED TO PREVENT TOXIC EXPOSURE OR ASPHYXIATION OF RESCUE WORKERS. Assisted respiration and supplemental oxygen should be given if the victim is not breathing. Frozen tissues should be flooded or soaked with tepid water (105-115F; 41-46C). DO NOT USE HOT WATER. Cryogenic burns which result in blistering or deeper tissue freezing should be seen promptly by a physician.					
<b>FIRE AND EXPLOSION HAZARD DATA</b>					
<b>FLASH POINT (Method Used)</b> N/A		<b>AUTO IGNITION TEMP</b> N/A	<b>FLAMMABLE LIMITS</b> N/A	<b>LEL</b> N/A	<b>UEL</b> N/A
<b>EXTINGUISHING MEDIA</b> Carbon dioxide is an extinguishing agent for Class B & C fires.			<b>ELECTRICAL CLASSIFICATION GROUP</b> N/A		
<b>SPECIAL FIRE FIGHTING PROCEDURES</b> N/A					
<b>UNUSUAL FIRE AND EXPLOSION HAZARDS</b> Cylinders exposed to high heat or flame may vent rapidly.					
<b>PHYSICAL DATA</b>					
<b>BOILING POINT (F)</b> 1 atm -109.3F (-78.5C)		<b>FREEZING POINT (F)</b> @ 76 psia -69.9F (-56.6C)			
<b>VAPOR PRESSURE (psia)</b> @ 68F (20C) 831 psia (56.5 atm)		<b>SOLUBILITY IN WATER</b> @ 68F (20C), 1 ATM 87.8% by volume		<b>VAPOR DENSITY (lb/cu ft)</b> @ 68F (20C), 1 atm 0.115	
<b>SPECIFIC GRAVITY (AIR=1)</b> @ 68F (20C), 1 atm 1.53		<b>LIQUID DENSITY (lb/cu ft)</b> @ -35F (37C), 11 atm 68.74		<b>SPECIFIC GRAVITY (H2O=1)</b> solid @ -110F (-79C), 1 atm 1.56	
<b>APPEARANCE AND ODOR</b> Both liquid and gaseous Carbon Dioxide are colorless and odorless. If pressure is relieved suddenly, the liquid forms dry ice.					
<b>REACTIVITY DATA</b>					
<b>STABILITY</b>	<b>UNSTABLE</b>		<b>CONDITIONS TO AVOID</b> None		
	<b>STABLE</b>	X			
<b>INCOMPATIBILITY (Materials to avoid)</b> If moisture is present, materials must resist carbonic acid.					
<b>HAZARDOUS DECOMPOSITION PRODUCTS</b> None					
<b>HAZARDOUS</b>	<b>MAY OCCUR</b>		<b>CONDITIONS TO AVOID</b> None		
<b>POLYMERIZATION</b>	<b>WILL NOT OCCUR</b>	X			

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**SPILL OR LEAK PROCEDURES**

**STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED**

Avoid contact of skin with liquid Carbon Dioxide or its cold boil-off gas. Flush liquid Carbon Dioxide spill with water to disperse. Ventilate closed areas to prevent formation of oxygen deficient atmospheres caused by the evaporation of liquid Carbon Dioxide or the release of gaseous Carbon Dioxide.

**WASTE DISPOSAL METHOD**

Allow liquid Carbon Dioxide to evaporate in a well ventilated outdoor location remote from work areas. Vent Carbon Dioxide gas slowly to a well ventilated outdoor location remote from work areas. Do not attempt to dispose of residual Carbon Dioxide in compressed gas cylinders. Return cylinders to Boggs Gases with residual pressure, the cylinder valve tightly closed and valve caps in place.

**SPECIAL PROTECTION INFORMATION**

**RESPIRATORY PROTECTION (Specify type)**

Use self-contained breathing apparatus in oxygen deficient atmospheres. Caution! Respirators will not function. Use may result in asphyxiation.

<b>VENTILATION</b>	<b>LOCAL EXHAUST</b> As Necessary	<b>SPECIAL</b> As Necessary
Natural or mechanical where gas is present	<b>MECHANICAL (General)</b> Where low lying areas are not naturally ventilated	<b>OTHER</b> Vents should be situated to avoid higher than normal concentration of Carbon Dioxide in work areas.

**PROTECTIVE GLOVES**

Loose-fitting gloves of impermeable materials such as leather. Leather work gloves are recommended when handling compressed gas cylinders.

**EYE PROTECTION**

Chemical goggles or safety glasses. Safety glasses are recommended when handling high-pressure cylinders.

**OTHER PROTECTIVE EQUIPMENT**

None

**SPECIAL PRECAUTIONS\***

**SPECIAL LABELING INFORMATION**

DOT Shipping Name: Carbon Dioxide or Carbon Dioxide, refrigerated liquid.  
DOT Hazard Class: Nonflammable Gas  
DOT Shipping Label: Nonflammable Gas  
I.D. Number: UN 1013

**SPECIAL HANDLING RECOMMENDATIONS**

Prevent contact of liquid Carbon Dioxide or cold boil-off gas with exposed skin. Prevent entrapment of liquid in closed systems. Use only in well ventilated areas. Compressed gas cylinders contain Carbon Dioxide at extremely high pressure and should be handled with care. Use a pressure-reducing regulator and pressure relief devices when connecting to lower pressure piping systems. Secure cylinders when in use. Never use a direct flame to heat a compressed gas cylinder. Use a check valve to prevent back flow into a storage container. Avoid dragging, rolling or sliding cylinders, even for a short distance. Use a suitable hand truck. For additional handling recommendations on compressed gas cylinders, consult Compressed Gas Association Pamphlet P-1.

**SPECIAL STORAGE RECOMMENDATIONS**

It is recommended that liquid cylinders be stored outside and the gas or liquid piped to the use point. However, if liquid cylinders are to be stored or transported in an enclosed area, it is essential that the area be well ventilated. In case of poor ventilation, forced ventilation should be installed. Keep cylinders away from sources of heat. Storage should not be in heavy traffic areas to prevent accidental knocking over or damage from passing or falling objects. Valve caps should remain on cylinders not connected for use. Segregate full and empty cylinders. Storage areas should be free of combustible material. Replace the cylinder cap when the cylinder is not in use. Avoid exposure to areas where salt or other corrosive chemicals are present. See Compressed GAs Association Pamphlet P-1 for additional storage recommendations.

**SPECIAL PACKAGING RECOMMENDATIONS**

Gaseous Carbon Dioxide containers meet DOT specifications or American Society of Mechanical Engineers (ASME) codes. Liquid Carbon Dioxide is stored in vacuum-insulated containers meeting DOT specifications or ASME codes.

**OTHER RECOMMENDATIONS OR PRECAUTIONS**

Avoid use of carbon steel and other materials which become brittle at low temperatures. Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder filled without the permission of the owner is a violation of Federal Law. If oxygen-deficient atmospheres are suspected or can occur, use oxygen monitoring equipment to test for oxygen deficient atmospheres. The atmosphere in areas in which CO2 gas may be vented and collect should be tested with a portable or continuous monitoring with CO2 gas analyzer.

\* Various Government agencies (i.e., Department of Transportation, Occupational Safety and Health Administration, Food and Drug Administration and others) may have specific regulations concerning the transportation handling, storage or use of this product which will not be reflected in this data sheet. The customer should review these regulations to ensure that s/he is in full compliance.