Material Safety Data Sheet ASI Part#: BBG-20 & BBG-20103

829 Juniper Crescent, Chesapeake, VA 23320
Telephone (757) 424-3967
Toll Free 1-800-866-8100
Fax Number (757) 424-5348
For Chemical Emergency Spill Leak Fire Exposure or Accident Call CHEMTREC Day or Night
DOMESTIC NORTH AMERICA 800-424-9300
INTERNATIONAL, CALL 703-527-3887 (collect calls accepted)

Identification

Name: Carbon Monoxide in Air 0.0001% to 6.0%
CAS #: N/A MSDS ID Code #: 2060
Chemical Family: Gas Mixture Chemical Formula: CO in Air Synonyms: None

Composition/Information on Ingredients

Ingredient	% Volume	PEL-OSHA[1]	TLV-ACGIH[2]	LD_{50} or LC_{50} Route /Species
Air Formula: N/A CAS: N/A RTECS#: N/A	94.0 to 99.9999	Not Applicable	Not Applicable	Not Applicable
Carbon Monoxide Formula: CO CAS: 630-08-0 RTECS: FG3500000	0.0001 to 6.0	50PPM TWA	25 PPM TWA Stel = 400PPM	LC 50 1807 PPM / 4H (rat)

[1] As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)
[2] As stated in the ACGIH 1994-95 Threshold Limit Values for Chemical Substances and Physical Agents

Hazards Identification

Emergency Overview:
Inhaled carbon monoxide binds to the blood hemoglobin, greatly reducing the red blood cell's ability to transport oxygen to body tissues. Effects may include headaches, dizziness, convulsions, and loss of consciousness and death. Nonflammable

Route of Entry:

Skin Contact: No	Skin Absorption: No	Eye Contact: No		Ingestion: No

Health Effects:

Exposure Limits: Yes	Irritant: No	Sensitization: No
Teratogen: Yes	Reproductive Hazard: Yes	Mutagen: Yes
Synergistic Effects: None Reported		

Carcinogenicity: NTP: No IARC: No OSHA: No

Eye Effect: None reported	**Skin Effects**: None reported	**Ingestion Effects: None** reported
Inhalation Effects: Inhaled carbon monoxide binds the blood hemoglobin to form carboxyhemoglobin. Carboxyhemoglobin cannot take part in normal oxygen transport, greatly reducing the blood's ability to transport oxygen. Depending on levels and the duration of exposure, symptoms may include headache, dizziness, heart palpitations, weakness, confusion, nausea, and even convulsions, eventual unconsciousness and death.		

Some experimental evidence indicating teratogenic and reproductive effects.

NFPA HAZARD CODES	HMIS HAZARD CODES	RATINGS SYSTEM
Health: 2 (as CO) Flammability: 0 (4 as CO) Reactivity: 0	Health: 2 (as CO) Flammability: 0 (4 as CO) Reactivity: 0	0 = No Hazard 3 = Serious Hazard 1 = Slight Hazard 4 = Severe Hazard 2 = Moderate Hazard

First Aid Measures

Eyes: None required	**Skin**: None required	**Ingestion:** None required
Inhalation: conscious persons should be assisted to an uncontaminated area and be treated with supplemental oxygen. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area and be given artificial respiration and oxygen at the same time. The administering of the oxygen at an elevated pressure (up to 2 to 2.5 atmospheres) has shown to be beneficial, as has treatment in a hyperbaric chamber. The physician should be informed that the patient has inhaled toxic quantities of carbon monoxide. PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO CARBON MONOXIDE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS AND BE COGNIZANT OF EXTREME FIRE AND EXPLOSION HAZARD.		

Hazardous combustion products: None
Sensitivity to mechanical shock: None
Sensitivity to static discharge: Not available
Fire and Explosion Hazards: None. Nonflammable
Extinguishing Media: None required. Use media appropriate for surrounding materials.
Fire Fighting Instructions: If possible, stop flow of gas; use water spray to cool surrounding containers.

Accidental Release Measures

Evacuate all personnel from effected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs. If leak is in container or container valve, contact the appropriate emergency telephone number listed in Section 1 or call Air Systems.

Handling and Storage

Carbon monoxide can be handled in all commonly used metals up to approximately 500 psig (3450kPa). Above that pressure it forms toxic and corrosive carbonyl compounds with some metals. Carbon steels, aluminum alloys, copper and copper alloys, low carbon stainless steels and nickel-based alloys such as Hastelloy A,B & C are recommended for higher pressure applications.

Protect cylinders from physical damage. Store in cool, dry, well-ventilated areas away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 130°F (54°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in – first out" inventory system to prevent full cylinders being stored for excessive periods of time.

Use only well ventilated areas. Valve protection caps must remain in place unless cylinder is secured with valve outlet piped to use pint. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<3000 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. If necessary, use a check valve or trap in the discharge line to prevent hazardous back flow of the system. Never carry a compressed gas cylinder or container of gas in cryogenic liquid in an enclosed space such as a car trunk, van or station wagon. A leak can result in a fire, explosion, asphyxiation or toxic exposure.

Exposure Controls, Personal Protection

Exposure Limits[1]:

Ingredient	% Volume	PEL-OSHA[2]	TLV-ACGIH[3]	LD_{50} or LC_{50} Route / Species
Air Formula: N/A CAS: N/A RTECS#: N/A	94.0 to 99.9999	N/A	N/A	N/A
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[1]As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)
[2]Refer to individual state or provincial regulations, as applicable, for limits which may be more stringent than those listed here.
[3] As stated in the ACGIH 1994 – 1995 Threshold Limit Values for Chemical Substances and Physical Agents.
IDLH (Carbon Monoxide): 1500 ppm

Engineering Controls: Hood with forced ventilation. Use local exhaust to prevent accumulation above the exposure limit. Use general mechanical ventilation in accordance with electrical codes.
Eye/Face Protection: Safety goggles or glasses as appropriate for the job.
Skin Protection: Protective gloves of material appropriate for the job.
Respiratory Protection: Positive pressure air line with full-face mask and escape bottle or self-contained breathing apparatus should be available for emergency use.
Other / General Protection: Safety shoes.

Physical and Chemical Properties

Parameter:	Value:	Parameter:	Value:
Physical state (gas, liquid, solid):	gas	Vapor pressure:	Not available
Vapor density (Air = 1):	Not available	Evaporation point:	Not available
Boiling point:	Not available	Freezing point:	Not available
pH:	Not available	Specific gravity:	Not available
Oil/water partition coefficient:	Not available	Solubility (H2O):	Very slight
Odor threshold:	Not available	Odor and appearance:	Odorless: colorless gas

Stability and Reactivity

Stability: Stable
Hazardous Decomposition Products: Carbon Monoxide
Incompatible Materials: None known
Hazardous Polymerization: Will not occur

Toxicological Information

Reproductive: Inhalation of 150 ppm carbon monoxide for 24 hours by pregnant rats produced cardiovascular and behavioral defects in offspring. Toxic effects to fertility were observed in female rats exposed to $1mg/m^3$ for 24 hours. Similar effects observed in other mammalian species.
Mutagenic: Genetic changes observed in mammalian cell assay systems at exposures of 1500 to 2500 ppm for 10 minutes.
Other: Degenerative changes to the brain in rats chronically exposed to 30 mg/m^3.

Ecological Information

No data given.

Disposal Considerations

Returnable cylinders: Do not attempt to dispose of residual waste or unused quantities in **RETURNABLE CYLINDERS**. Return in shipping container PROPERLY LABELED, WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to authorized distributor for proper disposal. **Non-refillable (disposable) cylinders:** For non-refillable cylinders, vent to atmospheric in a well ventilated area then dispose of used cylinder in standard waste receptacle. Do not attempt to refill disposable cylinder. Follow all local solid waste disposal regulations.

Transportation Information

Parameter	United States DOT	Canada TDG
Proper shipping name:	Compressed Gases, N.O.S. (Carbon Monoxide, Air)	Compressed Gases, N.O.S. (Carbon Monoxide, Air)
Hazard Class:	2.2	2.2
Identification Number:	UN 1956	UN 1956
Shipping Label:	Nonflammable Gas	Nonflammable Gas

Regulatory Information

SARA TITLE III NOTIFICATION AND INFORMATION
SARA TITLE III – HAZARD CLASSES: Acute Health Hazard
Chronic Health Hazard
Sudden Release of Pressure Hazard

Other Information

Compressed gas cylinders shall not be refilled without the express written permission of the owner. Shipment of a compressed gas cylinder, which has not been filled by the owner or with his/her written consent, is a violation of transportation regulations.

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