

G E

Section 1: Product and Company Identification

General Air Svcs.

6330 Colorado Blvd., Commerce City, CO, 80022

Product Code: **CO2 H2 HE AR**

Synonyms:

Recommended Use:

Usage Restrictions:

Section 2: Hazards Identification



Warning

Hazard Classification: Gases Under Pressure
 Hazard Statements: Contains gas under pressure; may explode if heated
 Precautionary Statements
 Storage: Protect from sunlight.
 Store in well-ventilated place.

Section 3: Composition/Information on Ingredients

	CAS #	Concentration
Carbon Dioxide	124-38-9	0.05%
Hydrogen	1333-74-0	2%
Helium	7440-59-7	30%
Argon	7440-37-1	Balance

	Chemical Substance	Chemical Family	Trade Names
Carbon Dioxide	CARBON DIOXIDE, GAS	Inorganic gases	CARBONIC ACID GAS; CARBONIC ANHYDRIDE; CARBON DIOXIDE; CARBON OXIDE; UN 1013; CO2
Hydrogen	HYDROGEN	Inorganic gases	HYDROGEN GAS; HYDROGEN COMPRESSED; HYDROGEN (H2); DIHYDROGEN; UN 1049; H2
Helium	HELIUM	Inorganic gases	HELIUM GAS; HELIUM COMPRESSED; HELIUM-4; ATOMIC HELIUM; UN 1046; He
Argon	ARGON, COMPRESSED	Inorganic gases	ARGON; UN 1006; AR

Section 4: First Aid Measures

	Skin Contact	Eye Contact	Ingestion	Inhalation	Note to Physicians
Carbon Dioxide	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.	Contact with liquid: Immediately flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.	Do not induce vomiting.	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.	For inhalation, consider oxygen.
Hydrogen	Wash exposed skin with soap and water.	Flush eyes with plenty of water.	If a large amount is swallowed, get medical attention.	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.	For inhalation, consider oxygen.

	Skin Contact	Eye Contact	Ingestion	Inhalation	Note to Physicians
Helium	Wash exposed skin with soap and water.	Flush eyes with plenty of water.	If a large amount is swallowed, get medical attention.	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.	For inhalation, consider oxygen.
Argon	Not applicable route of exposure	Flush eyes with plenty of water.	Not applicable route of exposure	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.	For inhalation, consider oxygen.

Section 5: Fire Fighting Measures

	Suitable Extinguishing Media	Products of Combustion	Protection of Firefighters
Carbon Dioxide	Non-flammable	Non-flammable	<ul style="list-style-type: none"> ▪ Any appropriate escape-type, self-contained breathing apparatus. ▪ non-flammable
Hydrogen	Carbon dioxide, regular dry chemical Large fires: Flood with fine water spray.	None known	<ul style="list-style-type: none"> ▪ Any self-contained breathing apparatus with a full facepiece. ▪ Any self-contained breathing apparatus with a full facepiece.
Helium	Non-flammable. use suitable extinguishing media for surrounding fire.	Non-flammable	<ul style="list-style-type: none"> ▪ Non-flammable ▪ non-flammable
Argon	Non-flammable gas	Not applicable	<ul style="list-style-type: none"> ▪ N/a ▪ N/A

Section 6: Accidental Release Measures

	Personal Precautions	Environmental Precautions	Methods for Containment
Carbon Dioxide	Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering. Do not touch spilled material.	Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Keep out of water supplies and sewers.	Stop leak if possible without personal risk.
Hydrogen	Keep unnecessary people away, isolate hazard area and deny entry. Do not touch spilled material. Ventilate closed spaces before entering.	Avoid heat, flames, sparks and other sources of ignition.	Reduce vapors with water spray. Remove sources of ignition.
Helium	Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas.	Avoid soil, waterways, drains and sewers	Stop leak if possible without personal risk.
Argon	Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas.	None known.	Stop leak if possible without personal risk.

	Methods for Cleanup	Other Information
Carbon Dioxide	Stop leak, evacuate, remove source of ignition.	None
Hydrogen	Stop leak if possible without personal risk.	None
Helium	Stop leak, evacuate area. Contact emergency personnel.	None
Argon	Leaks may be detected by a soapy-water solution.	

Section 7: Handling and Storage

	Handling	Storage
Carbon Dioxide	Subject to storage regulations: U.S. OSHA 29 CFR 1910.101. Keep separated from incompatible substances.	Store and handle in accordance with all current regulations and standards
Hydrogen	Store and handle in accordance with all current regulations and standards. Grounding and bonding required. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101.	Keep separated from incompatible substances.
Helium	Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101.	Keep separated from incompatible substances.
Argon	Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101. Keep separated from incompatible substances.	Avoid using in confined spaces.

Section 8: Exposure Controls/Personal Protection

	Exposure Guidelines
Carbon Dioxide	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
Hydrogen	HYDROGEN: ACGIH (simple asphyxiant)
Helium	HELIUM: ACGIH (simple asphyxiant)
Argon	ARGON, COMPRESSED: ARGON: ACGIH (simple asphyxiant)

Engineering Controls

Handle only in fully enclosed systems.

	Eye Protection	Skin Protection	Respiratory Protection
Carbon Dioxide	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.	For the gas: Protective clothing is not required. For the liquid: Wear appropriate protective, cold insulating clothing. Wear insulated gloves.	Any appropriate escape-type, self-contained breathing apparatus.
Hydrogen	Eye protection not required, but recommended.	Protective clothing is not required. Wear appropriate chemical resistant gloves.	Any self-contained breathing apparatus with a full facepiece.
Helium	Eye protection not required, but recommended.	Protective clothing is not required. Protective gloves are not required	Non-flammable
Argon	Eye protection not required, but recommended.	Protective clothing is not required. Wear appropriate chemical resistant gloves.	N/a

General Hygiene considerations

- Avoid breathing vapor or mist
- Avoid contact with eyes and skin
- Wash thoroughly after handling and before eating or drinking

Section 9: Physical and Chemical Properties

	Physical State	Appearance	Color	Change in Appearance	Physical Form	Odor
Carbon Dioxide	Gas	Colorless	Colorless	N/A	Gas	Odorless
Hydrogen	Gas	Colorless	Colorless	N/A	Gas	Odorless
Helium	Gas	Colorless	Colorless	N/A	Gas	Odorless
Argon	Gas	Colorless	Colorless	N/A	Gas	Odorless

	Taste	Flash Point	Flammability	Partition Coefficient	Autoignition Temperature	Upper Explosive Limits
Carbon Dioxide	Acid taste	Not flammable	Not available	N/A	Nonflammable	Nonflammable

	Taste	Flash Point	Flammability	Partition Coefficient	Autoignition Temperature	Upper Explosive Limits
Hydrogen	Tasteless	Flammable gas (burns at all ambient temperatures)	Not available	Not available	752 F (400 C)	0.75
Helium	Tasteless	Not flammable	Not available	Not available	Nonflammable	Nonflammable
Argon	Tasteless	Not flammable			Nonflammable	Nonflammable

	Lower Explosive Limits	Boiling Point	Freezing Point	Vapor Pressure	Vapor Density	Specific Gravity
Carbon Dioxide	Nonflammable	Not available	-71 F (-57 C) @ 4000 mmHg	43700 mmHg @ 21 C	1.5 (Air=1)	1.522 @ 21 C
Hydrogen	0.04	-423 F (-253 C)	-434 F (-259 C)	760 mmHg @ -253 C	0.07 (Air=1)	Not applicable
Helium	Nonflammable	-452 F (-269 C)	-458 F (-272 C) @ 26 atm	1719 mmHg @ -268 C	0.138 (Air=1)	Not applicable
Argon	Nonflammable	-303 F (-186 C)	-308 F (-189 C)	500 mmHg @ -190 C	1.38 (Air=1)	Not applicable

	Water Solubility	pH	Odor Threshold	Evaporation Rate	Viscosity	Molecular Weight
Carbon Dioxide	Soluble	3.7 (saturated aqueous solution) @ 101.3 kPa (carbonic acid)	Not available	Not applicable	0.01657 cP @ 0 C	44.01
Hydrogen	1.82% @ 20 C	Not applicable	Not available	Not applicable	0.008957 cP @ 26.8 C	2
Helium	0.94% @ 0 C	Not applicable	Not available	Not applicable	0.02012 cP @ 26.8 C	4.0026
Argon	3.36% @ 20 C	Not applicable	Not available	Not applicable	0.0225 cP @ 25 C	39.948

	Molecular Formula	Density	Weight per Gallon	Volatility by Volume	Volatility	Solvent Solubility
Carbon Dioxide	C-O2	0.114	Not available	Not applicable	Not applicable	Soluble : Alcohol, acetone, hydrocarbons, organic solvents
Hydrogen	H2	0.08987 g/L @ 0 C	Not available	Not available	Not applicable	Soluble : Not available
Helium	He	0.1785 g/L @ 0 C	Not available	100%	Not applicable	Insoluble : Not available
Argon	AR	1.784 g/L @ 0 C	Not available	100%	Not applicable	Soluble : Organic solvents

Section 10: Stability and Reactivity

	Stability	Conditions to Avoid	Incompatible Materials
Carbon Dioxide	Stable at normal temperatures and pressure.	Protect from physical damage and heat. Containers may rupture or explode if exposed to heat. Avoid contact with water or moisture.	Combustible materials, oxidizing materials, metal salts, reducing agents, metal carbide, metals, bases
Hydrogen	Stable at normal temperatures and pressure.	Avoid heat, flames, sparks and other sources of ignition. Minimize contact with material. Containers may rupture or explode if exposed to heat.	Metals, oxidizing materials, metal oxides, combustible materials, halogens, metal salts, halo carbons, nitrogen trifluoride, oxygen difluoride, magnesium and calcium carbonate, sodium, potassium
Helium	Stable at normal temperatures and pressure.	Protect from physical damage and heat. Containers may rupture or explode if exposed to heat. Keep liquid helium from contact with air.	No data available.

	Stability	Conditions to Avoid	Incompatible Materials
Argon	Stable at normal temperatures and pressure.	Protect from physical damage and heat. Containers may rupture or explode if exposed to heat.	No data available.

	Hazardous Decomposition Products	Possibility of Hazardous Reactions
Carbon Dioxide	Carbon monoxide	Will not polymerize.
Hydrogen	Miscellaneous decomposition products	Will not polymerize.
Helium	Miscellaneous decomposition products	Will not polymerize.
Argon	No data available.	Will not polymerize.

Section 11: Toxicology Information

Acute Effects

	Oral LD50	Dermal LD50	Inhalation
Carbon Dioxide	Not established	Not established	Ringing in the ears, nausea, irregular heartbeat, headache, drowsiness, dizziness, tingling sensation, visual disturbances, suffocation, convulsions, coma
Hydrogen	Not available	Not available	Nausea, vomiting, difficulty breathing, irregular heartbeat, headache, fatigue, dizziness, disorientation, mood swings, tingling sensation, loss of coordination, convulsions, unconsciousness, coma
Helium	Not available	Not available	Nausea, vomiting, difficulty breathing, irregular heartbeat, headache, fatigue, dizziness, disorientation, emotional disturbances, tingling sensation, loss of coordination, suffocation, convulsions, unconsciousness, coma
Argon	Not established	Not established	Nausea, vomiting, difficulty breathing, irregular heartbeat, headache, dizziness, disorientation, mood swings, tingling sensation, loss of coordination, suffocation, convulsions, unconsciousness, coma

	Eye Irritation	Skin Irritation	Sensitization
Carbon Dioxide	Irritation, frostbite, blurred vision	Liquid: blisters, frostbite	Difficulty breathing
Hydrogen	Not irritating	Not irritating	Difficulty breathing
Helium	Liquid: frostbite, blurred vision	Liquid: frostbite	Difficulty breathing
Argon	No information on significant adverse effects	No information on significant adverse effects	

Chronic Effects

	Carcinogenicity	Mutagenicity	Reproductive Effects	Developmental Effects
Carbon Dioxide	Not available	Not established	Available.	No data
Hydrogen	Not available	Not available	Not available	No data
Helium	Not available	Not available	Not available	No data
Argon	Not established	Not established	Not established	No data

Section 12: Ecological Information

Fate and Transport

	Eco toxicity	Persistence / Degradability	Bioaccumulation / Accumulation	Mobility in Environment
Carbon Dioxide	Fish toxicity: 150000 ug/L 48 day(s) (Mortality) Brown trout (Salmo trutta)	Relatively non-persistent in the environment. Moderately volatile from water.	Accumulates very little in the bodies of living organisms.	Leaches through the soil

	Invertebrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available			
Hydrogen	Fish toxicity: Not available Invertebrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Not available	Not available	Not available
Helium	Fish toxicity: Not available Invertebrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Not available	Not available	Not available
Argon	Fish toxicity: Not available Invertebrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Not available	Not available	Not available

Section 13: Disposal Considerations

Carbon Dioxide	Dispose in accordance with all applicable regulations.
Hydrogen	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
Helium	Dispose in accordance with all applicable regulations.
Argon	Dispose in accordance with all applicable regulations.

Section 14: Transportation Information

U.S. DOT 49 CFR 172.101

DOT Information For This Mixture

Shipping Name	Compressed gas, n.o.s. (Carbon Dioxide, Hydrogen, Helium, Argon)
UN Number	UN1956
Hazard Class	2.2
Hazard Information	NonFlammable Gas

Individual Component Information

	Proper Shipping Name	ID Number	Hazard Class or Division	Packing Group	Labeling Requirements	Passenger Aircraft or Railcar Quantity Limitations	Cargo Aircraft Only Quantity Limitations	Additional Shipping Description
Carbon Dioxide	Carbon dioxide	UN1013	2.2	Not applicable	2.2	75 kg or L	150kg	None
Hydrogen	Hydrogen, compressed	UN1049	2.1	Not applicable	2.1	Forbidden	150 kg	None
Helium	Helium, compressed	UN1046	2.2	Not applicable	2.2	75 kg or L	150 kg	N/A
Argon	Argon, compressed	UN1006	2.2	Not applicable	2.2	75 kg or L	150 kg	N/A

Canadian Transportation of Dangerous Goods

	Shipping Name	UN Number	Class	Packing Group / Risk Group
Carbon Dioxide	Carbon dioxide	UN1013	2.2	Not applicable
Hydrogen	Hydrogen, compressed	UN1049	2.1	Not applicable
Helium	Helium, compressed	UN1046	2.2	Not applicable
Argon	Argon, compressed	UN1006	2.2	Not applicable

Section 15: Regulatory Information

U.S. Regulations

	CERCLA Sections	SARA 355.30	SARA 355.40
Carbon Dioxide	Not regulated.	Not regulated.	Not regulated.
Hydrogen	Not regulated.	Not regulated.	Not regulated.
Helium	Not regulated.	Not regulated.	Not regulated.
Argon	Not regulated.	Not regulated.	Not regulated.

SARA 370.21

	Acute	Chronic	Fire	Reactive	Sudden Release
Carbon Dioxide	Yes	No	No	No	Yes
Hydrogen	Yes	No	Yes	No	Yes
Helium	Yes	No	No	No	Yes
Argon	Yes	No	No	No	Yes

SARA 372.65

Carbon Dioxide	Not regulated.
Hydrogen	Not regulated.
Helium	Not regulated.
Argon	Not regulated.

OSHA Process Safety

Carbon Dioxide	Not regulated.
Hydrogen	Not regulated.
Helium	Not regulated.
Argon	Not regulated.

State Regulations

	CA Proposition 65
Carbon Dioxide	Not regulated.
Hydrogen	Not regulated.
Helium	Not regulated.
Argon	Not regulated.

Canadian Regulations

	WHMIS Classification
Carbon Dioxide	A
Hydrogen	A, B1.
Helium	A
Argon	A

National Inventory Status

	US Inventory (TSCA)	TSCA 12b Export Notification	Canada Inventory (DSL/NDSL)
Carbon Dioxide	Listed on inventory.	Not listed.	Listed on inventory.
Hydrogen	Listed on inventory.	Not listed.	Listed on inventory.
Helium	Listed on inventory.	Not listed.	Not determined.
Argon	Listed on inventory.	Not listed.	Listed on inventory.

Section 16: Other Information

	NFPA Rating
Carbon Dioxide	HEALTH=3 FIRE=0 REACTIVITY=0 SPECIAL=SA
Hydrogen	HEALTH=0 FIRE=4 REACTIVITY=0
Helium	HEALTH=0 FIRE=0 REACTIVITY=0 SPECIAL=SA
Argon	HEALTH=0 FIRE=0 REACTIVITY=0 SPECIAL=SA

0 = minimal hazard, 1 = slight hazard, 2 = moderate hazard, 3 = severe hazard, 4 = extreme hazard