



Safety Data Sheet

Nitrogen 85% Hydrogen 10% Carbon Dioxide
5%

Section 1: Product and Company Identification

Purity Cylinder Gases, Inc.

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Wyoming, MI 49519
P: (616)532-2375
www.puritygas.com

Product Code: Nitrogen 85% Hydrogen 10% Carbon Dioxide 5%

Synonyms:

Recommended Use: Industrial and professional use

Usage Restrictions:

Section 2: Hazards Identification



Danger

Hazard Classification:

Flammable (Category 1)
Gases Under Pressure

Hazard Statements:

Contains gas under pressure; may explode if heated
Extremely flammable gas

Precautionary Statements

Prevention:

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

Response:

Eliminate all ignition sources if safe to do so.
Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

Storage:

Protect from sunlight.
Store in well-ventilated place.

Section 3: Composition/Information on Ingredients

| | CAS # | Concentration |
|----------------|-----------|---------------|
| Carbon Dioxide | 124-38-9 | 5 |
| Hydrogen | 1333-74-0 | 10 |
| Nitrogen | 7727-37-9 | 85 |

| | 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 |
| Nitrogen | NITROGEN, COMPRESSED GAS | Inorganic gases | DIATOMIC NITROGEN; DINITROGEN; NITROGEN; NITROGEN-14; NITROGEN GAS; UN 1066; N2 |

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. |
| Nitrogen | 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. |

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. |
| Nitrogen | Non-flammable. Use suitable extinguishing media for surrounding fire. Cylinders may rupture or explode if exposed to heat. | Non-flammable | <ul style="list-style-type: none"> Respiratory protection may be needed for frequent or heavy exposure. |

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. |
| Nitrogen | Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas. | No significant effects from contamination expected. | 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 |
| Nitrogen | N/A | N/A |

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. |
| Nitrogen | 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. |

Section 8: Exposure Controls/Personal Protection

| | Exposure Guidelines |
|-----------------------|---|
| Carbon Dioxide | CARBON DIOXIDE, GAS: CARBON DIOXIDE: 5000 ppm (9000 mg/m ³) OSHA TWA 10000 ppm (18000 mg/m ³) OSHA TWA (vacated by 58 FR 35338, June 30, 1993) 30000 ppm (54000 mg/m ³) OSHA STEL (vacated by 58 FR 35338, June 30, 1993) 5000 ppm ACGIH TWA 30000 ppm ACGIH STEL 5000 ppm (9000 mg/m ³) NIOSH recommended TWA 10 hour(s) 30000 ppm (54000 mg/m ³) NIOSH recommended STEL |
| Hydrogen | HYDROGEN: ACGIH (simple asphyxiant) |
| Nitrogen | NITROGEN, COMPRESSED GAS: NITROGEN: 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. | Any appropriate escape-type, self-contained breathing apparatus. |
| Hydrogen | Eye protection not required, but recommended. | Protective clothing is not required. | Any self-contained breathing apparatus with a full facepiece. |
| Nitrogen | Eye protection not required, but recommended. | Protective clothing is not required. | Respiratory protection may be needed for frequent or heavy exposure. |

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 | Taste |
|-----------------------|----------------|------------|-----------|----------------------|---------------|----------|------------|
| Carbon Dioxide | Gas | Colorless | Colorless | N/A | Gas | Odorless | Acid taste |
| Hydrogen | Gas | Colorless | Colorless | N/A | Gas | Odorless | Tasteless |
| Nitrogen | Gas | Clear | Colorless | N/A | Gas | Odorless | Tasteless |

| | Flash Point | Flammability | Partition Coefficient | Autoignition Temperature | Upper Explosive Limits | Lower Explosive Limits |
|-----------------------|---|---------------|-----------------------|--------------------------|------------------------|------------------------|
| Carbon Dioxide | Not flammable | Not available | N/A | Nonflammable | Nonflammable | Nonflammable |
| Hydrogen | Flammable gas (burns at all ambient temperatures) | Not available | Not available | 752 F (400 C) | 0.75 | 0.04 |
| Nitrogen | Not flammable | Not available | Not available | Nonflammable | Nonflammable | Nonflammable |

| | Boiling Point | Freezing Point | Vapor Pressure | Vapor Density | Specific Gravity | Water Solubility | pH | Odor Threshold | Evaporation Rate | Viscosity |
|-----------------------|-----------------|---------------------------|-------------------|---------------|------------------|------------------|--|----------------|------------------|----------------------|
| Carbon Dioxide | Not available | -71 F (-57 C) @ 4000 mmHg | 43700 mmHg @ 21 C | 1.5 (Air=1) | 1.522 @ 21 C | Soluble | 3.7 (saturated aqueous solution) @ 101.3 kPa (carbonic acid) | Not available | Not applicable | 0.01657 cP @ 0 C |
| Hydrogen | -423 F (-253 C) | -434 F (-259 C) | 760 mmHg @ -253 C | 0.07 (Air=1) | Not applicable | 1.82% @ 20 C | Not applicable | Not available | Not applicable | 0.008957 cP @ 26.8 C |
| Nitrogen | -321 F (-196 C) | -346 F (-210 C) | 760 mmHg @ -196 C | 0.967 (Air=1) | Not applicable | 1.6% @ 20 C | Not applicable | Not available | Not applicable | 0.01787 cP @ 27 C |

| | Molecular Weight | Molecular Formula | Density | Weight per Gallon | Volatility by Volume | Volatility | Solvent Solubility |
|-----------------------|------------------|-------------------|-------------------|-------------------|----------------------|----------------|---|
| Carbon Dioxide | 44.01 | C-O2 | 0.114 | Not available | Not applicable | Not applicable | Soluble: Alcohol, acetone, hydrocarbons, organic solvents |
| Hydrogen | 2 | H2 | 0.08987 g/L @ 0 C | Not available | Not available | Not applicable | Soluble: Not available |
| Nitrogen | 28.0134 | N2 | 1.2506 g/L | Not available | 100% | 1 | Soluble: Liquid ammonia |

Section 10: Stability and Reactivity

| | Stability | Conditions to Avoid | Incompatible Materials |
|-----------------------|---|---|--|
| Carbon Dioxide | Stable at normal temperatures and pressure. | Stable at normal temperatures and pressure. | Combustible materials, oxidizing materials, metal salts, reducing agents, metal carbide, metals, bases |
| Hydrogen | Stable at normal temperatures and pressure. | Stable at normal temperatures and pressure. | Metals, oxidizing materials, metal oxides, combustible materials, halogens, metal salts, halo carbons, nitrogen trifluoride, oxygen difluoride, magnesium and calcium carbonate, sodium, potassium |
| Nitrogen | Stable at normal temperatures and pressure. | Stable at normal temperatures and pressure. | Metals, oxidizing materials |

| | Hazardous Decomposition Products | Possibility of Hazardous Reactions |
|-----------------------|--------------------------------------|------------------------------------|
| Carbon Dioxide | Carbon monoxide | Will not polymerize. |
| Hydrogen | Miscellaneous decomposition products | Will not polymerize. |
| Nitrogen | Oxides of nitrogen | Will not polymerize. |

Section 11: Toxicology Information

Acute Effects

| | Oral LD50 | Dermal LD50 | Inhalation |
|-----------------------|-----------------|-----------------|--|
| Carbon Dioxide | Not established | Not established | Ringling 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 |
| Nitrogen | Not available | Not available | Nausea, vomiting, difficulty breathing, headache, drowsiness, dizziness, tingling sensation, loss of coordination, convulsions, coma |

| | Eye Irritation | Skin Irritation | Sensitization |
|-----------------------|---|---|----------------------|
| Carbon Dioxide | Irritation, frostbite, blurred vision | Liquid: blisters, frostbite | Difficulty breathing |
| Hydrogen | Not irritating | Not irritating | Difficulty breathing |
| Nitrogen | Contact with rapidly expanding gas may cause burns or frostbite | No information on significant adverse effects | Difficulty breathing |

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 |
| Nitrogen | Not hazardous | Not available | Not available | 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) Invertebrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available | Relatively non-persistent in the environment. Moderately volatile from water. | Accumulates very little in the bodies of living organisms. | Leaches through the soil |
| 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 |
| Nitrogen | 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. |
| Nitrogen | 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, flammable, n.o.s. (Nitrogen, Hydrogen) |
| UN Number | UN1954 |
| Hazard Class | 2.1 |
| Hazard Information | FLAMMABLE 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 |
| Nitrogen | Nitrogen, compressed | UN1066 | 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 |
| Nitrogen | Nitrogen, compressed | UN1066 | 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. |
| Nitrogen | 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 |
| Nitrogen | Yes | No | No | No | Yes |

SARA 372.65

| | |
|----------------|----------------|
| Carbon Dioxide | Not regulated. |
| Hydrogen | Not regulated. |
| Nitrogen | Not regulated. |

OSHA Process Safety

| | |
|----------------|----------------|
| Carbon Dioxide | Not regulated. |
| Hydrogen | Not regulated. |
| Nitrogen | Not regulated. |

State Regulations

| | CA Proposition 65 |
|----------------|-------------------|
| Carbon Dioxide | Not regulated. |
| Hydrogen | Not regulated. |
| Nitrogen | Not regulated. |

Canadian Regulations

| | WHMIS Classification |
|----------------|----------------------|
| Carbon Dioxide | A |
| Hydrogen | A, B1. |
| Nitrogen | 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. |
| Nitrogen | 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 |
| Nitrogen | HEALTH=0 FIRE=0 REACTIVITY=0 SPECIAL=SA |

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