



## Safety Data Sheet

8% LEL Carbon Monoxide, 15% VOL  
Hydrogen; balance Methane

**Ideal Calibrations, LLC**

2750 Oakwood Blvd.

Melvindale, MI 48122

(734) 956-0539

<http://www.idealcalibrations.com/>

### Section 1: Product and Company Identification

**Ideal Calibrations, LLC**

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Melvindale, MI 48122

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Product Code: 8% LEL Carbon Monoxide, 15% VOL Hydrogen; balance Methane

Part Number: 0409

**Synonyms:**

**Recommended Use:** Calibration of gas detection devices

**Usage Restrictions:** Do not use if current date is past expiration date on cylinder

### Section 2: Hazards Identification



**Danger**

**Hazard Classification:**

Flammable (Category 1)

Gases Under Pressure

Reproductive Toxicity (Category 1.A)

Specific target organ toxicity (Repeated Exposure) (Category 1)

**Hazard Statements:**

Causes damage to organs through prolonged or repeated exposure

Contains gas under pressure; may explode if heated

Extremely flammable gas

May damage fertility or the unborn child

**Precautionary Statements**

**Prevention:**

Wash thoroughly after handling.

Do not eat, drink or smoke when using this product.

Do not handle until all safety precautions have been read and understood.

Do not breathe dust/fume/gas/mist/ vapors/spray..

Wear protective gloves, protective clothing, eye protection and face protection.

Obtain special instructions before use.

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

**Response:**

Call a poison center or doctor if you feel unwell.  
 Eliminate all ignition sources if safe to do so.  
 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.  
 If exposed or concerned: Get medical advice/attention.

**Storage:**

Protect from sunlight.  
 Store in well-ventilated place.  
 Store locked up.

**Disposal:**

Dispose of contents and/or container in accordance with applicable regulations.

## Section 3: Composition/Information on Ingredients

|                 | CAS #     | Concentration |
|-----------------|-----------|---------------|
| Carbon Monoxide | 630-08-0  | 1             |
| Hydrogen        | 1333-74-0 | 15            |
| Methane         | 74-82-8   | 84            |

|                 | Chemical Substance      | Chemical Family                    | Trade Names   |
|-----------------|-------------------------|------------------------------------|---|
| Carbon Monoxide | CARBON MONOXIDE         | Inorganic gases                    | CARBON OXIDE; CARBON OXIDE (CO); UN 1016; CO                                  |
| Hydrogen        | HYDROGEN                | Inorganic gases                    | HYDROGEN GAS; HYDROGEN COMPRESSED; HYDROGEN (H2); DIHYDROGEN; UN 1049; H2     |
| Methane         | METHANE, COMPRESSED GAS | Hydrocarbons, Aliphatic, Saturated | FIRE DAMP; MARSH GAS; METHYL HYDRIDE; NATURAL GAS; METHANE; UN 1971; R50; CH4 |

## Section 4: First Aid Measures

|                 | Skin Contact   | Eye Contact  | Ingestion  | Inhalation   | Note to Physicians               |
|-----------------|--|--|--|--|----------------------------------|
| Carbon Monoxide | Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse. | Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention. | 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. |
| 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. |
| Methane         | 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   |
|------------------------|---|--|--|
| <b>Carbon Monoxide</b> | Carbon dioxide, regular dry chemical<br>Large fires: Use regular foam or flood with fine water spray. | Carbon dioxide                         | <ul style="list-style-type: none"> <li>Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.</li> <li>Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.</li> </ul> |
| <b>Hydrogen</b>        | Carbon dioxide, regular dry chemical<br>Large fires: Flood with fine water spray.                     | None known                             | <ul style="list-style-type: none"> <li>Any self-contained breathing apparatus with a full facepiece.</li> <li>Any self-contained breathing apparatus with a full facepiece.</li> </ul>   |
| <b>Methane</b>         | Carbon dioxide, regular dry chemical<br>Large fires: Use regular foam or flood with fine water spray. | Carbon monoxide, carbon dioxide, water | <ul style="list-style-type: none"> <li>Respiratory protection may be needed for frequent or heavy exposure. Any self-contained breathing apparatus with a full facepiece.</li> <li>Respiratory protection may be needed for frequent or heavy exposure. Any self-contained breathing apparatus with a full facepiece.</li> </ul>   |

## Section 6: Accidental Release Measures

|                        | Personal Precautions  | Environmental Precautions  | Methods for Containment  |
|------------------------|---|--|--|
| <b>Carbon Monoxide</b> | Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering.                                | Avoid heat, flames, sparks and other sources of ignition. Keep out of water supplies and sewers. | Stop leak if possible without personal risk. Reduce vapors with water spray. Remove sources of ignition. |
| <b>Hydrogen</b>        | 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.  |
| <b>Methane</b>         | Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering.                                | Avoid heat, flames, sparks and other sources of ignition.  | Stop leak if possible without personal risk. Reduce vapors with water spray. Remove sources of ignition. |

|                        | Methods for Cleanup                                  | Other Information   |
|------------------------|--|---|
| <b>Carbon Monoxide</b> | Stop leak, evacuate area. Wear protective equipment. | Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). |
| <b>Hydrogen</b>        | Stop leak if possible without personal risk.         | None  |
| <b>Methane</b>         | Not available  | Not available   |

## Section 7: Handling and Storage

|                        | Handling  | Storage   |
|------------------------|---|---|
| <b>Carbon Monoxide</b> | Keep separated from incompatible substances.  | 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. |
| <b>Hydrogen</b>        | 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.  |
| <b>Methane</b>         | 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.  |

## Section 8: Exposure Controls/Personal Protection

|  | Exposure Guidelines |
|--|---------------------|
|  |                     |

|                        | Exposure Guidelines  |
|------------------------|--|
| <b>Carbon Monoxide</b> | CARBON MONOXIDE: 50 ppm (55 mg/m <sup>3</sup> ) OSHA TWA 35 ppm (40 mg/m <sup>3</sup> ) OSHA TWA (vacated by 58 FR 35338, June 30, 1993) 200 ppm (229 mg/m <sup>3</sup> ) OSHA ceiling (vacated by 58 FR 35338, June 30, 1993) 25 ppm ACGIH TWA 35 ppm (40 mg/m <sup>3</sup> ) NIOSH recommended TWA 10 hour(s) 200 ppm (229 mg/m <sup>3</sup> ) NIOSH recommended ceiling |
| <b>Hydrogen</b>        | HYDROGEN: ACGIH (simple asphyxiant)  |
| <b>Methane</b>         | METHANE, COMPRESSED GAS: ALIPHATIC HYDROCARBON GASES ALKANE (C1-C4): 1000 ppm ACGIH TWA METHANE: No occupational exposure limits established. ALIPHATIC HYDROCARBON GASES ALKANE (C1-C4): 1000 ppm ACGIH TWA   |

### Engineering Controls

Handle only in fully enclosed systems.

|                        | Eye Protection                                | Skin Protection                      | Respiratory Protection  |
|------------------------|---|--------------------------------------|---|
| <b>Carbon Monoxide</b> | Eye protection not required, but recommended. | Protective clothing is not required. | Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. |
| <b>Hydrogen</b>        | Eye protection not required, but recommended. | Protective clothing is not required. | Any self-contained breathing apparatus with a full facepiece.   |
| <b>Methane</b>         | Eye protection not required, but recommended. | Protective clothing is not required. | Respiratory protection may be needed for frequent or heavy exposure. Any self-contained breathing apparatus with a full facepiece.                              |

### 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     |
|------------------------|----------------|------------|-----------|----------------------|---------------|----------|-----------|
| <b>Carbon Monoxide</b> | Gas            | Colorless  | Colorless | N/A                  | Gas           | Odorless | Tasteless |
| <b>Hydrogen</b>        | Gas            | Colorless  | Colorless | N/A                  | Gas           | Odorless | Tasteless |
| <b>Methane</b>         | Gas            | Colorless  | Colorless | N/A                  | Gas           | Odorless | Tasteless |

|                        | Flash Point                                       | Flammability  | Partition Coefficient                                  | Autoignition Temperature | Upper Explosive Limits | Lower Explosive Limits |
|------------------------|---|---------------|--|--------------------------|------------------------|------------------------|
| <b>Carbon Monoxide</b> | Flammable   | Not available | 1479.11 (log = 3.17) (estimated from water solubility) | 1128-1202 F (609-650 C)  | 0.74                   | 12.0-12.5%             |
| <b>Hydrogen</b>        | Flammable gas (burns at all ambient temperatures) | Not available | Not available  | 752 F (400 C)            | 0.75                   | 0.04                   |
| <b>Methane</b>         | -369 F (-223 C)                                   | Not available | 724.44 (log = 2.87) (estimated from water solubility)  | 999 F (537 C)            | 15%                    | 5%                     |

|                        | Boiling Point       | Freezing Point  | Vapor Pressure   | Vapor Density | Specific Gravity | Water Solubility | pH             | Odor Threshold | Evaporation Rate | Viscosity            |
|------------------------|---------------------|-----------------|--|---------------|------------------|------------------|----------------|----------------|------------------|----------------------|
| <b>Carbon Monoxide</b> | -312.7 F (-191.5 C) | -326 F (-199 C) | 760 mmHg @ -191 C gas; cannot be liquefied at room temperature | 0.968 (Air=1) | Not applicable   | 2.3% @ 20 C      | Not applicable | Not available  | Not applicable   | 0.01657 cP @ 0 C     |
| <b>Hydrogen</b>        | -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 |
| <b>Methane</b>         | -260 F (-162 C)     | -297 F (-183 C) | 760 mmHg @ -161 C  | 0.555 (Air=1) | Not applicable   | 3.5% @ 17 C      | Not applicable | Not available  | Not applicable   | 0.01118 cP @ 27 C    |

|                        | Molecular Weight | Molecular Formula | Density         | Weight per Gallon | Volatility by Volume | Volatility     | Solvent Solubility  |
|------------------------|------------------|-------------------|-----------------|-------------------|----------------------|----------------|---|
| <b>Carbon Monoxide</b> | 28.01            | C-O               | 1.250 g/L @ 0 C | Not available     | 100%                 | Not applicable | Soluble: Alcohol, benzene, acetic acid, ethyl acetate, chloroform, cuprous chloride solutions |

|          | Molecular Weight | Molecular Formula | Density           | Weight per Gallon | Volatility by Volume | Volatility     | Solvent Solubility                                 |
|----------|------------------|-------------------|-------------------|-------------------|----------------------|----------------|--|
| Hydrogen | 2                | H2                | 0.08987 g/L @ 0 C | Not available     | Not available        | Not applicable | Soluble: Not available                             |
| Methane  | 16.04            | C-H4              | 0.717 g/L @ 0 C   | Not available     | Not applicable       | Not applicable | Soluble: Alcohol, ether, benzene, organic solvents |

## Section 10: Stability and Reactivity

|                 | Stability                                   | Conditions to Avoid                         | Incompatible Materials   |
|-----------------|---|---|--|
| Carbon Monoxide | Stable at normal temperatures and pressure. | Stable at normal temperatures and pressure. | Oxidizing materials, halogens, metal oxides, metals, combustible materials, lithium  |
| 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 |
| Methane         | Stable at normal temperatures and pressure. | Stable at normal temperatures and pressure. | Halogens, oxidizing materials, combustible materials   |

|                 | Hazardous Decomposition Products     | Possibility of Hazardous Reactions |
|-----------------|--------------------------------------|------------------------------------|
| Carbon Monoxide | Oxides of carbon                     | Will not polymerize.               |
| Hydrogen        | Miscellaneous decomposition products | Will not polymerize.               |
| Methane         | Oxides of carbon                     | Will not polymerize.               |

## Section 11: Toxicology Information

### Acute Effects

|                 | Oral LD50                                 | Dermal LD50   | Inhalation   |
|-----------------|---|---------------|--|
| Carbon Monoxide | LC50 Inhalation Gas. Rat 1807 ppm 4 hours | Not available | Changes in body temperature, changes in blood pressure, nausea, vomiting, chest pain, difficulty breathing, irregular heartbeat, headache, drowsiness, dizziness, disorientation, hallucinations, pain in extremities, tremors, loss of coordination, hearing loss, visual disturbances, eye damage, suffocation, blood disorders, 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   |
| Methane         | Not available                             | Not available | Nausea, vomiting, difficulty breathing, irregular heartbeat, headache, drowsiness, fatigue, dizziness, disorientation, mood swings, tingling sensation, loss of coordination, suffocation, convulsions, unconsciousness, coma  |

|                 | Eye Irritation                                | Skin Irritation                               | Sensitization   |
|-----------------|---|---|---|
| Carbon Monoxide | No information on significant adverse effects | No information on significant adverse effects | Acute toxicity, Category 3, inhalation; H331: Toxic if inhaled. Reproductive toxicity, Category 1A; H360D: May damage the unborn child. Specific Target Organ Toxicity (repeated exposure), Category 1; H372: Causes damage to organs through prolonged or repeated exposure. |
| Hydrogen        | Not irritating                                | Not irritating                                | Difficulty breathing  |
| Methane         | No information on significant adverse effects | No information on significant adverse effects | Difficulty breathing  |

### Chronic Effects

|                 | Carcinogenicity | Mutagenicity  | Reproductive Effects | Developmental Effects |
|-----------------|-----------------|---------------|----------------------|-----------------------|
| Carbon Monoxide | Not available   | Available.    | Available.           | No data               |
| Hydrogen        | Not available   | Not available | Not available        | No data               |
| Methane         | Not available   | Not available | Not available        | No data               |

## Section 12: Ecological Information

### Fate and Transport

|                        | Eco toxicity  | Persistence / Degradability   | Bioaccumulation / Accumulation                             | Mobility in Environment                                 |
|------------------------|---|---|--|---|
| <b>Carbon Monoxide</b> | Fish toxicity: 75000 ug/L 1 day(s)<br>LC100 (Mortality) Orangespotted sunfish ( <i>Lepomis humilis</i> )<br>Invertebrate toxicity: Not available<br>Algal toxicity: Not available<br>Phyto toxicity: Not available<br>Other toxicity: Not available | Relatively non-persistent in the environment. Highly volatile from water.     | Not available  | Not expected to leach through the soil or the sediment. |
| <b>Hydrogen</b>        | Fish toxicity: Not available<br>Invertebrate toxicity: Not available<br>Algal toxicity: Not available<br>Phyto toxicity: Not available<br>Other toxicity: Not available   | Not available   | Not available  | Not available   |
| <b>Methane</b>         | Fish toxicity: Not available<br>Invertebrate toxicity: Not available<br>Algal toxicity: Not available<br>Phyto toxicity: Not available<br>Other toxicity: Not available   | Relatively non-persistent in the environment. Moderately volatile from water. | Accumulates very little in the bodies of living organisms. | Not expected to leach through the soil or the sediment. |

## Section 13: Disposal Considerations

|                        |   |
|------------------------|---|
| <b>Carbon Monoxide</b> | Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001. |
| <b>Hydrogen</b>        | Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001. |
| <b>Methane</b>         | Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001. |

## Section 14: Transportation Information

### U.S. DOT 49 CFR 172.101

#### DOT Information For This Mixture

|                           |   |
|---------------------------|---|
| <b>Shipping Name</b>      | Compressed gas, flammable, n.o.s. (Methane, Hydrogen) |
| <b>UN Number</b>          | UN1954  |
| <b>Hazard Class</b>       | 2.1   |
| <b>Hazard Information</b> | 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 |
|------------------------|-----------------------------|-----------|--------------------------|----------------|-----------------------|--|--|---------------------------------|
| <b>Carbon Monoxide</b> | Carbon monoxide, compressed | UN1016    | 2.3                      | Not applicable | 2.3; 2.1              | Forbidden  | 25 kg                                    | Toxic-Inhalation Hazard Zone D  |
| <b>Hydrogen</b>        | Hydrogen, compressed        | UN1049    | 2.1                      | Not applicable | 2.1                   | Forbidden  | 150 kg                                   | None                            |
| <b>Methane</b>         | Methane, compressed         | UN1971    | 2.1                      | Not applicable | 2.1                   | Forbidden  | 150 kg                                   | N/A                             |

#### Canadian Transportation of Dangerous Goods

| Shipping Name | UN Number | Class | Packing Group / Risk Group |
|---------------|-----------|-------|----------------------------|
|---------------|-----------|-------|----------------------------|

|                        |                             |        |          |                |
|------------------------|-----------------------------|--------|----------|----------------|
| <b>Carbon Monoxide</b> | Carbon monoxide, compressed | UN1016 | 2.3; 2.1 | Not applicable |
| <b>Hydrogen</b>        | Hydrogen, compressed        | UN1049 | 2.1      | Not applicable |
| <b>Methane</b>         | Methane, compressed         | UN1971 | 2.1      | Not applicable |

## Section 15: Regulatory Information

### U.S. Regulations

|                        | <b>CERCLA Sections</b> | <b>SARA 355.30</b> | <b>SARA 355.40</b> |
|------------------------|------------------------|--------------------|--------------------|
| <b>Carbon Monoxide</b> | Not regulated.         | Not regulated.     | Not regulated.     |
| <b>Hydrogen</b>        | Not regulated.         | Not regulated.     | Not regulated.     |
| <b>Methane</b>         | Not regulated.         | Not regulated.     | Not regulated.     |

### SARA 370.21

|                        | <b>Acute</b> | <b>Chronic</b> | <b>Fire</b> | <b>Reactive</b> | <b>Sudden Release</b> |
|------------------------|--------------|----------------|-------------|-----------------|-----------------------|
| <b>Carbon Monoxide</b> | Yes          | No             | Yes         | No              | Yes                   |
| <b>Hydrogen</b>        | Yes          | No             | Yes         | No              | Yes                   |
| <b>Methane</b>         | Yes          | No             | Yes         | No              | Yes                   |

### SARA 372.65

|                        |                |
|------------------------|----------------|
| <b>Carbon Monoxide</b> | Not regulated. |
| <b>Hydrogen</b>        | Not regulated. |
| <b>Methane</b>         | Not regulated. |

### OSHA Process Safety

|                        |                |
|------------------------|----------------|
| <b>Carbon Monoxide</b> | Not regulated. |
| <b>Hydrogen</b>        | Not regulated. |
| <b>Methane</b>         | Not regulated. |

### State Regulations

|                        | <b>CA Proposition 65</b>  |
|------------------------|---|
| <b>Carbon Monoxide</b> | WARNING: This product can expose you to chemicals including Carbon Monoxide, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to <a href="http://www.P65Warnings.ca.gov">www.P65Warnings.ca.gov</a> . |
| <b>Hydrogen</b>        | Not regulated.  |
| <b>Methane</b>         | Not regulated.  |

### Canadian Regulations

|                        | <b>WHMIS Classification</b> |
|------------------------|-----------------------------|
| <b>Carbon Monoxide</b> | A, B1, D1A, D2A.            |
| <b>Hydrogen</b>        | A, B1.                      |
| <b>Methane</b>         | A, B1                       |

### National Inventory Status

|                        | <b>US Inventory (TSCA)</b> | <b>TSCA 12b Export Notification</b> | <b>Canada Inventory (DSL/NDSL)</b> |
|------------------------|----------------------------|-------------------------------------|------------------------------------|
| <b>Carbon Monoxide</b> | Listed on inventory.       | Not listed.                         | Listed on inventory.               |
| <b>Hydrogen</b>        | Listed on inventory.       | Not listed.                         | Listed on inventory.               |
| <b>Methane</b>         | Listed on inventory.       | Not listed.                         | Listed on inventory.               |

## Section 16: Other Information

|                        | <b>NFPA Rating</b>           |
|------------------------|------------------------------|
| <b>Carbon Monoxide</b> | HEALTH=2 FIRE=4 REACTIVITY=0 |
| <b>Hydrogen</b>        | HEALTH=0 FIRE=4 REACTIVITY=0 |
| <b>Methane</b>         | HEALTH=0 FIRE=4 REACTIVITY=0 |

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