



CO2 SAFETY AND OPERATIONS MANUAL

Guidelines for safely handling CO2 based VirTra products

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ACKNOWLEDGMENT

These important safety guidelines represent the work of VirTra personnel, comprised of dedicated professionals who value the safety of our customers when using a VirTra system. We'd like to acknowledge and thank the following who've been working diligently to help create this important safety manual:

Brent Barcena, Matt Burlend, Bob Ferris, Scott Dilullo, James Peters, Richard Mansfield, Matt Hopp, Gabe Sanchez
Daniel Reeder, Doug Clark, Loren Aragon

While there is still much work to be done, the foundation has been set and we'll be relying on VirTra employees to build upon these efforts. Thank you for your enthusiastic support of our product.

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I. SAFE STORAGE, HANDLING, AND USE OF CO₂ CYLINDERS

A. INTRODUCTION

To use compressed gas cylinders safely, it is important that they are stored properly, handled correctly, used with the correct equipment, and that the properties of the gases they contain are fully understood.

B. OVERVIEW OF CYLINDER PHYSICAL HAZARDS

1. Physical Damage

Cylinders, with their high internal pressure [up to 2,500 pounds per square inch gauge (psig)], are very hazardous when exposed to damage from falling over or tipping, heat, electric circuits, motion, or vibration – anything that can cause a weakness or crack in the cylinder wall or shell. Such damage can cause the cylinder to rupture and explode sending sharp metal pieces, like shrapnel, blasting through the area.

2. Valve Hazard

The Compressed Gas Association (CGA) *Pamphlet V-1: "Standard for Compressed Gas Cylinder Valves"* has established a 0.300 inch (7.62 mm) maximum valve inlet diameter as a requirement to minimize the propulsion effect in case the valve is severed. This standard has the exception of valves used in liquefied gas services and fire control systems. Special design requirements and unique applications such as fire control systems, which require a “*high blow down flow*”, may dictate greater diameters. The actual outcome of a broken off valve depends on the design and pressure of the valve and cylinder. If the valve is broken off and the valve inlet opening meets the (CGA) requirements, the cylinder will rapidly release all its gas (which could be a health and/or flammability concern), cause a whistling sound, and possibly spin uncontrollably. If the valve inlet opening is different from the standard hole size used in most welding gases, such as those used for propane or butane and fire protection system cylinders, the cylinders may take off and become airborne. You can check this size matter by being sure the cylinder meets all V-1 requirements.

3. Tipping and Falling

The most common major hazard is having a cylinder tip or fall over on you or another nearby worker. Since cylinders are heavy and awkward to handle, they require special care and equipment in handling and securing so they don't fall or tip over and cause injury.

4. Valve Leakage

Cylinder valves can leak, causing their contents to discharge. To minimize hazards from leaks, use proper ventilation and storage.

C. OVERVIEW OF CYLINDER CONTENTS HAZARDS

Read, understand, and follow the markings on the cylinder, the label(s) on the cylinder, and the Material Safety Data Sheet (MSDS). Each compressed gas cylinder has unique hazards based on contents. Some are filled with inert gases – especially those used in arc welding. Many gases are flammable, explosive, toxic, or a combination. Common compressed gases include acetylene, carbon dioxide, argon, hydrogen, nitrogen, air, propane, and oxygen. See *Section VI: Reference Sheet* for Airgas' MSDS sheet.

D. STORAGE

- Store cylinders upright and secure them with a chain, strap, or cable to a stationary building support or to a proper cylinder cart to prevent them from tipping or falling.
- Completely close the valves, and keep the valve protection devices, such as caps or guards, securely in place.
- Store cylinders in a dry, well-ventilated area at least 20 feet from combustible materials. Do not keep cylinders in lockers. If they leak, a buildup of flammable or other types of gases can occur inside the locker.
- Mark the storage area with proper precautionary signs, such as flammable, oxidizer, or toxic.
- Place them in a location where they will not be subject to mechanical or physical damage, heat, or electrical circuits to prevent possible explosion or fire.
- Do not leave cylinders inside a hot vehicle. The excessive heating of a pressurized cylinder could cause the tank to explode.
- Store empty cylinders separate from full ones.
- Keep oxygen cylinders 20 feet away from fuel-gas cylinders, such as acetylene, or separate them with a non-combustible barrier (such as a wall) at least 5 feet high with a fire-resistance rating of at least one-half hour.

F. PROPER USE

- Keep cylinders upright and away from heat, sparks, fire, physical damage, or electrical circuits to avoid rupture.
- Use in a well-ventilated area to avoid gas accumulation.
- Do not bring cylinders into a confined space to avoid inhaling the gas and possible suffocation from the accumulation of flammable, toxic, or reactive gases.
- Read, understand, and follow all cylinder markings and labels to avoid misuse.
- Lift and move cylinders properly.

E. TRANSPORT

- Most accidents or injuries involving cylinders happen when moving or handling the gas cylinders.
- Use the right equipment, correct procedures, and sufficient number of persons to lift and move cylinders to avoid personal injury and cylinder damage.
- Wear protective footwear, safety glasses, and heavy gloves.
- Securely install all valve protection devices, such as caps or guards.
- Secure cylinders upright to a proper hand truck or cylinder cart designed for the purpose.
- Don't drag or roll them – use a properly designed cart or hand truck.
- When using a crane, be sure to use proper cradles, nets, boats, or special platforms designed for this purpose to prevent cylinders from falling.
- Prevent damage – handle carefully – avoid dropping or banging them.
- Do not lift them by the protective cap/guard or use magnets or slings to lift or move them since valves may be damaged or sheared off.

G. MAINTENANCE

- Protect the markings on cylinders that identify the contents, and mark the full/empty status on cylinders (do not use color to identify contents). Mark all empty cylinders (some companies use “MT”).
- Don’t use the recessed top of the cylinder as a storage area for tools or material.
- If cylinders are leaking, immediately isolate them outdoors (good ventilation) and away from sparks or heat. Call your gas supplier to send qualified people to take care of the problem – don’t try any repairs yourself. Tag leaking cylinders.
- Never mix gases in a cylinder or try to refill a cylinder – always contact your gas supplier.

H. SUMMARY

High-pressure, gas cylinders are near or part of most welding and cutting operations, they are used safely everyday by many people throughout the world. To prevent injury, always store, handle, use, and maintain them properly. ***Treat them with the respect they deserve.***

I. RESOURCES

Listed below are a few resources that were used in creating this manual. Please visit the links below to find additional safety and health information and standards that may not have been covered in this manual.

Compressed Gas Association (CGA)
 1725 Jefferson Davis Highway
 Suite 1004
 Arlington, VA 22202-4102
 Phone: (703) 412-0900
 Fax: (703) 412-0128
 Web site: www.cganet.com

U.S. Department of Labor, Occupational Safety & Health Administration, (OSHA).
 Public Affairs Office -Room 3647,
 200 Constitution Ave,
 Ashington, D.C. 20210.
 Phone: (202) 693-1999
 Web site: www.osha.gov

American National Standards Institute (ANSI).
 Safety in Welding, Cutting, and Allied Processes (ANSI Z49.1), published by the American Welding Society, 550 NW LeJeune Road, Miami, FL 33126 (telephone: 800-443-9353; web site: www.aws.org). Fact Sheet No.30 - 3/05.

II. CO2 SAFETY INFORMATION IN SIMULATED FIREARMS APPLICATIONS

VirTra uses pressurized CO2 cylinders in most cases to simulate the recoil action of its modified firearm kits. VirTra's recoil kits save money, while providing a level of safety beyond what is possible with live ammunition.

VirTra believes CO2 to be the safest, most cost effective, and realistic approach to firearms simulation training and continues to stress the importance of safety when handling CO2 based VirTra products.

VirTra strongly suggests that customers read over this safety manual before handling any of VirTra's CO2 based products. The manual covers important safety information regarding the proper use of the Refill Station, Recoil Kit Magazines, and the SmartMags. Please take a moment to read the important safety procedures and get acquainted with each products mentioned above prior to initial use.

Again, VirTra thanks you for the enthusiastic support with the purchase of a VirTra product.

III. SAFETY OVERVIEW - REFILL STATION

A. REFILL STATION

Please take a minute to familiarize yourself with the components that make up the Refill Station. Carefully follow the important safety guidelines covered in this chapter to ensure proper and safe operation of the Refill Station. Failure to acknowledge or follow these safety guidelines may result in bodily injury or death.

1. What is a Refill Station?

A Refill Station is a table-top device that is developed by VirTra. It is used to refill magazines with CO2 gas to simulate the recoil feel of a real firearm. By having the ability to refill, the cost per shot dramatically goes down. This cost effective method is both safe and friendly to the environment by cutting down on the disposal of used CO2 cylinders.

2. Components to the Refill Station

CO2 Cylinder/Tank

The Refill Station works in conjunction with the use of a full CO2 cylinder. The unit draws CO2 gas from the tank and refills the used CO2 cylinder in the magazine block or the Smart Mag. Fig. 01 - item 01.

Regulator

The Regulator connects to the CO2 cylinder and supplies CO2 to the Refill Station. It is connected by two hoses - a High and Low Pressure hose. The hoses come preinstalled to the Regulator per VirTra regulations. Fig. 01 - item 2.

Adapter Plate

An adapter plate is supplied to match the types of weapon in use. The magazine is placed in the adapter plate which is then placed inside the Refill Station to be injected with CO2 gas. Fig. 01 - item 06.

ITEM #	DESCRIPTION
1	CO2 Cylinder
2	Regulator
3	Low Pressure Hose
4	High Pressure Hose
5	Refill Station
6	Adapter Plate

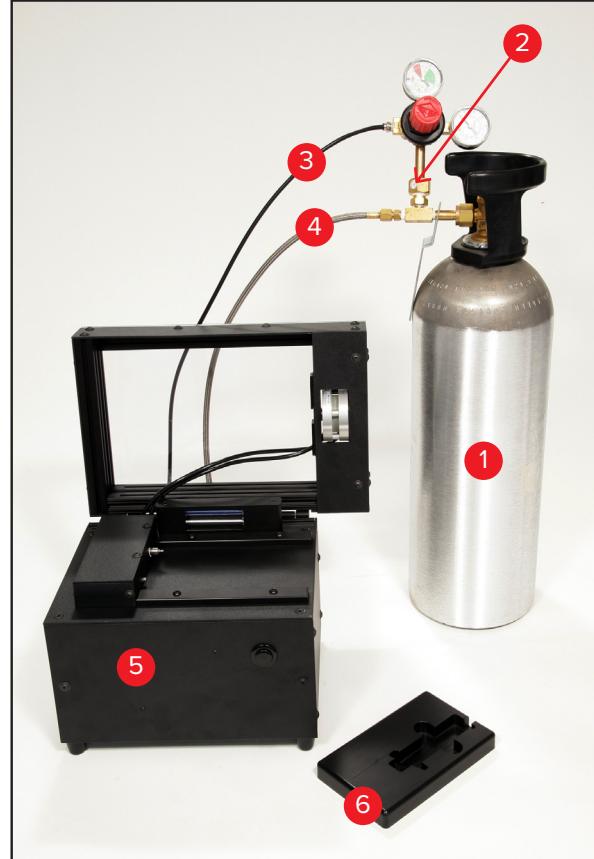


Fig. 01: Refill Station components

3. Refill Station Specification

3.1 Requirements

Power Outlet: 100-240V AC @ 50-60 Hz (clean power requested - no power spikes or brown-outs).

Temperature: 77 – 85 F° (25-30 C°) indoors temperature.

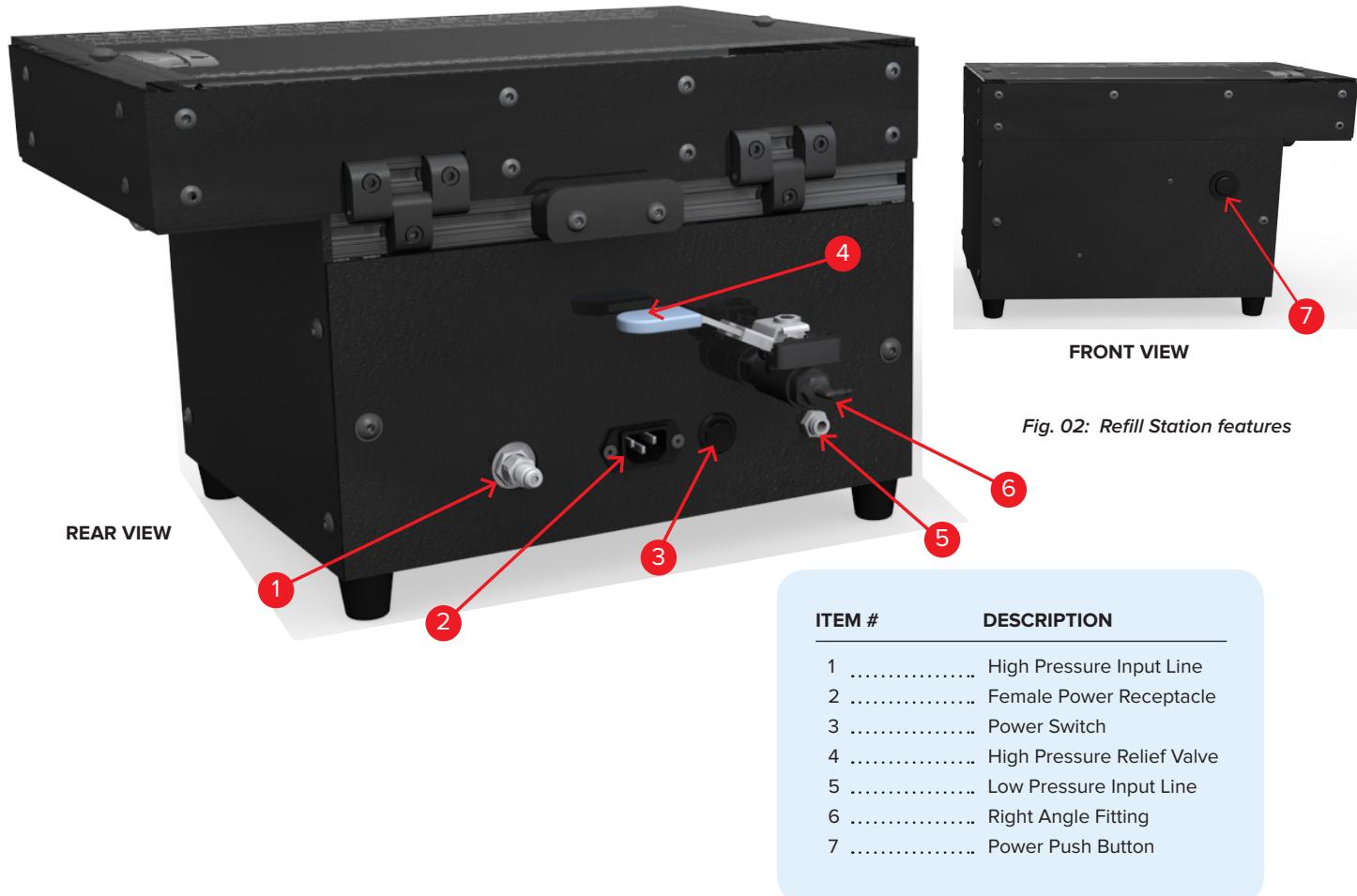
Humidity: Less than 90% relative.

Storage: Well ventilated room.

CO2 Tank: CO2 tank with siphon tube.

3.2 Parts

The picture below, Fig. 02, show an overview of the Refill Station's main features.



3.3 Safety Notices

CAUTION: Carbon Dioxide (CO2) can be fatal if ingested or inhaled in abnormally high concentrations. The procedures outlined below should **ALWAYS** be performed in a large, well ventilated room in which dispelling CO2 does not have a significant impact upon the overall air quality.

B. CONNECTING THE REFILL STATION

- IMPORTANT:** Before connecting **BOTH** the High Pressure hose and the Low Pressure hose from the Regulator/CO2 cylinder to the Refill Station, make sure the CO2 valve is completely **SHUT OFF**. See Fig. 03.
- Set the High Pressure Relief Valve located on the back of the Refill Station to **OFF**. See Fig. 04.

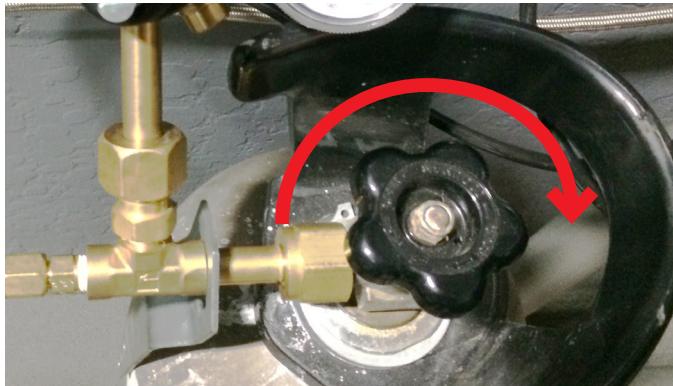


Fig. 03: Clockwise to SHUT OFF CO2 valve



Fig. 04: High Pressure Relief Valve OFF position

- Locate the Regulator and connect it to the CO2 cylinder. Make sure the Regular is tightly secured before proceeding. Both the High and the Low Pressure hoses should already come connected to the Regulator per VirTra's regulation. See Fig. 05 below.

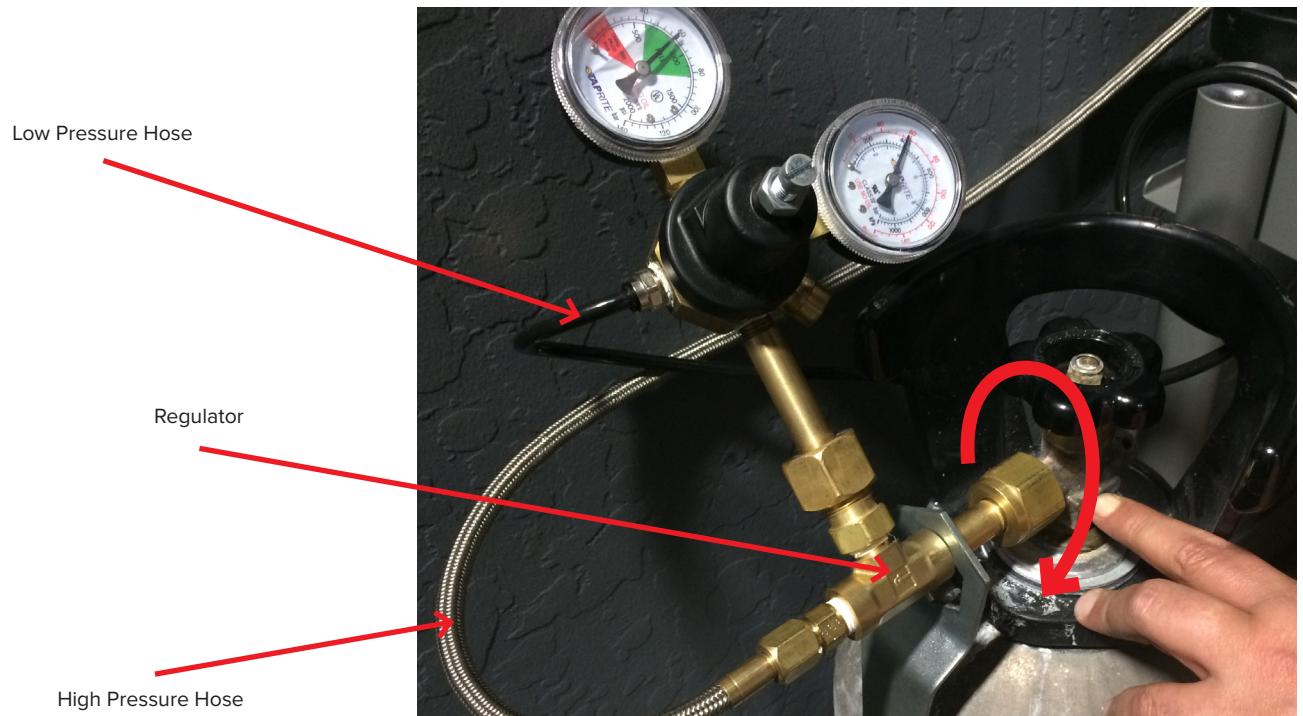


Fig. 05: Thread the Regulator to the CO2 Cylinder. Turn clockwise (CW) to tighten.

4. Connect both the High Pressure hose and the Low Pressure hose to their respective inlets on the back of the Refill Station. To tighten, use a 5/8" open end wrench. See Fig. 06 below.

WARNING: When connecting the High Pressure hose (braided steel line) to the high pressure input of the Refill Station, make sure it is **SECURED TIGHTLY** to prevent the High Pressure hose from violently disconnecting causing bodily injury. **ALWAYS** make sure hoses are connected securely prior to opening the CO₂ cylinder valve.

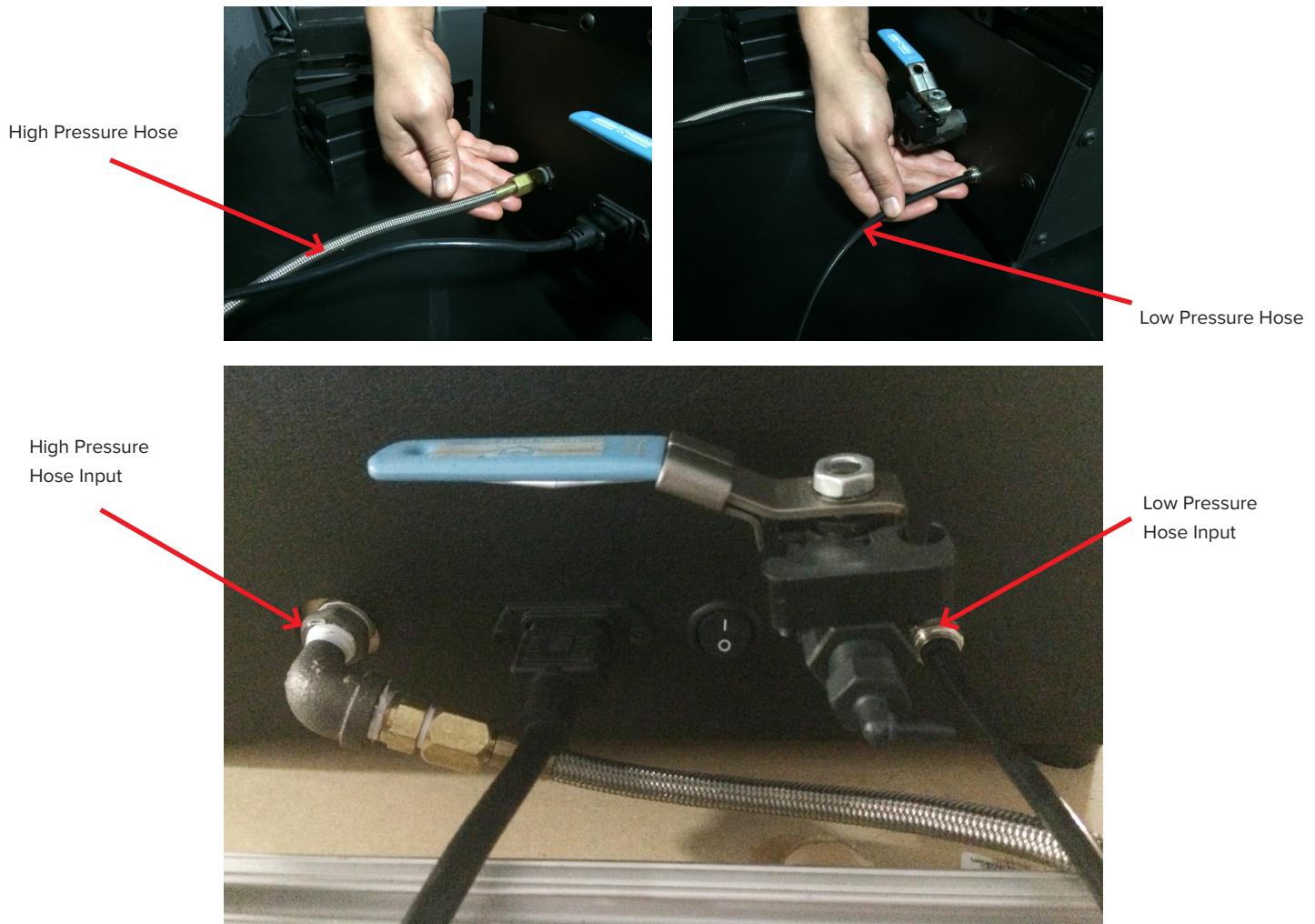


Fig. 06: High/Low Pressure hoses connected securely to the back of the Refill Station

- Once both hoses are connected securely to the back of the Refill Station, slowly open the CO2 valve on the CO2 tank to release liquid CO2 into the system. Fig. 07.



Fig. 07: Counter Clockwise to OPEN CO2 valve

- The gauge pressure on the Low Pressure line should read between 55-60 psi and the High Pressure line should read between 900-1000 psi. See Fig. 08.

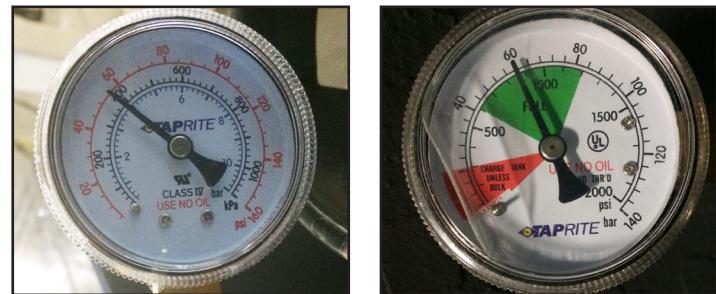


Fig. 08: Low Pressure gauge (left), High Pressure gauge (right)

- Open the High Pressure Relief valve to bleed off any air in the lines. The bleed valve should only be open for approximately 1 second until liquid CO2 begins to spray out. See Fig. 09 to the right.



Fig. 09: Bleer Air

- Rotate the Right Angle Fitting to adjust the direction of the CO2 flow. When bleeding air, always be mindful to direct the flow away from any persons standing in close proximity. See Fig. 10.



Fig. 10: Right Angle Fitting

IV. SAFETY OVERVIEW - CO2 RECOIL KIT MAGAZINES

A. USAGE AND MAINTENANCE

Guidelines for care concerning the entire line of firearms containing CO2 recoil kits.



Fig. 11: Magazine Components

ITEM #	DESCRIPTION
1	Magazine Seal Fastener
2	Tailpiece to Magazine Mating Seal
3	Magazine Pressure Seal Bearing
4	M2.5mm Set Screw Plug
5	Aluminum Magazine Block
6	Wing Nut Assembly
7	E-Clip
8	CO2 Canister
9	CO2 Canister Seal
10	CO2 Canister Punch
11	CO2 Canister Punch O-Ring

1. OEM - Firing Pin - IMPORTANT

It is recommended that specific firearms (non-duty firearms) are dedicated and solely used with the CO2 recoil kits. At the very least firing pins should be dedicated for use **ONLY** with the CO2 recoil kits. The reason for this is due to the fact that the tip of the firing pin can/will wear flat after extended use of the CO2 recoil kit; the worn firing pin could affect its ability to detonate a primer. The OEM firing pins will wear out quicker than in normal operation (use of only live ammunition) and could become a source of improper operation.

2. Known Issue

CO2 canisters are known to suddenly release out of the magazine if proper steps are not being followed. This in turn causes the CO2 cylinder to turn into a high-speed projectile that could potentially cause bodily injury to the user and/or to others.

Carefully read the following pages to avoid this incident from occurring. Again, VirTra cannot stress enough the importance of reading this safety manual prior to working with CO2 based VirTra products.

3. At Start of Day/Before Use

The following guidelines have been designed with daily use of the CO2 recoil kits in mind. Because it is unrealistic to apply these guidelines based on number of shots fired, the term “*daily use*” will be quantified as follows; daily use refers to the user expelling two full magazines of CO2 through the recoil kit within a time period of 0-10min, then afterwards taking approximately 5 minutes to refill/replace the spent CO2 canisters. Repeating this cycle for an approximate 8-9hr time period is considered daily use.

IMPORTANT: When dealing with an older type magazine, please check that the E-Clip is in place at the bottom of the mag washer. See Fig 12 below. **DO NOT** insert a CO2 cartridge if the E-Clip is missing. Check with a supervisor or contact VirTra for assistance.

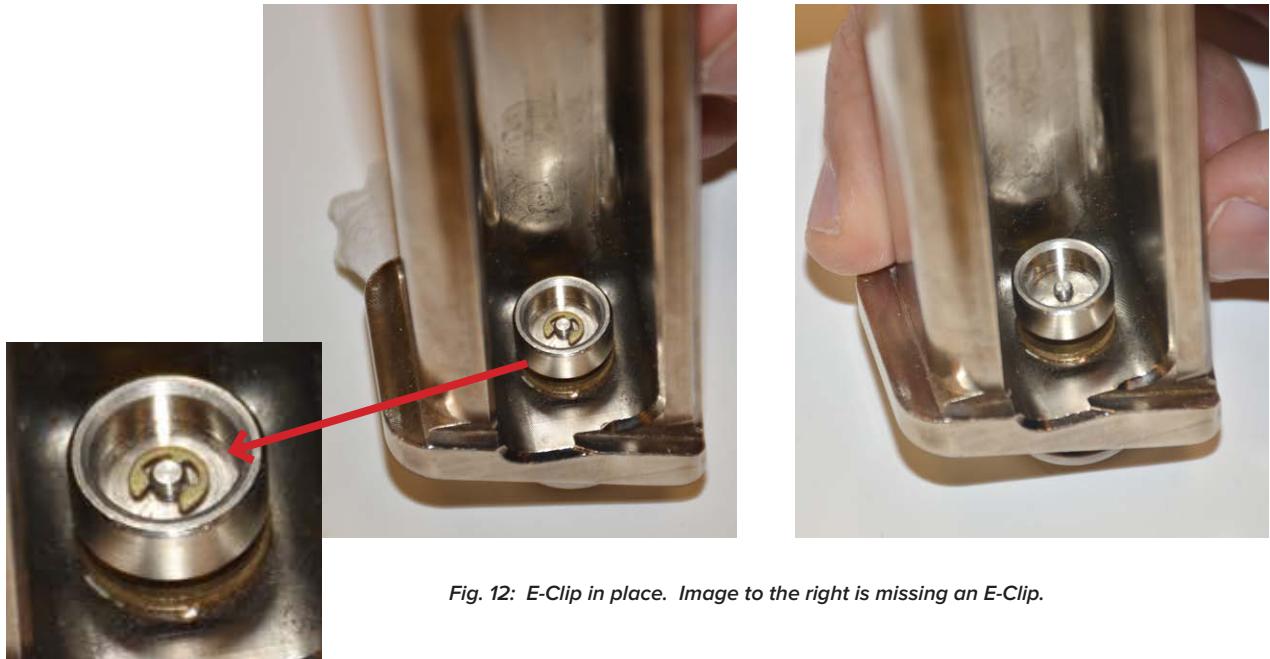


Fig. 12: E-Clip in place. Image to the right is missing an E-Clip.

4. At the End of the Day

The guidelines outlined in this section should always be performed at the end of the day. It is important **NOT** to leave any pressurized CO₂ canisters in any of the magazines overnight. For this reason, it is vital to depressurize every magazine containing a CO₂ canister. The following steps will guide the reader through this process.

1. First remove the magazine from the firearm.
2. **SLOWLY** loosen the Wing Nut Assembly (item 7 in Section IV.A) counter clockwise (CCW) until escaping gas is heard, see Fig 13.
3. Continue to loosen the Wing Nut Assembly to the point that the CO₂ canister could easily slide off the magazine block.
4. Finally, allow all gas to escape (once all hissing has stopped) and either recycle the spent CO₂ canister or tighten it back up into the magazine with the wing nut to be refilled in later use. Fig 14.



Fig. 13: Releasing CO₂.



Fig 14. Remove empty canister from magazine

5. Potential Danger During Depressurization

1. **CAUTION:** If the wing nut is loosened too fast, the CO₂ canister and the washer that the CO₂ canister rest on could potentially fly out at a **dangerous speed** resulting in bodily injury. Please be very careful when releasing CO₂. Remember to **SLOWLY** loosen the wing nut to prevent such incidents from occurring. See Fig. 15.
2. **CAUTION:** If CO₂ gas escapes too quickly the CO₂ canister will become **VERY** cold and should not be touched to avoid skin injury. See Fig. 16.

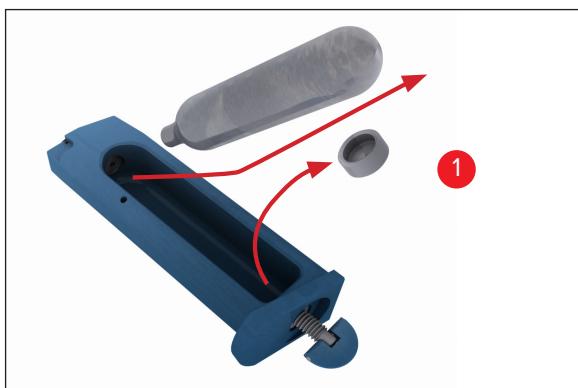


Fig 15. Washers and CO₂ cartridge could fly out if wing-nut is loosened too quickly.



Fig 16. CO₂ canister gets very cold if CO₂ escapes too quickly. DO NOT TOUCH.

6. Magazine Assembly

It is important that the magazine is assembled and disassembled correctly for the CO2 canister to operate safely and properly to avoid injuries. VirTra assumes no responsibility for injury or damage of any kind from failing to adhere to this warning.

IMPORTANT: Assembling/Disassembling of the magazine should only be done when the CO2 canister has been removed from the magazine.

1. Lineup and insert the pins on the wrench (included with the kit) into the mating holes of the fastener. See Fig. 17.
2. Turn the wrench clockwise (CW) and make sure the Magazine Seal Fastener is screwed tight. See Fig. 18.
3. Check to make sure the E-Clip is in place on the bottom of the magazine washer. See page 14.
4. Insert the CO2 canister. Make sure it is seated in the magazine properly. See Fig. 19.
5. Securely tighten the Wing Nut Assembly. Rotate clockwise (CW) to tighten. See Fig. 20.
6. Once the CO2 canister is secured, proceed with training. If it's empty, refill with CO2 cylinder using the Refill Station.



Fig 17. Lining up the pins to the holes



Fig 18. Rotate clockwise to tighten

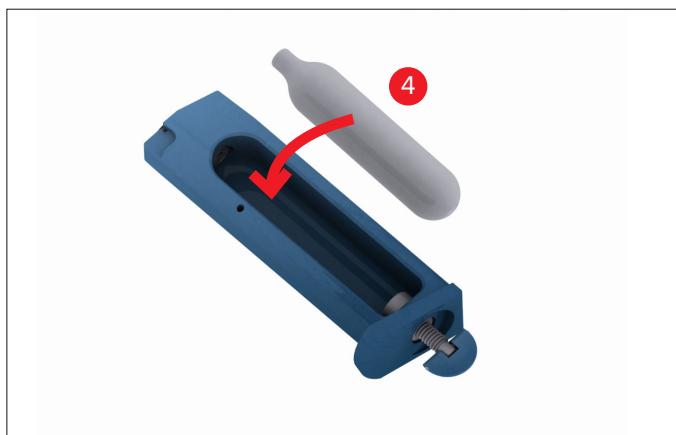


Fig 19. Place the CO2 cylinder inside the magazine

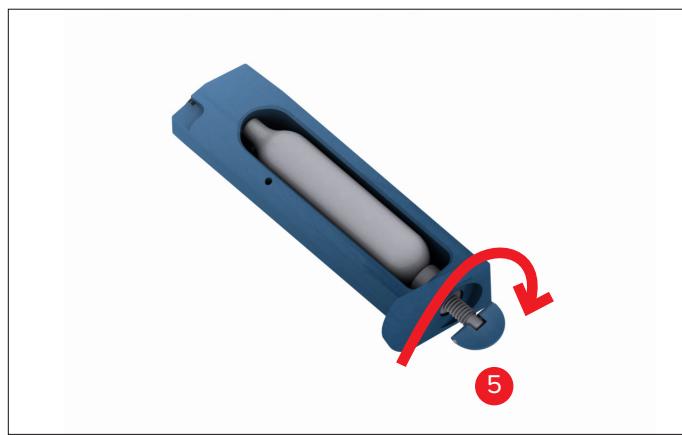


Fig 20. Tighten the wing nut to secure the CO2 cylinder

7. Magazine Disassembly

It is important that the magazine is assembled and disassembled correctly for the CO₂ canister to operate safely and properly to avoid injuries. VirTra assumes no responsibility for injury or damage of any kind from failing to adhere to this warning.

IMPORTANT: Assembling/Disassembling of the magazine should only be done when the CO₂ canister has been removed from the magazine.

1. Lineup and insert the pins on the wrench into the mating holes of the fastener. See Fig. 21.
2. Turn the wrench counter clockwise (CCW) and remove the fastener from the magazine. See Fig. 22.
3. Remove items 1, 2, and 3 from the top of the magazine. See Section IV.A for the components list. Inspect all items for damage that could hinder proper operation of the CO₂ recoil kit. Fig. 23.

Notify your supervisor if there is any noticeable damage.



Fig 21. Lining up the pins to the holes

Fig 22. Rotate Counter clockwise

Fig 23. Remove items for repair

V. SAFETY OVERVIEW - SMART MAGAZINES

A. SAFETY NOTICES

CAUTION: Carbon Dioxide (CO₂) can be fatal if ingested or inhaled in abnormally high concentrations. The procedures outlined below should **ALWAYS** be performed in a large, well ventilated room in which dispersing CO₂ would not have a significant impact upon the overall air quality.

As per the Compressed Gas Association standard CGA G-6—2009, Chapter 8: **Storage and Handling of Carbon Dioxide**, Section 8.1: **Uninsulated Cylinders**, Subsection 8.1.1: **Storage Precautions**.

The Smart Magazine should **NEVER** be stored or subjected to temperatures in excess of 125° F (51.7° C).

Furthermore, the lower limit of operation (77° F or the equivalent of 25° C) should be understood as an ideal lower temperature. Operation occurring at a temperature below the ideal will potentially result in a reduced number of shots and overall functionality of the unit.

1. Requirements

Temperature: 77 – 85° F [25-30° C] indoors temperature.

Storage: Well ventilated room.

CO₂ Tank: CO₂ tank with siphon tube.

CO₂ Refill Station: VirTra Systems proprietary CO₂ refill station.

M16 Guide Block: M16 magazine black plastic guide block for use in CO₂ refill station.

B. MAINTENANCE

WARNING: It is **EXTREMELY** important that you depressurize the magazine before doing any maintenance on the unit. Failure to depressurize could cause the pin, CO2 cylinder, or screws to fly out at a dangerous rate of speed resulting in serious bodily injury.

1. Depressurize Magazine

1. Locate the top of the magazine. You should see 2 holes and 2 screw heads. See Fig. 24 below.
2. Take the Depressurizing pin, and place it in the bigger hole. Fig. 25 below.
3. Push down to release the excess CO2 gas. Gas will be released from both sides of the depressurizing pin. See Fig.26.

CAUTION: When depressurizing the magazine, point away from body and face!



Fig 24. Top of magazine



Fig 25. Insert Depressurizing pin



Fig 26. Release of excess CO2 gas

2. Removing the CO₂ Cylinder

In the event that the CO₂ cylinder is not fully functioning, please contact VirTra immediately. Any attempts to remove the CO₂ cylinder by users other than VirTra personnel is **STRICTLY PROHIBITED** unless otherwise approved by VirTra. For your own safety, always contact VirTra for service support.

IMPORTANT: The following steps should **ONLY** be done by trained VirTra personnel.

1. To reiterate, **ALWAYS** depressurize the magazine before you do any maintenance to the SmartMag. Failure to depressurize the unit could cause the CO₂ cylinder to fly out and cause serious bodily injury. See Section V - B.1 for instructions on depressurizing the SmartMag.
2. Once the SmartMag is fully depressurized, take a punch tool and a hammer to knock the pin out that holds the CO₂ cylinder in place. Apply pressure to the opposite end of the magazine to keep it stable as you hammer the pin out. See Fig. 27.
3. Pull and remove the Pin. See Fig. 28.
4. Tip the SmartMag down to reveal the CO₂ cylinder and remove for maintenance. See Fig. 29/30.



Fig 27. Punching out the Pin



Fig 28. Pin slides out



Fig 29. CO₂ cylinder slides out



Fig 30. CO₂ cylinder and Pin removed

3. Replacing the seal on the CO2 Cylinder

WARNING: When replacing the seal in the CO2 cylinder, it is **IMPORTANT** that you depressurize the magazine first. Failure to depressurize the unit could cause the CO2 cylinder head and other parts to fly out and cause serious bodily injury. See Fig. 31 to the right.

To replace the seal, follow the steps below:

1. Again, **ALWAYS** depressurize the magazine first before you do any maintenance to the SmartMag. See Section V - B.1 for instructions on depressurizing the SmartMag.
2. Once the SmartMag has been depressurized, take an allen wrench or hex key (included with the kit) and unscrew the two screw heads on top of the Magazine Seal Fastener. See Fig. 32 below.
3. Rotate counter clockwise (CCW) to loosen the screws. Fig.33.
4. Remove the Magazine Seal Fastener and replace the seal. Fig. 34.
5. Once the seal has been properly maintained, replace back the magazine seal fastener to the magazine.
6. Rotate the allen wrench clockwise (CW) to tighten the screws.



Fig 31. Always depressurize beforehand to prevent parts from flying out and causing bodily injury.

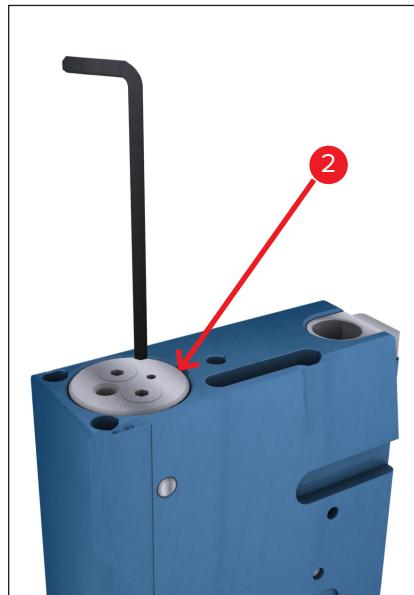


Fig 32. Use wrench to loosen screws.



Fig 33. Rotate counter clockwise to loosen.

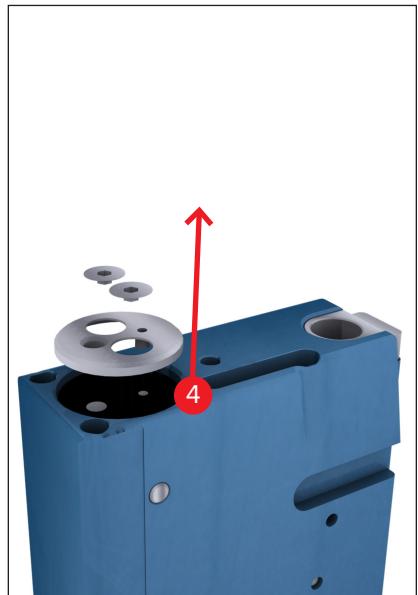


Fig 34. Remove screw heads and replace seal.

VI. REFERENCE SHEET

A. AIRGAS MSDS

Material Safety Data Sheet

Carbon Dioxide



Section 1. Chemical product and company identification

Product name	: Carbon Dioxide
Supplier	: AIRGAS INC., on behalf of its subsidiaries 259 North Radnor-Chester Road Suite 100 Radnor, PA 19087-5283 1-610-687-5253
Product use	: Synthetic/Analytical chemistry.
Synonym	: Carbonic Acid, Carbon Dioxide Liquid, Carbon Dioxide, Refrigerated Liquid, Carbonic Anhydride
MSDS #	: 001013
Date of Preparation/Revision	: 1/20/2012.
In case of emergency	: 1-866-734-3438

Section 2. Hazards identification

Physical state	: Gas or Liquid.
Emergency overview	: WARNING! GAS: CONTENTS UNDER PRESSURE. MAY CAUSE RESPIRATORY TRACT, EYE, AND SKIN IRRITATION. CAN CAUSE TARGET ORGAN DAMAGE. Do not puncture or incinerate container. Can cause rapid suffocation. LIQUID: MAY CAUSE RESPIRATORY TRACT, EYE, AND SKIN IRRITATION. CAN CAUSE TARGET ORGAN DAMAGE. Extremely cold liquid and gas under pressure. Can cause rapid suffocation. May cause severe frostbite. Do not puncture or incinerate container. Avoid contact with eyes, skin and clothing. May cause target organ damage, based on animal data. Wash thoroughly after handling. Keep container closed. Avoid breathing gas. Use with adequate ventilation. Contact with rapidly expanding gas, liquid, or solid can cause frostbite.
Target organs	: May cause damage to the following organs: lungs.
Routes of entry	: Inhalation Dermal Eyes
Potential acute health effects	
Eyes	: Moderately irritating to eyes. Contact with rapidly expanding gas may cause burns or frostbite. Contact with cryogenic liquid can cause frostbite and cryogenic burns.
Skin	: Moderately irritating to the skin. Contact with rapidly expanding gas may cause burns or frostbite. Contact with cryogenic liquid can cause frostbite and cryogenic burns.
Inhalation	: Moderately irritating to the respiratory system.
Ingestion	: Ingestion is not a normal route of exposure for gases. Contact with cryogenic liquid can cause frostbite and cryogenic burns.
Potential chronic health effects	
Chronic effects	: May cause target organ damage, based on animal data.
Target organs	: May cause damage to the following organs: lungs.
Medical conditions aggravated by over-exposure	: Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

Carbon Dioxide**Section 3. Composition, Information on Ingredients**

Name	CAS number	% Volume	Exposure limits
Carbon Dioxide	124-38-9	100	ACGIH TLV (United States, 2/2010). STEL: 54000 mg/m ³ 15 minute(s). STEL: 30000 ppm 15 minute(s). TWA: 9000 mg/m ³ 8 hour(s). TWA: 5000 ppm 8 hour(s). NIOSH REL (United States, 6/2009). STEL: 54000 mg/m ³ 15 minute(s). STEL: 30000 ppm 15 minute(s). TWA: 9000 mg/m ³ 10 hour(s). TWA: 5000 ppm 10 hour(s). OSHA PEL (United States, 6/2010). TWA: 9000 mg/m ³ 8 hour(s). TWA: 5000 ppm 8 hour(s). OSHA PEL 1989 (United States, 3/1989). STEL: 54000 mg/m ³ 15 minute(s). STEL: 30000 ppm 15 minute(s). TWA: 18000 mg/m ³ 8 hour(s). TWA: 10000 ppm 8 hour(s).

Section 4. First aid measures

No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- Frostbite** : Try to warm up the frozen tissues and seek medical attention.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : As this product is a gas, refer to the inhalation section.

Section 5. Fire-fighting measures

- Flammability of the product** : Non-flammable.
- Products of combustion** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
- Fire-fighting media and instructions** : Use an extinguishing agent suitable for the surrounding fire.

Apply water from a safe distance to cool container and protect surrounding area. If involved in fire, shut off flow immediately if it can be done without risk.

Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Carbon Dioxide**Section 6. Accidental release measures**

- Personal precautions** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.
- Methods for cleaning up** : Immediately contact emergency personnel. Stop leak if without risk. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Section 7. Handling and storage

- Handling** : Wash thoroughly after handling. High pressure gas. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Keep container closed. Avoid contact with skin and clothing. Use with adequate ventilation. Avoid contact with eyes. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement. Never allow any unprotected part of the body to touch uninsulated pipes or vessels that contain cryogenic liquids. Prevent entrapment of liquid in closed systems or piping without pressure relief devices. Some materials may become brittle at low temperatures and will easily fracture.
- Storage** : Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F). For additional information concerning storage and handling refer to Compressed Gas Association pamphlets P-1 Safe Handling of Compressed Gases in Containers and P-12 Safe Handling of Cryogenic Liquids available from the Compressed Gas Association, Inc.

Section 8. Exposure controls/personal protection

- Engineering controls** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
- Personal protection**
- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
When working with cryogenic liquids, wear a full face shield.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
The applicable standards are (US) 29 CFR 1910.134 and (Canada) Z94.4-93
- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Insulated gloves suitable for low temperatures
- Personal protection in case of a large spill** : Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product. Full chemical-resistant suit and self-contained breathing apparatus should be worn only by trained and authorized persons.
- Product name**

Carbon Dioxide

Carbon dioxide

ACGIH TLV (United States, 2/2010).

STEL: 54000 mg/m³ 15 minute(s).
 STEL: 30000 ppm 15 minute(s).
 TWA: 9000 mg/m³ 8 hour(s).
 TWA: 5000 ppm 8 hour(s).

NIOSH REL (United States, 6/2009).

STEL: 54000 mg/m³ 15 minute(s).
 STEL: 30000 ppm 15 minute(s).
 TWA: 9000 mg/m³ 10 hour(s).
 TWA: 5000 ppm 10 hour(s).

OSHA PEL (United States, 6/2010).

TWA: 9000 mg/m³ 8 hour(s).
 TWA: 5000 ppm 8 hour(s).

OSHA PEL 1989 (United States, 3/1989).

STEL: 54000 mg/m³ 15 minute(s).
 STEL: 30000 ppm 15 minute(s).
 TWA: 18000 mg/m³ 8 hour(s).
 TWA: 10000 ppm 8 hour(s).

Consult local authorities for acceptable exposure limits.

Section 9. Physical and chemical properties

Molecular weight	:	44.01 g/mole
Molecular formula	:	C-O2
Melting/freezing point	:	Sublimation temperature: -79°C (-110.2 to °F)
Critical temperature	:	30.9°C (87.6°F)
Vapor pressure	:	830 (psig)
Vapor density	:	1.53 (Air = 1) Liquid Density@BP: Solid density = 97.5 lb/ft3 (1562 kg/m3)
Specific Volume (ft³/lb)	:	8.7719
Gas Density (lb/ft³)	:	0.114

Section 10. Stability and reactivity

Stability and reactivity	:	The product is stable.
Hazardous decomposition products	:	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous polymerization	:	Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information**Toxicity data**

Product/ingredient name	Result	Species	Dose	Exposure
Carbon dioxide	LC50 Inhalation Gas.	Rat	470000 ppm	30 minutes
IDLH	:	40000 ppm		
Chronic effects on humans	:	May cause damage to the following organs: lungs.		
Other toxic effects on humans	:	No specific information is available in our database regarding the other toxic effects of this material to humans.		
Specific effects				
Carcinogenic effects	:	No known significant effects or critical hazards.		
Mutagenic effects	:	No known significant effects or critical hazards.		
Reproduction toxicity	:	No known significant effects or critical hazards.		

<i>Carbon Dioxide</i>

Section 12. Ecological information

Aquatic ecotoxicity

Not available.

Toxicity of the products of biodegradation : not available

Environmental fate : Not available.

Environmental hazards : This product shows a low bioaccumulation potential.

Toxicity to the environment : Not available.

Section 13. Disposal considerations

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation. Return cylinders with residual product to Airgas, Inc. Do not dispose locally.

Section 14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	UN1013 UN2187	CARBON DIOXIDE Carbon dioxide, refrigerated liquid	2.2	Not applicable (gas).		<u>Limited quantity</u> Yes. <u>Packaging instruction</u> Passenger aircraft Quantity limitation: 75 kg Cargo aircraft Quantity limitation: 150 kg
TDG Classification	UN1013 UN2187	CARBON DIOXIDE Carbon dioxide, refrigerated liquid	2.2	Not applicable (gas).		<u>Explosive Limit and Limited Quantity Index</u> 0.125 <u>Passenger Carrying Road or Rail Index</u> 75
Mexico Classification	UN1013 UN2187	CARBON DIOXIDE Carbon dioxide, refrigerated liquid	2.2	Not applicable (gas).		-

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Carbon Dioxide**Section 15. Regulatory information****United States**

- U.S. Federal regulations** : TSCA 8(a) IUR: This material is listed or exempted.
United States inventory (TSCA 8b): This material is listed or exempted.
SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: Carbon dioxide
SARA 311/312 MSDS distribution - chemical inventory - hazard identification:
Carbon dioxide: Sudden release of pressure, Immediate (acute) health hazard, Delayed (chronic) health hazard
- State regulations** : Connecticut Carcinogen Reporting: This material is not listed.
Connecticut Hazardous Material Survey: This material is not listed.
Florida substances: This material is not listed.
Illinois Chemical Safety Act: This material is not listed.
Illinois Toxic Substances Disclosure to Employee Act: This material is not listed.
Louisiana Reporting: This material is not listed.
Louisiana Spill: This material is not listed.
Massachusetts Spill: This material is not listed.
Massachusetts Substances: This material is listed.
Michigan Critical Material: This material is not listed.
Minnesota Hazardous Substances: This material is not listed.
New Jersey Hazardous Substances: This material is listed.
New Jersey Spill: This material is not listed.
New Jersey Toxic Catastrophe Prevention Act: This material is not listed.
New York Acutely Hazardous Substances: This material is not listed.
New York Toxic Chemical Release Reporting: This material is not listed.
Pennsylvania RTK Hazardous Substances: This material is listed.
Rhode Island Hazardous Substances: This material is not listed.

Canada

- WHMIS (Canada)** : Class A: Compressed gas.
CEPA Toxic substances: This material is listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is not listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Section 16. Other information**United States**

- Label requirements** : GAS:
CONTENTS UNDER PRESSURE.
MAY CAUSE RESPIRATORY TRACT, EYE, AND SKIN IRRITATION.
CAN CAUSE TARGET ORGAN DAMAGE.
Do not puncture or incinerate container.
Can cause rapid suffocation.
LIQUID:
MAY CAUSE RESPIRATORY TRACT, EYE, AND SKIN IRRITATION.
CAN CAUSE TARGET ORGAN DAMAGE.
Extremely cold liquid and gas under pressure.
Can cause rapid suffocation.
May cause severe frostbite.

Canada

- Label requirements** : Class A: Compressed gas.

Carbon Dioxide

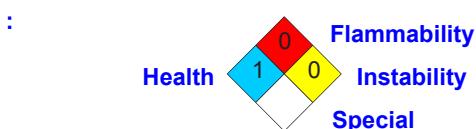
Hazardous Material Information System (U.S.A.)

Health	*	1
Flammability		0
Physical hazards		0

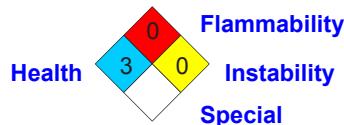
liquid:

Health		3
Fire hazard		0
Reactivity		0
Personal protection		

National Fire Protection Association (U.S.A.)



liquid:



Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

B. CROSMAN 12G CO2 POWERLETS MSDS



Safety Data Sheet

All Models Powerlets

Section 1: Identification

Product Name:	Crosman Powerlet
Synonyms:	Compressed CO2, Carbon Dioxide
CAS Number:	124-38-9
Product Use:	Propellant
Manufacturer:	Crosman Corporation
Address:	7629 State Route 5 & 20 Bloomfield, New York 14469
General Information Phone Number:	(585) 657-6161
Transportation Emergency Number:	CHEMTREC: 800-424-9300
Date of Preparation/Revision:	December 22, 2011

Section 2: Hazard Identification

Physical State:	Gas
Emergency Overview:	WARNING!
CONTENTS UNDER PRESSURE. MAY CAUSE RESPIRATORY TRACT, EYE, AND SKIN IRRITATION. CAN CAUSE TARGET ORGAN DAMAGE. Do not puncture or incinerate container. Can cause rapid suffocation. Avoid breathing gas. Use with adequate ventilation. contact with rapidly expanding gas can cause frostbite.	
Target Organs: May cause damage to the following organs: lungs, cardiovascular system, skin, eyes, central nervous system (CNS).	
Routes of Entry: Inhalation	

Potential acute health effects

Eyes:	Moderately irritating to eyes. Contact with rapidly expanding gasses may cause burns or frostbite.
Skin:	Moderately irritating to skin. Contact with rapidly expanding gasses may cause burns or frostbite.
Inhalation:	Moderately irritating to respiratory system.

Ingestion:	Ingestion is not a normal route of exposure for gases.
<u>Potential chronic health effects</u>	
Carcinogenic Effects:	Not available
Mutagenic Effects:	Not available
Teratogenic Effects:	Not available
Medical Conditions aggravated by over-exposure:	Pre-existing disorders involving any target organs mentioned above as being at risk may be aggravated by over-exposure to this product.

Section 3: <i>Composition</i>			
	<u>Name</u> Carbon Dioxide	<u>CAS Number</u> 124-38-9	<u>% Volume</u> 100

Exposure Limits**ACGIH TLV (US 1/2008)**STEL: 54000 mg/m³ 15 minutes

STEL: 30000 ppm 15 minutes

TWA: 9000 mg/m³ 8 hours

TWA: 5000 ppm 8 hours

NIOSH REL (US, 6/2008)STEL: 54000 mg/m³ 15 minutes

STEL: 30000 ppm 15 minutes

TWA: 9000 mg/m³ 10 hours

TWA: 5000 ppm 10 hours

OSHA PEL (US, 11/2006)TWA: 9000 mg/m³ 8 hours

TWA: 5000 ppm 8 hours

OSHA PEL 1989 (US, 3/1989)STEL: 54000 mg/m³ 15 minutes

STEL: 30000 ppm 15 minutes

TWA: 18000 mg/m³ 8 hours

TWA: 10000 ppm 8 hours

Section 4: <i>First Aid Measures</i>		
Eyes:	Check for and remove contact lenses. Immediately flush eyes with copious amounts of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.	
Skin:	In case of contact, flush skin with copious amounts of water for at least 15 minutes. Seek medical attention immediately.	
Frostbite:	Try to warm up the frozen tissues and seek medical attention.	
Inhalation:	Move exposed person to fresh air. If not breathing, if breathing is irregular or if	

Ingestion:	respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as collar, tie, belt or waistband. Seek medical attention immediately.
	As this product is a gas, refer to the inhalation section.

Section 5: Fire Fighting Measures	
Flammability of Product:	Non-Flammable
Combustion Products:	Decomposition products may include the following materials: carbon dioxide carbon monoxide
Suitable Extinguishing Media:	Use an extinguishing agent that is suitable for the surrounding fire.
Fire-Fighting Procedures	Apply water or other suitable extinguishing agent from a safe distance to cool the container and protect surrounding area.
Unusual Fire and Explosion Hazards:	Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

Section 6: Accidental Release Measures	
Personal Protection:	Use suitable protective equipment.
Environmental Precautions:	Discard any product in an environmentally acceptable manner, in compliance with all federal, state and local regulations.

Section 7: Handling and Storage	
Handling	
Use good hygiene practices. Wash hands before eating, drinking or smoking.	
<i>Keep away from heat and flame.</i>	<i>Do not puncture container.</i>
Storage	
Store in a cool, dry, well-ventilated area away from heat and sources of ignition.	
Protect against physical damage.	Storage temperature should not exceed 52°C (125°F).

Section 8: Exposure Controls / Personal Protection	
Engineering Controls	Use with adequate ventilation.
Personal Protection - Eyes	Wear appropriate safety glasses/goggles.
Personal Protection - Skin	Personal protective equipment for the body should be selected based upon the tasks being performed and the risks associated with those tasks.
Personal Protection - Respiratory	No special protection required under normal product usage.
Personal Protection - Hands	Personal protective equipment for the body

should be selected based upon the tasks being performed and the risks associated with those tasks.

Section 9:	<i>Physical and Chemical Properties</i>
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Molecular Weight:	44.01 g/mole
Molecular Formula:	CO ₂
Boiling/condensation point:	-78.6°C (-109.5°F)
Melting/freezing point:	Sublimation Temperature: -78.6°C (-109.5°F)
Critical Temperature:	30.9°C (87.6°F)
Vapor Pressure:	830 (psig)
Vapor Density:	1.53 (Air = 1)
Specific Volume (ft ³ /lb):	8.7719
Gas Density (lb/ft ³):	0.114

Section 10:	<i>Stability and Reactivity</i>
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Stability and Reactivity	This product is stable
Hazardous decomposition	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous Polymerization	Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11:	<i>Toxicological Information</i>
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Toxicity Data

Product/ingredient name: carbon dioxide

<u>Result</u>	<u>Species</u>	<u>Dose</u>	<u>Exposure</u>
LC50 Inhalation Gas	Rat	470000 ppm	30 minutes
IDLH:		40000 ppm	
Chronic effects on humans:		May cause damage to the following organs: lungs, cardiovascular system, skin, eyes, central nervous system.	
Carcinogenic effects:		None known	
Mutagenic effects:		None known	
Reproductive effects:		None known	

Section 12:	<i>Ecological Information</i>
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Aquatic ecotoxicity:	Not available
Products of Degradation:	Not available
Environmental fate:	Not available
Environmental Hazards:	No known significant effects or critical hazards.
Toxicity to the environment:	Not available

Section 13:	<i>Disposal Considerations</i>
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Product must be disposed of in accordance with all appropriate Federal, State, and local regulations.

Section 14:	<i>Transport Information</i>
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United States
DOT Classification

UN Number:	UN1013
Proper Shipping Name:	CARBON DIOXIDE
Class:	2.2
Packing Group:	Not Applicable (gas)
Label:	2.2
UN Number:	UN2187
Proper Shipping Name:	Carbon dioxide, refrigerated liquid
Class:	2.2
Packing Group:	Not Applicable (gas)
Label:	2.2
Canada	
TDG Classification	
UN Number:	UN1013
Proper Shipping Name:	CARBON DIOXIDE
Class:	2.2
Packing Group:	Not Applicable (gas)
Label:	2.2
UN Number:	UN2187
Proper Shipping Name:	Carbon dioxide, refrigerated liquid
Class:	2.2
Packing Group:	Not Applicable (gas)
Label:	2.2
Mexico	
UN Number:	UN1013
Proper Shipping Name:	CARBON DIOXIDE
Class:	2.2
Packing Group:	Not Applicable (gas)
Label:	2.2
UN Number:	UN2187
Proper Shipping Name:	Carbon dioxide, refrigerated liquid
Class:	2.2
Packing Group:	Not Applicable (gas)
Label:	2.2

Section 15: Regulatory Information

United States	
U.S. Federal Regulations:	United States inventory (TSCA 8b): This material is listed or exempted.
	SARA 302/304/311/312 Extremely Hazardous Substances: No products were found
	SARA 302/304 Emergency Planning and Notification: No products were found.
	SARA 302/304/311/312 Hazardous Chemicals: carbon dioxide
	SARA 311/312 MSDS distribution - chemical inventory - hazard identification:

TABLE OF CONTENTS

carbon dioxide: sudden release of pressure, immediate (acute) health hazard, delayed (chronic) health hazard.	
Clean Water Act (CWA) 307: No products were found.	
Clean Water Act (CWA) 311: No products were found.	
Clean Air Act (CAA) 112 accidental release prevention: No products were found.	
Clean Air Act (CAA) 112 regulated flammable substances: No products were found.	
Clean Air Act (CAA) 112 regulated toxic substances: No products were found.	
State Regulations:	
Connecticut Carcinogen Reporting: This material is not listed.	
Connecticut Hazardous Material Survey: This material is not listed.	
Florida Substances: This material is not listed.	
Illinois Chemical Safety Act: This material is not listed.	
Illinois Toxic Substances Disclosure to Employee Act: This material is not listed.	
Louisiana Reporting: This material is not listed.	
Louisiana Spill: This material is not listed.	
Massachusetts Spill: This material is not listed.	
Massachusetts Substances: This material is not listed.	
Michigan Critical Material: This material is not listed.	
Minnesota Hazardous Substances: This material is not listed.	
New Jersey Hazardous Substances: This material is not listed.	
New Jersey Spill: This material is not listed.	
New Jersey Toxic Catastrophe Prevention Act: This material is not listed.	
New York Acutely Hazardous Substances: This material is not listed.	
New York Toxic Chemical Release reporting: This material is not listed.	

Pennsylvania RTK Hazardous Substances:

This material is not listed.

Rhode Island Hazardous Substances:

This material is not listed.

Canada**WHMIS:**

Class A: Compressed Gas.

CEPA Toxic Substances:

This material is not listed.

Canadian ARET:

This material is not listed.

Canadian NPRI:

This material is not listed.

Alberta Designated Substances:

This material is not listed.

Ontario Designated Substances:

This material is not listed.

Quebec Designated Substances:

This material is not listed.

Section 16: Other Information**United States Label Requirements:****GAS:**

CONTENTS UNDER PRESSURE. CAUSE RESPIRATORY TACT, EYE, AND SKIN IRRITATION. CAN CAUSE TARGET ORGAN DAMAGE.

Do not puncture or incinerate container.
Can cause rapid suffocation.

Canada Label Requirements:

Class A: Compressed Gas.

Hazardous Material Information**System (U.S.A.):**

Health	1*
Flammability	0
Physical Hazards	0

Note: To the best of our knowledge, the information contained in this document is accurate.

No liability is assumed for the accuracy or completeness of the information contained in this document.

All materials may present unknown hazards and should be used with caution.

Although certain hazards have been noted in this document, there is no guarantee that these are the only hazards that exist.

VII. CONTACT VIRTRA

If you have any questions or issues with any part of this manual, please see contact below:

VirTra Service Department



7970 S. Kyrene Road
Tempe, AZ 85284 USA

Office: 480.968.1488 x 5029
Mobile: 602.616.7504
Email: service@virtra.com



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