User’s Guide
CARBON DIOXIDE CYLINDERS
AND REGULATORS

Part No. 316704000
June, 1974
Revised: August 21, 1992

THIS DOCUMENT CONTAINS IMPORTANT INFORMATION
This Manual must be read and understood before installing or operating this equipment
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>GENERAL</td>
<td>1</td>
</tr>
<tr>
<td>TOXICITY</td>
<td>2</td>
</tr>
<tr>
<td>CO2 CYLINDER STORAGE AND HANDLING SAFETY</td>
<td>3</td>
</tr>
<tr>
<td>SAFETY DEVICE</td>
<td>4</td>
</tr>
<tr>
<td>USING CYLINDER CONTENT</td>
<td>4</td>
</tr>
<tr>
<td>CYLINDER FILLING</td>
<td>5</td>
</tr>
<tr>
<td>CONNECTING CO2 REGULATORS</td>
<td>6</td>
</tr>
<tr>
<td>INTERNAL CO2 REGULATOR LEAK (MAIN SEAT, ETC.)</td>
<td>7</td>
</tr>
<tr>
<td>EXTERNAL SYSTEM LEAK</td>
<td>7</td>
</tr>
<tr>
<td>TESTING</td>
<td>8</td>
</tr>
<tr>
<td>DISCONNECTING</td>
<td>8</td>
</tr>
<tr>
<td>TEST DATES ON CYLINDERS</td>
<td>8</td>
</tr>
<tr>
<td>TRANSPORTATION OF CYLINDERS</td>
<td>8</td>
</tr>
<tr>
<td>CONCLUSION</td>
<td>9</td>
</tr>
<tr>
<td>CLEANING CO2 CHECK VALVE</td>
<td>9</td>
</tr>
</tbody>
</table>

# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIGURE 1. CO2 CYLINDER AND PRIMARY CO2 REGULATOR ASS’Y</td>
<td>3</td>
</tr>
<tr>
<td>FIGURE 2. HIGH-PRESSURE GAGE</td>
<td>7</td>
</tr>
<tr>
<td>FIGURE 3. CO2 CHECK VALVE ASSEMBLY</td>
<td>9</td>
</tr>
</tbody>
</table>
INTRODUCTION

This USER’S GUIDE is available to personnel in the beverage industry so that they might have a better understanding with regard to proper handling of the CO\textsubscript{2} CYLINDERS and related equipment purchased from IMI Cornelius Inc. It is important that all users of this equipment read and understand information contained in this USER’S GUIDE before attempting to handle CO\textsubscript{2} cylinders and related items. Being aware of factors discussed in this USER’S GUIDE, and the following recommendations for proper care and handling of the CO\textsubscript{2} cylinders outlined herein, can help assure dependable and economical compressed carbon dioxide gas service and help to minimize possibilities of personal injury or property damage.

This USER’S GUIDE applies to CO\textsubscript{2} cylinders, CO\textsubscript{2} regulators, and related equipment manufactured and or sold by IMI Cornelius Inc. There is no intended application of any kind whatsoever to equipment from other sources.

This document is subject to periodic review and revision. User’s are cautioned to obtain the latest edition. Comments and suggestions are invited from all User’s for consideration by IMI Cornelius Inc. In connection with such review; any such comments or suggestions will be fully reviewed by IMI Cornelius Inc.

This document should not be confused with Federal, State, or municipal specifications or regulations, insurance requirements, or national safety codes.

The compressed CO\textsubscript{2}, nitrogen, or air used with pressurized dispensing systems is stored at relatively high pressures in specially designed, heavy-duty steel or aluminum pressure vessels. Regulations governing the use of compressed gas cylinders are under jurisdiction of the D.O.T. (Department of Transportation) in Washington, DC. Additional information can be obtained from the Compressed Gas Association (CGA) in New York.

GENERAL

**WARNING:** Due to the possibility of an explosion which could result in personal injury and/or property damage, never allow carbon dioxide cylinder and its contents to reach a temperature exceeding 115\degree F. A carbon dioxide cylinder is a pressure vessel and is considered to be in high pressure service when the cylinder is at 900-PSIG or higher. For example: A 20-pound carbon dioxide cylinder at 838-PSIG pressure and 70\degree F, has a force of 3,500 pounds exerted over its bottom while the sides are holding 365,000 pounds. At higher temperatures, these figures become much more significant. Refer to CO\textsubscript{2} temperatures and corresponding pressures on the next page.

Usage of compressed carbon dioxide gases (CO\textsubscript{2}) requires care and attention to proper handling procedures. Less attention to safety can result in serious or deadly personal injury and property damage.

Carbon dioxide is marketed by weight. Each CO\textsubscript{2} cylinder should have its own “tare” (empty cylinder with valve installed) weight (see Figure 1). We recommend that this “tare” weight be stamped on side of the cylinder neck. It usually is an extra cost option but we believe it to be valuable (see Figure 1 for location). Since the empty cylinder “Tare” weight is known, the User can determine the liquid CO\textsubscript{2} content of the cylinder he receives by simply weighing a filled cylinder and subtracting from that figure the cylinder “Tare” weight.

**WARNING:** Do not rely on pressure gage readings to attempt to evaluate liquid CO\textsubscript{2} content. Pressure reading can vary according to temperature CO\textsubscript{2} cylinder is or has been exposed to. Pressure has no relation to quantity of liquid CO\textsubscript{2} the cylinder contains.

As an example, a 20-pound cylinder must not have more than 20-pounds by weight of liquid CO\textsubscript{2} in the cylinder. Therefore, after the CO\textsubscript{2} cylinders have been filled by User’s plant or a supplier, a careful weight check should be made to determine that each cylinder contains the proper amount of liquid CO\textsubscript{2}. A valve outlet cap should then be firmly screwed onto each cylinder outlet to minimize possibilities of handling damage.

CO\textsubscript{2} cylinders are allowed to be filled to a legal maximum “filling density” of 68%. The term “filling density” designates percent ratio of weight of liquid CO\textsubscript{2} in cylinder to weight of water at 60\degree F that the cylinder will hold.

Commonly, CO\textsubscript{2} will have the following pressures at temperatures up to 80\degree F, whether cylinder is full (68% filling density), or if it has been used and only a small portion of liquid CO\textsubscript{2} remains. After the CO\textsubscript{2} has been used past point of causing all liquid CO\textsubscript{2} to change to CO\textsubscript{2} gas, pressure will be lower than those listed.
Above 88°F, CO₂ exist as a gas regardless of pressure. CO₂ will have the following approximate pressures at temperatures above 88°F in cylinders with filling density of 68% CO₂. At a given temperature, pressure will decrease proportionately as CO₂ is used.

<table>
<thead>
<tr>
<th>CO₂ Temperature</th>
<th>CO₂ Gage Pressure (sea level)</th>
</tr>
</thead>
<tbody>
<tr>
<td>90°F</td>
<td>1190-PSIG</td>
</tr>
<tr>
<td>100°F</td>
<td>1450-PSIG</td>
</tr>
<tr>
<td>110°F</td>
<td>1710-PSIG</td>
</tr>
<tr>
<td>120°F</td>
<td>1980-PSIG</td>
</tr>
<tr>
<td>130°F</td>
<td>2250-PSIG</td>
</tr>
</tbody>
</table>

A cylinder must have 1800-PSIG minimum service pressure to be used as a CO₂ cylinder.

**TOXICITY**

**WARNING:** CO₂ displaces oxygen. Strict attention must be observed in the prevention of CO₂ (carbon dioxide) gas leaks in the entire CO₂ and soft drink system. If a CO₂ gas leak is suspected, particularly in a small area, immediately ventilate the contaminated area before attempting to repair the leak. Personnel exposed to a high concentration of CO₂ gas will experience tremors which are followed rapidly by loss of consciousness and suffocation.

With regard to concentrations of CO₂, one of the principal problems of giving and indication of safe working limits for carbon dioxide is that individual tolerances vary widely. The tolerance depends on, among other things, physiological condition of the person and temperature and humidity of the atmosphere. Cardiac or respiratory ailments increase the hazard of carbon dioxide inhalation.

The threshold limit value for carbon dioxide is 5,000 parts per million (ppm) or 0.5%, i.e; level which can reasonably be tolerated over an eight hour working day. Any level above this must be regarded as a hazard, bearing in mind the variation in physiological state of the individual. As levels of carbon dioxide are increased above this level, respiratory rate increases and becomes markedly increased at 20,000 ppm (2%).

Exposure to an atmosphere containing 30,000 ppm (3%) CO₂ results in difficulty of breathing (dyspnea), headache, decreased acuity of hearing, increased blood pressure and pulse rate, and may have a narcotic effect. Breathing becomes very labored in a short space of time at double this concentration.

At levels of 100,000 ppm (10⁵) carbon dioxide, after only one minute, headache, visual disturbance, ringing in the ears (tinnitus) and tremors occur which are rapidly followed by loss of consciousness.

It is obvious that persons who may come into contact with abnormal concentrations of carbon dioxide in the atmosphere should be warned of these dangers and be informed of the symptoms, i.e; headache, difficulty of breathing, etc. and are advised to leave the contaminated area as soon as they are aware of such effects.

If a full CO₂ cylinder is emptied into a room 10’ x 20’ x 7’, the approximate concentration of CO₂ will be 8–9%. As CO₂ gas is “heavier” than air, it will accumulate or remain at lowest levels in a higher concentration.
CO₂ CYLINDER STORAGE AND HANDLING SAFETY

WARNING: CO₂ displaces oxygen. Strict attention must be observed in the prevention of CO₂ (carbon dioxide) gas leaks in the entire CO₂ and soft drink system. If a CO₂ gas leak is suspected, particularly in a small area, immediately ventilate the contaminated area before attempting to repair the leak. Personnel exposed to high concentration of CO₂ gas will experience tremors which are followed rapidly by loss of consciousness and suffocation.

For sake of safety and orderliness, CO₂ cylinders should always be stored in a definitely assigned location, secured by a chain of approved type, and with empty and filled cylinders segregated to avoid handling errors. In selecting location of the storage area, it is important to remember that although liquified carbon dioxide does not support combustion or life, it is stored under HIGH PRESSURE and REQUIRES CERTAIN PRECAUTIONS.

Both filled and empty cylinders should be stored indoors in a cool, dry, ventilated location away from salts, other corrosives, and away from any source of heat.

The cylinders must never be allowed to reach temperatures exceeding 115° F because of rapid rise of internal pressure above 1800-PSIG service pressure with increasing temperature. Therefore, cylinders should never be stored in sunlight or near heating radiators, furnaces, or other sources of heat. All sources of extreme heat should be avoided. The cylinders should never be welded or permitted to come in contact with open flame as excessive heat affects temper of steel in the cylinders.

The cylinders must never be dropped or subjected to abnormal shock. This may damage the cylinder, valve, or the safety relief devices. The cylinders should not be stored in locations where heavy moving objects may strike or fall on them. The cylinders must never be used as rollers for moving other equipment. The cylinder carts, with cylinders secured, are to be used to transport cylinders from one location to another.

Never handle the cylinder with a lifting magnet. A crane (other than electromagnetic) may be used when safe cradle or platform is provided to hold the cylinders and the cylinders are properly secured to the cradle or platform.

FIGURE 1. CO₂ CYLINDER AND PRIMARY CO₂ REGULATOR ASS’Y
To eliminate the possibility of toppling, the CO₂ cylinders must be secured in an upright position when in storage and/or service to a wall, post, or guard rail by an approved adjustable chain or other acceptable device.

The cylinder valve should be closed at all times, except when gas is actually being used. When in use, the valve should be opened fully to back-seat the valve (back-seating the valve prevents leakage around the valve shaft). The valves on empty cylinders should always be tightly closed to prevent moisture or odors from entering the cylinders.

SAFETY DEVICE

(see Figure 1)

Every CO₂ cylinder is equipped with a cylinder safety device. This device, usually a small disc, is designed to burst between 2700 and 3000 PSIG which is ordinarily below maximum design pressure of the cylinder. If the cylinder is overfilled and/or exposed to extreme heat causing high internal pressure, the safety disc should burst and safely vent CO₂ to the surrounding atmosphere (see section on toxicity). AVOID EXPOSING CO₂ CYLINDERS TO TEMPERATURES EXCEEDING 115° F AND NEVER OVERFILL A CYLINDER. Be sure only one safety disc, manufactured by the same manufacturer as the valve, is installed using the proper attaching parts. The current nut and safety disc assemblies have the disc and washer staked into the nut. We recommend that this type of assembly be used exclusively.

WARNING: Due to the possibility of an explosion which could result in personal injury and/or property damage, care must be taken not to expose the CO₂ cylinders to temperatures exceeding 115° F. When a properly filled (68%) CO₂ cylinder is exposed to a temperature of 145° F to 156° F, the safety disc will burst and release CO₂ from the cylinder.

never loosen or attempt to adjust the safety device under any circumstances. Should the safety device leak, “blow down” the cylinder and have it properly repaired. We recommend use of the safety nut and disc assemblies which have the washer and disc staked into the nut.

WARNING: To minimize the possibilities of personal injury and/or property damage when repairs are made to the cylinder valve, be sure that only parts designed and intended for use in that particular valve are used, particularly the frangible disc. Be sure to always remove the ruptured disc or any remaining parts prior to installing the new disc. Never install more than one safety disc.

USING CYLINDER CONTENT

(see Figure 2)

On receipt, identity of the gas should be checked by comparing the label and the other markings. Do not depend on cylinder color to identify the content. If proper identification is lacking, return the unused cylinder to the supplier.

Chain or secure the cylinders in an upright position when in use or storage. Never lay the cylinders down. Liquid CO₂ entering the gas regulator may cause problems (rupture of the soft drink tanks or gas lines) due to rapid expansion of the liquid CO₂. The gas regulator could freeze up preventing the regulator from shutting down allowing CO₂ to continue to flow from the cylinder.

As soon as shipment of the CO₂ cylinders is received, it is recommended that the weights be verified immediately. The net weight of the contents may be verified as follows:

1. Weigh each cylinder individually. Averaging cylinders could result in one cylinder being dangerously overfilled and the others underfilled.
2. Deduct tare (empty cylinders with valve installed) weight stamped on side of each cylinder or valve.

3. The difference should correspond to the required net CO\textsubscript{2} weight.

*Never attempt to use contents of the cylinder without a suitable pressure regulating device.* A regulator is designed to reduce pressure of gas as it issues from the cylinder to a useable pressure. It should not be confused with a “gage” or a “valve”. A “valve” is a movable mechanism which opens and closes a passage and is usually found on top of the cylinder to which the regulator is connected. A “gage” is simply an instrument to measure pressure.

*Use proper tools.* Possible damage to the valve or a serious accident could occur if improper tools are used. Never hammer on the valve handwheel in an attempt to open or close the valve.

*Never force connections that do not fit.* The threads on the regulator connections or other auxiliary equipment must be the same as those on the cylinder valve outlet. If different, there is a reason for this difference. If in doubt, call IMI Cornelius Inc. or the cylinder manufacturer.

*Never permit gas to enter regulating device suddenly.* Open the CO\textsubscript{2} cylinder valve slowly and fully. Never rely on the regulating device to shut off gas flow for periods of non-use. Close the valve when not in use.

**WARNING:** To avoid the possibility of personal injury as a result of an explosion, **make sure** empty CO\textsubscript{2} cylinder is indeed empty before pressurizing the cylinder for purging procedure.

**CYLINDER FILLING**

(see Figure 1)

All CO\textsubscript{2} cylinders should be placed in the upside down position for a period of time (we recommend overnight) and the valve then opened with the cylinder in this position so that any dirt, water, or oil that may have been inside the cylinder is blown out before the cylinder is refilled. If the cylinder does not have any pressure in it, put approximately 20-PSIG of CO\textsubscript{2} in the cylinder before it is placed in the upside down position. This procedure will increase the service life of the CO\textsubscript{2} cylinder and the regulators. It also reduces the opportunity for off taste and odor problems. A CO\textsubscript{2} cylinder holding rack can be constructed of wood or other materials of sufficient strength to avoid accidents. All filling of the CO\textsubscript{2} cylinders should be performed by a trained operator or a recognized CO\textsubscript{2} supplier.

**NOTE:** To pressurize a CO\textsubscript{2} cylinder for purging procedure, use a CO\textsubscript{2} cylinder which contains CO\textsubscript{2}, a CO\textsubscript{2} regulator, and a gas line to connect regulator to empty cylinder valve. Open both CO\textsubscript{2} cylinder valves, adjust CO\textsubscript{2} regulator to approximately 20-PSIG. When CO\textsubscript{2} stops flowing from the CO\textsubscript{2} regulator to cylinder, turn off both CO\textsubscript{2} cylinder valves. Purging procedure can now be performed.

*Proper way to fill a CO\textsubscript{2} cylinder* is to use an accurate scale. Each cylinder should have tare weight stamped on the cylinder near the neck. If you should find a cylinder without a tare weight stamp, it should be checked to be sure it is empty, no water, no dirt, etc. and then weighed with complete valve in place and then stamped. This is best done by an I.C.C. (Interstate Commerce Commission) or D.O.T. (Department of Transportation) licensed test station.

Compare stamp versus the actual tare weight of the cylinder prior to filling. If they do not agree, reject the cylinder. Remove contaminants if the cylinder is heavier than the tare weight. If the cylinder is lighter and all components of the cylinder are present, have the cylinder hydrostatically tested, as internal corrosion may have occurred.

To fill the cylinder, place the cylinder on a scale. Fill the cylinder with CO\textsubscript{2} liquid until the scale reads the stamped tare weight, plus the cylinder capacity of liquid CO\textsubscript{2}.

**Example:** A 10-pound cylinder is being filled, tare weight stamped is 20-pounds, 6-ounces. With the cylinder on a scale, pump liquid CO\textsubscript{2} into the cylinder until the scale reads 30-pounds, 6-ounces.

**WARNING:** *Do not*, under any circumstances, add 10-pounds or 20-pounds of liquid CO\textsubscript{2} to a cylinder simply because that is its normal capacity. You may be adding liquid CO\textsubscript{2} on top of several pounds of water or other contaminants. The cylinder would then be overfilled and might cause the safety disc to rupture or the cylinder might explode.
A CO₂ (gas only) pressure regulator is used to decrease CO₂ gas pressure issuing from the CO₂ cylinder to a usable pressure. The regulated lower pressure is fed through pipes of flexible tubing to the point of use. The regulator is a functional piece of equipment and is ruggedly built; however, it is a sensitive device and should be handled with the same care as all CO₂ equipment.

**CONNECTING CO₂ REGULATORS**

(see Figure 1 and 2)

**IMPORTANT:** The primary CO₂ regulators must have a minimum inlet pressure of 1500-PSI (35-bars). Bulk CO₂ tanks have an outlet pressure of approximately 125-PSI (8.6 bars) and is issued from the tank through a secondary CO₂ regulator mounted on the tank. There cannot be any primary CO₂ regulators used with the bulk CO₂ system. Some systems have primary CO₂ regulators mounted on the wall and are fed by a high-pressure hose from a high-pressure CO₂ cylinder. Some bulk CO₂ tank system installers are connecting from the bulk CO₂ tank secondary CO₂ regulator to the wall-mounted primary CO₂ regulators. This means that the wall-mounted primary CO₂ regulators are receiving an incoming pressure well below the required 500-PSI (34-bars). In these instances, the primary CO₂ regulators must be replaced with secondary CO₂ regulators. Always select a secondary CO₂ regulator that will allow the operating pressure to be within the middle half of the range. For example: if the operating pressure is 35-PSI (2.4-bars), use a 0 to 60-PSI (0 to 4.1-bars) CO₂ regulator.

To connect and operate a Cornelius CO₂ pressure regulator, use procedure outlined in the following steps 1 through 5.

---

**WARNING:** To minimize possibilities of personal injury and/or property damage, always install the CO₂ cylinder in an upright position. Installing the CO₂ cylinder in other than upright position will cause loss of control of the regulated pressure and may result in an explosion.

Always secure the CO₂ cylinder with a safety chain to prevent it from falling over. Should the valve become accidentally damaged or broken off, the CO₂ cylinder can cause serious personal injury.

---

1. Secure CO₂ cylinder in an upright position to an appropriate holding device with a safety chain.

---

**CAUTION:** Before connecting the regulator to a CO₂ cylinder, turn the regulator adjusting screw to the left (counterclockwise) until all tension is relieved from the adjusting screw spring.

---

2. Place nylon washer of proper size inside the regulator coupling nut making certain the washer presents a flat even surface to the CO₂ cylinder valve outlet. Turn coupling nut to the right (clockwise) on cylinder valve outlet until finger tight. Turn the regulator to the desired position. Using the proper size wrench, tighten the coupling nut firmly. Minimum force should be used to tighten the coupling nut to prevent damaging the nylon washer. Washers with obvious imperfections should not be used.

3. Double check the regulator adjusting screw to be sure that it is turned out far enough so no tension is on the spring. If there is tension on the spring, turn the screw to the left (counterclockwise) until the screw is loose. Look at the gages, they should all read 0-PSIG.

4. Slowly open the CO₂ cylinder valve by turning the valve handwheel to the left (counterclockwise) until the valve is fully open. A special back-seating feature of the CO₂ cylinder valve requires that the valve be fully open to prevent gas loss from valve stem leakage. Look at the high-pressure gage. If the ambient temperature is between 60° F and 90° F, the gage should read between 733 and 1190-PSIG. If it does not, recheck your procedures.

5. Slowly turn the regulator adjusting screw to the right (clockwise) until desired operating pressure registers on the regulator gage. Do not bottom out the adjusting screw.
FIGURE 2. HIGH-PRESSURE GAGE

NOTE: All CO₂ gas regulators must have check valve installed for each gas line connected to it to be positive that water, syrup, or product cannot back up through the regulator into the CO₂ cylinder when it is empty. Also, each CO₂ regulator square must have an external relief device either in the outlet port or in the product tank lid of tanks connected to the regulator.

WARNING: The high-pressure gage indicator in the “DANGER” (in excess of 1800-PSI) area is caused by one of two or both conditions. Either the CO₂ cylinder has been overfilled and/or is exposed to extreme heat which should cause the safety disc to burst or the cylinder could explode. If this condition should occur, either leave the area or immediately open the CO₂ cylinder valve and vent off the excessive pressure to a safe (1800-PSI or below) level: correct cause of overpressure.

INTERNAL CO₂ REGULATOR LEAK (MAIN SEAT, ETC.)

1. The adjustment screw should be backed out so there is no tension on the spring.
2. Slowly open the CO₂ cylinder valve by turning the valve handwheel to the left (counterclockwise) until full pressure is reached.
3. If the regulator gage indicator still reads 0-PSIG, the supply part of the regulator seat is in good condition. If the indicator rises slowly, the regulator needs repair. Inspect the main seat and the poppet and replace parts as necessary.
4. Now check the internal relief system on the Cornelius CO₂ regulator by turning in the adjustment screw until the gage reads approximately 30-PSIG. Place finger over the cover vent hole. If low pressure gage starts to rise, an internal leak is evident which may be in the relief system (check main seat, poppet, and diaphragm stem). Replace parts as necessary.

EXTERNAL SYSTEM LEAK

1. Close the CO₂ cylinder valve by turning the valve handwheel to the right (clockwise).
2. Observe the high-pressure gage (1800-PSIG) for approximately one minute. The pressure reading should remain the same. If it progressively reads less, then system (not necessarily CO₂ regulator) leak is indicated.
3. Check all CO₂ system connections and lines as well as CO₂ regulators gages and fittings.
4. Bleed off line pressure at quick disconnect or carbonator.
5. The regulator pressure gage indicator should now read 0-PSIG. If not, recalibrate or replace the gage.
TESTING

WARNING: Strict adherence to the proper gas regulator repair must be observed due to the possibility of a gas leak which could result in personal injury and/or property damage. If regulator repair is needed, be sure only repair parts designed and intended for that particular regulator are used. Be sure repair personnel are properly trained as to repair techniques to be used.

DISCONNECTING
(see Figure 2)

1. Close the CO₂ cylinder valve by turning the valve handwheel to the right (clockwise).
2. Turn the regulator adjusting screw to the left (counterclockwise) until no tension is on the spring.
3. Slowly unscrew the regulator coupling nut from the cylinder valve outlet.

NOTE: A slight amount of CO₂ vapor will escape between the regulator coupling nut and the cylinder valve outlet when disconnected.
4. Replace cylinder valve outlet cap on the empty CO₂ cylinder to prevent possible damage to the valve outlet threads. To avoid confusing capped empty cylinders with full cylinders, chalk letter “MT” on the empty cylinder.

TEST DATES ON CYLINDERS

In accordance with the D.O.T. (Department of Transportation) regulations, it is required that all carbon dioxide (CO₂) cylinders be tested every five (5) years. If, as a User, you receive a cylinder which has not been tested within the previous five years (all test dates, month and year, are stamped on shoulder of the cylinder), it must be tagged as “out of test date” and be returned immediately to your supplier or be sent to an inspection station. Such a cylinder is not considered safe, AND IT’S SHIPMENT IS ILLEGAL, according to the D.O.T regulations, to fill and transport the cylinder that has not been pressure tested within (5) years.

For a quick at a glance identification of the year your CO₂ cylinder was purchased or inspected last, it is suggested CO₂ cylinders be color coded by painting a one inch wide band around the neck close to the cylinder valve. As an example, paint all cylinders purchased or inspected this year yellow. All cylinders purchased or inspected next year white. Then five years from now all cylinders with fresh yellow bands are either new or have been inspected. However, this does not take the place of keeping the proper serial number records but will only assist in identifying those requiring test.

TRANSPORTATION OF CYLINDERS

WARNING: To avoid personal injury and/or property damage, always secure the CO₂ cylinder in an upright position with a safety chain to prevent it from falling over. Should the valve become accidentally damaged or broken off, the CO₂ cylinder can cause serious personal injury.

Anytime CO₂ cylinders are carried in a service or route truck, racks must be provided for fastening or chaining up the cylinders to prevent damage. Particular care must be taken so that the cylinder valve will not be broken off. Also, remember that (CO₂) carbon dioxide is used in fire extinguishers to put out fires because it displaces oxygen. If CO₂ gas escapes in a small room, enclosed truck, or car, quick action is required. Open windows and doors so that oxygen can be replaced. Stop and leave vehicle as soon as possible. IF POSSIBLE, DO NOT ALLOW CO₂ CYLINDERS TO BE STORED OR TRANSPORTED IN A MANNER WHICH WILL ALLOW THIS TO HAPPEN.

Be sure to follow all Department of Transportation (D.O.T.) and local regulations regarding transportation of CO₂ cylinders.
IMPORTANT: The D.O.T. (Department of Transportation) imposes strict regulations for transporting cylinders. Regulations include special warning signs to be posted on all trucks and cylinders to be marked and labeled. The Code of Federal Regulations, title 49, Department of Transportation governs all aspects of hazardous material transported in interstate commerce within the United States. Refer to this regulation and your nearest D.O.T. office for complete listings of the regulations.

CONCLUSION

The CO₂ cylinders are pressurized containers. When mishandled, they can be dangerous.

All personnel that use, install, or repair CO₂ systems must be properly trained in order to minimize opportunity for personal injury or damage to equipment and property. CO₂ itself can be dangerous when mishandled.

CO₂ is toxic in high concentrations. CO₂ gas will displace oxygen and therefore, without proper ventilation, can cause loss of life.

The information contained in this USER’S GUIDE was obtained from sources believed to be reliable and is based to a large extent upon experience of IMI Cornelius Inc.; and it’s customers and suppliers. However, by issuance of this guide, IMI Cornelius Inc. makes no guarantee of results and assumes no liability in connection with information herein contained, or for safety suggestions herein, or that abnormal or unusual circumstances may not warrant or require further or additional procedures. If in doubt about any safety matter, call IMI Cornelius Inc; or any CO₂ cylinder manufacturer.

CLEANING CO₂ CHECK VALVE

(see Figure 3)

The CO₂ check valves in the CO₂ system must be inspected and serviced at least once a year under normal conditions and after any servicing or disruption of the CO₂ system. ALWAYS REPLACE QUAD RING SEAL EACH TIME THE CO₂ CHECK VALVE IS SERVICED.

FIGURE 3. CO₂ CHECK VALVE ASSEMBLY

*Quad ring seal must be replaced each time check valve is serviced.
IMI CORNELIUS INC.

CORPORATE HEADQUARTERS:
One Cornelius Place
Anoka, Minnesota 55303-6234
(612) 421-6120
(800) 238-3600