

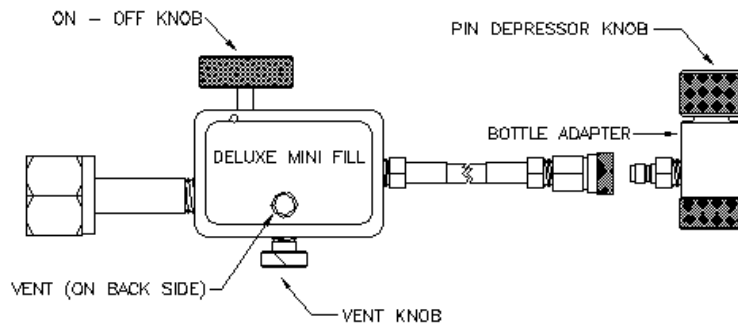
DELUXE MINI CO2 FILL STATION

UNITED STATES PATENT NUMBER 6,263,927,B1

SAFETY FIRST!

SETTING UP THE FILL STATION

Before you even remove the safety cap on the bulk cylinder, the bulk cylinder ***MUST*** be solidly secured to a post or wall bracket. If the cylinder were to be knocked over, the valve could be broken off, and the cylinder “Launched”.



Your Deluxe Mini-Fill is equipped with a standard “CGA 320” fitting on the input side. This fitting will connect to any standard CO2 bulk tank in the United States. Please note that the threads are right -handed, and that a sealing washer (included) is required.

The bulk supply tank you connect to must be equipped with an internal “dip tube” because it is necessary to dispense the liquid CO2 from the bottom of the bulk supply tank. YOU WILL NOT BE ABLE TO DISPENSE A COMPLETE FILL FROM A NON DIP TUBE TANK!

On the backside of the fill station is a vent port. For safety reasons, this port must be directed away from the operator and bystanders. This port is equipped with 1/8 NPT threads so that if desired, a vent hose or muffler may be attached. Do not use a bronze sintered muffler!!

Referenced Documents:

CGA G-6.3, Carbon Dioxide Cylinder Filling and Handling Procedures

CGA C-6-2005 Standards for visual inspection of steel compressed gas cylinders

CGA C-6.1 – 2006 Standards for visual inspection of high pressure aluminum compressed gas cylinders

CGA G-6.8 – 2007 transfilling and safe handling of small carbon dioxide cylinders

CFR 49 Parts 100 to 185

TB-14 Torque Guidelines For Sealing CGA Valve Outlet Connections.

Always wear heavy gloves and eye protection while filling cylinders.

Always have the MSDS at the location that the filling takes place.

Always read and understand all fill station instructions.

Insure that there is proper ventilation in the filling area.

Warning posters should be posted near the filling operation

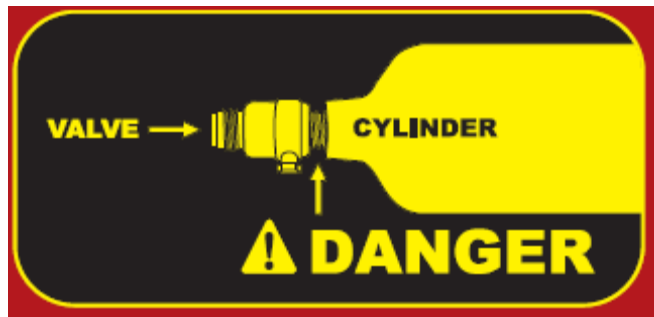
Appropriate warning signs should be placed at the entrance to confined areas where high concentrations of carbon dioxide gas can accumulate

DOING THE FILL

OPERATION 1: CHECKING OUT THE BOTTLE

Conduct a valve twist test to determine if the valve is securely attached to the cylinder. Any cylinders which have valves that can be twisted by hand, or which show signs of the valve having been partially removed, must not be filled. The owners of such cylinders should be warned to have the valve repaired by the manufacturer or its authorized representative, prior to using the cylinder or attaching it to a marker.

Valve twist test, n – a test done by hand where as the user grasp the valve with one hand and the bottle with the other and attempts to turn the valve by hand in a counter- clockwise direction(left). If the valve does move, the valve and bottle should not be filled and should be repaired and /or serviced by the manufacturer or its authorized representative. If the valve does not move then the valve passes the test and may be filled provided it passes all other



Look for a rotation indication mark between tank and bottle. Ensure line matches between two pieces. IF THE LINE DOES NOT MATCH DO NOT FILL THE CYLINDER.



If no line is present place a non removable, non etching marking between the valve and bottle for future checks. A paint pen is a good item to use to apply the rotation indication mark.

Visually inspect the cylinder condition before each fill.

Cylinders must be stamped on the shoulder with a DOT (Department of Transportation) and potentially a TC (Transport Canada) mark, working pressure, manufacturer's code or name, serial number, hydrostatic test date and rated CO₂ capacity. If no stamping is present or stamping has been altered or non legible, do not use the cylinder.



DOT – 3AL 1800 M4625 04^03 8 oz CO₂ A051391

This cylinder layline of data breaks down like this:

DOT – Department of Transportation (a Federal Agency)

3AL – the specification standard the cylinder conforms to

1800 – the working pressure rating of the cylinder

M4625 – the manufacturer of the cylinder

04^03 – The hydrostatic test date of the cylinder

The first two digits are the month

The ^ is the testing agency mark

The last two digits are the year

The above date would be valid to use until April 1, 2008

8oz CO₂ – The amount of CO₂ the cylinder is rated to hold

A051391 – The serial number of the tank

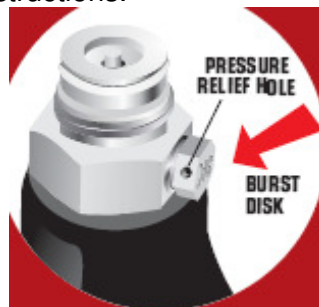
The pressure rating stamped on the cylinder must be at least 1800 psi.

Cylinders should be in good condition: free of stickers, dents, scrapes, bulges, obvious corrosion, pits, evidence of fire damage and leaks.

Cylinders should not be buffed or polished.

Cylinders having valves without a rupture disk or pressure relief mechanism must not be filled.

Pressure relief or rupture disk assembly should be tight, and all pressure relief passages should be clear of obstructions.



Cylinders must have correct rupture disk; 3AL-1800 CO₂ cylinders require a 3000 psi (3K) rupture disc.

The valve and external threading must not be damaged, and must be free of foreign material. The valve o-ring must be in good condition in order to fill. Damaged valves or components must be cleaned or repaired by the manufacturer or its authorized representative, prior to filling the cylinder.

Cylinders must NOT be filled if any one of the following conditions exists:

Cylinders are outside the valid test date range.

Requalification period for CO₂ cylinders used in paintball is five (5) years for 3AL aluminum and 3A and 3AA steel bottles. There is no maximum life for a 3AL, 3A, and 3AA cylinders as long as the cylinder passes visual and hydrostatic inspections.

Do not refill 3HT bottles. These cylinders are not for paintball use.

Aluminum cylinders not exceeding 5 cm (2 inch) outside diameter and less than 61 cm (2 feet) in length are exempt from hydrostatic retesting.

Even though these bottles are exempt, they should be visual inspected each time and tested if damaged.

Presence of water or other liquids in the cylinder.

Evidence of internal contamination such as rust or other particles.

External corrosion exceeding 0.8 mm (0.032 inch) in depth or 25 percent of surface area.

Dents in aluminum bottles that exceed 1.6 mm (0.062 inch) with a diameter less than 50.8 mm (2 inches).

Dents in steel bottles that exceed 1.6 mm (0.062 inch) with a diameter less than 10 times the depth of the dent.

Scrapes or gouges that decrease the wall thickness of a cylinder by an appreciable amount.

Visible bulges.

Cylinders show evidence of polishing, buffing, welding, grinding, sandblasting, plating, or exposure to high temperature over 350 degrees F.

Any other condition that seems unsafe to use should not be filled and should be inspected by a certified DOT authorized re-tester.

OPERATION 2: HOOKING UP!

NOTE: CO₂ should only be filled by weight, never pressure. Use an accurate scale; never guess the weight of a cylinder. It is recommended that the scale have an accuracy of 0.05 lb.

Step one: Attachment. MAKE SURE THE ON – OFF KNOB AND THE VENT KNOB ON THE FILL STATION IS IN THE OFF POSITION. Screw the bottle into the fill adapter. Do not attach the fill adapter to the fill hose yet!

Step two: Purging. Purge off the residual CO₂ in the bottle. It is necessary to do this because you must decrease the pressure in the bottle for the transfer from the bulk tank to take place. You do this by inverting the bottle so that the valve is at the bottom, and turning the knob on the fill adapter clockwise to depress the valve pin. **POINT THE BOTTLE IN A SAFE DIRECTION AWAY FROM ALL PERSONS!** Vent until gas ceases to be exhausted. The “Inverted Dump” is used because it prevents excessive chilling of the bottle, and subsequent dry ice formation.

Step three: Weighing. CO₂ should only be filled by weight, never pressure. Use an accurate scale; never guess the weight of a cylinder. It is recommended that the scale have an accuracy of 0.05 lb.

When there is no residual CO₂ in the bottle, weigh the empty bottle (with the Fill Adapter still attached) to determine the Empty Weight.

Step four: Filling. Zero out the scale, Connect the Fill Adapter and bottle to the fill hose, making sure that the Quick Disconnect clicks into its locked position. Open the On-Off Knob on the bulk tank. Open the on-off knob on the fill station. The gas will start to flow into the paintball bottle. **WATCH THE SCALE DO NOT FILL THE PAINTBALL BOTTLE BEYOND ITS RATED CAPACITY. TURN THE ON-OFF KNOB ON THE FILL STATION TO OFF WHEN THE PAINTBALL BOTTLE IS FILLED TO ITS CAPACITY.**

Step five: Disconnecting Turn the knob on the bottle adapter counterclockwise to allow the pin valve in the bottle to close. Open the vent knob to vent any CO₂ that may be trapped in the hose. Unscrew the bottle from the fill adapter.

Step six: Final weighing. CO₂ should only be filled by weight, never pressure. Use an accurate scale; never guess the weight of a cylinder. It is recommended that the scale have an accuracy of 0.05 lb.

Re-weigh the bottle to make sure the weight is correct.

THIS IS THE MOST IMPORTANT STEP IN THE WHOLE OPERATION! DO NOT OMIT IT!!!

November 08