

Cascaded Cylinder Transfilling Procedure

SEE OTHER SIDE FOR SAFETY PRECAUTIONS

1. Configure the transfilling tank system. Cylinders may be added or removed as required. Use a Cylinder Inter Coupler with Tee Fitting to daisy-chain the cylinders together as shown. If using the check valved version of the CIC, p/n 00GSE-1020-01, ensure that the check valved CGA-540 connector is facing the correct direction (Arrows point TOWARDS the transfiller, the direction oxygen will flow). The tanks should be arranged and labeled based on remaining internal pressure, starting with the lowest Tank "A" and progressing to the highest. Securely mount the Supply end of the Transfiller to the Tee fitting of Tank "A" (your lowest pressure tank).
2. Verify that the Supply and Refill fittings properly match the type of the fittings (CGA-540 or DIN-477-9) of your cylinders (and vice-versa). Make sure that all fittings are in good condition and completely free of any oil, grease or dirt.
3. Verify that the hydro-test date on the cylinder you intend to refill has not expired. Also note the DOT type rating stamped or labeled on the cylinder to double-check the proper refill pressure.
4. If the cylinder is completely empty and the valve has been left open, or if there is any question about it's status, make sure that the cylinder has not been internally contaminated with oil, gases, or any other combustible materials. If you cannot assure the cylinder is safe... DO NOT FILL IT!
5. Connect the Refill end of the Transfiller to the Refill cylinder (hand tight).
6. Once all cylinders are securely connected, make sure the Bleed and Transfer valves are closed then SLOWLY open the lowest pressure Supply cylinder valve first. You should hear oxygen flow into the transfiller line. Next, SLOWLY open the valve on the empty Refill cylinder, then SLOWLY open the Transfer valve to start filling. You should hear oxygen passing into the Refill cylinder. Use the Transfer valve to control the fill rate.
7. Fill the cylinder SLOWLY to void excessive heating, using the Transfer valve to control the fill rate. The recommended fill-rate is ~ 50-75 liters/min,

IMPORTANT NOTE:
If using the check valved version of the Cylinder Inter Coupler, p/n 00GSE-1020-01, ensure that the check valved CGA-540 connector is facing the correct direction. The engraved indicator arrows on the connector point TOWARDS the transfiller, and AWAY from the supply tank (in the direction oxygen will flow).
If using the non-check-valved version of the Cylinder Inter Coupler, p/n 00GSE-1020-00, the direction of the fitting does not need to be taken into account. There will not be engraved indicator arrows on the non-check valved fitting, which enables the user to easily distinguish between the two types of CIC.

- meaning an empty cylinder will require approx. 1½-2 minutes for each 100 liters of capacity. The cylinder will become warm to the touch during transfilling, but should not be allowed to get any hotter. For cylinders over 300 liters, transfilling may need to be done in segments, pausing to let the cylinders cool in between. In addition to keeping the cylinders cool, this will also help in detect-ing leaks or other problems. Use the gauge on the Refill cylinder to monitor the Refill cylinder pressure.
- DO NOT fill a cylinder past its rated pressure.
8. Eventually the pressure in Supply tank "A" will drop to below the rated pressure of the Refill cylinder. When this happens, wait for the pressure in the Supply tank and the Refill tank to equalize, then:
 - (1) Close the Supply tank "A" valve.
 - (2) Close the Transfer Valve.
 - (3) SLOWLY open the Supply tank "B" valve.
 - (4) SLOWLY open the Transfer valve to start filling. Use the transfer valve to control the fill rate.
- If using the non-check valved CIC, ensure these steps are done in EXACTLY that order to avoid the high pressure oxygen being wasted. This will happen if two Supply tank valves are left open at the same time. Using the Check Valved version of the CIC (00GSE-1020-01) will prevent inadvertant backfilling of the lower pressure supply cylinders. Repeat these steps with tanks "C", "D", ect. as each subsequent supply tank lowers in pressure until the Refill Cylinder is full.
9. After the Refill cylinder has been filled, first shut off the Transfer valve, then the Refill cylinder valve and all Supply cylinder valves. In other words, close all valves. Then, SLOWLY crack open (counter clock-wise) the Bleed valve to bleed the Transfiller hose. DO NOT attempt to unscrew any of the O-ring nipple ends while the line is under pressure - this will damage the O-ring. You can now loosen the Refill fitting nut and remove the Refill cylinder.
 10. If filling additional cylinders, ensure that filling begins with the lowest pressure Supply cylinder. Then repeat steps 2-9 for the new cylinder.

See WWW.MHOXYGEN.COM/Category/Videos/ for videos on cascading supply tanks and transfilling.



HOW TO CASCADE OXYGEN SUPPLY TANKS

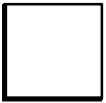


HOW TO FILL YOUR OWN OXYGEN CYLINDERS

Cylinder Inter Coupler (CIC) Kit

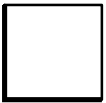
00GSE-1020-00

(No Check Valve)

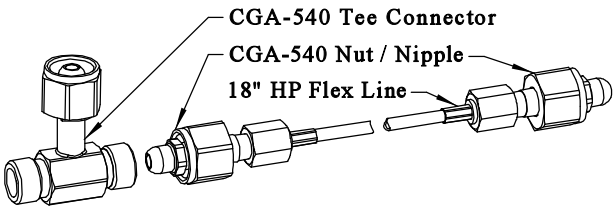


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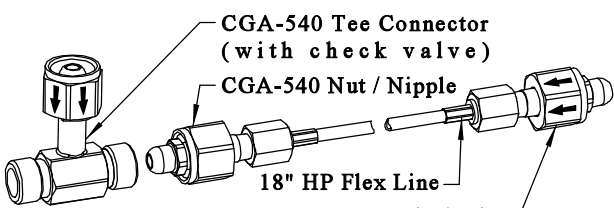
(With Check Valve)



Check Applicable Box



00GSE-1020-00
(No Check Valve)



00GSE-1020-01
(With Check Valve)

Cleaning the Adapter, Service Line and Valve of Oil and Grease

If any part of the system should become contaminated (or you suspect so), it may be cleaned with hot water and detergent. Do not use the system if it has become contaminated with oil or grease. If the contamination is mild, a liquid form of automatic dishwasher detergent or the cleaning product "Formula 409" has been shown to work best for this purpose. This type of detergent is able to cut and remove almost all types of oils or greases and will rinse off without any detectable residue.

To test for contamination, wipe the suspected area with a clean cotton swab ("Q-Tip"). Next, touch the tip of the cotton swab to the surface of a pan of CLEAN water while observing the light reflected from the water's surface. You should not detect any oil whatsoever bleed from the cotton tip fanning out over the water's surface. This is an accepted method for

detection of oil contamination. An oil-clean surface will pass this test without any doubt.

If the service line should become contaminated internally by oil or grease, it can be cleaned by soaking the entire line in a vat of hot water and a liquid form of automatic dish-washer detergent. Rinse the line in hot water and inspect. Repeat soaking if contaminates are still present. Dry the line by hanging it vertically in a hot air environment or in direct sunlight. If the contamination is severe, you may have to perform the cleaning process several times or use a solvent such as "111 trichloro-ethane".

Note: Solvent-type cleaning fluids have an adverse effect on plastic and elastomeric materials after prolonged exposure. Components containing such materials should be removed from the system before proceeding with the cleaning operation.



MADE IN THE USA



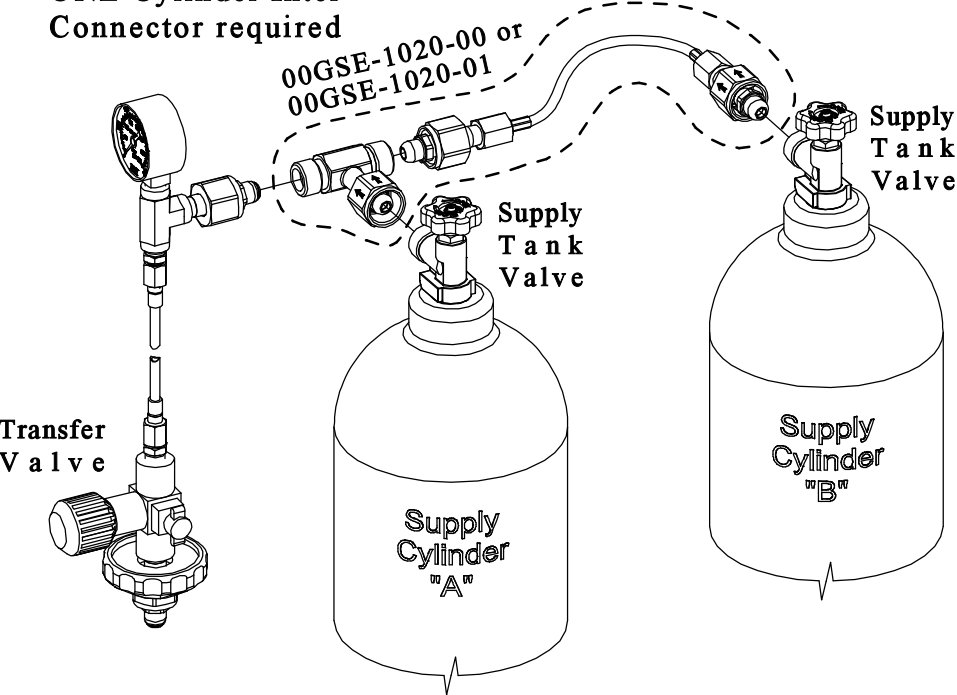
Tollfree: 800-468-8185 | Local: 541-923-4100

CUSTOM BUILT-IN AND CARRY ON AVIATION OXYGEN SYSTEMS

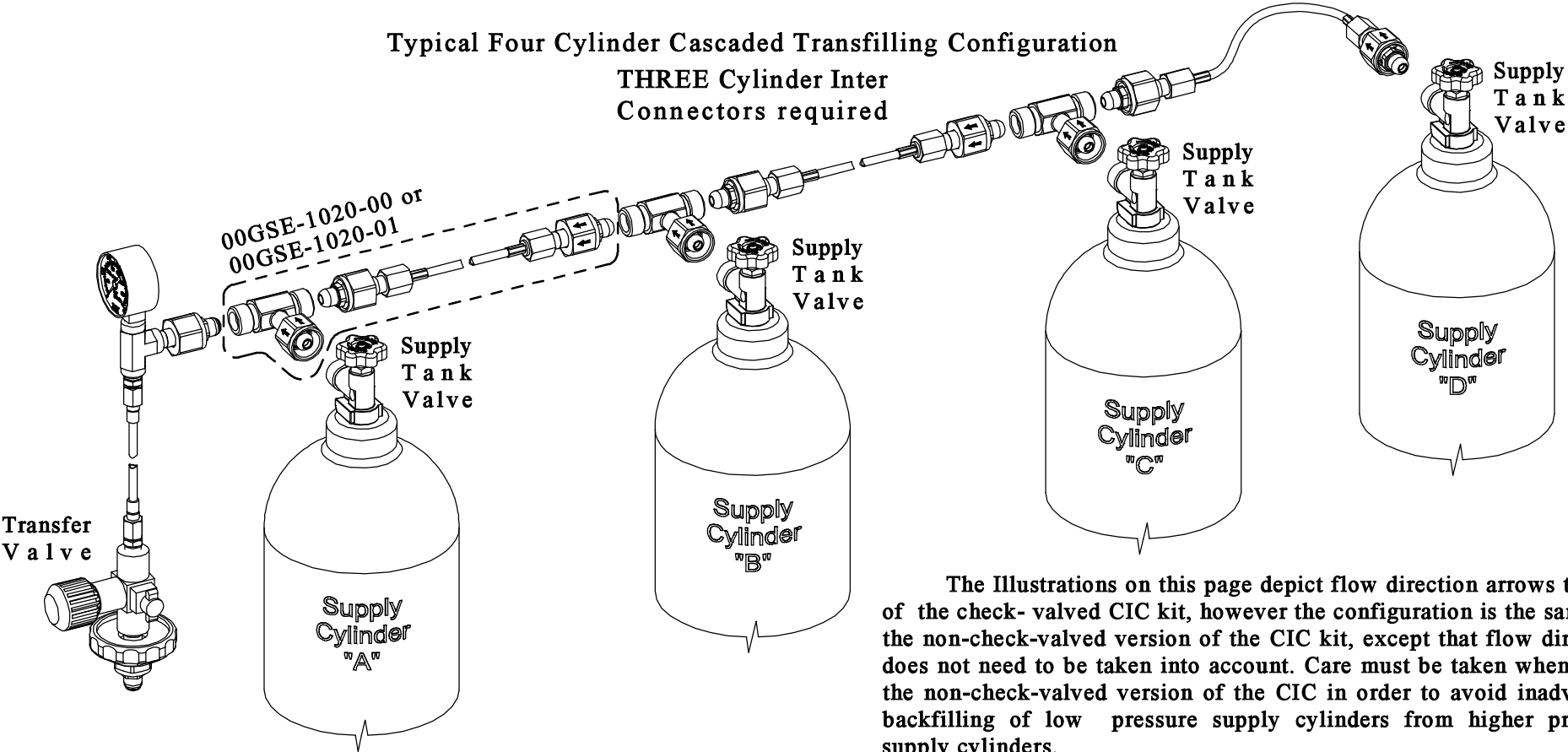
Mountain High Oxygen, 2244 SE Airport Way, Suite 100, Redmond OR. 97756 MHOxygen.com

Typical configurations for a Cascaded Cylinder Transfilling setup

Typical Two Cylinder Cascaded Transfilling Configuration
ONE Cylinder Inter Connector required

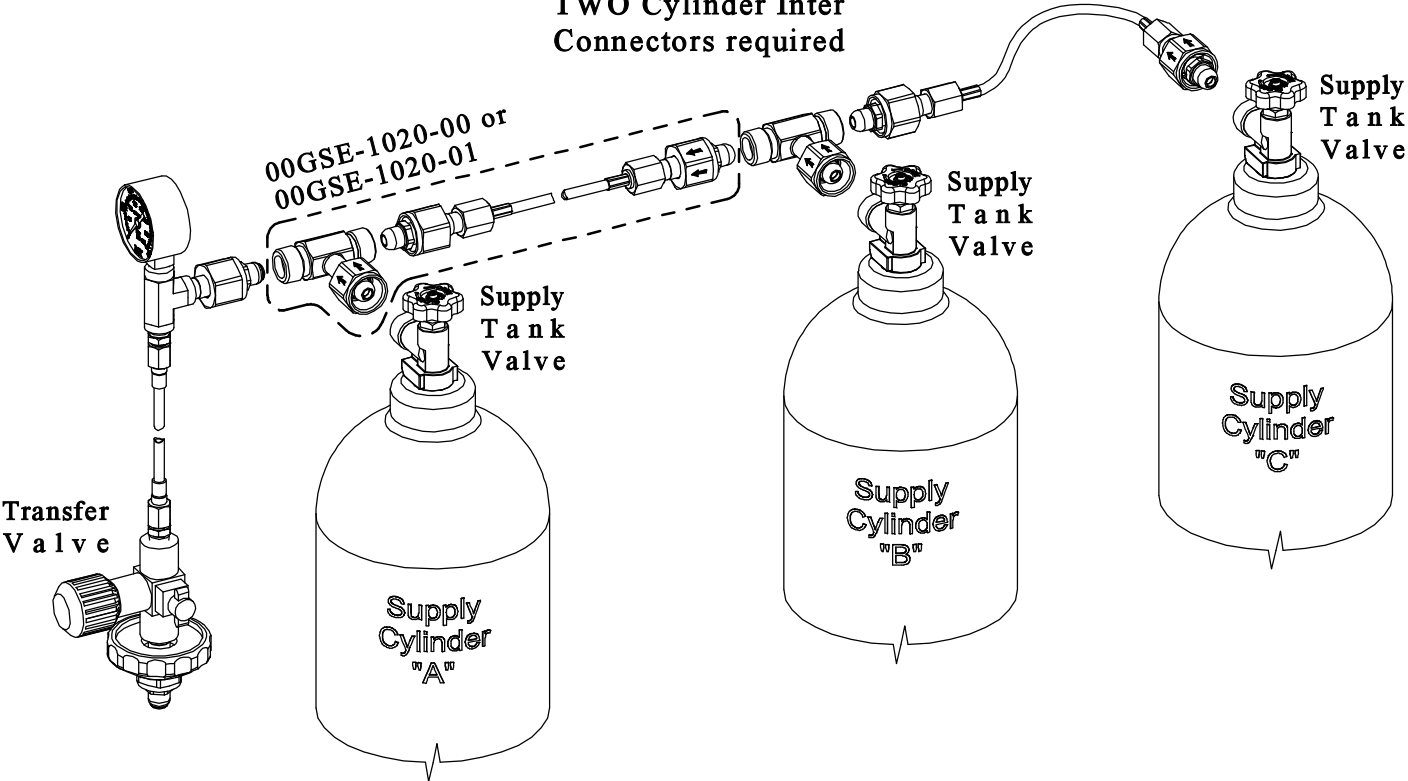


Typical Four Cylinder Cascaded Transfilling Configuration
THREE Cylinder Inter Connectors required



The Illustrations on this page depict flow direction arrows typical of the check- valved CIC kit, however the configuration is the same for the non-check-valved version of the CIC kit, except that flow direction does not need to be taken into account. Care must be taken when using the non-check-valved version of the CIC in order to avoid inadvertant backfilling of low pressure supply cylinders from higher pressure supply cylinders.

Typical Three Cylinder Cascaded Transfilling Configuration
TWO Cylinder Inter Connectors required



Hazards of High Pressure Oxygen and Transfilling

Transfilling of gaseous oxygen from one cylinder to another involves hazards associated with the handling of oxygen under pressure. A hazardous condition exists if high-pressure oxygen equipment becomes contaminated with hydrocarbons such as oil, grease or other combustible materials, which may include oil from a person's hands or contaminated tools.

A cylinder will heat up as it is filled from a high-pressure source. The more rapidly the cylinder is filled, the greater the temperature rise in the cylinder as a result of the heat of compression of the gas. Excessive temperature may result in the ignition of any combustible materials present in the system. Refill the cylinder at a flow rate that limits heating of the cylinder. Use only equipment designed for refilling and transfilling.

Although oxygen itself is nonflammable, materials that burn in air will burn much more

vigorously and at higher temperatures in oxygen enriched atmospheres. If ignited, some combustible materials such as oil will burn in oxygen with explosive violence. Many other materials that do not burn in air will burn vigorously in oxygen-enriched atmospheres. Ignition temperatures are reduced in oxygen-enriched atmospheres.

Open cylinder valves slowly. The rapid release of high pressure oxygen through orifices, control valves, etc. in the presence of foreign particles can cause friction or impact heating resulting in temperatures which may be sufficient to ignite combustible materials present in the system.

Compressed oxygen also presents a hazard in the form of stored energy due to the high pressure inside the cylinder. Sudden or uncontrolled release of oxygen can create an extreme safety hazard. Exercise due caution in handling, transporting or storing compressed oxygen cylinders.