FLOTEC

MADE IN USA

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Instructions for Use
Transfill Cascade System

TCS Transfill System Instructions for Use:

In order to utilize the system's benefits, you should follow the instructions listed below. The TCS Transfill system maximizes your refill potential by utilizing a series of high pressure supply cylinders in a cascading order to incrementally build pressure in the empty tank so that your highest pressure supply cylinder can be used to maximum benefit. It is helpful to number the supply cylinders in order to remember which of your supply cylinders is the most highly pressurized. The number tags should be easy to move from tank to tank and we recommend magnetic numbers so the tanks can be numbered with number one as the lowest pressure tank. When you begin to fill the empty tank with your first supply cylinder, the empty tank will fill with pressurized gas until the pressure inside both the supply cylinder and the tank is equal. This new pressure will slightly lower the supply cylinder's pressure with each fill. The decrease in pressure of the final supply cylinder in the TCS Transfill system will be very small because the difference in pressure between the tank being filled and the pressurized supply cylinder will be nearly negligible by the end of the pressurization process. Thus, the TCS Transfill system ensures the highest number of pressure fills per supply cylinder.

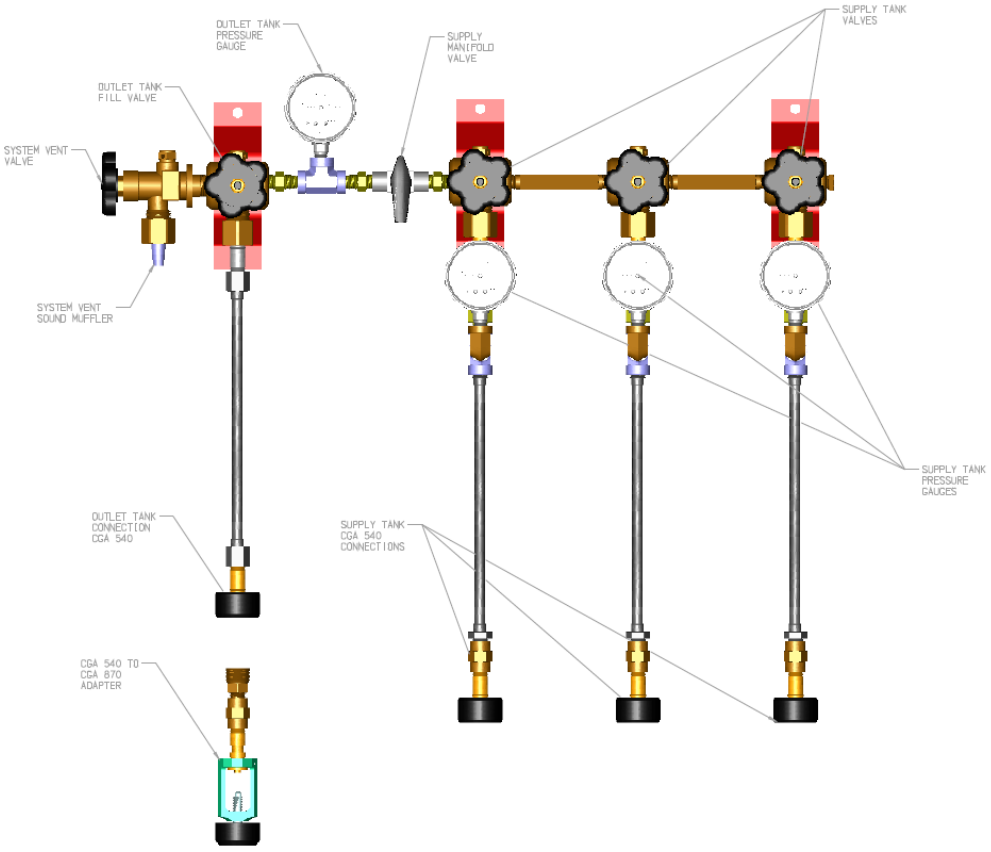

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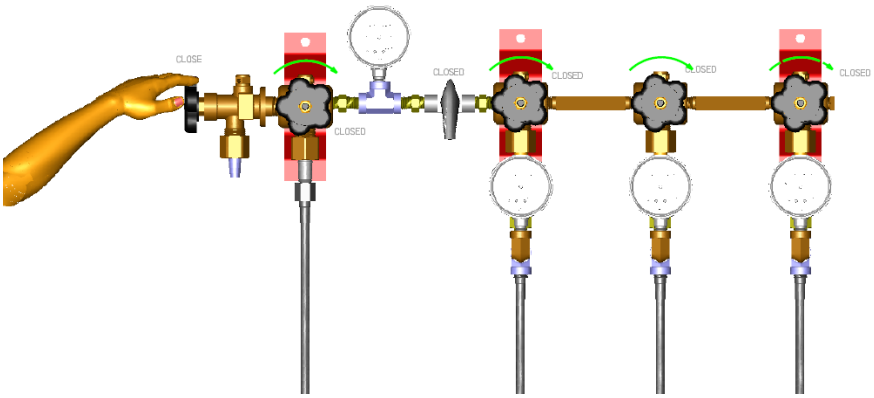
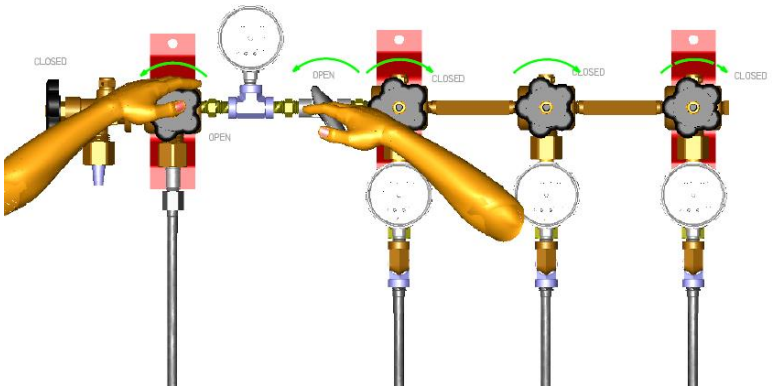
Figure 1. TCS System Components

Figure 1 shows a three supply tank system with one outlet. The greater the number of supply tanks the better utilization of the gas supply because the supply tanks can be drained to lower pressures while maintaining a higher final pressure in the tank being filled.

1. Label the pressurized supply cylinders with numbers in order to easily identify the order of use. The lowest pressure supply tank should be labeled one, the second lowest, two and so on.



2. After checking that the Manifold Vent Valve is closed, the manifold supply tank valves are all closed (Full clockwise.) and the manifold valve is closed, as shown in the picture above. Attach the empty tank to the outlet fill hose and open its tank valve. At this time you can check the outlet tank pressure by opening the outlet tank fill valve. This is useful if you are just topping off a partial tank that may be at a higher pressure than the starting supply tank. In this case you can start with the supply tank that is higher than the tank to be filled. You can compare that reading with the supply tank readings to determine which to start with.
3. When you wish to pressurize the system, open the supply manifold shutoff valve. Be sure that all of the supply tank valves that are on the actual tanks, not the ones on the manifold, are all opened.



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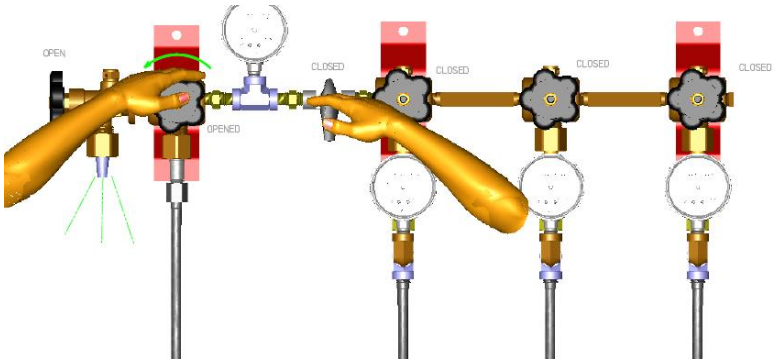
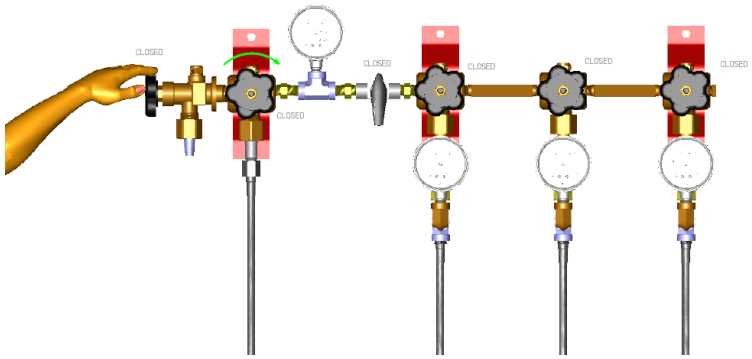
4. Next, begin to pressurize the empty tank by opening the supply manifold valve attached to the lowest pressurized supply tank.
5. Once the two tanks are equal in pressure, close the supply manifold valve and open the second lowest supply manifold valve, then continue with each supply valve until you have equalized with the highest pressure, supply tank. Be sure to close each successive valve before opening the next fill valve to avoid equalizing the supply tanks. (Some systems will have check valves to prevent this equalization from happening.) Equalizing the supply tanks will reduce the effectiveness of the system. Note that there is a restrictor to control the rate of fill to prevent excessive heating of the gas, which can cause oxygen fires. This will extend the equalization time during filling. If this time interval increases significantly, the orifice may need replacement or cleaning.
6. Before disconnecting the filled tank, shut off the tank valve on the filled tank, close the manifold shutoff valve, then open the vent valve to release the pressure in the fill line. This will make the disconnection from the system easier and safer.



7. Close all valves (including the supply manifold master shutoff valve) and remove the now pressurized tank. (The valves on the supply tanks do not need to be closed, unless you are finished with the system.)



8. When your highest pressure, supply tank depletes to below your highest desired fill pressure rotate a fresh tank into the highest numbered tank and renumber the supply tanks accordingly.

When finished with your filling cycles, the system should be closed down and vented.

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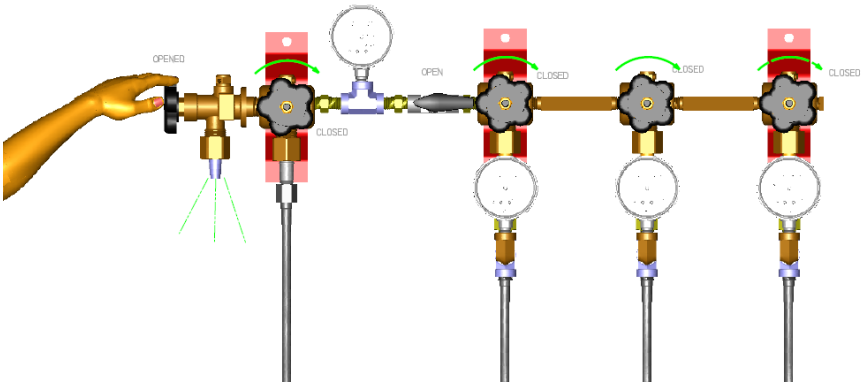
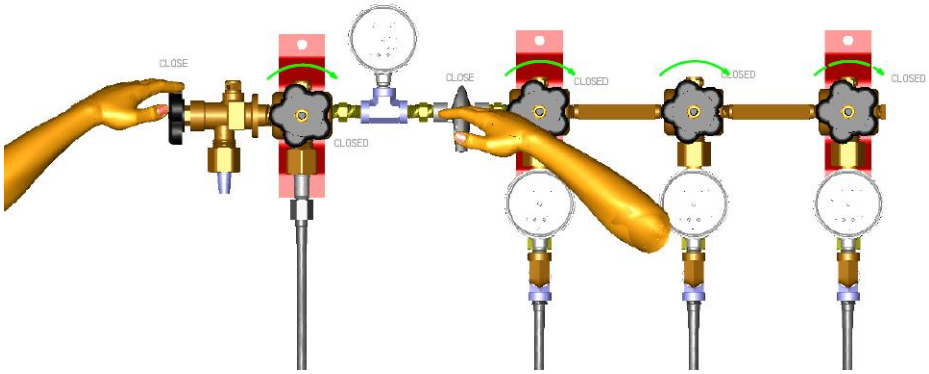


1. Close all valves, including the supply manifold master shutoff valve, the manifold valves and all supply tank valves.
2. Open the vent valve to release any gas from the manifold system, then close the vent valve.



For additional information and tips for using Transfill systems visit the following URL.

http://www.fda.gov/downloads/drugs/guidancecomplianceregulatoryinformation/guidances/ucm070270.pdf

