

Changing CO₂ tanks for mammalian cell incubators

Exercise extreme caution handling and moving CO₂ tanks. Consult EHS training modules, call EHS, or ask for help if you have not previously changed CO₂ tanks.

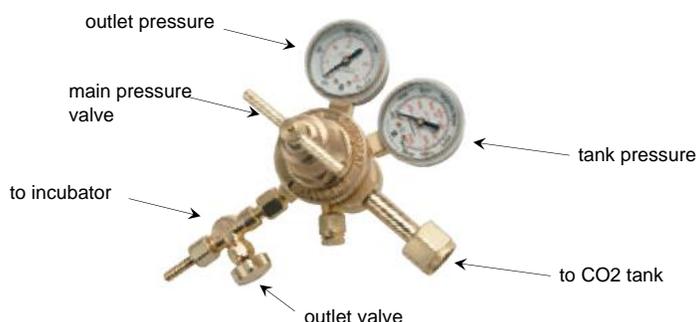
Background

CO₂ is delivered in 50 lb tanks from Praxair (part no. CD50). Tanks are pressurized to 825 psig (pounds per square inch gauge, amount above atmospheric). At this pressure, both liquid and vapor are in the tank. The input pressure to the incubator (or gas guard) should be maintained at 15±5 psig (see Thermo Forma i160 manual). A two-stage regulator is recommended to bring the tank pressure down to the incubator inlet pressure because, unlike a single-stage regulator, two-stage regulators compensate as tank pressure falls to maintain a constant output pressure. Our Harris two-stage regulators (model 9296) have a max output pressure of 50 psi.

When a new tank is attached to a regulator, the tank pressure should read ~800 psig. This pressure should be maintained so long as there is liquid in the tank. When the liquid phase is depleted, the tank pressure will begin to drop. As long as a second full CO₂ tank is connected to the gas guard, you do not need to be concerned about loss of CO₂ to the incubators. However, replace depleted tanks as soon as possible to ensure there is always one full reserve tank available.

Procedure for switching the regulator to a new tank:

1. Close the main tank valve at top of the tank.
2. Next, close the outlet valve.
3. Note: Do not adjust the main pressure valve on the regulator.
4. Using a wrench, loosen the nut on the regulator's connector to the CO₂ tank and remove the regulator.
5. Attach the regulator to the new tank, and tighten the connector nut using a wrench.
6. Open the main tank valve a few turns until the tank pressure no longer changes. The tank pressure gauge should read ~800 psig, and the outlet pressure gauge should read ~15 psig if you did not adjust the regulator main pressure valve. If outlet pressure is off, adjust using the main pressure valve.
7. Open the outlet valve.



Resources

Thermo Forma i160 Incubator manual: See Lazzara Lab website protocols page for link to pdf.

Harris Model 9296 Two-Stage Regulator (Thermo Part # 95001012) manual:

<http://www.harrisproductsgroup.com/en/Products/Equipment/Gas-Control/Two-Stage/Model-9296.aspx>

CD50 – 50 lb CO₂ tank from Praxair:

http://www.praxairdirect.com/PXItemDisplay%3FcatalogId%3D10051%26parent_category_rn%3D11504%26top_category%3D11501%26categoryId%3D11530%26langId%3D-1%26storeId%3D10152%26itemId%3D66714

Safety info on CO₂ from Praxair, including CO₂ phase diagram:

<http://catalogs.praxairdirect.com/i/27114-safety-precautions-for-carbon-dioxide/8>

How a two-stage pressure regulator works:

<https://www.youtube.com/watch?v=UfaucxS5rlc>