

Gas cylinders/regulators:

Categories of Regulators

- A single-stage regulator will usually require delivery pressure adjustment as the cylinder pressure decreases.
- Two-stage regulators will usually require no adjustment.

Installation and Operation

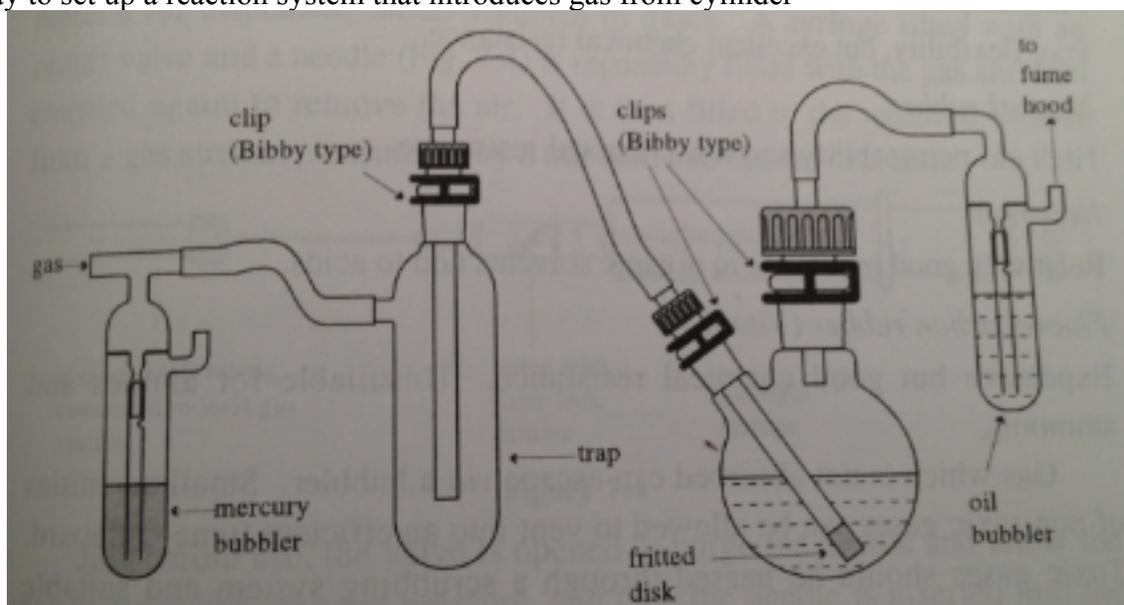
1. Properly secure the cylinder to a stable surface.
2. Remove the cap from the cylinder.
3. Make sure the cylinder valve is tightly closed.
4. Remove the cylinder valve cap or plug if present.
5. Check the CGA regulator fitting and the fitting surface of the cylinder valve for damage, especially the threads and seat. If damaged, return the cylinder for replacement. Remove any loose debris from the threads and seat.
6. Close the regulator by turning the adjusting knob or handle counterclockwise.
7. Close the outlet valve fully in a clockwise direction. If a valve is not present, one should be purchased.
8. Connect the regulator to the cylinder. **DO NOT FORCE** the connection. You should be able to make the initial connection by hand. If not, then you are using the wrong regulator, or the threads on the cylinder valve or CGA connection or both are damaged and should be replaced. Tighten until snug using a regulator wrench, an open end wrench or an adjustable wrench. **DO NOT OVER-TIGHTEN.**
9. **NEVER** use lubricants or Teflon tape to aid in the connection or sealing of the CGA fitting.
10. Check the cylinder valve for leaks around the thread connections into the cylinder and the valve handle, using an approved soap solution (available from gas suppliers). If any are discovered, return the cylinder for replacement.
11. Hex nuts on the CGA connection with notches in the middle indicate left hand threads and are tightened in a counterclockwise direction.
12. Some regulators require gaskets on the CGA connections. These should be inspected for wear or contamination and be replaced as necessary. **USE THE PROPER REPLACEMENT GASKET.** Do not over-tighten, as this could cause the gasket to extrude in the gas stream. Replace the gasket at each cylinder change out.
13. Use the proper fittings on the outlet of the regulator to the system. Avoid too many connections. The correct fitting can be purchased from the regulator supplier. Do not make adapters to get to the proper fitting.
14. The operator should position himself/herself with the cylinder between themselves and the regulator. While looking away, **SLOWLY** open the cylinder valve in a counterclockwise direction, 1/8 turn. The high pressure gauge should rise to full cylinder pressure.
15. Leak check all connections using an approved soap solution or other leak checking device (hand-held detectors for specific gases, etc.). If leaks are discovered, depressurize, tighten, then recheck the connections. If you cannot easily make a leak-tight seal at the CGA fitting, and the problem is not with the cylinder valve, the CGA fitting should be replaced. These can be obtained from any gas supplier. **DO NOT OVER-TIGHTEN THE CGA CONNECTION TO TRY AND ACHIEVE A LEAK TIGHT-SEAL.**

16. If no leaks are discovered, open the valve fully to seat the valve, then close 1/8 turn.
17. Turn the regulator adjusting knob or handle clockwise to raise the delivery pressure to the desired working pressure while observing the delivery pressure gauge. **DO NOT EXCEED THE MAXIMUM DELIVERY PRESSURE FOR THE REGULATOR OR THE SYSTEM.**
18. Check the system for leaks.
19. Open the outlet valve on the regulator to supply gas to the system. Delivery pressure may need some adjustment.

Shutdown and Removal

- For temporary shutdown (less than 30 minutes), simply close the outlet valve of the regulator.
- For extended shutdown, shut off the gas cylinder valve completely, open the regulator adjusting valve (to delivery pressure) and outlet valve, and drain all gas from the regulator through the system. Both gauges should read zero. Close the regulator by turning adjust knob counterclockwise and outlet valves.
- If replacing the cylinder, follow the procedure for extended shutdown, remove the regulator from the cylinder, and install the new cylinder as outlined in the installation procedures above.
- In general, a cylinder is considered empty when the cylinder pressure is 2X the usable delivery pressure. Do not draw down below 2 bar.

Way to set up a reaction system that introduces gas from cylinder



Sources:

<http://www.udel.edu/ehs/regulatoruse.html>

Lenoard, J. *et al.* Advanced Practical Organic Chemistry. 2nd ed. 1998: CRC Press.