GAS CYLINDERS AND PLASTIC TUBING

Have you ever seen a high-pressure gas cylinder (perhaps a 3000 psi nitrogen cylinder) with the regulator feeding plastic tubing?

Is this safe? We do it all the time with incubators, spectrometers, and other equipment. **BUT: There's a potential problem.**

Most high pressure regulators don't adequately control the exit pressure and flow rate. Suppose you need 0.1 SCFH of nitrogen at 3 psi, but you use a high-pressure regulator with an output pressure range of 0-150 or 0-300psi.

- The regulators and their gauges are only accurate in the middle of the control range (25-125psi or 50-250psi). You're not getting accurate pressure control.
- The regulators do not control flow rate at all—they control pressure. The rate is probably too high (wasting gas) or too low (starving your equipment).

If your regulator's maximum delivery pressure is greater than the pressure rating of your tubing (typically 50-100 psi at room temperature), **you have created a hazard**—the tubing could burst in your face and dump the cylinder contents into the room if you accidentally turn the pressure up too high. This is easy to do with a high-pressure regulator.

How should you provide purge gas from a high pressure cylinder to your experiment with a controlled flow rate and a supply pressure of less than 20 psi?

SOLUTION:

Some regulators will reduce the high pressure cylinder's 3000 psi down to between 0 and 25psi, but they cost nearly $400.00.

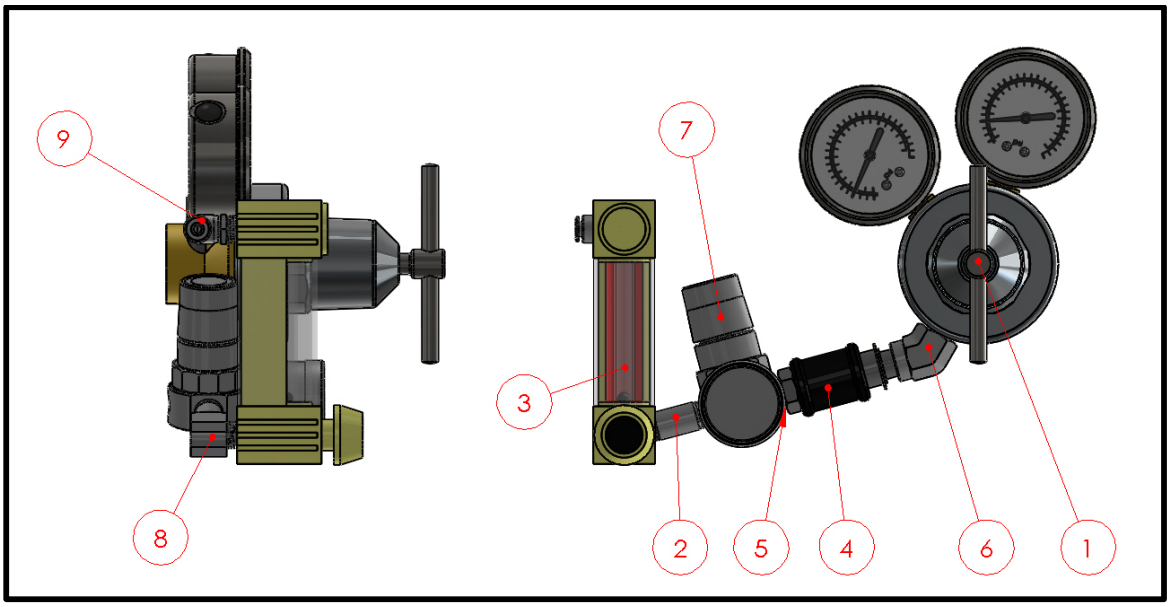
A more cost-effective solution might be to add a secondary regulator to the output of your original high pressure regulator (see the sample system on the next page). The cost of this system including rotameter (flow measuring device) and flow control valve is less than $150.00.

Secondary regulators with input pressures of 150 or 300 psi are available with maximum output pressures of 2 to 25 psi. For high-purity or corrosive applications, you can obtain them in stainless steel.

Rotameters come in a wide variety of flow rates and accuracies. You can probably find one for your application.

Consult the Laboratory Safety Advocate (contact details below) with any questions about establishing a safe compressed gas system.

Contact Dr. Dan Kuespert, Laboratory Safety Advocate,
at 410-516-5525 or dkuespert@jhu.edu for
more information about this JHU Safety Note.



ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	HAR-25-1000	HP Regulator, Harris, 3500psi input /150psi max output	1
2	MCC-4568K133	Pipe Nipple, Schedule 40, Brass ¼” NPT x 2"	1
3	TBD	Rotameter, Flow Rate TBD	1
4	MCC-4622K53	Sliding-Sleeve Brass Air Valve, ¼” MNPT x FNPT	1
5	MCC-4568K131	Close Nipple, ¼” Pipe Size X 7/8" L, Brass	1
6	MCC-4757T132	Elbow 45deg, HP, ¼” Pipe Size, FNPT x MNPT	1
7	MCC- 6763K821	Miniature Air Regulator with Pressure Gauge, 300psi IN, 0-25psi Out	1
8	MCC- 50785K430	Elbow, Brass, ¼” Pipe Size, 90 Deg. FNPT x MNPT	1
9	MCC- 52115K214	Elbow, Push to Connect, ¼” tube to ¼” NPT	1

Sample Bill of Material: similar parts are available from a number of commercial sources. Provided for illustration. This example is executed in brass for simple applications with one gas—use materials compatible with your gas and application. More than one gas used simultaneously will require additional equipment to balance flows and prevent backflow.

Note: MCC = McMaster-Carr, http://www.mcmaster.com/

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