High Pressure Blow-off Gas

What's wrong with this picture? Found in a lab on 21 April 2017.

1. Open high pressure cylinder of N_2 connected to unterminated tubing in vacant lab. **Possible asphyxiation source.**
2. Metal tubing crimped and damaged. **Possible uncontrolled leakage**.
3. Unreinforced rubber hose used as connector. **Could blow out**.
4. Glass pipette used as a hose barb. **Could easily break.**
5. Unreinforced plastic tubing **not rated for regulator's maximum 60psi**.
6. Tubing **not securely connected**.
7. Two shut-off valves after regulator. **Can trap pressurized gas.**
8. Unterminated hose configured to be used for blowing off parts. **Gas injection hazard.** [outside figure]

Figure 1: You do not want this in your lab!

It is against the law to use compressed gases for cleaning parts unless the pressure is below 30 psi, personal protective equipment is used, guards are erected to stop flying chips, and the nozzle is designed to prevent dead-heading (closing off). Cleaning people with compressed gases is absolutely forbidden.

Many types of unreinforced plastic tubing only have a pressure rating of 20-30 psi; be sure to check the pressure rating of your tubing before using. Always attach

Contact Dr. Dan Kuespert, Laboratory Safety Advocate,
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more information about this JHU Safety Note.

tubing to a regulator securely with a clamp or specialized fitting, and always take precautions against overpressure.

A BETTER WAY

You can install a **safe, legal** parts blow-off air knife using air or inert gas from a high pressure cylinder. Ensure that the delivery pressure is less than 25psi by choosing an appropriate regulator or by installing a 25 psi secondary regulator.

You can use a variety of 1/8" or ¼" diameter plastic tubing safely at low pressures: Polyethylene (Push-to-Connect fittings), PVC (e.g. Tygon® B-44-3, or E-FLF for hose barb applications), or Nylon-based tubing (Compression or Push-to-Connect Fittings).

This tubing can then be connected to a Luer-Lock Pipette Tip (available from Fisher Scientific) or a blunt dispensing needle (available from McMaster-Carr). You may wish to consider the bill of materials below as a starting point, as it uses the inexpensive nylon tubing.

Item No	P/N	Description	QTY
1	MCC-75165A27	Stainless Steel Dispensing Needle with Luer-Lock Connection, 45˚ Angle, 14 Gauge, 1/2" Long, Green [Other colors available]	10 per
2	MCC-51465K155	Brass Quick-Turn Tube Coupling for Air, Plug, 1/8 NPT Male	1
3	MCC-7880T159	Push-to-Connect Tube Fitting for Air & Water, Adapter, 1/8" Tube OD x 1/8 NPT Female	1
4	MCC-7880T114	Push-to-Connect Tube Fitting for Air & Water, Straight Adapter, 1/8" Tube OD x 1/4 NPT Male	1
5	MCC-9685T1	Flexible High-Pressure Nylon Tubing, Semi-Clear, 0.073" ID, 1/8" OD	Length as required

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

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Not Rocket Science: A JHU Safety Note

See JHU Safety Note - Gas Cylinders and Plastic Tubing detailing a recommended set up for appropriately delivering gas from high pressure cylinders similar one in the figure above. For blow-off applications, replace Item 9 in the Safety Note mentioned with Item 4 above and do not include the Close Nipple or the Rotameter. Total material cost for the installation is less than $80.00.

For more information about establishing a safer compressed gas system consult the Laboratory Safety Advocate (contact details below).

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