UMassAmherst | Environmental Health & Safety

Gas Generator Fact Sheet

What is a Gas Generator?

A laboratory gas generator is an on-site unit that delivers a continuous supply of purified gas directly to a system that requires the use of that particular gas. Different generators may purify gas already present in the atmosphere, such as nitrogen and oxygen generators, may use electrolysis to generate hydrogen from water, or other methods to produce a variety of gases. Instruments that would particularly benefit from gas generators include gas chromatographs, GC-MS, FTIR, ion mobility spectrometer, gas analyzer, environmental chamber, or applications requiring clean, dry gas.

Umass recommends the use of gas generators for applications, as they have many benefits in comparison with gas cylinders (see our Compressed Gases SOP).

What are the Benefits?

Laboratory gas generators offer many advantages over traditional gas cylinders, for instance:

- They eliminate the hazards of handling high-pressure gas cylinders.
- They eliminate the hazards of storing high-pressure gas cylinders.
- They generate a continuous supply of gas to a system, eliminating hassle and the experiment downtime needed to exchange empty cylinders. It is more convenient, improves workflow, and you don't need to worry about the gas running out.
- They provide consistent and very high gas purity, whereas purity may vary somewhat from cylinder to cylinder.
- Because you don't need to store as many cylinders, you don't need to worry about flammable gas storage limitations based on the location of your lab (e.g. in the upper floors of a building).
- They have lower ongoing maintenance costs, compared to the ongoing delivery, administrative and rental fees associated with gas cylinders.
- They reduce environmental impact, as cylinder deliveries and collections are not needed, and gas generators are more energy efficient than industrial gas manufacture and processing.

What are the Limitations?

- Gas generators have a high up-front cost, and so these are not typically cost effective except for high volume and continual uses.
- Gas generators are not intrinsically safe, and have electrical components that may serve as an ignition source if the experiment apparatus is not set up safely or if the wiring is damaged.
- The electrical components may offer a steeper learning curve to troubleshoot and maintain than traditional cylinders.

Recommendations and Requirements

- Gas generators may need to be contained in a fume hood, require room ventilation modifications, be supplied with air compressors, have external gas sensors, etc. depending on the specific gas, flow rate, and experiment intended. Always contact EH&S for assistance conducting a risk assessment prior to installing and operating a gas generator (413-545-2682, askehs@umass.edu).
- Read the instrument's manual thoroughly, and understand the generator's capabilities, limitations, safety features and safety protocol. Always follow manufacturer protocol and recommendations. Contact the manufacturer if any issues or malfunctions arise with your gas generator unit.
- Keep the generator's wiring tidy and away from heat-generating sources. Damaged wiring could result in an electrical fire.
- Never disable safety features. Only service units if permitted by the manufacturer.
- Regularly inspect your gas generator for any loose or damaged wiring, water and heat damage, or other visual defects. If something appears damaged, worn, or is malfunctioning, DO NOT begin/continue using the generator – power off immediately. Contact the manufacturer or vendor directly for repairs and servicing
- When your gas generator comes to the end of its lifetime, you can refer the equipment for disposal through UMass Waste Management. The disposal process is initiated by completing a surplus equipment disposal form.

Incident Procedure

In the event of a gas generator incident or malfunction, immediately turn off and unplug the instrument if it is safe to do so. Evacuate the room, if necessary, and notify EH&S (413-545-2682) for assistance. After any emergency or near-miss circumstance, notify EH&S (413-545-2682) as soon as possible and complete the lab incident form.

- Electrical Fire: If the unit is on fire, immediately evacuate the room, close the door behind you, and activate the fire alarm. Follow your lab's evacuation route and meet in your designated location outside of the building. Call 911 or 413- 545-3111 once outside to report the incident and provide information, such as locations of the fire and materials involved.

References and Sources

1. Prudent Practices, Working with Chemicals 6.H.1.
2. Compressed Gas Technologies Inc.: Nitrogen Gas Generator Technology.
3. LabMate: Hydrogen Gas Generator Technology.
4. SilPac: Hydrogen Gas Generator Technology.
5. Peak Scientific: Why a Gas Generator?
6. LabCompare: Laboratory Gas Generators.