Gas Cylinder Safety

Acetylene cylinder-related damage

http://my.firefighternation.com/forum/topics/even-a-small-cylinder-of?q=forum/topics/even-a-small-cylinder-of

Gas Cylinder Safety

https://www.youtube.com/watch?v=C4kb-8CjVYg

Gas Cylinder Safety

- Gas cylinders and cryogenic tank hazards:
  - Cylinder weight
  - Gas volume – asphyxiation hazard
  - Gas properties – toxic, flammable, oxidizer
  - Cylinder energy
- Cylinders and tanks are hazardous at any location, but pose a particular hazard in hallways:
  - Open to the public
  - Cylinder incident could block egress routes

Hazard – Cylinder Contents

- Example: 2010 - Missouri
  - Lab using hydrogen gas; gas leak led to explosion
  - 4 injured, lab destroyed

Hazard – High Pressure

- Example: 2008 – United Kingdom
  - 80 cylinders stored in hallway; no caps; not properly secured; contained argonite - argon/nitrogen mix
  - One fell over, hit another, setting off chain reaction of 66 cylinders rocketing through hall.
  - Estimated speeds of up to 170 mph.
  - One person killed.

http://press.hse.gov.uk/2013/rnn-se-rocketing-gas-cylinder/

Hazard – High Pressure

Gas Cylinder Safety

- What guidance/regulations exist regarding cylinders in the hall?
  - OSHA, NFPA – Cylinders must be secured from access by unauthorized personnel.
  - Mass. Building and Fire Codes, Cambridge Fire and Building Inspectors – Keep hallways clear of obstructions.
  - FM Global (MIT's insurance carrier)
  - Compressed Gas Association
- Based on safety/security issues and regulatory requirements, MIT Safety Committee has directed us to remove gas cylinders and cryogenics from hallways.

What Should You Do?

- Prioritize
  1) Hazardous gases – flammable, toxic, corrosive, oxidizers
  2) Inert gases
  3) Cryogenics
- Ways to deal with cylinders:
  - Tag cylinders to make status clear – full, in-use, empty/unneeded
  - Request pick up of empty and unneeded cylinders.
  - Find appropriate in-lab storage options for remaining cylinders.

It Pays to Remove Unneeded Cylinders

- Monthly fee charged to lab for each cylinder/ tank.
- Compare Airgas inventory with current cylinders in lab to identify candidates for removal.
  - Some cylinders may have been in the lab many years. The older the cylinder is, the less likely it is to be in active use.
  - Unused cylinders in (or outside) a lab may actually belong to another lab.
- Remove unneeded cylinders–empty or no longer in use.
- Saves money and space for the labs.
- Decreases potential need for additional brackets or cylinder stands.

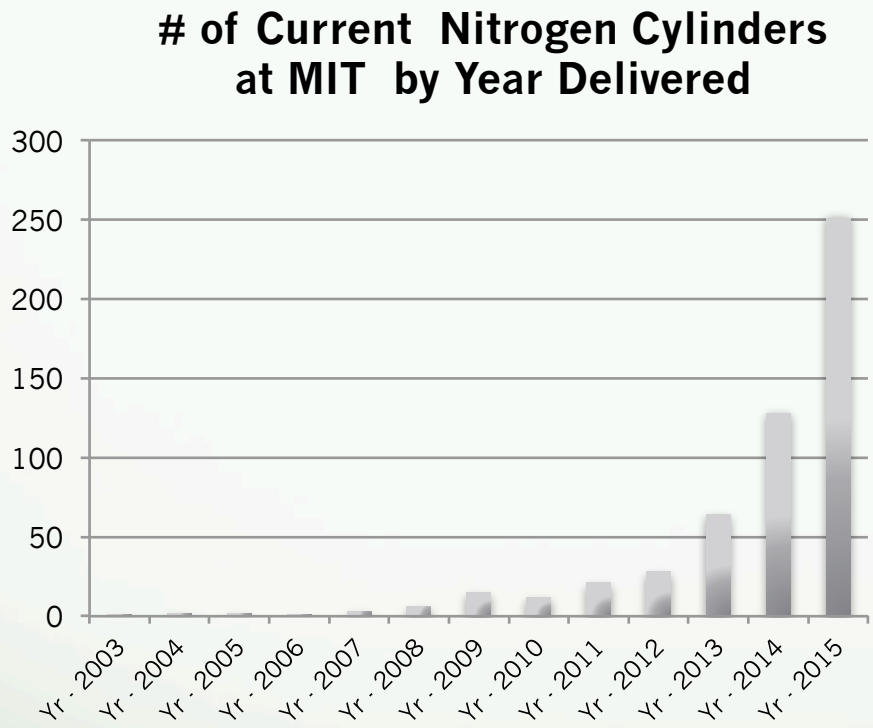
It Pays to Hand in Old Cylinders

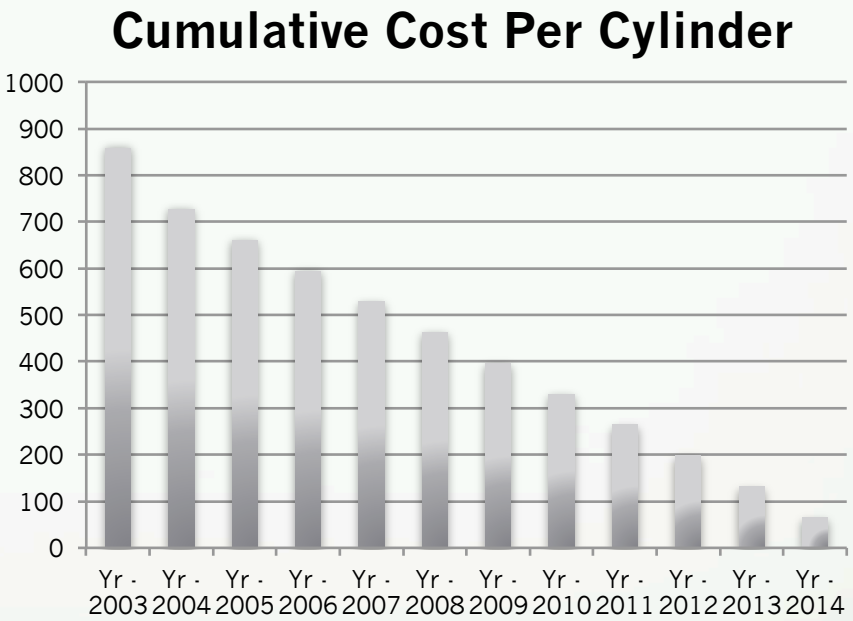
Initial cost vs. rental fee for some commonly used Airgas products.

Product	Initial Cost	Monthly Rental	Cost/Rent Ratio*
Industrial Grade Argon	$33.36	$5.50	6.06
Industrial Grade Carbon Dioxide	$12.81	$5.50	2.32
Industrial Grade Helium	$90.20	$5.50	16.4
Industrial Grade Nitrogen	$9.52	$5.50	1.73
Industrial Grade Oxygen	$13.10	$5.50	2.38
Liquid Nitrogen	$54.53	$48.53	1.12

* This ratio shows how many months it takes for the cylinder rental charge to exceed the initial cost.

It Pays to Hand in Old Cylinders





Sample cost over time for retained cylinders. Nitrogen tanks have an initial cost of **$9.52**. Monthly rental cost for nitrogen tanks are $5.50.

Make it Easy for Airgas to Know Which Cylinders to Pick Up

This can lead to more efficient removal on empty/ unneeded tanks.

Returning Cylinders

- Most cylinders can be returned to Airgas.
- If Airgas is delivering new cylinders, make clear which old cylinders need to be removed.
- If there is not a scheduled delivery of new cylinders, email John Jordan (john.jordan@airgas.com).
- If all cylinders aren't removed, contact John again to request pickup of remaining cylinders.
- If Airgas won't take a cylinder let me know so arrangements can be made for disposal.

Gas Cylinder Safety

- Secure cylinder above center of gravity.
- Facilities can install wall brackets.
- No more than 3 cylinders chained together – triangle shape.
- Chains are ok, but need to be at least ¼” in diameter.

Securing Needed Cylinders

- Gas cylinder stands can be used in locations where wall- or bench-mounted brackets are impractical.

Example: Large # of Tall Cylinders

Resources on Gas Cylinder Web Page

- Guidance on securing cylinders
- Link to Mythbusters demonstration
- Why it pays not to keep cylinders for years
- Ordering info for brackets, straps, floor stands
- Options for delivery & pick up inside the lab
- How to request cylinder pick up

Timeline

- Fall Inspections – data collection.
- Winter 2015/2016 – Work with any labs that have difficulty removing hallway tanks/cylinders to identify appropriate solutions.
- Spring 2016 inspection – remaining cylinders/tanks in hallway will become inspection findings.