

# Environmental Health & Safety

## Safety Matters

### FDNY and Cryogenic Liquids

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Cryogenic liquids are widely used in research at Columbia University, and can be dangerous if not stored or handled properly. Cryogenics are extremely cold, typically colder than  $-130^{\circ}\text{F}$  ( $-90^{\circ}\text{C}$ ). The most commonly used cryogenics at Columbia are liquid nitrogen, argon, oxygen, and helium. The hazards of handling and storing cryogenic liquids are associated with this extreme cold and the expansion rate of the liquid as it vaporizes. Liquid nitrogen expands to 700 times its liquid volume if released at room temperature. In a confined area the resultant displacement of oxygen can result in serious injury, even death. If liquid oxygen is spilled, an oxygen enriched atmosphere would be generated. In this atmosphere, the potential for a fire would be greatly increased and if a fire were to occur, it would burn more vigorously.

In addition, cryogenic liquids require care during handling and dispensing. Due to their extremely low temperature, cryogenic liquids pose a significant danger to exposed skin and eye tissue. These

liquids or even their vapors can cause frostbite. Proper personal protective equipment (PPE) includes loose fitting gloves, and a full-face eye shield **whenever** handling or dispensing cryogenics. It is also recommended that pants (not shorts) without cuffs, appropriate footwear (no sandals or Crocs) and long sleeves be worn when handling cryogenics.

The New York City Fire Department's new Fire Code, effective July 1, 2009 (see details below), requires that users of cryogenic liquid at locations containing over 60 gallons obtain a G-97, or "Storage, Handling and Use of Cryogenic Liquids" Certificate of Fitness. EH&S, has developed an on-line training module ([www.rascal.columbia.edu](http://www.rascal.columbia.edu)) to help researchers using cryogenic liquids meet the FDNY Code requirements. The Fire Department has allowed EH&S to provide training and an on-site exam to meet the new requirements; without this permis-

sion, researchers would have to interrupt their workday and travel to Brooklyn to take the exam. Laboratories that have more than 60 gallons of cryogenic liquids can have their (C-14) Certificate of Fitness holder (Chemical Laboratory Supervisor) take the on-line RASCAL training and exam. Please visit the EH&S website <http://ehs.columbia.edu/indexMC.html> and click on the Fire Safety link for Information or to obtain the G-97 Certificate of Fitness.

#### Details, New FDNY Fire Code

- ◆ A laboratory, in which more than 60 gallons of cryogenic liquids are present (more than 1 large cylinder), requires a Certificate of Fitness holder (G-97) for "Storage, Handling and Use of Cryogenic Liquids".
- ◆ In these laboratories an **O2 sensor must be installed\***. Cryogenic cylinders cannot be stored within 3 feet of a laboratory exit door, unless there is a secondary means of egress from that lab.

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## FDNY and Cryogenic Liquids continued

### PROOF OF COMPLIANCE = GRANT MONEY

MANY GRANTING AGENCIES, PUBLIC AND PRIVATE, REQUIRE APPLICANTS TO PROVIDE DOCUMENTATION THAT THE ACTIVITIES TO BE FUNDED WILL BE CONDUCTED IN COMPLIANCE WITH REGULATORY AND INSTITUTIONAL REQUIREMENTS FOR OCCUPATIONAL AND ENVIRONMENTAL SAFETY. EH&S HAS DEVELOPED AN INFORMATION PAGE DETAILING WHAT LABS NEED TO PROVIDE IN ORDER TO RECEIVE THIS TYPE OF COMPLIANCE CERTIFICATION. SEE: [HTTP://WWW.EHS.COLUMBIA.EDU/GRANTSREDUX.HTML](http://www.ehs.columbia.edu/grantsredux.html)

For Lab Fire Safety Prevention tips, check out: FDN(wh)Y Me @ <http://www.ehs.columbia.edu/FDNYMe.html>



- ◆ No more than **one cryogenic cylinder may be stored in any corridor.**
- ◆ Please see FDNY links below for additional details. [http://nyc.gov/html/fdny/pdf/cof\\_study\\_material/csm\\_g\\_97.pdf](http://nyc.gov/html/fdny/pdf/cof_study_material/csm_g_97.pdf)
- ◆ For information regarding O2 sensors. See <http://>

[ehs.columbia.edu/O2OxygenSensors.html](http://ehs.columbia.edu/O2OxygenSensors.html)  
EH&S is working with an outside vendor (*TechAir*) to install sensors where volumes exceed 60 gallons. To reduce the number of sensors necessary across campus please consider one of following to limit storage to less than 60 gallons:

- ◆ Schedule more frequent deliveries.
- ◆ Assemble cryogenics in one room so that only one sensor is needed (in one room, not several).
- ◆ Distribute tanks and *Dewars* among multiple labs.

## H1N1 Influenza

On June 11, WHO officially declared that the global incidence of H1N1 had met the criteria for official classification as a 'pandemic', the first such designation in 41 years. Our collective knowledge of this agent's epidemiology is rapidly evolving as would be expected with any novel pathogen. But despite the inability to provide many definitive answers about H1N1, several infection control concepts transcend the particulars of an individual outbreak. A useful mnemonic is the 5 C's:

- ◆ *Communicate.* Keep informed of the current outbreak status. Health experts at the University continue to monitor the flu situation closely. For current

information, especially prevention tips and resources, visit the Columbia University Preparedness website: <http://www.columbia.edu/cu/studentservices/preparedness>

- ◆ (stay) *Calm.* Obtaining accurate information (see bullet above) will allow you to take the steps necessary to reduce your chances of becoming ill.
- ◆ *Clean* shared equipment such as keyboards and telephones; door knobs are also a high priority item as a significant percentage of any disease transmission is initiated from the hands of infected individuals. The most important thing to clean is your hands, frequently. In the absence

of soap and running water, alcohol-based hand sanitizers are effective.

- ◆ *Cover* your coughs or sneezes. In the absence of a tissue, cough or sneeze into your arm or elbow.
- ◆ *Contain.* If you are sick from a cold or influenza-like illness (ILI), stay home and contact as few people as possible. Conversely, if you are caring for an ill family member or friend, be sure to protect yourself through frequent hand washing and housekeeping. See [http://www.cdc.gov/h1n1flu/guidance\\_homecare.htm](http://www.cdc.gov/h1n1flu/guidance_homecare.htm) for detailed CDC guidance for providers of home care. Children should remain at home while they are infectious.

## New Collection Containers

With the help of Geoff Goold, CEPSPR Clean Room Manager, more economical one-gallon waste containers are available for waste collection in Columbia laboratories. To request a container or a waste pickup, use the waste pickup form @ <http://vesta.cumc.columbia.edu/ehs/wastepickup/> Alternatively, labs are encouraged to reuse empty reagent bottles for waste collection, provided they are empty, and are made of material that is compatible with the waste to be stored.

## Zapped by New Battery Regulations

To ensure they are handled safely, a new regulation requires battery terminals to be protected during transit to prevent terminal to terminal contact. Terminal-terminal or terminal-other metal contact can generate enough heat to start a fire. As a result of 98 different air transportation incidents since 1991 and several serious incidents involving batteries during ground transit, the US Department of Transportation (DOT) and Federal Aviation Administration (FAA) have revised their regulations to include several new safety measures. Incidents involving battery terminals coming in contact with each other follow:

- ◆ A waste processing facility was destroyed by a lithium battery fire...Canada 2/07
- ◆ A UPS DC-8 cargo plane caught fire, burning the majority of its contents, causing the plane to make an emergency landing; 3 crew members escaped unharmed... Washington D.C. 7/06

- ◆ A three-alarm blaze destroyed a building and required the response of over 50 firefighters as a result of a worker mishandling a multi-cell battery... Arizona, 11/06
- ◆ Fire destroyed a tractor trailer while in transit as a result of a battery fire resulting from unprotected terminals... Jackson, MI 7/08

With the new regulations come changes to the onsite handling of batteries in the recycling containers on campus. There is one easy, but critical step now necessary before depositing batteries into the [recycling containers](#). Ensure the terminals cannot come into contact with other terminals, batteries, or metal objects by using one or more of the methods described below before depositing into campus containers for recycling:

- ◆ Place CLEAR tape over the terminals/contact points
- ◆ Replace the original cap on the terminals
- ◆ Place each battery into a

separate bag

- ◆ Bundle the same type of batteries together (using a rubber band) and then place CLEAR tape over the tops (see below)
- ◆ Place button-style batteries on a piece of tape a small space apart from each other and affix another piece of tape over the top. Then write the battery type on the tape.

Then recycle batteries as you normally would in the containers provided for on-campus for recycling. For additional battery recycling information, including pictures of the acceptable terminal protection methods please refer to our website at <http://ehs.columbia.edu/RecycleBattery.html>



HAVE YOU FLUSHED YOUR LAB'S EYE WASH LATELY? A FEW SECONDS EVERY WEEK WILL ALLOW YOU TO DETERMINE IF IT IS WORKING PROPERLY. WOULDN'T YOU RATHER KNOW NOW, RATHER THAN FINDING OUT ITS BROKEN WHEN YOU REALLY NEED IT???

## If you See something, Say something:

### SMOKE FREE

CUMC campus coming August 10<sup>th</sup>. New York Presbyterian and CUMC will expand smoking prohibitions, inside and out, to sidewalk areas under their control. This includes the block bounded by Broadway, Fort Washington, 165<sup>th</sup> and 168<sup>th</sup> streets, as well as the area around the Audubon buildings, up Haven Avenue

including NI, ARB, Bard Hall and the Towers. This effort demonstrates the commitment to the health and well-being of our patients, visitors, students, faculty and staff.

### MORE CLEAN AIR:

A University work group (The Idlers) are addressing compliance with NYC's

prohibitions on vehicle idling. Stationary vehicles may not idle for more three minutes, or one minute in front of Public Schools. Signage has been developed for distribution to drivers and additional education and enforcement efforts are under way.

EH&S  
Website:  
<http://www.ehs.columbia.edu>

## Want some safety with that burger? Summer BBQ Tips

Barbequing is an essential element of warm weather activities for many people, but it carries with it some hazards. With just a few simple, precautionary steps, you can enjoy a safe cookout, every time.

- ◆ Never grill indoors. Carbon monoxide, a byproduct of combustion, can cause rapid asphyxiation.
- ◆ Before cooking, roll up your sleeves and use oven mitts. Loose-fitting clothes can ignite if they contact a hot surface; if clothes catch fire STOP-DROP-and ROLL.
- ◆ Keep grills at least 10 feet from any structure or any combustible material.\*
- ◆ Grills may NOT be used on a building roof. Hot coals may cause a roof fire capable of dropping into the attic or top floor of the building.\*
- ◆ The grill area for any barbeque may

not exceed 10 square feet.\*

- ◆ A minimum of two 2 1/2 gallon pressurized water extinguishers, a sixteen quart pail of water, or a charged water hose must be present during grill use.\*

(\* = NYC Law)

### For Charcoal Grills :

- ◆ Do not use lighter fluid-Columbia University policy requires the use of "Match Light"-type charcoal on campus. If you use lighter fluid, do not use it on coals that are already lit. Flames can travel up the stream of fluid, igniting the can while it is being held.
- ◆ Operate charcoal grills AWAY from air intakes near campus structures. Even after the coals are

extinguished, they will still produce carbon monoxide for an extended period of time.

### For Gas Grills :

- ◆ Propane cylinders may not be refilled within New York City limits or transported into New York City via tunnels or lower levels of bridges.
- ◆ Keep tanks upright, and move gas hoses away from dripping grease and hot surfaces.
- ◆ NEVER use cigarettes, lighters, or matches near your gas grill, whether it is in use or not. You cannot be sure that there is not a slight gas leak somewhere in the unit, so it is always better to be safe than sorry.

## Biosafety: What we've seen lately

EH&S periodically surveys laboratories in an effort to ensure safe working conditions for all members of the Columbia research community and to maintain compliance with a host of regulatory requirements. The following items are among the most commonly cited biosafety-related findings:

### Regulated Medical Waste Management -

Only those items that belong in the RMW waste stream should be disposed of in your lab's red bags and sharps containers. Due to their ability to easily tear through a red bag, serological pipettes and micropipette tips should be discarded only in a sharps container.

<http://ehs.columbia.edu/MedWaste.html>

**Biosafety Cabinet Certification** - The biosafety cabinet is the primary engineering control for working with potentially infectious materials. BSCs protect lab workers from laboratory-acquired infection AND protect research

materials from contamination. Laboratories are required by University policy and federal regulation, to annually certify biosafety cabinets to ensure that they are operating properly. <http://ehs.columbia.edu/bsscrt.html>

**Vacuum Line Protection** - Whenever the laboratory vacuum system or a vacuum pump is used for aspiration of potentially infectious materials, the vacuum line must be protected by a collection flask and a filtration device. The filter prevents contamination of building plumbing by biological aerosols that are not captured in the collection flask. <http://www.fishersci.com/wps/portal/PRODUCTDETAIL?aid=107084>

[http://www.cdc.gov/OD/ohs/biosfty/bmb15/BMBL\\_5th\\_Edition.pdf](http://www.cdc.gov/OD/ohs/biosfty/bmb15/BMBL_5th_Edition.pdf)

(see p. 339)

**rDNA Registration** - The construction and use of

recombinant DNA molecules in research at Columbia is regulated by the *NIH Guidelines for Research Involving Recombinant DNA Molecules*. To ensure compliance, all rDNA work, including *in vitro*-only protocols, must be described in a submission to the University's Institutional Biosafety Committee. A Hazardous Materials Appendix A can be completed and submitted electronically to the IBC via the RASCAL system. <https://www.rascal.columbia.edu/hazmatlogin.html>

While EH&S thoroughly reviews these and other areas during your annual lab survey, you and your important research materials will be far better off if you spend a few moments now to address these biosafety topics.