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Environmental Health & Safety

SafetyMatters

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ENVIRONMENTAL HEALTH & SAFETY

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RFID Chemical Tracking at the Morningside Campus

by Maisha Rahman, Safety Advisor II

In the Winter 2018 edition of *SafetyMatters*, EH&S announced the launch of RFID chemical tracking at Jerome L. Greene Science Center (JLGSC). Radio-frequency identification, otherwise known as RFID, utilizes electromagnetic fields to automatically identify and track objects using an electronically stored information tag.

Over the past year at JLGSC, RFID technology has been successfully integrated with ChemTracker, the University's web-based chemical inventory program. Real-time hazardous chemical inventory record-keeping has improved through a significant reduction the amount of time required for inventory audits and scanning of items for disposal.

On the Morningside campus, optical barcodes have been used to track chemical inventory in ChemTracker since 2006. The disadvantage of optical barcodes is that each chemical container must be scanned individually, by hand, for inventory reconciliation and disposal. As a consequence, a full audit cycle for Morningside campus can take upwards of two years. In contrast, with RFID tags, a mobile reader can automatically scan all containers within five to ten minutes of entering a room, and without the need to physically handle individual containers, dramatically reducing the length of a full audit cycle.

Building on the success of the RFID ChemTracker integration at JLGSC, Morningside is currently undergoing conversion to the enhanced technology. Effective March 2017, all new, incoming chemical containers are given an RFID tag. In addition, each laboratory's barcoded inventory is being retroactively labeled with RFID tags as audits are completed. As of October 2018, more than 14,000 chemicals, representing approximately 28% of the chemical containers at Morningside, have been retro-tagged. EH&S anticipates full conversion to RFID tagging by 2020. If there are any questions or concerns about RFID technology, please reach out to chemtracker@columbia.edu.

When working in the laboratory: eating, drinking or applying cosmetics is prohibited.

Proper work attire (e.g., long pants, closed toe shoes) and PPE (e.g., laboratory coat, gloves and eye protection) must be worn when working in the laboratory.

Remember to periodically flush your laboratory cup sinks and floor drains with water to prevent odors from migrating into your laboratory.

For Lab Fire Safety Prevention tips, check out FDN(wh)Y Me https://research.columbia.edu/content/fdnwhy-me

Avoid FDNY Violations: Tips and Tricks

by Jon Paul Aponte, Fire Safety Officer

The New York City Fire Department (FDNY) conducts periodic inspections of permitted laboratory spaces across all Columbia campuses. Violation Orders (VO) may be issued to the Principal Investigator for non-compliance conditions observed in a laboratory. EH&S Fire Safety Officers accompany the FDNY Inspectors and offer the following pointers to avoid certain common violations:

Do not rely solely on manufacturer information about fire and/or life safety hazards

One commonly issued VO is related to inherently flame resistant (IFR) blackout curtains. While it may seem that "a curtain is just a curtain," any curtain in a permitted laboratory must be inherently flame resistant, *and* accompanied with an affidavit certifying its flame resistance. A qualified holder of a C-15 Certificate of Fitness must sign-off on the material in order for the FDNY to accept the affidavit, and this information will be reflected on the laboratory permit. For example, if an IFR/blackout curtain is purchased from Amazon or E-Bay, regardless of any manufacturer's or seller's guarantee that it will not burn, the FDNY does not consider this sufficient! The FDNY will not accept a company's claim. EH&S Fire Safety Officers can assist laboratories with finding appropriate retailers that will sell FDNY approved IFR/blackout curtains and guide researchers on how to obtain the appropriate documentation.

Improper Chemical Labeling is an unsafe practice

FDNY Inspectors not only examine paperwork and permits, they also identify unsafe practices and may issue a VO accordingly. For example, an improperly labeled peroxide-forming chemical is a clear code violation, and the FDNY regularly applies the relevant labeling regulations during inspections. Un-tested and un-dated peroxide formers may become explosive over time. To assist laboratories at Morningside and Manhattanville, the EH&S Chemtracker barcoders affix special stickers to every container of peroxide forming chemicals to ensure proper labeling compliance. The stickers are bright green and have space to record the date received, date opened, date tested, and date of expiration. To aid in avoiding violations, upon receipt of the labeled container, researchers should fill in the required dates. Six months after opening, researchers are mandated to test the chemical and record the test date (see: https://research.columbia.edu/fdnwhy-me-2018 for more information on testing). If peroxides have not formed, the chemical may be used for an additional six months (and at the end of those six months must be discarded). If peroxides have formed, the chemical must no longer be used, and an EH&S waste pick-up request should be submitted for prompt removal of the container. (http://vesta.cumc.columbia.edu/ehs/wastepickup/).

If any question arises concerning curtains, peroxide formers or any other fire and compliance related issues, please contact fire-life@columbia.edu for assistance.

Manage Radiation Safety Records in LION

by Ran Angela Meng, Deputy Radiation Safety Officer

EH&S is pleased to announce that radiation safety recordkeeping is now going digital at Columbia University across all campuses via EH&S' online database - the Laboratory Information Online Network (LION). This is a modern transition away from maintaining radiation safety records in the yellow radiation safety binders.

The radioactive materials (RAM) module was added to the Laboratory Assessment Tool and Chemical Hygiene Plan (LATCH) in LION to serve as the new home for radiation safety records for research laboratories. The RAM module has been developed in-house to meet both regulatory requirements and the specific needs of Columbia researchers in managing radiation safety. Some key functions of the RAM module include:

- **Permit** – allows a Principal Investigator to apply for a RAM permit, request a permit amendment to renew or inactivate the RAM permit, and to make changes to permitted isotopes, quantity, space, etc.
- **RAM inventory** – provides a snapshot of the current RAM inventory in the laboratory and allows researchers to digitally keep track of RAM use.
- **RAM waste** – RAM waste pickup service requests or requests for RAM waste supplies are integrated into the system.

In addition, researchers can manage the laboratory's overall radiation safety compliance with the aid of some existing functions in LION:

- **Inspection findings** – view RAM audit results and manage any corrective actions.
- **Personnel** – view all personnel in the laboratory. The Laboratory Manager and Principal Investigator can specifically designate staff as RAM users.
- **Training** – provides an overview of training status of all laboratory members.

For any questions about the RAM module in LION, please reach out to Radiation Safety at 212-305-0303 or rsocumc@columbia.edu. A step-by-step guide on how to navigate the RAM module is coming soon to LION at ehs.columbia.edu/LION and will also be made available on the EH&S website at www.ehs.columbia.edu. Stay tuned for more updates!

Fire Safety Minute

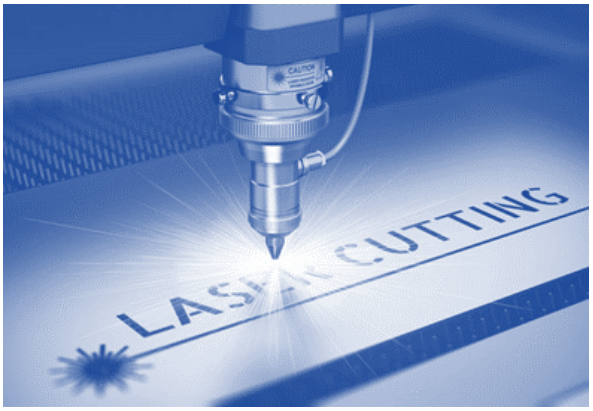
In Case of Fire:
Rescue
Alarm
Confine
Extinguish / **E**vacuate

To use Fire Extinguisher:
Pull Pin
Aim Hose
Squeeze Handle
Sweep From Side to Side

Laser Cutting Emissions

by Ritu Pandit, Health & Safety Professional

Laser Cutters have been gaining popularity across Columbia University because of their high precision, efficiency, and flexibility in a variety of research and artistic applications. A typical laser cutter's beam poses little hazard due to its Class 1 enclosure, however, the media being cut, especially certain metals or plastics, may create a hazard. These hazards include the ultrafine particulates (UFPs) and gases emitted during cutting. For example, cutting acrylic plastics can generate airborne methyl methacrylate, while the cutting of treated wood can generate airborne formaldehyde.



To reduce exposure to these contaminants, filtration and/or exhaust systems must be utilized. Proper removal of contaminants is not only protective for the user, but is also essential to ensure a properly functioning cutter and production of a quality end product. The choice of whether to use filtration or exhaust systems will be specified by the manufacturer and these specifications should always be followed. Columbia University shops currently housing laser cutters have either a filtration system or a combination of filtration and exhaust ventilation. These systems generally also include a second stage and/or third stage chemical filter that further protects the user from exposure to chemical vapors and fine particles.

EH&S has performed exposure assessments on UFPs and various chemicals during laser cutter use. Based on the initial set of assessments, EH&S has observed that filtration systems have the potential to become saturated earlier than the recommended use cycle. In light of this result, EH&S recommends several work practices for the management of filters and exhaust systems to properly determine their end of life, and to maintain safety during cutter usage:

- Turn the filtration/ventilation system on prior to starting the laser operation, and leave on 10-15 seconds after the laser has finished operating.
- Both the HEPA and chemical filters in a second stage system should be changed more frequently than the manufacturer's recommendation. In order to determine this schedule, shops should maintain a user log book to track information on the user (name and UNI), date and time of the job, type of material used, and the length of the job. This log then can be used to determine filter change out schedules based on frequency of use. Early detection or "breakthrough" of odors while operating the cutter also serves as an indicator to change out filters.
- Shops must ensure that all materials used for laser cutting are compatible with the equipment per manufacturer's specifications and recommendations. Use of incompatible materials may lead to fire and emission of hazardous chemicals. For example, cutting of artificial leather containing PVC can emit pure chlorine gas and can severely damage the laser cutter's optics. Posting a list of materials compatible with the cutter can assist students and staff with identifying appropriate media and avoiding incompatible materials. If any materials that are suspected of being incompatible must be used, contact EH&S to perform a risk assessment.

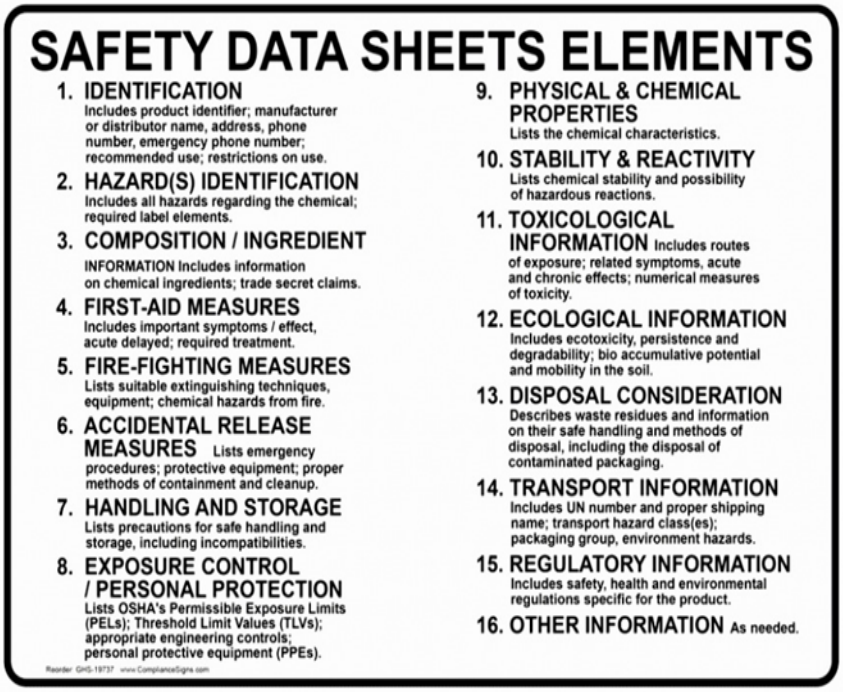
For all questions or concerns about using laser cutters, or to set up a risk assessment, please reach out to occusafety@columbia.edu.

Hazard Communication—Safety Data Sheets

by Princy Bhardwaj, Safety Advisor

The Hazard Communication Standard (HCS) "right to know" policy is simple: in the workplace employees must be provided with information about the chemicals and hazards that they may be exposed to at work. This information must be part of an employee training program, and must include an explanation of labels and Safety Data Sheets (SDS), two primary sources of information on protection from occupational injuries/exposures from chemicals. The HCS requires chemical manufacturers, distributors, or importers to provide SDSs (formerly known as Material Safety Data Sheets, or MSDSs) to those who purchase chemicals. Employers must in turn ensure that SDSs are readily accessible to employees.

As of June 1, 2015, the HCS requires the SDS to have a structured format with 16 standardized categories providing information about a chemical (see image) as part of the Globally Harmonized System (GHS) of classification and labeling. An employee should familiarize themselves with the whole document, but important sections to read over are first-aid measures, accidental release measures, handling and storage, and exposure control. The SDS also provides valuable information to emergency responders such as fire fighters, hazardous material crews, emergency medical technicians, and emergency room personnel.



Another key to minimizing workplace exposure, laboratory spills and accidents is maintaining a chemical inventory that records all the hazardous chemicals that a laboratory may use. The SDS should accompany the chemical inventory (a good practice is to keep the inventory and SDSs together in an electronic file or physical binder) and should always be consulted before working with a material or developing a new process. Accidents may happen, but the SDS is one of the first tools a researcher should reach for.

If a company did not send an SDS with a chemical purchase, what options are available to find one? Researchers can access an SDS from any computer on the campus network using the University's ChemWatch service. It is strongly recommended that laboratories bookmark the ChemWatch URL at https://jr.chemwatch.net/chemwatch.web/home and download copies for any chemicals, as needed.

Spotlight on Safety – Columbia EH&S Earned CSHEMA Innovation Award for "Print &Go" Sheets

by Christopher Aston, Associate Director Biological Safety Programs

Columbia University EH&S has received an Award of Merit from the Campus Safety, Health, and Environmental Management Association (CSHEMA), for demonstrating an innovative approach to accident response. Columbia EH&S staff accepted the award at the 2018 CSHEMA annual conference in Baltimore. Shown pictured with the award is Dr. Christopher Aston, Associate Director for Biological Safety Programs, who spearheaded the development of the recognized innovation, EH&S' "Print & Go" sheets.

Columbia University continually strives to be a leader in laboratory accident prevention through its implementation of the hierarchy of controls. Nonetheless, accidents can happen, and with this in mind, EH&S compiled its series of "Print & Go" guidance sheets that are a valuable resource following a potential occupational exposure to a hazardous biological or chemical material. Emergency room physicians do not typically see many cases of exposure to chemicals such as cyanide and hydrofluoric acid, or biological agents such as diphtheria toxin, lentiviral vectors, and Macacine herpes virus 1. The sheets are easily available to print (or download to a mobile device) directly from the home page of the EH&S website: research.columbia.edu/print-and-go-sheets, and are designed to be presented to the physician when seeking medical attention for the clinical team to reference.

Dr. Christopher Aston, Associate Director Biological Safety Programs
Photo Credit: Princy Bhardwaj, Safety Advisor

The sheets have been endorsed by the New York Presbyterian Hospital Emergency Room. Furthermore, when the University's animal care program was reviewed for accreditation by the Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC), the site visitors made special mention of the sheets as an exemplary initiative. At Penn State, their EH&S department has adapted the content for their own "Grab and Go" sheets.

Does your laboratory work with a hazardous material that you think warrants a "Print & Go" sheet? Contact an EH&S safety professional to discuss at biosafety@columbia.edu.

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Please share questions or comments with us at **newsfeedback@columbia.edu**