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Environmental Health & Safety

SafetyMatters

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Under Pressure? Keeping the Heat on Your Autoclave

by Christopher Aston

Autoclaves are programmable pressurized steam chambers that serve two purposes in research laboratories: to sterilize reagents or equipment and to decontaminate infectious waste. The ability of these laboratory work horses to perform such tasks effectively and consistently is often taken for granted. The consequences of not paying attention to the quality control needs of your autoclave are that product sterility may not be accomplished, or the more dangerous scenario in which pathogens are not killed, with the resulting waste potentially posing a risk to those that handle it.

The proper combination of high pressure, steam and time is critical to the successful sterilization of an autoclave load. A number of verifications methods are available to ensure that your autoclave cycle has reached sufficient temperature and pressure, for a long enough period, to sterilize. The most common, autoclave tape, is easy to use, but not a fail-safe indicator of sterilization. When attached to glassware or a waste bag, hash-marks or indicators on the white tape blacken after only brief exposure to a temperature of 121°C, a potential false-positive. For greater accuracy, when the autoclave is used for sterilizing infectious waste, performance should be periodically validated by using *Geobacillus stearothermophilus* spore vials. Place a vial in a hard-to-reach area of a mock challenge load and attach a string to facilitate removal after autoclaving. Incubate as directed; a lack of turbidity indicates that the autoclave is achieving sterilizing conditions.

A maximum-registering thermometer, also placed in a challenging area, will indicate the highest temperate the autoclave reached, but these provide only a snapshot and they contain mercury, which presents its own environmental concerns. Better still, a data logger is an electronic thermometer that records temperatures temporally and can download data to a computer. Users are often surprised to realize that heat and steam have not reached the center of a large load, but the remedy is usually to extend the cycle length and/or distribute the load into smaller bags to enable more steam to circulate. If extending the cycle length and load distribution do not produce the desired results, a service engineer should be contacted immediately to diagnose the autoclave.

Laser Safety by Occupational Safety Team

Research involving lasers often involves manipulation of an exposed beam through a maze of optical elements. The primary hazards of lasers used in research are the highly-focused, energy-dense beams of monochromatic light and the high voltages needed to operate such equipment. Permanent injury can result from exposure to laser light, so users must be properly trained in the safe use of such equipment.

ENVIRONMENTAL HEALTH & SAFETY

HTTP://EHS.COLUMBIA.EDU

MEDICAL CENTER
PHONE: (212) 305-6780
EHS-SAFETY@COLUMBIA.EDU

MEDICAL CENTER RADIATION
PHONE: (212) 305–0303
RSOCUMC@COLUMBIA.EDU

MORNINGSIDE CAMPUS
419 W 119TH ST
NEW YORK, NY 10027
PHONE: (212) 854-8749

EHRS@COLUMBIA.EDU

It's HOW Old? by Lauren Kelly

There may be chemicals in your laboratory that have been there longer than you realize. These old chemicals may also be a high risk hazard to you and your laboratory staff if they have been improperly stored or allowed to degrade over time and become unstable. While not all old chemicals become unsafe over time, many do. Chemicals that can become unstable over time, such as diethyl ether or 1,4-dioxane, can form peroxides which can result in a flash fire or explosion upon opening. Monomers, such as methyl methacrylate, can self-polymerize and become explosive if not chemically inhibited while stored. There are many other compounds that can ignite or explode on heating, grinding or repeated exposure to air or moisture producing degradation products which may contain peroxides, such as sodium amide.

In the past several years, EH&S has had to manage numerous unstable, degraded or otherwise "reactive" chemicals stored in laboratories. Proper handling, stabilization and ultimate disposal of these chemicals required assistance from experts trained in safe handling of explosive compounds. Several compounds, including ethers and sodium amide compounds, required the use of robotic technology to remotely open the containers, while under the careful supervision of experts wearing ballistics gear for blast protection. These types of projects are both inherently risky and expensive. There are several steps that laboratories can take to avoid chemicals becoming unstable during storage, including:

- Check your chemical inventories regularly for chemicals exhibiting signs of degradation , such as multi-colored layering you might see with sodium amide, or clumps of crystals as you might see with peroxide forming compounds.
- Follow the EH&S and FDNY guidance regarding dating your peroxide formers upon opening available at http://www.ehs.columbia.edu/tsc.html

If you are unsure how to properly manage a chemical or dispose of it, please contact the Hazardous Materials Team at hazmat@columbia.edu.

EH&S HAS REDESIGNED THE WEBSITE OFFERING NEW FEATURES AND ENHANCED NAVIGATION. HTTP://EHS.COLUMBIA.EDU

NO EATING DRINKING OR APPLYING COSMETICS WHEN WORKING IN THE LABORATORY

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

On-line Chemical Waste Pick-up Request Form.

Congratulations to Dr. Kathleen Anne Crowley

On May 21, 2013, Kathleen Anne Crowley (KAC) received her Doctor of Public Health (DrPH) degree from the Columbia University Mailman School of Public Health. In addition to earning her degree, KAC was awarded the I. Bernard Weinstein award for academic excellence in environmental health sciences, which is given to a student in the Department of Environmental Health Sciences for outstanding academic achievement and promise in the field of public health.

Please join the EH&S Team in congratulating KAC on her academic accomplishments.

Odor in Your Laboratory? Think Cup Sink by Harry J. Oster

Known by several names, including cup sink or bench sink (figure #1), this small receptacle can be a source of odors in your laboratory. How? The u-bend or p-trap below the drain is designed to provide a water seal, preventing back-up of gases, vapors and fumes into the laboratory. When the water in the p-trap evaporates due to lack of use (figure #2) odors can migrate through the trap into the laboratory. How can you help prevent these odors? Do not let these traps become dry. Sinks that are regularly used are typically not a source of odors; for those that are rarely used, simply turn on the faucet to fill the trap or pour a liter of water into the sink. That's all it takes to refresh the trap and block odors! Please note, placing duct tape, cardboard or other covers over the cup sink will not prevent odors from escaping into your laboratory. While many newly renovated laboratories no longer have this type of sink built into the bench, check today for the locations of cup sinks in your lab, especially "hidden" sinks that could become odor sources, and refresh as needed.

Figure #1

Fig. #2 – Shows proper water buffer seal. Odors, fumes or gases cannot pass thru into the lab room.

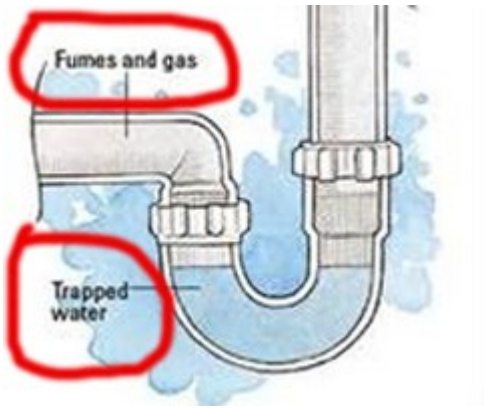

Figure #2

Perfect Attendance by Christopher Pitoscia

Running water, solvents in supply and effluent loops, and energized electrical connections are common and generally safe aspects of laboratory operations and equipment under normal circumstances. If not observed under the direct, watchful eye of a responsible laboratory staff member, however, the potential is greatly increased for hazardous conditions to occur. To guard against flood, fire and other emergencies that can be caused by equipment or utility failure, unattended operations should be periodically checked to ensure no problems arise. Researchers must post a sign (http://www.ehs.columbia.edu/UnattendedLaboratoryOperationsDoorSgnFillable.pdf) detailing the nature of the hazards, and contact information where a knowledgeable laboratory representative can be reached in the event of an emergency. Finally, unattended operations involving highly hazardous materials should be brought to the attention of EH&S prior to commencement of work. Taken together, these simple steps can help ensure your safety, the safety of first responders, and the successful completion of your experiments!

Hot Fun in the Summertime by Jim Kaznosky and Harry J. Oster

In the New York City area between June and September, ambient temperatures average in the mid to high 80's and may rise above 100° Fahrenheit (F). Summer is also the time of year that people tend to spend increased time outdoors, either for work or recreation. Along with elevated temperatures, high humidity can make the outdoors feel even hotter and can make it an unhealthy place to be. If your job entails activity in hot, humid weather, heat related illness can be a major occupational hazard. Additionally, pre-existing medical conditions may contribute to heat related illness. Some common heat related illnesses and their symptoms include:

- Heatstroke - a life-threatening condition in which body temperature may rise above 106° F in minutes; symptoms include dry skin, rapid heartbeat and dizziness
- Heat exhaustion - an illness that can precede heatstroke; symptoms include heavy sweating, rapid breathing and a fast, weak pulse
- Heat cramps - muscle pains or spasms that happen during heavy exercise
  Heat rash - skin irritation from excessive sweating usually appearing where clothing is restrictive

The following tips can help prevent adverse health effects related to summer weather:

- Stay hydrated; drink water even before you feel thirsty. You may need a cup of water every fifteen minutes during intense outdoor physical activity!
- Work in the shade, when possible; take frequent rest breaks in a cool, shady, or air-conditioned spot.
- Wear light-colored, loose-fitting clothing, preferably made of cotton or quick drying, performance fabric. Apply sunscreen and wear a hat and sunglasses (check the UV protection ratings for the glasses and sunscreen).
- Heavy work or the need to wear personal protective equipment (PPE) are additional stressors and extra allowances in terms of hydration and break times need to be considered.
- Most importantly, treat any heat related illness seriously and seek medical attention immediately if conditions worsen.

The Importance of Proper Training by Andrew Silling

According to the Occupational Safety and Health Administration (OSHA), nearly 4 million employees are injured on the job in the United States every year and each day 13 employees are killed on the job. OSHA has promulgated numerous regulations aimed at protecting America's workforce from injury and illness. A primary component of these regulations is safety training for employees. Proper training is essential to maintaining a safe workplace and is a primary method of accident prevention. Other safety tools, such as engineering controls (e.g., chemical fume hoods, biological safety cabinets) and personal protective equipment (e.g., lab coats, hand and eye protection) are also important for safety, but without safety awareness, these tools may not be used properly or to their fullest potential, thus compromising their effectiveness in protecting the user. Without proper training, laboratory personnel may be unintentionally putting themselves, their colleagues and others at risk, and may not know the proper protocols to follow in the event of an emergency.

Columbia University has developed a complement of safety training programs to address potential workplace hazards that may be encountered across the University, which also meet OSHA's training requirements. It is essential that all University personnel understand their individual training requirements and attend the appropriate training for the type of work performed or potential hazards present. Information about the University's laboratory training programs can be viewed @ http://www.ehs.columbia.edu/Training.html, where specifics about courses, schedules, frequency and other training-related information can be found. Safety training for Facilities personnel should be referred to the respective campus' Facilities Compliance Teams. Contact safetytraining@columbia.edu with any training questions or suggestions.

Mismanagement of Glass Collection Containers by Shane Son

You may think the trash can, laboratory glass disposal box or chemical waste container is the end of the line for your laboratory materials. What you don't see, is that after leaving the lab, there are numerous exchanges involved prior to final, proper disposal of your laboratory debris, waste and chemicals. The most important link in this chain is the safe primary handling of hazardous materials by laboratory staff. One carelessly uncapped needle or misplaced chemical bottle can be hazardous to many people. So, think "safety first" and do the right thing by placing laboratory waste in the correct container the first time to protect yourself, Facilities custodial staff and the EH&S Hazardous Materials team.

It's simple: collect waste streams into their appropriate containers for proper disposal. It is everyone's responsibility to make sure all waste is proper labeled with its correct constituents and stored properly, ready for disposal. A recent incident illustrates just how important proper waste management can be. A Facilities custodial staff member alerted the EH&S Hazardous Materials Team to an improperly managed laboratory glass disposal container, filled with uncapped needles, syringes, chemical reagent bottles, and unknown liquid vials. Had this mismanagement not been discovered before the container was removed from the lab, numerous handlers of this container could have been exposed to potential injury. In addition to injury, such mismanagement puts the University at risk for penalties from regulatory agencies.

For your safety and the safety of your colleagues, it is crucial to properly manage your laboratory waste. If at any time you are unsure how to manage or properly dispose of laboratory materials, please reach out to the Hazardous Materials Team at hazmat@columbia.edu.

EH&S Consolidates Offices and Relocates the RAM Package Room @ CUMC

by Radiation Safety Team

The EH&S Radiation Safety and Research Safety Teams at Columbia University Medical Center have moved from the Allan Rosenfield Building (ARB) to 601 W. 168th St, Suites 44, 53, 54 and 56. 601 West 168th St, which is directly across the street from the NYPH Emergency Room, is the building where CUMC's EH&S Team has had offices for the past 15+ years. Note, all email, phone and fax contacts remain unchanged.

The radioactive materials (RAM) package room has also been relocated from ARB 4th Floor. The RAM package room is now located in the Physicians & Surgeons (P&S) Building basement level, room B447 and effective May 2nd, 2013 all RAM packages can be picked up from P&S B447 from 1:00pm to 2:00pm on Monday through Thursday and from 2:00pm to 3:00pm on Friday. If extenuating circumstances require RAM package pick-up at an alternate time, EH&S will try to accommodate such requests, given adequate notice. This arrangement should be established through email correspondence with Bithi Roy (br2280) or Jeffrey Leavey (jl4025) at least 24 hours in advance.

Additionally, all radiation survey meter exchanges will occur at P&S B447 during the scheduled RAM package pick-up hours. EH&S thanks you in advance for adjusting to this new schedule and we welcome your feedback at rsocumc@columbia.edu.

Welcome to Dr. Max Amurao

EH&S is pleased to announce the appointment of Maxwell Amurao, Ph.D., M.B.A., DABR to the position of Radiation Safety Officer for Clinical Programs and Director of Clinical radiation Safety Programs. Dr. Amurao will direct and supervise clinical radiation safety programs at New York Presbyterian/Columbia University Medical Center, including Milstein Hospital, the Morgan Stanley Children's Hospital of New York (CHONY) and the Allen Hospital. He will also oversee quality assurance programs for the College of Dental Medicine and affiliated offsite faculty practices.

Prior to his arrival at Columbia University, Dr. Amurao was the Director of Radiation Safety for Georgetown University Hospital in Washington, DC. He served as the Radiation Safety Officer and implemented a comprehensive medical physics program for diagnostic imaging services. He was also an Adjunct Assistant Professor in the Department of Radiology where he taught medical imaging physics. Previously he served as Senior Medical Physicist in the Clinical Imaging Physics Group at Duke University in Durham, NC.

Dr. Amurao is a graduate of De La Salle University, Manila, Philippines, where he earned a M.S. in Physics, and the University of Texas Health Sciences Center at San Antonio, where he completed a Ph.D. in Medical Physics. He also holds a M.B.A. from the McCombs School of Business at the University of Texas at Austin. He is certified by the American Board of Radiology in Diagnostic Medical Physics and Nuclear Medical Physics. Dr. Amurao is also certified by the Board of Laser Safety in Medical Lasers.

Eating/Drinking in Laboratories by Research Safety Team

Columbia University's Health & Safety Manual prohibits eating, drinking, and food storage in laboratories that use Chemical, Biological, Radiological or any other hazardous materials. This policy is based on the potential for food/drink in the laboratory to become contaminated with subsequent ingestion associated with harmful effects. In the case of certain radioactive materials, trace amounts can cause great harm; therefore all radiation regulatory agencies consider it a major violation if food/drink is found in a laboratory that uses radioactive materials. Also consider that the effects of certain chemical exposures may be cumulative; 'small' unapparent exposures over time could add up until a threshold for adverse effects is reached – every little bit (or bite) may ultimately hurt.

Vision Statement

Environmental Health & Safety (EH&S) provides expert guidance and timely service to the University Community through our commitment to health and safety. Employing best practices and collaboration, and by building long term relationships, we promote a productive and safety conscious work environment.

Editorial Staff: Kathleen Crowley, Chris Pettinato, Chris Pitoscia
Graphics, Design, Lay-out: Jean Lee
Do you have a suggestion for a future *SafetyMatters* article? Do you have a comment on something you just read? Please share it with us at newsfeedback@columbia.edu