Overview
A properly functioning chemical hood is an important safety device in a laboratory. The chemical hood protects users from inhaling chemicals by constantly pulling air into the hood and exhausting it out of the building. Chemical hoods also provide protection in the event of an explosion or fire. This Update provides guidance on the usage of chemical hoods at Weill Cornell Medicine (WCM).

Applicability
This procedure applies to:
- All laboratory personnel who use chemical hoods.
- Engineering & Maintenance and External Contractors working with or repairing WMC chemical hoods.
- Project Managers installing or renovating chemical hoods.

Responsibilities
Environmental Health and Safety (EHS) advises laboratory personnel of proper hood procedures, ensures that chemical hoods are surveyed annually with a calibrated anemometer, reports hood malfunctions to laboratory personnel and Engineering and Maintenance immediately, and performs follow-up airflow surveys promptly after hood repairs are completed.

Principal Investigators and Laboratory Managers establish policies and procedures in their laboratories to ensure compliance with regulatory and institutional requirements and make certain that their personnel receive necessary training and are using chemical hoods safely and responsibly.

Laboratory Personnel restrict work in chemical hoods is appropriate for the type of hood available and the quality of ventilation present, use hoods according to recommended guidelines for safe use, and coordinate modifications, maintenance, repair, and new equipment needs with EHS and/or Engineering & Maintenance.

Engineering and Maintenance performs preventive maintenance on fans, ductwork, and hoods, makes repairs or maintenance as identified by annual surveys or by users, and notifies EHS and coordinates with laboratory personnel when hoods must be turned off for repair, maintenance, or other operations. Engineering and Maintenance will notify EHS to certify a hood that has been repaired.

Project Managers ensure all chemical hoods have been commissioned and are working properly at the completion of a renovation project.

Procedure
The New York City Fire Department requires all chemical hoods to operate at an average minimum face velocity of 80 to 120 feet per minute (fpm).

A chemical hood should be used when:
- Handling chemicals with significant inhalation hazards such as toxic gases, toxic chemical vapors, volatile radioactive material, and respirable toxic powders
- Carrying out experimental procedures with strong exothermic reactions
- Handling chemicals with significant vapor pressure
- Chemical vapors generated could cause a fire hazard
- Working with compounds that have an offensive odor
CONTINUED: Chemical Hoods

RATING CLASSIFICATIONS
All chemical hood surveys are conducted at a sash height of 18”.

- **PASS** – Chemical hoods with an average face velocity between 80 and 150 fpm. The optimum range for face velocity is 80 to 120 fpm.
- **RESTRICTED USE ONLY** – Chemical hoods with an average face velocity between 151 and 180 fpm are acceptable for restricted use only. Laboratories should not use acutely toxic, highly hazardous, or carcinogenic chemicals in hoods deemed for restricted use only.
- **FAIL** – Chemical hoods with an average face velocity less than 80 fpm or greater than 180 fpm.

USER GUIDELINES (STANDARD OPERATING PROCEDURES)

- Position the hood sash to a maximum of 18 inches to ensure proper airflow velocities at the work opening. Adjust the sash to shield from splashes or flying objects. In addition to aiding in proper airflow, the sash acts as a physical barrier in the event of an unplanned incident in the hood.
- Keep hood storage to an absolute minimum. Excess materials in the hood disrupt airflow and can act as a barrier or cause airflow to bounce back across the face of the hood. Do not take up hood space and block ventilation by storing unused equipment or chemicals in hoods. If large items must be kept in the hood, contact EHS for evaluation, certification and a smoke test.
- Keep all work at least six inches inside the hood. The capture ability of a hood may not be 100% at the front of the hood.
- Avoid cross drafts. Someone walking rapidly past the work opening can create a cross draft that may disturb the direction of airflow and cause turbulence.
- Keep the hood clean. Remove old experimental glassware and clutter. Wipe up spilled chemicals or residues. Ensure the glass sash remains clear for visibility.
- Do not heat perchloric acid in standard chemical hoods. Perchloric vapors may create explosive perchlorates in the ductwork. Contact EHS if you are performing perchloric acid digestions.
- Confirm that the chemical hood is operational. Check the air flow gauge if so equipped. Check a telltale (a piece of paper attached to the bottom of the sash). The telltale should be noticeably pulled toward the back of the hood.
- Separate and elevate each instrument. Use blocks or racks to elevate equipment one to two inches off the hood deck surface so that air can easily flow around all apparatus with no disruption.
- Avoid opening and closing the hood sash rapidly and swift arm movements in front or inside the hood. These actions may cause turbulence and reduce the effectiveness of hood containment.
- Use extreme caution with ignition sources inside a hood. Ignition sources such as electrical connections and equipment, hot plates, controllers, and open flame can ignite flammable vapors or explosive particles from materials being used in the hood.
- Never put your head inside a hood while operations are in progress. The plane of the sash is the imaginary boundary that should not be crossed except to set up or dismantle equipment.
- Report airflow problems and problems with the physical structure of the chemical hood to EHS as soon as possible. If a hood fails while working with highly hazardous materials, immediately close the sash. Leave the immediate area and contact EHS for further assistance.
- Lower the sash to a 2” opening when the hood is not being used.

CHEMICAL HOOD SURVEYS AND MAINTENANCE

EHS surveys all chemical hoods on an annual basis to verify that the air velocity at the opening is within an acceptable range. The Chemical Hood Test Record label is affixed to the external surface of the hood and will indicate the inspection date, the average face velocity measurement at 18” sash height, and the rating classification (e.g., Pass, Restrict, or Fail). If the hood is found to be in the restricted or failing range, EHS will conduct a hazard assessment of the operations conducted in the hood and inform laboratory staff if the hood is acceptable for use until it is repaired and re-certified. If the hood is found not to be acceptable for use, EHS will post a sign on the hood informing laboratory staff not to use the hood.

EHS will automatically submit a work order to Engineering and Maintenance to repair all non-passing hoods and post a sign on the chemical hood to notify laboratory personnel. Questions about restrictions on the use of hoods during repair should be directed to EHS.

Engineering & Maintenance conducts repairs to chemical hoods and flow monitors. Engineering & Maintenance will notify EHS when a chemical hood and/or monitor have been repaired. EHS will re-survey the hood to verify the air flow is at passing levels.
SHUTDOWN NOTIFICATION

Notifications will be posted when chemical hood fans will be shut down. For minor shut downs affecting only a few hoods, notifications will be placed directly on each hood affected. For large shutdowns affecting large areas (e.g. an entire building), notifications will be posted in elevators and other public areas as with other utility shut downs.

References

OSHA Laboratory Standard 29CFR 1910.1450
New York City Fire Code