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CHEMICAL FUME HOOD PROGRAM

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I. PURPOSE

- To minimize exposure to airborne contaminants created by laboratory research activities.
- To ensure the laboratory fume hoods are operating in accordance with College requirements.
- To establish design criteria consistent with professionally recognized consensus standards and practices to provide the best level of protection and performance for new laboratory fume hoods installed at Reed College.

II. SCOPE

Laboratory fume hoods provide the primary control measure available in the laboratory to minimize exposure to toxic gases, vapors, mists, or fumes generated by the manipulation of chemicals during research activities. EHS measures fume hood face velocity annually to confirm proper operation, and notifies Facilities Maintenance of fume hoods with poor velocity for repair.

The laboratory researchers, EHS, and Facilities must work together to ensure fume hoods operate and are used properly to provide adequate protection to the end user.

III. REFERENCES

- ANSI/ASHRAE 110, Method of Testing Performance of Laboratory Fume Hoods
- ANSI Z9.5 Laboratory Ventilation

IV. PROGRAM RESPONSIBILITIES

A. ENVIRONMENTAL HEALTH AND SAFETY:

Responsible for the establishment, implementation, and maintenance of a written fume hood program. The EH&S office shall:

- facilitate and coordinate testing of fume hoods;
- report deficiencies found during the EH&S-facilitated survey and produce repair requests;
- develop and provide training for the fume hood users;
- review fume hood commissioning reports.

The program shall be updated as necessary to reflect changes in workplace conditions that affect fume hood use.

B. FACILITIES SERVICES

- Repair reported deficiencies or contract outside service, if needed.
- Notify the department administrator and/or lab users when repairs are planned for fume hoods.
- Do not remove contents from inside the laboratory fume hood. If repairs are required inside the laboratory fume hood, have user remove its contents to provide access inside the hood.

C. EMPLOYEE/FUME HOOD USER

- Use the fume hood with the sash as low as possible, at or below the indicated operating height. The fume hood is more effective at the sash operating height and provides a physical barrier between you and the fume hood contents.
- Do not store chemicals or equipment that are not in use within the fume hood, and do not place these items at the front edge of the hood or at the rear baffles (openings) of the hood. These practices can cause turbulence and a loss of containment within the hood.
- If you must use large equipment to support your research activities within a hood, raise the equipment on blocks at least 2" above the work surface to ensure a more uniform flow into the hood and to minimize turbulence produced by this equipment.
- Work at least 4" in from the hood sash opening, and keep the sash glass clean and free from visible obstructions.

- Avoid sudden movements at the face of the hood. Walking briskly past the hood can disrupt air currents or create turbulence, pulling vapors out of the hood.
- Do not use perchloric or hydrofluoric acid inside a fume hood unless the hood was specifically designed for its use. Due to the physical properties of these materials, special fume hoods are required for work with these materials.
- If the hood is equipped with a flow indicating device (i.e., magnehelic gage, audible/visual alarm), confirm the hood operates properly before use.
- Immediately report fume hood malfunctions to Facilities Maintenance for repair. Obey all signs and notices posted on the hood by the Facilities Maintenance staff that is repairing hoods.

V. LABORATORY VENTILATION

A. CHEMICAL FUME HOOD TYPES

- Conventional Fume Hood or constant air volume hood. Equipped with an internal baffle to the exhaust opening. Face velocity is inversely proportional to sash height.

- Bypass Hood is designed so a fraction of air entering the hood face may pass over the top and bottom of the hood sash. This allows the air velocity near the work surface to stay relatively constant. This protects susceptible experiments and equipment from excessive air speeds which could have detrimental effects. It also allows for less static pressure and frictional resistance to air flow than would a conventional hood. This ensures a constant air volume as the hood sash height is changed.

- Auxiliary Hood is a bypass hood with a direct auxiliary air connection that has not been cooled in the summer or completely heated in the winter. This is an attempt to reduce heating and cooling costs for the institution. Its disadvantage is that it increases maintenance costs due to the requirement of more ductwork, fans and air tempering facilities.

- Self-Contained Hoods pull room air over the work surface and through a filter suitable for the work intended in the hood. This prevents the fan from being contaminated because the air has already has been filtered. Such hoods are desirable in areas where ductwork is not available. Filters usually need to be replaced every 1 to 2 years.

- Walk-in Hoods rest directly on the floor or on a pad on the floor. They are designed to fit around an apparatus which will not fit in a standard hood.

- Explosion-proof Hoods have "explosion-proof" electrical devices. The hood will not contain an explosion but the electrical equipment will not provide a source of ignition.

- Perchloric Acid Hoods are designed for use with perchloric acid and must be equipped with a water wash system for the hood and ductwork.

- Radioisotope Hoods are designed for use with radioactive chemicals and constructed from stainless steel without seams or edges.

- Variable Air Volume (VAV) Hood maintain a constant face velocity regardless of sash position. The system continuously measures the amount of air exhausted to maintain a constant face velocity. A VAV system increases the ability of the hood to protect the worker from the possibility of exposure to chemical fumes.

B. SPECIALTY EXHAUST SYSTEMS

- Biological Safety Cabinet is not a laboratory hood and considered to be a special safety enclosure used to handle and contain pathogenic microorganisms. The cabinet is designed to protect the product and also provides limited protection for lab personnel by utilizing an inward airflow away from the employee. Biological Safety Cabinets must be National Sanitation Foundation (NSF Standard 49) certified for Class II, Type A2 Biological Safety Cabinets and bear the NSF seal.

- Laminar Flow Cabinets are not considered laboratory hoods and do not provide any protection for lab personnel and are intended to provide a clean airflow for the product protection. It is typically a ventilated, partially enclosed cabinet with airflow over the work surface.

- Canopy Hoods have an enclosed horizontal duct suspended above a work area that is too large to be contained in a conventional hood. The disadvantage of the hood is it draws contaminants past the workers breathing zone.

- Glove box is used when toxicity, radioactivity or reactivity is too great a hazard for work in a conventional hood. The greatest advantage of the glove box is worker protection