A Survival Guide to Chemical Fume Hoods

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INTRODUCTION

Laboratory hood safety may not be an important issue for everyone. However, for people who work in laboratories it is especially critical. Why? Because for worker protection, the laboratory fume hood is the most useful piece of safety equipment found in the lab. When used appropriately, fume hoods not only provide protection from toxic gases and vapors but also provide protection from unanticipated fires and explosions. In short it could save you from serious injury or death.

As with any type of equipment you use, you should become familiar with how the hood works and its limitations. The following listing will help you to recognize the specific types of hoods commonly found at O.S.U.

TYPES OF FUME HOODS

Conventional: All air enters through the hood opening as defined by the bottom of the sash, the sides of the hood and the work surface.

Conventional Bypass: As the sash is closed, some of the air enters through a bypass grille instead of through the sash opening to help maintain a constant velocity. The bypass is usually located directly above the sash.

Auxiliary Air: In this type of hood some of the air being drawn into the opening is supplied directly at the hood. The delivery duct for this air is usually located just above the bypass grille and extends out 1-2 feet.

Radioactive: Any of the above hoods can be used for radioactive materials provided the interior work surfaces are impervious (usually stainless steel). Some types of radioactive material also require a filter at the hood outlet and surveillance by the Office of Radiation Safety.

Perchloric Acid: Any of the above hoods can also be used for perchloric acid provided the hood has a water wash-down system. Use of small quantities (ml) of perchloric acid at room temperature (no heating) does not require a wash-down facility.

Glove Box: This is a complete enclosure whose only access is through a side pass-through chamber or the gloves in front. It is usually kept under a negative pressure of approximately 0.5 inches of water.

Bio Safety Cabinet: This is not a chemical fume hood. It is used for biological materials. Only small amounts of non-volatile chemicals can be used in these cabinets.

Horizontal vs. Vertical Sliding Sash: The majority of hoods have one or two vertical sliding sashes, i.e., they move up and down. Some hoods have three or more horizontal sliding sashes, i.e., they move left to right.

Specially Designed Systems

1. Walk-in Hoods
2. Canopy Hoods (like kitchen stove hoods)
3. Slot Hoods (usually several feet in length with a slot of several inches)
4. Atomic Absorption Spectrophotometer Exhausts.

HOOD MAINTENANCE AND USE

The University evaluates chemical fume hoods periodically to ensure that they are functioning appropriately. Physical Facilities and Facilities Maintenance (University Hospitals) perform preventive maintenance on the fume hood motors and exhaust fans. They also repair or replace faulty utilities, sashes and safety glass. The Division of Environmental and Occupational Health and Safety evaluates hood capture velocity and provides training to interested laboratory personnel regarding hood safety.

However, if improperly used, even the best hood can be compromised beyond its capabilities. When improperly used, toxic chemical vapors and gases can escape into the laboratory and jeopardize the health of laboratory workers.

The following page contains safe work practices for using laboratory fume hoods. When followed, these practices will limit the risk of exposures to toxic chemicals used in the hood.

WORK PRACTICES FOR LABORATORY FUME HOODS

1. Know the physical, chemical, and toxicological properties of all chemicals you use.
2. Conduct all operations which may generate air contaminants at or above the appropriate Threshold Limit Value~ inside a hood (50 ppm or less).
3. Keep all apparatus at least 6 inches back from the face of the hood. A stripe on the bench surface is a good reminder.
4. Elevate large equipment 1 to 2 inches above the working surface of the hood.
5. Do not place your head inside the hood when contaminants are being generated.
6. Do not use the hood as a chemical waste disposal mechanism.
7. Do not store chemicals or apparatus in the hood.
8. Keep the hood sash at the lowest possible position and use the sash as a shield.
9. Keep the slots in the hood baffle free from obstruction.
10. Keep laboratory doors closed (exception is when lab design requires the doors be open).
11. Minimize foot traffic and rapid movement past the face of the hood.
12. Do not remove hood sash or panels except when necessary for apparatus setup; replace sash or panels before operating.
13. Do not place electrical receptacles or other spark sources inside the hood when flammable liquids or gases are present. Permanent electrical receptacles are best located outside of the hood.
14. Use an appropriate barricade or shield if there is a chance of explosion or eruption (i.e., unstable reaction intermediates, strong oxidizers, exothermic reactions).
15. If hood sash is supposed to be partially closed for operation, the hood should be so labeled and the appropriate closure point clearly indicated.
16. Provide adequate maintenance for the hood exhaust system and the building supply system. Use static pressure gauges or other appropriate indicators to insure proper exhaust flow.