

## Safety Manual > Safety Rules for the Laboratory

### C. Safety Rules for The Laboratory

1. Chemical Hygiene Plan

See appendix.

2. Laboratory Ventilation

Toxic, pathogenic, radioactive, or unknown properties shall be controlled so that workers/students in the laboratory do not absorb, ingest, or inhale the contaminants. They shall be contained within, captured by hoods or enclosures, or dispersed through spot ventilation.

a. Laboratory Hoods

A laboratory fume hood is a ventilated enclosed work space consisting of side, back, and top enclosure panels, a work surface or deck, a work opening called the face, and an exhaust plenum equipped with horizontal adjustable slots for the regulation of air flow distribution.

b. Hood Face Velocity

- i. The American Conference of Governmental Industrial Hygienists (ACGIH), “Industrial Ventilation,” and the National Research Council, “Prudent Practices in the Laboratory,” recommend a face velocity of between 80 and 100 fpm.
- ii. The following table was taken from the ACGIH “Industrial Ventilation...Manual”:

	<b>Condition</b>	<b>cfm/ft<sup>2</sup> Open Hood Face</b>
1	Ceiling panels properly located with average panel face velocity <40 fpm. Horizontal sliding sash hoods. No equipment in hood closer than 12 inches to face of hood. Hoods located away from doors and traffic ways.*	60
2	Same as above; some traffic past hoods. No equipment in hoods closer than 6 inches to face of hood. Hoods located away from doors and traffic ways.*	80
3	Ceiling panels properly located with average panel face velocity <60 fpm. No equipment in hood closer than 6 inches to face of hood. Hoods located away from doors or traffic ways.*	80

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4	Same as 3 above; some traffic past hood. No equipment in hood closer than 6 inches to face of hood.	100
5	Wall grilles are possible but not recommended for advance planning of new facilities.	

\* Hoods near doors are acceptable if 1) there is a second safe egress from the room; 2) traffic past the hood is low; and 3) door is normally closed.

c. Work Practices for Laboratory Hoods (from ACGIH “Industrial Ventilation...”)

No large, open-face hood with a low face velocity can provide complete safety for a worker standing at the face against all events that may occur in the hood. The hood may not adequately protect the worker from volatile or otherwise airborne contaminants with a TLV in the low part-per-billion range. For more ordinary exposures, a properly designed hood in a properly ventilated room can provide adequate protection. However, certain work practices are necessary for the hood to perform capably. The following work practices are generally required; more stringent practices may be necessary in some circumstances.

- i. Conduct all operations that may generate air contaminants at or above the appropriate Threshold Limit Value (TLV) inside a hood.
- ii. Keep all apparatus at least 6 inches back from the face of the hood. A stripe on the bench surface is a good reminder.
- iii. Do not put your head in the hood when contaminants are being generated.
- iv. Do not use the hood as a waste disposal mechanism except for very small quantities of volatile materials.
- v. Do not store chemicals or apparatus in the hood. However, if hoods are used to store chemicals, they are to be labeled “for storage only.” Store hazardous chemicals in an approved safety cabinet.
- vi. Keep the hood sash closed as much as possible.
- vii. Keep the slots in the hood baffle free of obstruction by apparatus or containers.
- viii. Minimize foot traffic past the face of the hood.
- ix. Keep laboratory doors closed (exception: some laboratory designs require lab doors to be open).
- x. Do not remove hood sash or panels except when necessary for apparatus set-up; replace sash or panels before operating.
- xi. Do not place electrical receptacles or other spark sources inside the hood when flammable liquids or gases are present. No permanent electrical receptacles are permitted in the hood.
- xii. Use an appropriate barricade if there is a chance of explosion or eruption.
- xiii. Provide adequate maintenance for the hood exhaust system and the building supply system. Use static pressure gauges on the hood throat, across any filters in the

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exhaust system, or other appropriate indicators to ensure that exhaust flow is appropriate.

- xiv. If hood sash is supposed to be partially closed for the operation, the hood should be so labeled and the appropriate closure point clearly indicated.

d. Sash Operation

- i. Except when adjustments to the apparatus are being made, the hood should be kept closed, with vertical sashes down and horizontal sashes closed, to help prevent the spread of a fire, spill, or other hazard into the laboratory. Sliding sashes should not be removed from horizontal sliding sash hoods. The face opening of the hood should be kept small to improve the overall performance of the hood. If the face velocity becomes excessive, the facility engineers should make adjustments or corrections.
- ii. For hoods without face velocity controls, the sash should be positioned to produce the recommended face velocity, which often occurs only over a limited range of sash positions. This range should be determined and marked during fume hood testing. For hoods with face velocity controls, it is imperative to keep the sash closed when the hood is not in use.

e. Maintenance and Inspection

Periodic inspections and air velocity checks of hoods are necessary if effective control is to be maintained. The Office of Campus Safety inspects fume hoods once a year. In addition, an in house inspection program shall developed. This inspection program shall include:

- i. Face velocity checks—if possible. The ACGIH recommends, “Use static pressure gauges on the hood throat, across any filters in the exhaust system, or other appropriate indicators to ensure that exhaust flow is appropriate.”
- ii. Housekeeping—accumulation of chemicals and/or equipment in hood. Such materials restrict air flow.
- iii. Sashes—adequate number of sashes, condition, ease of movement, and cleanliness.
- iv. Motor/Belt Inspection—belts and motors shall be checked on a regular basis. Physical Plant shall be contacted for this service.

3. Refrigerators

- a. Use of domestic refrigerators in a laboratory setting constitutes a unique hazard in that explosions may occur when they are used for storage of volatile or unstable chemicals. Domestic (household) refrigerators shall not be used for chemical storage unless they have been modified in accordance with National Electric Code, Article 501.
- b. Chemicals stored in refrigerators shall be sealed and labeled with the name of the material, the date it was placed in the refrigerator, and the name and phone number of the person who stored the material.

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- c. In accordance with Labeling of Refrigerators Located in the Laboratories, refrigerators in which any toxic materials are stored shall bear a label located on the outside of the refrigerator door stating “No Food or Drink to Be Stored in This Refrigerator.” As indicated, no food or beverages of any kind shall be stored in the same refrigerator as chemicals.
4. Food and Beverage Consumption

No employee, student, visitor, etc., shall knowingly consume any food or beverage that has been stored in a chemical storage refrigerator (and labeled as such), nor shall food or beverages be stored or consumed in any area containing toxic materials.