SCHOOLS INSURANCE PROGRAM FOR EMPLOYEES

LABORATORY-TYPE FUME HOOD SAFETY

Date: May 21, 2012

Legal Reference: Title 8, Sections 5154.1 & 5143(a)(5)

PURPOSE: The purpose of this guidance document is to assist member school districts in the safe uses of laboratory-type fume hoods or chemical fume hoods. This includes safe use, performance testing, reporting and responding to equipment failure, appropriate steps necessary to safeguard workers who perform repairs and other responsibilities.

Laboratory fume hoods are typically found in science classrooms and are used to prevent harmful exposures of hazardous substances. Engineering controls are the first line of defense against workplace hazards by removing the hazard from the working environment. This includes local exhaust ventilation (i.e., fume hoods) to prevent exposure to gases, chemical vapors and aerosols. There are two basic categories of laboratory hoods: chemical fume hoods and biological safety cabinets. This guidance document only outlines the requirements and test procedures for chemical fume hoods. Biological safety cabinets are covered under standard 5154.2 and will not be discussed in this document.

USE AND SAFE WORK PRACTICES: Observation of the laboratory hood environment, maintenance, and work practices can provide an indication of proper exposure control performance. For example, if the sash(es) of the hood are left open during operation of the research activity, the hood is likely to reduce its functional effectiveness. Laboratory fume hood performance can also be compromised by equipment blocking airflow, cross drafts, maladjustment of exhaust dampers, worker leaning into the hood, leaks in exhaust ducting and turning off the hood fan during actual hood use. The sash of the fume hood may not be raised completely during usage, unless marked otherwise. If marked the hood shall be opened no further than the safe operating level, indicated by the visual indicator tape or decal when in use.

Lab personnel shall employ work practices that minimize or eliminate their exposures when working with hazardous materials in fume hoods:

- Lab personnel should not place their upper body or face in the fume hood except during initial setup of equipment inside the hood and before any hazardous materials have been placed inside the hood.
- Hazardous materials should be placed > 6” inside the hood for proper containment of chemical vapors.
- Hoods should not be used for permanent storage of hazardous materials, equipment or other items.
- When the hood is not in operation, hazardous substances in the hood shall be covered or capped off.
- Hazardous waste must never be stored in a hood.
- The hood shall remain in operation at all times when hoods are in use and for a sufficient time thereafter to clear hoods of airborne hazardous substances.
- Keep the inside and outside of the hood free from obstruction of large equipment whenever possible.
- The hood sash or panels should be lowered to the lowest (comfortable) working height, usually 12”. Fully opening the sash lowers the face velocity to the point of ineffectiveness.
- The hood sash or panels shall not be removed except for initial experimental setup and before hazardous chemicals are placed in the hood.
- Each hood shall be posted with the date of last certification. If the hood failed the performance test, it shall be taken out of service until repaired and posted with an out of service placard.
- Do not use chemical fume hoods for bio-hazardous materials or perchloric acid.

LOCATION: Fume hoods shall be located within a lab in such a way that their performance is not adversely affected by cross drafts. Cross currents, drafts and air currents from open windows, doorways, and personnel traffic flow directly influence hood containment ability.
OPERATOR TRAINING: The employer shall ensure that employees who use fume hoods are trained to:

- Use the hood and its features safely;
- Determine the date of the last performance test and if the hood performance met the requirements;
- Understand the general hood purpose, airflow characteristics, and potential for turbulent airflow and escape of hazardous substances from the hood; and,
- Know where the quantitative airflow monitor or alarm system is located on the hood and how it is used to indicate an inward airflow during hood operation.

INSPECTION AND TESTING: Fume hoods should be inspected annually to comply with Cal/OSHA regulations. During this annual inspection the fume hood face velocity (air intake) is measured, insures a visual indicator is in place (indicator tape or decal), that all chemicals are at least six inches inside the face of the hood, that the hood is not overly cluttered with chemicals or equipment, and that all large items are elevated to allow air to flow beneath and around them. This minimizes air flow blockage. The actual measurement for face velocity of a fume hood is done with an anemometer or vaneometer. This device measures the draw of the fume hood in feet per minute (fpm).

For a hood to pass this annual inspection, face velocities shall be sufficient to maintain an inward flow of air at all openings into the hood under operating conditions. The hood shall provide confinement of the possible hazards and protection of the employees for the work that is performed. The exhaust system shall provide an average face velocity of at least 100 feet per minute with a minimum of 70 fpm at any point.

The face velocity should be obtainable with the movable sashes fully opened. Where the required velocity can only be obtained by partly closing the sash, the sash and/or jamb shall be marked to show the maximum opening at which the hood face velocity will meet the requirements. Any hood failing to meet the requirements shall be considered deficient in airflow and the hood shall be taken out of service.

Airflow measurements that indicate the ability of the hood to maintain an inward airflow at all openings of the hood shall be performed:

- Upon initial installation;
- On an annual basis;
- After repairs or renovations of the hood or the ventilation system in that part of the facility where the hood is located; or
- After the addition of large equipment into the hood.

Records of these tests shall be retained for at least five years.

REMOVING HOODS FROM SERVICE: If it is suspected that a fume hood is not working properly or does not pass the performance test, work inside the hood should stop immediately and the problem should be reported to a supervisor/site administrator. When a fume hood is removed from service, the responsible laboratory personnel (typically the classroom instructor) must ensure that all hazardous materials have been removed and the hood has been properly cleaned and/or decontaminated. It is recommended that hoods only be serviced by authorized technicians. Place the following placard on the hood when the hood is not operating properly:

**DANGER – OUT OF SERVICE**

**HOOD IS NOT WORKING**

**DO NOT USE**
ROOF WORK: Chemical fume hood exhaust stacks are located on the roof, which may release chemical contaminants outdoors. Fume hood exhaust ducts terminate just above the roofline in many cases. Working near these outlets could potentially expose workers to hazardous chemicals in diluted concentrations. If maintenance/repair work must be done on the roof of any building containing hood exhausts, workers must first notify the responsible laboratory personnel and place the DANGER – OUT OF SERVICE placard on the hood.

OTHER REQUIREMENTS: By January 1, 2008, hoods shall be equipped with a quantitative airflow monitor that continuously indicates whether air is flowing into the exhaust system during operation (5141.1(e)(3)(a)). The quantitative airflow monitor shall measure either the exact rate of inward airflow or the relative amount of inward airflow. Examples of acceptable devices that measure the relative amount of inward airflow include: diaphragm pressure gauges, inclined manometers, and vane gauges. The requirement for a quantitative airflow monitor may also be met by an airflow alarm system if the system provides an audible or visual alarm when the airflow decreases to less than 80% of the airflow required.
# Fume Hood Inspection Form

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<th>SITE</th>
<th>ROOM NUMBER</th>
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<th>DATE</th>
<th>Safe Operation Height (in)</th>
<th>Avg. Face Velocity</th>
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Hoods shall be equipped with a quantitative airflow monitor. 5141.1 (e)(3)(a)
Do not use Perchloric Acid in this hood. 5141.1 (e)(7)
This form or similar must be on the fume hood after completion of certification. 5141.1 (e)(1)