

**University of Denver
Environmental Health & Safety Department
Laboratory Inspection Comment Sheet**

The following briefly describes what EHS looks for during a typical laboratory inspection.

Items in boxes are of special concern either because of high hazard or because they are items frequently cited and/or fined by the Environmental Protection Agency, the Occupational Safety and Health Administration or the Denver Fire Protection Bureau.

Signs & Labels

Entrance to Laboratory

Entrance to laboratories must display appropriate warning signs including contact information and hazards located within

Refrigerator/Freezer/Microwave/Icemaker

If a refrigerator/freezer or microwave is for laboratory use, it must be labeled "Warning: No Food or Drink Allowed." If the refrigerator/freezer is not designed by the manufacturer for flammable material storage, a "Not Suitable for Flammable Materials" sign should also be added.

Chemical Storage

Chemical storage cabinets must be labeled with the chemical hazard (flammable, corrosive, oxidizer, etc.) unless cabinet doors allow the contents' labels to be easily read. Refer to the EH&S Chemical Storage Guidelines for detailed guidance on chemical storage.

Chemicals not in primary container

All hazardous chemicals that are removed from the original container and placed in a secondary container must be labeled with:

1. **Full chemical name** (Ethanol, not EtOH).
 - Do not use the words "waste" or "used"
2. **Concentration**
3. **Hazard Class** (Flammable, Corrosive, Carcinogen, etc.)

The hazard class may be written on the bottle, a color code system may be used, or the NFPA diamond stickers may be used. If you are using a unique code system, post the code key chart in the laboratory near phones, exits and with the CHP.

Chemical Hygiene Plan

Chemical Hygiene Plan (CHP)

The OSHA Laboratory Standard requires all laboratories to have a CHP. EH&S has provided a template for this plan; however it must be completed with site-specific information.

Engineering Controls

Safety Showers and Eyewash Stations

Safety showers and eyewash stations must always be accessible and free from clutter. Eyewash stations must be inspected weekly by lab personnel, and an inspection log maintained.

Fire Extinguishers

All extinguishers must be easily accessible and mounted on the wall or stored in an extinguisher cart. The fire extinguisher must be certified annually by an outside company. The extinguisher should be inspected by lab personnel monthly. Verify that the extinguisher is not damaged and the pressure gauge is in the normal range. Initial and date the card attached to the extinguisher for documentation. A Class D extinguisher is required if your research involves work with reactive metals, pyrophoric chemicals or organometallic compounds (i.e. magnesium, sodium, potassium, or metal hydrides).

Gas Cylinders

Cylinders of compressed gases should be secured by straps or chains to a wall or bench top, or within a cart or stand. They must be capped when not in use, and a cart must be used to move the cylinder. Cylinders of incompatible gases may not be stored together. See CHP for more details.

Vacuum System Flasks

Collection flasks for vacuum systems should be plastic or plastic-coated glass. If flasks are kept on the floor, they must be properly contained. Flasks should be labeled with the contents (e.g. 10% bleach, tissue culture media, etc.) and should not be labeled "waste" or "used."

Fume Hoods

Materials placed in the fume hood should be kept to a minimum to allow proper airflow. Airflow slots in the back of the fume hood must be unobstructed. **Any chemical (including waste) stored in the fume hood must be capped when not in use. Funnels may not be left in the waste bottles. Waste may never be intentionally allowed to evaporate in the fume hood.** Chemical fume hoods are inspected annually by EH&S.

Biosafety Cabinets

Biosafety cabinets must be certified annually or when the cabinet is repaired or relocated EHS can provide a list of vendors with required NSF49-accredited personnel.

Personal Protective Equipment

Eye Protection

Appropriate eye protection is required while working with hazardous materials in the laboratory. At a minimum, eye protection should consist of ANSI-labeled safety glasses. Regular prescription glasses do not provide adequate eye protection. Splash goggles appropriate to the task must be worn for operations or areas in which significant splash hazards exist.

Selection and Use of Gloves

Gloves appropriate to the task must be worn. Appropriate thermal gloves must be worn when handling extremely hot or cold items. Gloves appropriate for autoclave use are not appropriate for handling cryogenic liquids.

Clothing Protection

Lab coats must be worn if there is reasonable chance of splash hazards. Lab coats shall be worn if poor clothing choices are made, such as shorts, tank tops, etc.

Foot Protection

Footwear must provide adequate protection from hazardous material spills. Shoes which leave areas of the foot exposed are not appropriate for use in a laboratory (e.g. sandals)

Respirators

Additional respiratory protection should not be necessary under normal lab operations. However, when effective engineering controls are not feasible, or while they are being implemented or evaluated, respiratory protection may be required. Prior to purchasing or wearing a respirator/respiratory protection, contact EHS to complete a mandatory medical questionnaire, fit test, and training. Training and fit testing must be done on an annual basis, or when the health status, physical condition, or job duties of the individual change. Note: Surgical masks do not provide respiratory protection and should only be used to protect mucous membranes from splashes of infectious material. Use of an N95 respirator requires enrollment in the Respiratory Protection Program.

Hazardous Materials Storage

Hazardous Chemicals

In general, solid materials should be placed on a shelf and liquid materials should be placed in an appropriate storage cabinet. If multiple hazard classes or incompatible materials within a hazard class must be stored in the same area, appropriate secondary containment must be used. All containers must be securely closed when not in use.

Flammables

All flammable liquids should be stored in an approved flammable storage cabinet. Flammable solids should be stored in a designated area of the dry chemical storage shelves, in secondary containment if necessary to maintain segregation.

Acids

Acids should be stored in a designated corrosive storage cabinet or storage area. The acids may be stored in the same cabinet as the bases as long as approved secondary containment is used.

Bases

Bases should be stored in a designated corrosive storage cabinet. The bases may be stored in the same cabinet as the acids as long as approved secondary containment is used.

Oxidizers

Oxidizing agents should be segregated from organic acids, flammable, and combustible materials. Nitric acid, sulfuric acid and perchloric acid are commonly-found oxidizing acids. Nitric acid should be stored in its own containment, while the sulfuric acid and perchloric acid may be stored together in secondary containment.

Toxics

Toxic agents should be segregated from other hazard classes. If toxic agents are stored on the same shelf as other hazard classes, secondary containment must be used.

Potentially unstable materials

Potentially unstable materials, including peroxide-forming chemicals, should be dated when opened and disposed of after one year. Some common examples include: Ethel Ether, 1'4-Dioxane, and Tetrahydrofuran. For a more extensive list of peroxide-forming chemicals call EHS.

Chemicals on Floor

At no time should glass containers (empty or full) be stored directly on the floor. If secondary containment is used, the container must be large enough to contain the entire volume of the primary vessel.

Waste Management

Labeling

All hazardous waste must be properly labeled. The label must be completely filled out and include:

1. Accumulation start-date reflecting when a waste container becomes full. Full dates must be used on this label (DD/MM/YY).
2. Full chemical names must be used; acronyms and chemical formulas are not acceptable
3. Volumes and concentrations added

Segregation of Chemical Waste

All chemical waste should be segregated by hazard class using appropriate secondary containment.

Secondary Containment

Proper secondary containment must be used when incompatible chemicals are stored in the same area. The secondary containers must be of sufficient capacity to contain the contents of the primary container in case of breakage and must be chemically compatible.

Chemical waste Containers securely capped or sealed

Securely capped means if the bottle is tipped, no leakage occurs. Aluminum foil and parafilm do not constitute a secure cap. If zip-top bags are used to contain contaminated pipette tips, the bag must be securely closed. Chemical waste containers should only be open during filling. Evaporating waste is never allowed.

Please contact EH&S for evaluation and/or removal of all expired or unused chemicals

Removal

Do not put hazardous waste down the sink or in the trash. If you are not sure if a chemical is hazardous, call the Chemical/Biosafety Officer at 303-871-4044.

Waste Stream

Labs should only have one container per waste stream at a time in the lab. Waste must be kept at or near the point of generation and cannot be moved to a different room for storage.

Miscellaneous

Fire Sprinkler Clearance

A minimum of 18 inches of clearance must be maintained below the deflector of the lowest installed fire sprinkler head.

Unattended Flames

Open flames must be attended at all times.

Food/Beverage

Eating, drinking, gum-chewing, or similar activities within laboratories can result in accidental ingestion of hazardous materials (chemical, radiological, or biological). Good laboratory practice, as outlined by the Occupational Safety and Health Administration (OSHA), the Centers for Disease Control and Prevention (CDC), and the Nuclear Regulatory Commission (NRC), seeks to eliminate this potential route of exposure by forbidding these activities in areas where hazardous materials are present. Areas designated for food and drink consumption should be labeled and hazardous materials should under no circumstances enter the area.

Chemical Spill Kit

All lab personnel should know the location of a chemical spill kit.