



UNIVERSITY OF
NORTHERN COLORADO

Environmental Health and Safety

Fume Hood Maintenance Procedure

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Fume Hood Maintenance Procedure

I. Purpose

The fume hood maintenance procedure is designed to guarantee the proper operation of laboratory hoods for all users. It is also for the protection of facility faculty and staff against exposure and intoxication on roofs, in laboratories, and in mechanical rooms.

When conducting maintenance work on fume hoods, all work must be carried out according to current regulations that are followed by the University of Northern Colorado. The work on fume hoods refer to all preventative or corrective maintenance work on all exhaust systems during which faculty could be exposed.

This procedure applies to all Facilities Management maintenance employees who perform minor maintenance that requires entering or removing duct work, changing filters, shutting off fans or any other maintenance that requires entering the inside of the exhaust system.

II. Definitions

Baffles: Moveable partitions used to create slotted openings along the back of the hood body.

Biological Safety Cabinet: An enclosed, ventilated laboratory workspace for safely working with materials contaminated with (or potentially contaminated with) pathogens requiring a defined biosafety level.

Chemical Fume Hood: A type of local ventilation device that is designed to limit exposure to hazardous or noxious fumes, vapors or dusts.

Laminar Fume Hood: A carefully enclosed bench designed to prevent contamination of semiconductor wafers, biological samples, or any particle sensitive device.

Plenum: A low-velocity chamber used to distribute static pressure (from the fan in the system) throughout its interior.

Radioisotopes Hood: A hood designed for safe and convenient handling of low-level radioactive mater.

III. Risk Identification

The campus buildings that house fume hoods and are involved in potential risks are Ross Hall, Crabbe Hall, and Arts Annex. Faculty, staff, and students who interact within these buildings could potentially be exposed to the following risks if proper usage and maintenance are not followed:

- Inhalation of toxic chemical vapors
- Exposure to unknown chemical, biological, or radioactive substances
- Contact between skin or clothing and dangerous substances

Fume hoods shall be certified and inspected annually or whenever major modifications or new installation occurs. This includes all lab hoods, lab hood exhaust systems, and lab special exhaust systems. Detectors, alarms, fans, and motors shall be inspected at least annually as well.

Routine inspections, testing, and maintenance shall take place when applicable. Possible routine procedures include the following:

- Visual inspection of the physical condition of the hood interior, sash, and ductwork
- Flow monitoring
- Low airflow and loss of airflow alarms at each alarm location
- Face velocity
- Verification of inward airflow over the entire hood face

When airflow detectors are not provided or airflow rate tests are not made, fan belts shall be inspected quarterly.

IV. Responsibilities

In order for these guidelines to be effective, all employees working with fume hoods or performing minor fume hood maintenance should understand and follow these responsibilities and guidelines. Due to the potential hazards with fume hoods, the specific responsibilities outlined below shall be followed.

Facilities Management Department

As employees that will be performing minor maintenance on fume hoods, facilities management personnel shall:

- Conduct a fume hood system evaluation after a notification of an unsafe system is made
- Schedule airflow certifications on fume hoods annually, at users request, or if needed after maintenance is performed

Environmental Health and Safety Department

The Environmental Health and Safety Department shall:

- Report results of any unsafe fume hood to the Facilities Management department and Laboratory Coordinator
- Perform follow up airflow survey if necessary

Laboratory Coordinator

- Ensure that the lab work conducted in the lab fume hood is appropriate for the type of hood and the quality of ventilation present
- Perform routine inspections of the fume hood when applicable
- Report questionable operation of a lab fume hood to the Facilities Management Service Center
- Post fume hood safety procedures on all fume hoods
- Ensure that hoods are not being used for chemical storage

Laboratory Hood Users

- Follow proper procedures when using the lab fume hoods
- Report questionable operation of a lab fume hood to the laboratory coordinator

V. Maintenance

Pre-Maintenance

When performing fume hood maintenance, proper pre-maintenance procedures shall be taken. When coordinating a shutdown of the system, the laboratory coordinators must receive notification prior to the beginning of maintenance. The lab coordinator shall carefully close, remove, identify and seal products before the fume hood can receive maintenance.

Within the exhaust system, it shall be verified that the hazardous materials have been secured and that the area surrounding the system is cleared.

It is not necessary to shut down the exhaust system when replacing lamps, cleaning behind the fume hood baffles, or replacing the airflow sensors.

Types of Fume Hoods on Campus

There are four different types of fume hoods that are used at the University:

- Chemical Fume Hoods (CFH)
- Biological Safety Cabinets (BSC)
- Laminar Fume Hoods (LFH)
- Radioisotope Hoods (RIH)

For each hood type there are specific guidelines on proper procedures and personal protective equipment (PPE). The following sections outline the maintenance procedures.

Chemical Fume Hood (CFH)

Maintenance that is being performed shall be conducted in pairs. Ensure that the immediate surrounding areas are hazard-free. If there are hazardous materials or lab equipment in the area, contact the laboratory coordinator to have the area fully cleared for maintenance. Do not remove the equipment unless told to do so. Assume the duct lining, fume hood lining and all internal

exhaust components are potentially contaminated with chemical residue. Ask the lab coordinator if heated Perchloric acid or Hydrofluoric acid was ever used in the hood. If so, contact EHS.

The following is possible personal protective equipment (PPE) needed when conducting maintenance on a CFH:

- Half face air purifying mask shall be worn
- Nitrile gloves, splash proof goggles, and coveralls shall be worn
- Individual workers must maintain their PPE according to manufacture specifications and training provided
- After maintenance work is completed, coveralls shall be placed in a bag and given to the EHS for proper disposal. The gloves and respirator must be washed in warm soapy water. (When removing PPE, it is important to remove mask then wash hands and face thoroughly).

Biological Safety Cabinets (BSC)

When servicing building Heating, Ventilating, and Air Conditioning (HVAC) equipment serving a biological safety cabinet, follow the guidelines for chemical fume hoods in the previous section. Particulate contaminants originating inside the cabinet are filtered out by BSC filters system before reaching the building HVAC system. Contact EHS before beginning work inside contaminated spaces of the BSC such as the plenum, blower, or HEPA filter compartment.

Follow the chemical fume hood PPE guidelines for BSC maintenance.

Replacement/ Repair of HEPA or Charcoal Filters

1. Turn off the fume hood fan after notifying the lab coordinator
2. Remove the filter access panel and place in a large poly bag
3. Attach the large bag around filter access panel opening in a manner that seals the filter access opening using duct tape
4. Remove pre-filter by grasping the filter from the outside of the bag and pull into the bag
5. Pull HEPA filter into the bag in the same manner
6. Remove bag from ductwork, then seal the bag shut with duct tape
7. Replace access panel and install new filter and pre-filters
8. Start fume hood fan and then reassemble
9. Any tools that had contact with the interior of the fume hood should be washed with warm soapy water
10. Clean up dust and debris outside of the fume hood with wet paper towels and place in the bag
11. Remove PPE and place in the bag. Be sure to wash hands and face thoroughly
12. Take removed filters to dumpster if the item was cleared for disposal. If it's not cleared, contact EHS
13. When completed, schedule an airflow certification to ensure the system is running at proper regulatory standards

Laminar Fume Hoods (LFH)

Laminar Fume Hoods can be treated the same way as biological safety cabinets and follows the same PPE guidelines as CFH and BSC.

Radioisotope Hoods (RIH)

The interior work surfaces should be constructed from non-porous or sealed materials that preclude adsorption of radioactive material and shall resist the corrosive action of chemicals used in this area. All seams and joints in the work surface and superstructure should be welded, sealed or soldered to eliminate pockets, cracks, or crevices that would permit a buildup of radioactive material. The surface should also be watertight and dished or furnished with raised bar across the front edge to contain spills and cleaning liquids. Some types of radioactive materials require a filter at the hood outlet; these should be regularly inspected by the Laboratory Coordinator.

The following guidelines shall be followed when maintenance on a radioisotope hood is necessary:

- Surveys must be provided by EHS before any maintenance is performed because volatile radioisotopes are being used
- Be sure to post a sign "Caution Radioactive Materials" while also contacting EHS for further instructions
- When working inside of ducts or fan systems that are connected to Radioisotope hoods, EHS must be notified

Strobic Room Procedure

When reclaiming coil filters in the Strobic Room in Ross Hall, proper PPE must be worn because even though the filters have been tested to be non-hazardous, many chemicals are able to make its way through the filters. The PPE outlined for CFHs is sufficient for Strobic Room maintenance.

The Strobic Room contains over 40 filters; therefore, special attention shall be made as to which filters need to be replaced when maintenance is needed.

Removal of Coil Filters

1. When removing the filters, pull out the filter and place in a large poly bag
2. Replace filter with a new filter
3. Clean up dust and debris outside of the fume hood with wet paper towels and place in the bag
4. Remove PPE and place in the bag. Be sure to wash hands and face thoroughly
5. After removal and replacement is complete, seal the bag shut with duct tape
6. Take removed filters to dumpster if the item was cleared for disposal. If it's not cleared, contact EHS

Appendix A

Building	Room #	Manufact ure	Serial #:	CFH	LFH	BSC Type B1	BSC Type B2	BSC Type B3
Arts Annex	17-1			X				
	17-2			X				
Crabbe	103-1			X				
	103-2			X				
Gunter	1620			X				
Ross	0080			X				
	0269			X				
	0273			X				
	0290				X			
	0292			X				
	0293			X				
	0305			X				
	0306	Labconco 3840000	050131609G		X			
	0310	Labconco 3440009	080181838A					X
	0400			X				
	0402			X				
	1330			X				
	1331			X				
	1360			X				
	1380			X				
	1385			X				
	1611-1			X				
	1611-3				X			
	1611-4	Nuaire- NU-425- 609	1525803200 2					X
	1611-5	Nuaire- NU-425- 600	1516903180 2					X
	1621-1			X				
	1621-2	Nuaire- NU-430- 600	1529503250 2				X	
	1631	Nuaire- NU-425- 600	1517103180 2					X
	1640	Nuaire- NU-425- 600	1.5171E+11					X

	1641-1	HERAE US	28002941					X
	1641-2			X				
	1650			X				
	1660			X				
	1671			X				
	1680			X				
	1681			X				
	1691-1			X				
	1691-2	Nuaire- NU-301- 430	1286411150 1		X			
	1691-3	Nuaire- NU-425- 600	1516303140 2					X
	2320			X				
	2335			X				
	2360					X		
	2360			X				
	2365			X				
	2385			X				
	2545-1			X				
	2545-2	Nuaire- NU-425- 600	1521503190 2					X
	2551-1				X			
	2555-2			X				
	2555				X			
	2615	A2 Labconco				x		
	2621-1			X				
	2621-2	ENVIRI CO			X			
	2621-3	Nuaire- NU-427- 600	782220G030 21			X		
	2625			X				
	2640-1			X				
	2640-2	Nuaire- NU301- 600	1523603200 2		X			
	2655-1			X				
	2655-2			X				
	2655-3			X				
	2655-4			X				
	2655-5			X				
	2680-1			X				
	2680-2			X				
	2680-3			X				
	2680-4	Nuaire	152562002		X			

	2685-1			X				
	2685-2			X				
	2685-3			X				
	3080			X				
	3220			X				
	3230			X				
	3255			X				
	3615-1			X				
	3615-2			X				
	3635			X				
	3650-1			X				
	3650-2			X				
	3650-3			X				
	3650-4			X				
	3650-5			X				
	3650-6			X				
	3650-7			X				
	3650-8			X				
	3650-9			X				
	3655-1			X				
	3655-2			X				
	3670			X				
	3675-1			X				
	3675-2			X				
	3690-1			X				
	3690-2			X				
	3690-3			X				
	3690-4			X				
	3695			X				
	3695			X				