



CHEMICAL FUME HOOD

PLAN

JULY 2010

CHEMICAL FUME HOOD PLAN

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Chemical Fume Hood

Program

Purpose

The purpose of the Chemical Fume Hood Program is to ensure the health and safety of students, faculty, and employees in the teaching and research laboratories. This program will establish requirements and procedures for chemical fume hood maintenance, inspections, work practices, and certifications.

Types of Chemical Fume Hoods

The university uses several types of chemical fume hoods. The following is a list of the most commonly used chemical fume hoods.

- **Constant Air Volume (CAV):** A constant air volume (CAV) fume hood draws a constant exhaust volume through the hood regardless of sash position. Because the volume is constant, the face velocity varies inversely with the sash position. The fume hood volume should be adjusted to achieve the proper face velocity at the desired working height of the sash.
- **Constant Volume Bypass (Bypass):** A bypass fume hood is similar to the CAV but has an opening above the sash through which air may pass at low sash positions. This hood will still exhibit the increasing velocity characteristic as the sash is lowered. But the face velocity stops increasing as the sash is lowered to the position where the bypass opening is exposed. Therefore, the air volume for the bypass hoods should also be adjusted to achieve the desired face velocity at the desired sash height.
- **Variable Air Volume (VAV):** A variable air volume fume hood is any hood that has been fitted with a face velocity control, which varies the amount of air exhausted from the fume hood in response to the sash opening to maintain a constant face velocity. In addition, to providing an acceptable face velocity over a relatively large sash opening (compared to a CAV hood), VAV hoods also provide significant energy savings by reducing the flow rate from the hood when it is closed.
- **Auxiliary Air Hoods:** An auxiliary air hood is a combination of a bypass fume hood and a supply air diffuser located at the top of the sash. These hoods were intended to introduce unconditioned or tempered air, as much as 70% of the air exhausted from the hood, directly to the front of the hood. Quantitative tracer gas testing of many auxiliary air hoods has revealed that significantly higher worker exposure to the materials used in the hood may occur than with conventional hoods.

- **Perchloric Acid Hoods:** The perchloric acid hood, with its associated ductwork, exhaust fan, and support systems, is designed especially for use with perchloric acid and other materials that can deposit shock-sensitive crystalline materials in the hood and exhaust system. Special water spray systems are employed to wash down all interior surfaces of the hood, duct, fan, and stack, and special drains are necessary to handle the effluent from the washdown. The hood liner and work surface are usually stainless steel and are sealed by welding all seams. Water spray heads are usually installed in the top of the hood, behind the baffles, and in the hood interior. The work surface is watertight and dished with a raised bar to contain spills and wash-down water. Laboratory fume hoods for use with perchloric acid shall be identified with a label indicating suitability for use with perchloric acid procedures. Use of small quantities (<2 ml) of perchloric acid at room temperature (no heating) does not require a wash down facility. If large quantities of perchloric acid must be used (or solutions must be heated), a perchloric acid hood must be utilized.
- **Radioactive Hoods:** Radioactive hoods should have work surfaces constructed from non-porous or sealed materials that preclude adsorption of radioactive material and shall resist the corrosive action of chemicals used in this work. A usual feature is a one-piece, stainless steel, welded liner with smooth, covered corners, which can be cleaned easily and completely. The work surface should be properly reinforced to support lead shielding and shielded containers. The load bearing capacity shall be 200-pounds/square foot minimum up to a total weight of 1000 pounds per fume hood. All the Nuclear Regulatory Commission (NRC) and University Radiation Safety requirements should be followed when working with radioactive materials.
- **Glove Box:** This is a sealed enclosure used to confine and contain hazardous materials with operator access through gloved portals or other limited openings (such as a passthrough chamber). Storage of volatile chemicals will not be permitted.
- **Horizontal Sash Hoods:** Horizontal sash hoods have two sash movements. The sash can either move side to side or up and down.

Safe Operating Procedures for Chemical Fume Hoods

- Know the toxic properties of the chemicals with which you work. Be able to identify signs and symptoms of overexposure.
- Prior to performing work in a chemical fume hood be sure the fume hood is exhausting properly. If hood is not working properly then notify laboratory supervisor or the educating professor. The laboratory supervisor or educating professor shall contact the Department Chemical Hygiene Officer and the Department of Environmental Health and Safety (Refer to Appendix I for Contact Numbers).
- Laboratory personnel shall not lean into the hood so that his/her head is inside the plane of the hood face without adequate respiratory and personal protection, except for setup or hood maintenance.
- Do not block baffles. Visually inspect the baffles to be sure the slots are open and unobstructed.

- Avoid opening and closing the fume hood sash rapidly, and avoid swift arm and body movements in front of or inside the hood. These actions may increase turbulence and reduce the effectiveness of fume hood containment.
- Place chemical sources and apparatus at least 6 inches behind the face of the hood.
- Place equipment as far to the back of the hood as practical without blocking the bottom baffle. Separate and elevate each instrument by using blocks or racks so that air can flow easily around all apparatus.
- Do not use large pieces of equipment in a hood, because they tend to cause dead spaces in the airflow and reduce the efficiency of the hood. If large pieces of equipment emit fumes or heat then have a special purpose hood designed and installed to ventilate that particular device.
- Flammable liquids shall not be stored permanently in the cabinet under the hood unless that cabinet is properly labeled “flammable liquid storage”.
- Keep sash completely lowered anytime no “hands-on” part of an experiment is in progress. Close sash when finished with hood work or when leaving experiments or chemicals unattended. The hood sash shall not be removed or left completely open except for setup work.
- Keep sash clean and clear.
- The hood sash shall be closed to the lowest position possible while still allowing comfortable working conditions. It is the recommendation of the Department of Environmental Health and Safety that the sash height be maintained at a distance from the bench top between **15” (fifteen inches)** and **18” (eighteen inches)**. This distance shall reduce the possibility of chemicals splashing on laboratory personnel’s eyes and face.
- Fume hoods shall not be used for storage space with the exception of chemical waste containers.
- All chemicals not being used for an experiment shall be removed from the hood and placed in their proper storage area until needed.
- Drip pads in the hood shall be replaced with new pads daily.
- Laboratory personnel shall clean up all minor spills in the hood immediately. In the case of a larger spill contact the Emergency Operator by dialing 215-762-7110 if at **Drexel Center City** or contact Security (x2222) if at **Drexel University City** and **Queen Lane** campuses.
- All materials used to clean up spills shall be discarded as hazardous waste.
- Clean all chemical residues from the hood chamber when finished with work.
- All electrical devices should be connected outside the hood to avoid sparks, which may ignite a flammable or explosive chemical.
- **Do not use a hood for any other function for which it was not intended.** Certain chemicals or reactions require specially constructed hoods.
- Keep all chemical containers closed except when adding or removing materials.
- Evaporation of wastes in the fume hood is **STRICTLY PROHIBITED**.
- The hood sash is not a substitute for personal protective equipment. Laboratory personnel shall wear safety glasses, laboratory coat, and gloves at all times when working with chemicals in the hood.

Chemical Fume Hood Certification Procedures

The Department of Environmental Health and Safety shall reference two standards for the certification of all chemical fume hoods:

AIHA/ANSI Z9.5-1992 Laboratory Ventilation Standard

This standard indicates that each chemical fume hood shall maintain an average face velocity of 80 – 120 feet per minute (fpm) with no face velocity measurement more than plus or minus 20 percent of the average.

SEFA 1.1-1994 Laboratory Fume Hoods Recommended Practices

This document indicates that a face velocity of 100 feet per minute (fpm) is considered acceptable for a chemical fume hood in standard practice. This document also indicates in certain situations a face velocity as low as 75 fpm or as high as 125 fpm is acceptable upon Department of Environmental Health and Safety's approval.

- The AIHA/ANSI Z9.5 – 1992 Laboratory Ventilation Standard shall be the primary standard used for all the chemical fume hood certifications.
- The SEFA 1.1 – 1194 Laboratory Fume Hoods Recommended Practices Standard shall be the secondary standard used for chemical fume hood certifications. The use of this standard shall be decided by the Department of Environmental Health and Safety.
- The Department of Environmental Health and Safety shall determine the certification sash height. The sash height shall be dependent upon the type of hood.
- The Department of Environmental Health and Safety will obtain an average face velocity of 100 feet per minute for all high flow chemical fume hoods. The average face velocity for low flow chemical fume hoods will be determined by the manufacturer's specifications.
- The Department of Environmental Health and Safety shall certify all chemical fume hoods annually or whenever a significant change has been made to the operational characteristics of the system or as per request or newly installed units.

Certification Equipment

Department of Environmental Health and Safety shall use the following equipment to certify all chemical fume hoods:

- TSI Velocical Air Velocity Meter Model 8345/8346
- Alnor Thermometer
- The TSI Velocity Meter and the Alnor Thermometer shall be recalibrated annually or whenever the instrument needs maintenance.
- Borozin A.C. Smoke Gun
- Smoke Tube
- Ring Stand 2' (two foot) and clamp

AIHA/ANSI Z9.5 –1992 Certification Test

Room Conditions

- The room conditions shall be checked in front of the chemical fume hood using the air velocity meter and the smoke gun to verify that there are no cross drafts exceeding 20 percent of the average chemical fume hood face velocity. Any cross drafts that exceed these values shall be eliminated before proceeding with the certification.
- The temperature and humidity of the room shall be recorded prior to the certification.

Face Velocity

The face velocity is the speed of air moving past the fume hood access opening (face), usually expressed in feet per minute (fpm) or meter per second (mps).

The following procedure shall be used for the face velocity certification test:

1. All materials located in the hood shall be removed prior to test.
2. CV and Bypass chemical fume hoods shall be tested at the sash height of 18 inches + or – 3 inches.
3. VAV chemical fume hoods shall be tested at the full open sash height.
4. The open face of the hood shall be divided into 12 (twelve) or more, (depending on the hood type), imaginary rectangles of approximately equal area.
5. All measurements shall be taken at the center of each rectangle.
6. All measurements shall be taken at distance of six inches from the top, bottom and sides of the chemical fume hood.

7. There will be three vertical measurements and four horizontal measurements totaling 12 measurements. Refer to Appendix II for the exact horizontal and vertical sampling points.
8. The air velocity meter shall be attached to the ring stand using a clamp. The ring stand shall be positioned so that the air velocity meter is in the center of the far left imaginary rectangle.
9. The far left bottom imaginary rectangle shall be designated as Rectangle #1. The rectangle numbering shall proceed vertically from left to right (i.e. Rectangle # 2 shall be above Rectangle #1 and Rectangle #4, bottom middle rectangle, shall be to the right of Rectangle #1).
10. Prior to measurement the air velocity meter sensor window must be fully opened and the red orientation dot is facing upstream.

Note: Steps 11, 12, and 13 refer to the TSI instrument.

11. The Department of Environmental Health and Safety shall initially use the time constant of five for all certifications. The time constant is an averaging period. The velocicalc display is always updated every second; however, the reading displayed is the average reading over the last time constant period.
12. If the time constant of five proves to be too unstable then another time constant shall be used.
13. The time constant shall not be changed during the certification process. If the time constant needs to be changed due to stability during the certification process then the certification test must be restarted
14. The measurement shall proceed vertically following the sequential order of the rectangles.
15. All measurements shall be recorded on the Certification Data Sheet. Refer to Appendix III for the Certification sheets.
16. The face velocity of each chemical fume hood shall be determined by averaging all the velocity measurements taken by the TSI Air Velocity Meter or the Alnor Thermometer. This average face velocity shall be recorded on the Certification Data Sheet.

Proper Airflow Verification

The Department of Environmental Health and Safety shall use the Smoke Test to determine that each chemical fume has proper airflow. Proper airflow shall be quantified using the Borozin A.C. Smoke Gun and/or smoke tubes. The following procedure shall be used for the quantification of airflow:

1. Introduce smoke throughout the fume hood work area, directing smoke across the work surface and against the sidewalls and baffle.
2. The sash shall be moved to different position while the smoke is introduced to the fume hood work area.
3. The smoke should be contained within the fume hood and be rapidly exhausted.
4. Record observations on the Certification Data Sheet.

Sash Operation

The chemical fume hood sash shall be moved through its full travel (fully open and fully closed). The movement shall be smooth and easy. All observation shall be recorded on the Certification Data Sheet.

Fume Hood Condition

The chemical fume hood condition (i.e. baffles, side wall seals, sash window seals, etc.) will be documented. If existing conditions are determined to be detrimental to the health and safety of the fume hood operator then the fume in question will be tagged out of service and repaired.

SEFA 1.1 – 1994 Certification Test

The SEFA 1.1 – 1994 Certification test shall have the same testing parameters (Room Conditions; Face Velocity; Proper Airflow Verification, Sash Operation; Fume Hood Condition) as the AIHA/ANSI Z.9.5 – 1992 Certification Test. The only difference between the two certification tests is the face velocity procedure. The SEFA face velocity procedure shall be as follows (the bold steps are the changes in the procedure):

1. All materials located in the hood shall be removed prior to test.
2. **All chemical fume hoods shall be tested with the sash in the full open position.**
3. **The open face of the hood shall be divided up into a grid of imaginary rectangles of approximately equal area.**
4. **Measurement readings shall be taken at every one square foot of face opening.**
5. All measurements shall be taken at the center of each rectangle.
6. All measurements shall be taken at distance of six inches from the top, bottom and sides of the chemical fume hood.
7. **There will be two vertical measurements. The horizontal measurements will depend on the hood size. Refer to Appendix II for the vertical and horizontal sampling points.**
8. The air velocity meter shall be attached to the ring stand using a clamp. The ring stand shall be positioned so that the air velocity meter is in the center of the far left imaginary rectangle.
9. The far left bottom imaginary rectangle shall be designated as Rectangle #1. The rectangle numbering shall proceed vertically from left to right (i.e. Rectangle # 2 shall be above Rectangle #1 and Rectangle #3, bottom middle rectangle, shall be to the right of Rectangle #1).
10. Prior to measurement the air velocity meter sensor window must be fully opened and the red orientation dot is facing upstream.

Note: Steps 11, 12, and 13 refer to the TSI instrument.

11. The Department of Environmental Health and Safety shall initially use the time constant of five for all certifications. The time constant is an averaging period. The velocicalc display is always updated every second; however, the reading displayed is the average reading over the last time constant period.
12. If the time constant of five proves to be too unstable then another time constant shall be used.
13. The time constant shall not be changed during the certification process. If the time constant needs to be changed due to stability during the certification process then the certification test must be restarted
14. The measurement shall proceed vertically following the sequential order of the rectangles.
15. All measurements shall be recorded on the Certification Data Sheet. Refer to Appendix II for the Certification sheets.
16. The face velocity of each chemical fume hood shall be determined by averaging all the velocity measurements taken by the TSI Air Velocity Meter. This average face velocity shall be recorded on the Certification Data Sheet.

Horizontal Sliding Sash Fume Hood Certification Test:

The Horizontal Sliding Sash Fume Hood Certification test shall have the same testing parameters (Room Conditions; Face Velocity; Proper Airflow Verification, Sash Operation; Fume Hood Condition) as the AIHA/ANSI Z.9.5 – 1992 Certification Test. The only difference between the two-certification tests is the face velocity procedure. The Horizontal Sliding Sash face velocity procedure differences are:

1. Slide glass sashes horizontally to yield a center opening measuring approximately 30 inches wide and 26.5 inches high. **This step replaces step 2 in the ANSI Test.**
2. Divide opening into six imaginary rectangles, three horizontal and two vertical. The total amount of measuring points will be six. **This step replaces step 4 in the ANSI Test.**

Passing Certification

The certification of the chemical fume hood shall be determined by all the data collected from the face velocity test, smoke test, sash test, and hood condition. A passing certification shall be determined by the following:

1. The average face velocity must be within the specifications set by the Department of Environmental Health and Safety.
2. The airflow smoke patterns must be contained and rapidly exhausted.
3. The sash operation must be smooth and easy to operate. It must be able to maintain certain heights during normal operation.
4. The fume hood is in good operating condition.

If all four of these requirements are passing a certification sticker shall be placed on the chemical fume hood. The sticker shall contain the following information: (Refer to Appendix IV for hood passing stickers)

- Recommended sash height
- Chemical Fume Hood ID Number
- Test Date
- Average Face Velocity
- Re-certification Due Date
- Technicians Initials

Failing Certification

A failing certification will be instituted if any of the certification tests have a failing grade. A failing certification will be determined by the following:

1. The face velocity does not fall within the specifications set by the Department of Environmental Health and Safety.
2. The airflow smoke patterns are not contained and rapidly exhausted.
3. The sash cannot maintain certain heights during normal operation.
4. The fume hood is in poor operating condition.

Hood Failure Procedures

If a chemical fume has failed the certification tests or reported to be unsafe then the Department of Environmental Health and Safety will immediately take the follow steps:

1. The hood is tagged with a label indicating that it is unsafe and should not be used. Refer to Appendix V for hood failure stickers.
2. The hood is locked out using a lockout device to prohibit use. The lockout device will be used to ensure the safety of the user and will remain in place until appropriate repairs are made.
3. Notify the user of the status of the hood.
4. Notify the Departmental Chemical Hygiene Officer (CHO) or Principle Investigator responsible for the hood.
5. If at Drexel University City, notify the Facilities Management Department using a work order request via fax 215-895-6754 or inter office mail or call 215-895-2808 or x1700. If at Drexel Center City notify facilities department 215-762-6500. If at Queen Lane, contact 215-991-8484. If at Doylestown, contact 215-489-4947.
6. Perform a follow-up airflow survey promptly after appropriate repairs are completed on those fume hoods found unsafe.

Facilities Department

If the Facilities Department receives notification of a failed hood then the department will immediately take the following steps:

1. Within 24 hours of notification of an unsafe hood by a user or the Department of Environmental Health and Safety, evaluate the hood system and make appropriate repairs.
2. Upon completion of the repair, notify both the user and the Department of Environmental Health and Safety that the hood is repaired.
3. If the repair requires more than one working day to complete, the user and the Department of Environmental Health and Safety must be notified that the hood is not repaired and should be appraised as to how long it will take to obtain parts, etc., and the hood should remain locked out.

Departmental Chemical Hygiene Officer or Principle Investigator

Upon receiving notification of a failed hood the CHO or PI will notify all parties affected by this notification.

Unsafe Hoods

Anyone finding an unsafe hood shall notify the Department of Environmental Health and Safety. All reported unsafe hoods will be treated as failed hoods. The failed hood procedures will be applied to the reported unsafe hood.

Surveys and Preventative Maintenance

- During laboratory surveys the Department of Environmental Health and Safety will survey the chemical fume hoods. The survey will cover the overall condition of the chemical fume hood.
- The Department of Environmental Health and Safety will perform periodic surveys of all laboratories to ensure that the Chemical Fume Hood Work Practices are being followed.
- Appropriately trained facilities personnel shall carry out preventive maintenance only.
- Fume hoods must not be turned off prior to notification of the laboratory supervisor or the Chemical Hygiene Officer/Principle Investigator (see the section on communication below for proper notification procedures).
- During maintenance, hood will be locked and tagged out to indicate that the hood is undergoing maintenance. The worker should verify that the hood is not in use and follow the standard Lockout/Tagout procedures prior to performing the work.

The following maintenance tasks should be performed on an annual basis:

- Remove all corrosion, spot prime and paint.
- Inspect electrical connections, tighten as required.
- Inspect motor control contacts for wear or pitting, replace as needed.
- Tighten all terminal lugs.
- Replace the drive belt as needed.

Responsibilities

Department of Environmental Health and Safety

The Department of Environmental Health and Safety will be responsible for the following:

- Implementation of all the requirements set forth by this plan.
- Provide advice on the selection and installation of new fume hoods.
- Provide advice on the relocation of existing hoods.

Facilities Department

Facilities Management will be responsible for the following:

- Implementation of all the requirements set forth by this plan.
- Provide advice on the selection new or rebuilt fume hoods.
- Supervise installation of new or rebuilt fume hoods.
- Approve the relocation of existing hoods.

Departmental Chemical Hygiene Officer (CHO) or Principle Investigator (PI)

The CHO or PI will be responsible for the following:

- The CHO or PI will implement and enforce all the requirements set forth by this plan.
- The CHO or PI shall provide training on the fume hood safe work practices to laboratory personnel, students, and faculty. Training must be provided initially and annually thereafter.
- All laboratory fume hood users must complete the Chemical Fume Hood (CFH) Confirmation of Training Form.
- The CFH Confirmation of Training form shall be completed on an annual basis.
- Contact the Department of Environmental Health and Safety's office to obtain a copy of the CFH Confirmation of Training form (Refer to Appendix I for contact numbers).
- The CFH Confirmation of Training form shall be completed and returned to the Department of Environmental Health and Safety.
- The CHO or PI post the fume hood safe work practices in the laboratory for the laboratory fume hood user to view.

Training

Laboratory hood users will be trained on the use and safe work practices to be employed prior to their initial involvement in Drexel laboratories. The training will discuss laboratory safety procedures and precautions to take while working in laboratories. A copy of the university safe work practices will be posted on all fume hoods. The practices will also be reviewed during student orientation.

Communication

Communication is critical in any integrated hood safety program. The hood user shall be notified (through the laboratory supervisor or PI/CHO) in advance of any scheduled preventive maintenance work, in order to enable chemical reactions to be finished and/or materials to be removed from the hood as is appropriate. This will protect both the laboratory user as well as the maintenance worker from unnecessary exposure to any hazardous chemicals. If any hood is found to be unsafe during a routine maintenance check or annual hood performance survey, the hood will be tagged "Unsafe, Do Not Use" and will be locked out. After the hood survey, the departmental chemical hygiene officer/principle investigator and the Physical Plant Department/Facilities Department will be notified in writing regarding the status of laboratory fume hoods in that department. The departmental chemical hygiene officer will forward copies of the reports to the individual laboratory supervisors.

Record Keeping

- A Certification Sheet and Certification Data Sheet shall be completed for each chemical fume hood whether passing or failing the certification tests.
- A copy of the chemical fume hood's certification sheet, certification data sheet, and any other information shall be given to the CHO or PI for their records.
- The certification sheets, certification data sheets, and any other information shall be maintained in the room's specific information file at the Department of Environmental Health and Safety for a minimum of three (3) years.
- All the records of inspections and training shall be maintained for a minimum of three years in the room's specific information file at the Department of Environmental Health and Safety.
- Facilities will keep records of the preventative maintenance checks performed on all laboratory fume hoods. A report of the hoods checked during the preventative maintenance will be forwarded to the Department of Environmental Health and Safety.

Emergency Contacts

University City Campus - Emergency Contact Numbers

Department	Name	Office Number	Mobile Number	Pager Number
Public Safety		215-895-2222		
Emergency Room	HUP	215-662-3920		
Student Health	Drexel	215-895-5800		
Occupational Health	Worknet	215-487-5800		
Univ. Safety	Jon Chase	215-895-5891	215-669-6122	
Univ. Safety	Martin Bell	215-895-5892	215-778-4278	
Univ. Safety	Phil Leo	215-895-5909	215-768-1624	
Univ. Safety	Jaime Barbaro	215-895-5896	215-768-1623	
Univ. Safety	Joseph Nihill	215-895-1624	267-249-0348	
Univ. Safety	Jeff Nemetz	215-895-5913	215-778-3039	
Univ. Safety	Diana Dukes	215-895-5907	215-778-4279	
Radiation Safety	Kent Lambert	215-255-7860	215-651-2211	4-1260
Facilities		215-895-2808		215-308-1058
Maintenance		215-895-2808		215-308-1058
Environmental Services		215-895-2808	267-446-1086	215-265-0583

Center City Campus - Emergency Contact Numbers

Department	Name	Office Number	Mobile Number	Pager Number
Emergency Operator		215-762-7110		
Emergency Room	HUH	215-762-7963		
Student Health		215-762-8590		
Occupational Health	Worknet	215-762-8590		
Univ. Safety	Jon Chase	215-895-5891	215-669-6122	
Univ. Safety	Martin Bell	215-895-5892	215-778-4278	
Univ. Safety	Phil Leo	215-895-5909	215-768-1624	
Univ. Safety	Jaime Barbaro	215-895-5896	215-768-1623	
Univ. Safety	Joseph Nihill	215-895-1624	267-249-0348	
Univ. Safety	Jeff Nemetz	215-895-5913	215-778-3039	
Univ. Safety	Diana Dukes	215-895-5907	215-778-4279	
Hospital Facilities	Luis Gonzalez	215-762-3519	215-762-3000	
Hospital Safety	Steven Morrissey	215-762-6133	215-779-8901	4-2830
Radiation Safety	Kent Lambert	215-255-7860	215-651-2211	4-1260
Facilities	Patricia Lewis	215-762-6500	215-783-2672	4-1015
Facilities	Brian Lynch	215-255-7318	215-783-2557	
Facilities	John Mahony	215-255-7320	215-668-7114	
Tenet Security		215-762-7110		
Tenet Maintenance		215-762-3000		
Environmental Services		215-762-4700		

Emergency Contacts

Queen Lane Campus - Emergency Contact Numbers

Department	Name	Office Number	Mobile Number	Pager Number
Emergency Operator		215-895-2222		
Public Safety		215-895-2222		
Student Health		215-895-5800		
Occupational Health		215-762-8590		
Univ. Safety	Jon Chase	215-895-5891	215-669-6122	
Univ. Safety	Martin Bell	215-895-5892	215-778-4278	
Univ. Safety	Phil Leo	215-895-5909	215-768-1624	
Univ. Safety	Jaime Barbaro	215-895-5896	215-768-1623	
Univ. Safety	Joseph Nihill	215-895-1624	267-249-0348	
Univ. Safety	Jeff Nemetz	215-895-5913	215-778-3039	
Univ. Safety	Diana Dukes	215-895-5907	215-778-4279	
Radiation Safety	Kent Lambert	215-255-7860	215-651-2211	4-1260
Facilities	Ray Stoffel	215-991-8484	215-651-1321	
Facilities	Brian Lynch	215-255-7318	215-783-2557	
Facilities	John Mahony	215-255-7320	215-668-7114	
Security		215-991-8102		
Maintenance		215-991-8484		
Env. Services		215-991-8145		

PA Biotechnology Center - Emergency Contact Numbers

Department	Name	Office Number	Mobile Number	Pager Number
Security		215-489-2315		
24 Hour Call Center		215-895-2222		
Emergency Room				
Student Health				
Occupational Health				
Univ. Safety	Jon Chase	215-895-5891	215-669-6122	
Univ. Safety	Martin Bell	215-895-5892	215-778-4278	
Univ. Safety	Phil Leo	215-895-5909	215-768-1624	
Univ. Safety	Jaime Barbaro	215-895-5896	215-768-1623	
Univ. Safety	Joseph Nihill	215-895-1624	267-249-0348	
Univ. Safety	Jeff Nemetz	215-895-5913	215-778-3039	
Univ. Safety	Diana Dukes	215-895-5907	215-778-4279	
Radiation Safety	Kent Lambert	215-255-7860	215-651-2211	4-1260
Facilities	Gerald Litschi	215-489-4947	484-767-5779	
Maintenance		215-489-4904	215-778-1184	
Env. Services		215-489-4904	215-778-1184	

Vertical and Horizontal Sampling Points

AIHA/ANSI Z9.5-1992 Certification Sampling Points:

Vertical Sampling Points:

Testing Sash Height (inches)	Vertical Sampling Points (inches)
21	7.5, 10.5, 13.5
18	7, 9, 11
15	6.5, 7.5, 8.5

Note: The sash heights of 20", 19", 17", and 16" will fall within the range of these three sash heights.

Horizontal Sampling Points:

Fume Hood Types (feet)	Horizontal Sampling Points (inches)
3	9, 15, 21, 27
4	6, 18, 30, 42
5	7.5, 22.5, 37.5, 52.5
6	9, 27, 45, 63
8	12, 36, 60, 84

SEFA 1.1-1994 Certification Sampling Points:

Vertical Sampling Points:

Testing Sash Height	Vertical Sampling Point (inches)
Full Open	6 and 18

Horizontal Sampling Points:

Fume Hood Type (feet)	Horizontal Sampling Points (inches)
3	6, 18, 30
4	6, 18, 30, 42
6	6, 18, 30, 42, 54, 66
8	6, 18, 30, 42, 54, 66, 78, 90

DEPARTMENT OF ENVIRONMENTAL HEALTH AND SAFETY

Telephone (215) 895-5907

Fax (215) 895-5926

CERTIFICATION DATA SHEET

Department Name _____
Telephone _____
Location _____

Contact _____
Fax _____

1. Test Date: _____

Test Frequency _____

Equipment Manufacturer _____

Serial Number _____

Type _____

Certification Testing Standard _____

Testing Sash Height _____

Time Constant _____

Certification – Annual _____

AIHA/ANSI or SEFA _____

2. Room Conditions: Temperature: _____ Humidity: _____

Comments: _____

3. Face Velocity Grid:

Average Face Velocity: _____ Variance High: _____ Variance Low: _____

OVERALL TEST RESULT: [] P [] F

Comments: _____

4. Airflow Patterns: [] PASS [] FAIL

Comments: _____

Inflow at Front Opening _____ External Turbulence at Front Access Opening: []

Smoke Containment _____ Cause of external turbulence, if _____

OVERALL TEST RESULT: [] P [] F

Sash Operation: [] PASS [] FAIL

Comments: _____

Hood Condition: [] PASS [] FAIL

Comments: _____

5. Service Summary: Overall Certification: [] PASS [] FAIL

Comments and Recommendations: _____

Technician's Signature: _____

Date: _____

DO NOT USE THIS HOOD

THIS HOOD HAS FAILED INSPECTION

Date

TYPE OF HOOD: _____ **SERIAL** _____

AUTHORIZED BY: _____

Comments: _____

CONTACT: DREXEL UNIVERSITY

**UNIVERSITY DEPARTMENT OF SAFETY & HEALTH
(215) 895-5907**

Safe Operating Procedures for Chemical Fume Hoods

- Know the toxic properties of the chemicals with which you work. Be able to identify signs and symptoms of overexposure.
- Prior to performing work in a chemical fume hood be sure the fume hood is exhausting properly. If hood is not working properly then notify laboratory supervisor or the educating professor. The laboratory supervisor or educating professor shall contact the Department Chemical Hygiene Officer and the Department of Environmental Health and Safety (Refer to Appendix I for Contact Numbers).
- Laboratory personnel shall not lean into the hood so that his/her head is inside the plane of the hood face without adequate respiratory and personal protection, except for setup or hood maintenance.
- Do not block baffles. Visually inspect the baffles to be sure the slots are open and unobstructed.
- Avoid opening and closing the fume hood sash rapidly, and avoid swift arm and body movements in front of or inside the hood. These actions may increase turbulence and reduce the effectiveness of fume hood containment.
- Place chemical sources and apparatus at least 6 inches behind the face of the hood.
- Place equipment as far to the back of the hood as practical without blocking the bottom baffle. Separate and elevate each instrument by using blocks or racks so that air can flow easily around all apparatus.
- Do not use large pieces of equipment in a hood, because they tend to cause dead spaces in the airflow and reduce the efficiency of the hood. If large pieces of equipment emit fumes or heat then have a special purpose hood designed and installed to ventilate that particular device.
- Flammable liquids shall not be stored permanently in the cabinet under the hood unless that cabinet is properly labeled “flammable liquid storage”.
- Keep sash completely lowered anytime no “hands-on” part of an experiment is in progress. Close sash when finished with hood work or when leaving experiments or chemicals unattended. The hood sash shall not be removed or left completely open except for setup work.
- Keep sash clean and clear.
- The hood sash shall be closed to the lowest position possible while still allowing comfortable working conditions. It is the recommendation of the University Department of Safety & Health that the sash height be maintained at a distance from the bench top between **15” (fifteen inches)** and **18” (eighteen inches)**. This distance shall reduce the possibility of chemicals splashing on laboratory personnel’s eyes and face.
- Fume hoods shall not be used for storage space with the exception of chemical waste containers.
- All chemicals not being used for an experiment shall be removed from the hood and placed in their proper storage area until needed.
- Drip pads in the hood shall be replaced with new pads daily.
- Laboratory personnel shall clean up all minor spills in the hood immediately. In the case of a larger spill contact the Public Safety on the University City and Queen Lane Campuses at 215-895-2222. Contact the Emergency Operator at Center City at 215-762-7110.
- All materials used to clean up spills shall be discarded as hazardous waste.
- Clean all chemical residues from the hood chamber when finished with work.
- All electrical devices should be connected outside the hood to avoid sparks, which may ignite a flammable or explosive chemical.
- **Do not use a hood for any other function for which it was not intended.** Certain chemicals or reactions require specially constructed hoods.
- Keep all chemical containers closed except when adding or removing materials.
- Evaporation of wastes in the fume hood is strictly prohibited.
- The hood sash is not a substitute for personal protective equipment. Laboratory personnel shall wear safety glasses, laboratory coat, and gloves at all times when working with chemicals in the hood.

Hood Failure Procedures

Department of Environmental Health and Safety

If a chemical fume has failed the certification tests or reported to be unsafe then the Department of Environmental Health and Safety will immediately take the following steps:

1. The hood is tagged with a label indicating that it is unsafe and should not be used. Refer to Appendix V for hood failure stickers.
2. The hood is locked out using a lockout device to prohibit use. The lockout device will be used to ensure the safety of the user and will remain in place until appropriate repairs are made.
3. Notify the user of the status of the hood.
4. Notify the Departmental Chemical Hygiene Officer (CHO) or Principle Investigator responsible for the hood.
5. If at Drexel University City, notify the Facilities Management Department using a work order request via fax 215-895-6754 or inter office mail or call 215-895-2808 or x1700. If at Drexel Center City notify facilities department 215-762-6500. If at Queen Lane, contact 215-991-8484. If at Doylestown, contact 215-489-4947.
6. Perform a follow-up airflow survey promptly after appropriate repairs are completed on those fume hoods found unsafe.

Facilities Department

If the Facilities Department receives notification of a failed hood then the department will immediately take the following steps:

1. Within 24 hours of notification of an unsafe hood by a user or the Department of Environmental Health and Safety, evaluate the hood system and make appropriate repairs.
2. Upon completion of the repair, notify both the user and the Department of Environmental Health and Safety that the hood is repaired.

3. If the repair requires more than one working day to complete, the user and the Department of Environmental Health and Safety must be notified that the hood is not repaired and should be apprised as to how long it will take to obtain parts, etc., and the hood should remain locked out.

Departmental Chemical Hygiene Officer or Principle Investigator

Upon receiving notification of a failed hood the CHO or PI will notify all parties affected by this notification.

Laboratory Fume Hoods

Recommended Practices

SEFA 1 - 2006

SEFA 1-2006 Recommended Practices for Laboratory Fume Hoods Page 2

This document was written with input from the following individuals.

SEFA 1 – 2006

http://www.sefalabs.com/files/public/SEFA1_FumeHoods.pdf

Chemical Fume Hood

Confirmation of Training Form

I, _____, certify that I have received training on the safe work practices relating to chemical fume hoods. In addition, I have read and understood the Chemical Fume Hood Work Practices protocol set forth by the Department of Environmental Health and Safety and will follow all requirements that are mandated in this protocol.

Please Print Name

Date

Signature

Title

Department Name

Telephone Number