

Chemical Fume Hood Commissioning & Annual Inspection

1.0 Purpose and Requirements

The OSHA Laboratory Standard 1910.1450 requires that "fume hoods ... function properly and that specific measures are taken to ensure proper and adequate performance of such equipment". The proper functioning and maintenance of fume hoods is the responsibility of a variety of service groups including Environmental Health and Safety (EHS), Maintenance Management, Facilities Services (FS), Building Coordinators, and laboratory personnel.

This SOP describes the processes for commissioning and annual inspection of laboratory fume hoods and is based on testing and specifications found in the ANSI/AIHA Z9.5-2012 and ANSI/ASHRAE 110-1995.

2.0 Scope

This SOP applies to all ducted chemical fume hoods on the Cornell Ithaca Campus and the outlying CALS facilities; but excluding the Federal Nutrition Lab. It incorporates the health and safety responsibilities of the EHS department and the energy conservation efforts of the University.

3.0 Responsibilities

3.1 Laboratory Ventilation Specialist

- Establish procedures for fume hood commissioning and annual inspections based on testing and specifications found in ANSI/AIHA Z9.5-2012 and ANSI/ASHRAE 110-1995.
- Commission, or arrange commissioning, of new, renovated or relocated fume hood installations.
- Provide fume hood commission information to Facilities Services for input into the University's database system (Maximo).
- Oversee the annual inspection of fume hoods by the FS Controls Shop.
- Facilitate or conduct annual inspection in facilities not covered by Maintenance Management.
- Provide training on fume hood inspection and commissioning to EHS staff/student testers, FS controls shop or their designees.
- Monitor test data and reports.
- Respond to problems; provides advice and guidance on new installations.
- Consult with FS Energy Management regarding laboratory ventilation.
- Track fume hood repair tickets (service requests) to ensure timely repairs are made.

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- Follow up on fume hoods identified by the FS Controls Shop as "Too Full to Test".
- Perform quality control testing on a sub-set of hoods tested by the FS Controls Shop.

3.2 EHS Staff/Student

• Inspect fume hoods under the supervision of the Laboratory Ventilation Specialist.

3.3 FS Central Zone Controls, Trades Superintendent, Zone Managers

- Provide FS Controls Shop Technician(s) for annual inspection and related.
- Activities, such as inspection after repairs of fume hoods, covered by maintenance management.
- Oversee work done by FS Controls Shop Technicians.

3.4 FS Controls Technician

- Schedule and conduct annual inspection of fume hoods covered by maintenance management or those contracted with the University on university properties.
- Schedule and conduct annual inspection of fume hoods not covered by maintenance management when requested by the user on a fee-for-service basis.
- Inspect fume hoods that have out-of-date annual inspection tags within 2 weeks of notification.
- Adjust controls during inspection if it is necessary and can be easily accomplished.
- Assign repair tickets (service requests) to hoods that fail inspection.
- Report hoods that are "Too Full to Test" to the Laboratory Ventilation Specialist.
- Enter test results into MAXIMO data base.
- Retest fume hoods that have been repaired.
- Receive annual training from the Associate Chemical Hygiene Officer.

3.5 FS Central Zone Project Associate

- Provide Laboratory Ventilation Specialist with access to test results, including building reports and full testing reports.
- Send out building reports to building coordinator.
- Enter new fume hood commissioning data.
- Enter annual test results for fume hoods not covered by maintenance Management that have been tested by EHS.

3.6 Project Manager

- Purchase and install hoods per FS design standard:
- Schedule commissioning with the Laboratory Ventilation Specialist

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 Provide controls person (e.g. contractor, Control Shop Technician) to put fume hoods into unoccupied mode during commissioning of VAV and 2-position by-pass hoods.

3.7 Maintenance Management, Director of Facilities

• Provide financial support to the controls shop for conducting annual inspection and follow-up testing of repairs for fume hoods covered under Maintenance Management.

3.8 Building Coordinator

- Receive reports of annual fume hood testing.
- Make service requests for fume hood repairs identified outside of annual testing cycle or by EHS.
- Arrange non-ticket maintenance items (e.g. new light bulb needed)

4.0 Procedure Instruction

4.1 Training

FS Controls technicians, EHS students and EHS staff who perform fume hood testing must receive introductory training and an annual Laboratory Ventilation program report from the Laboratory Ventilation Specialist.

4.2 Safety

4.2.1 Cryogen Safety

Dry ice is a cryogenic solid. Always use protective gloves and eye protection when handling dry ice. It is extremely cold and can burn the skin on contact. It also generates CO_2 gas as it warms and in an enclosed space can produce an oxygen deficient environment. Persons working with dry ice must read the SDS and be aware of the hazards before handling it.

4.2.2 Chemical Contamination

If there are concerns about the chemicals/equipment or contamination in a hood, do not do testing and contact the Laboratory Ventilation Specialist with the hood ID and contact information for that laboratory.

4.2.3 Guidance Documents and Forms

Guidance for shop personnel doing maintenance work on hoods is given in these documents:

- 1. ToolBox Safety Talk Safety Precautions for Fume Hood Repair
- 2. ToolBox Safety Talk Fume Hood Decommissioning
- 3. Fume Hood Repair Notice

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Other relevant documentation:

- 1. Fume Hood Commissioning Request Form
- 2. Fume Hood Decontamination Request Form
- 3. Fume Hood Commissioning/Inventory Form

For an overview of the EHS fume hood program see the Laboratory Ventilation webpage on the EHS website:

http://www.tinyurl/cornell-lvmp

4.2.4 Special Precautions

Special precautions are needed when testing radiation hoods.



Hoods where radioactive material is used are identified with labels or signs stating RADIOACTIVE MATERIAL on the sash or in the hood. Special procedures need to be followed when testing a "Rad" hood.

The laboratory should be notified in advance so they can plan for the hood testing or schedule an appropriate time. Laboratories need to perform a contamination survey of the entire hood prior to testing and clean surfaces that the survey identifies as being contaminated.

Upon arriving at the laboratory, the tester should verify with the PI, lab manager, or hood users that a survey was done and the hood is free of contamination. If this cannot be verified, reschedule testing for another time when the laboratory can have the hood prepared. Contact EHS Radiation Safety with questions or problems.

4.2.5 Iodination Hoods

Hoods that are used for radioactive iodination are always constant volume, never VAV. The Radiation Section of EHS checks these hoods for radiation contamination twice a year but these procedures are not equivalent to routine annual hood testing. There are (8/26/2013) currently 3 iodination hoods at Cornell:

Rm 412MorrisonRm S1 091SchurmanRm C2 221Vet Medical Center

5.0 Commissioning and Inspection

Commissioning of new hoods is conducted by EHS and is arranged by Project Managers when required. To request commissioning, Project Managers are to fill out a Request for Commissioning Form located on the EHS Laboratory Ventilation Management webpage. For this procedure, Project Managers need to

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provide a controls person to put the ventilation system into unoccupied mode during commissioning of VAV and 2-position bypass fume hoods.

Fume hood inspections are done annually and upon renovation. In facilities maintained by Maintenance Management, the schedule for testing of fume hoods is coordinated by assignment of Job Plans via the Maximo database system. Facilities not under the Maintenance Management program, but who have contracted with the Controls Shop to perform annual testing, the scheduling of fume hood inspections is accomplished in the same manner except there must be a standing service request associated with the job to allow for payment. Hood inspectors should notify building coordinators at least 2 business days before testing.

5.1 Commissioning

Commissioning of lab ventilation systems ensures proper installation and operation. Face velocity tests are accompanied by visual containment tests. The following procedures are based off the ANSI/ASHRAE 110 Method of Testing Performance of Laboratory Fume Hoods and the ANSI Z9.5 Standard for Laboratory Ventilation. The check list that EHS uses for commissioning is given in **Appendix 5**, "Fume Hood Inspection/Commissioning Form".

5.1.1 Face Velocity Measurement

This is the measurement of the velocity of the air flow at the fume hood sash opening, expressed in feet per minute (fpm). The procedure for face velocity measurement is described in **Appendix 2**. A Shortridge electronic micromanometer with VelGrid attachment is used to conduct the test. The criteria for pass/fail are described in **Appendix 1**, "Hood Testing Criteria". Hoods that have an unoccupied mode (typically VAV and 2-position by-pass) are tested in unoccupied mode at 18" for face velocity and capture during commissioning. It is also verified that the occupancy sensor controls are over-ridden when the sash is raised over 18" sash height. The project manager must provide a controls technician to put fume hoods into unoccupied mode during commissioning of VAV and 2-position by-pass hoods.

5.1.2 Dry Ice Capture Test

This is a visual test of the ability of the hood to capture vapors. Fume hood containment is determined visually and rated subjectively. Water vapor is produced by adding dry ice to warm water. ANSI/ASHRAE 110-1995 provides a procedure to supplement face velocity testing with a visual test for capture called a dry ice test. We have used this procedure as the basis for our own dry ice protocol.

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- Dry ice can be obtained in the following laboratory containing buildings on main campus: 1) Weill Hall basement 2) Biotech 2nd floor 3) ST Olin basement, and 4) VRT receiving.
- For testing, the dry ice needs to be in small pellets or chunks.
- Fill a 2 liter stainless steel bowl about 3/4 full with hot water. Put some dry ice (about ½ cup) into the bowl so that vapors are rolling out but not excessively. Place the bowl into the center of the hood at least 6" in. If the hood is too crowded, place the bowl as close to 6" back as you can. Test at the appropriate sash height(s).
- Observe the airflow at the face of the fume hood. The patterns across the bench of the hood can be described as:

1. If the smoke moves forward toward the front of the hood, the air flow is described as "reverse flow."

2. If the smoke remains on the work surface without smoothly flowing to the back baffle, the air flow is described as "lazy."

3. If the smoke moves outside the plane of the sash, the observation of such is described as "escape."

http://publications.gc.ca/collections/collection_2013/tpsgcpwgsc/P4-32-2013-eng.pdf

The vapor should be pulled inside and to the back. Move the bowl to the left & right. If no vapors or a trivial amount break the plane of the sash then the test passes. Vapors should not consistently break the sash plane.

• If there is any dry ice left in the bowl after testing, either let it dissolve or pour the left over ice into the side of a sink. Do not to leave the dry ice in the drain since it could freeze the trap and burst the pipe.

5.1.3 Room Pressurization

Laboratories should be under negative pressure relative to hallways and offices. This means that the ventilation being supplied to the lab is slightly less than that which is being exhausted. This can be verified either with the Shortridge Meter or visually using dry ice. In order to balance the energy conservation efforts of the University and the safety of laboratory workers there is no numerical value recommended to accomplish this pressure differential.

- Follow the directions supplied in the Operational Manual for the Shortridge meter. There is no quantitative minimum value expected at this institution; only that there is a negative value.
- The water vapor for the dry ice test should visually draw into the lab. In many cases there are buildings connected to adjacent

buildings. If, during a dry ice test of the room, there is the occasional drawing out of water vapor into the hallway, the Laboratory Ventilation Specialist must be notified. Re-commissioning of the labs or entire building may need to be done.

5.1.4 Visual Inspection

When a fume hood is not actively being used, the sash of a fume hood should be closed. This conserves energy in a Variable Air Volume system (VAV) and maintains safety by providing a smaller opening area. Initial sash height is recorded so that both EHS and FS Energy Management can evaluate how consistently laboratory staff are adhering to these recommendations.

A visual inspection of the hood is done to ensure its integrity and working order. Cracked glass, sashes that don't operate properly (stuck or creep down); poor visibility and lights not working are examples of things that would be noted as needing repair.

5.1.5 Posting and Stickering

Fume hoods should have various postings and stickers on them. The types of postings/stickers and their placement are described in "Stickerings & Postings", Appendix 4. Any missing items or items that need updating are put on at the time of the inspection. To obtain a new supply of stickers, labels or signs, see Appendix 5, "Fume Hood Testing Checklist & Inventory".

5.2 Fume Hood Commissioning at 80 FPM

Standard fume hoods designed to have increased capture capabilities and better fluid dynamics may be candidates for commissioning at a lower face velocity. These hoods do not have the same pass/fail criteria and must maintain 80 fpm at the time of annual inspection.

Candidates for commissioning and subsequent inspection must meet all of the following criteria or be returned to a face velocity of 100 fpm (occupied) and 65 fpm (unoccupied):

- Consistent and stable face velocity readings across the area being measured with the VelGrid. This is to be tested with items blocking airflow inside the cabinet.
- Visual capture of water vapor as described above with the sash at a height of 18" and full open; usually 2.5'.

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- Commissioning and inspection with the room in unoccupied mode. The face velocity must maintain containment at 65 fpm with the sash open and at 18".
- Proper hood usage must be maintained. During annual inspection the HHS must be 2. If this score is the result of competing usages or contamination that is left (HHS of 4 or 5), the face velocity must be returned to 100 fpm.

Hoods that are potential candidates for this lower face velocity are to be commissioned by the Laboratory Ventilation Specialist with the assistance of a controls technician. Those that are successfully commissioned at 80 feet per minute will be marked with a green face velocity sticker.

5.3 Annual Performance Inspection

The steps for routine containment inspection are the same for commissioning with the exception of testing in unoccupied mode. See Headings 5.1.1 through 5.1.5. An addition to the visual inspection is the documentation of the Hood Housekeeping Score in Heading 5.4.

5.4 Hood Housekeeping Score

This scale is based on best practices for safe and sustainable fume hood use. Trends in these scores will be used to design laboratory worker training and education efforts.

Ноо	Reason for concern	
1	Hood decommissioned	None
2	Hood on, used for a single chemical process or well organized multiple purposes	None
3	Hood on, but empty or being used for storage	Sustainability
4	Hood on, crowded or used for competing multiple chemical uses	Safety
5	Hood on and contamination evident	Safety
The higher the Hood Housekeeping Score, the more serious the concern		

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5.2 Fume Hood Hibernation

As stated in the ANSI Z9.5 Standard, fume hoods must "maintain a minimum exhaust volume to ensure that contaminants are properly diluted and exhausted". This exhaust requirement can increase the volume of ventilation for the laboratory room. By temporarily turning off the hood, and only using the general exhaust, significant energy reductions can be realized.

For those labs that do not use or store hazardous chemicals that must be kept inside the hood or a vented corrosive cabinet underneath; the fume hood may be a candidate for temporary shutdown.

The purpose of temporarily decommissioning a fume hood is to save on energy costs. Identifying hoods that may be candidates is done via the Hood Housekeeping Score (HHS) during the annual performance inspection, through lab inspection or ventilation assessment or by the request of the lab occupants.

To request a fume hood to be "hibernated" the following Google Form can be submitted.

http://tinyurl.com/cornell-hood-hibernation

Guidance for those completing the task of hibernating a fume hood is Located on the Lab Ventilation page of the EHS website.

http://www.tinyurl/cornell-lvmp

6.0 Hood Repair or Decommissioning

When a hood or associated hood equipment (e.g. exhaust fan, ducts, sash) are being worked on or repaired by the shops, laboratory personnel may be unaware that the hood is out-of-service. A sign affixed to the front of the sash can communicate this information.

Guidance for shop personnel on the safe completion of fume hood or exhaust system repair or decommissioning is given in the documents:

- 1. ToolBox Safety Talk Safety Precautions for Fume Hood Repair
- 2. ToolBox Safety Talk Fume Hood Decommissioning
- 3. Fume Hood Repair Notice

All of these documents are located on the Laboratory Ventilation webpage of the Environmental Health and Safety website.

Hoods that have had exhaust system repair or controls adjustment should be recertified before repair signage is removed. This can be completed by the

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Laboratory Ventilation Specialist.

7.0 Reporting

A report should be sent to the building coordinator and Laboratory Ventilation Specialist when testing is complete. The building coordinator is responsible for issuing service requests for fume hoods or other ventilation system components that need repairs or adjustment.

All data is to be transferred to the Maximo database system.

8.0 Quality Control

Tracking the performance of the Lab Ventilation Management Program is intended to maintain the quality of service provided to the stakeholders as well as manage the proper functioning of the mechanical systems. Information gathered helps staff to identify coaching and training needs.

Description	Type of Indicator
Distribution of Labs with Lower Ventilation Assignments	Leading Sustainability
	Indicator
Improvements in Hood Housekeeping Scoring (HHS)	Leading Safety Indicator
Reduction of Energy Usage by Cornell Labs on an annual basis	Lagging Sustainability Indicator
Trends in lab safety based on inspections and IAQ concerns	Lagging Safety Indicator

Information gathered includes:

- Fume hood usage based on the HHS
- Chemical storage and segregation
- Awareness of safety value of lab ventilation
- Communication by lab occupants of possible chemical exposures
- Fume hood face velocity within ANSI Z9.5 parameters
- Effective Operations & Maintenance

9.0 Definitions

AIHA: American Industrial Hygiene Association

ANSI: American National Standards Institute

ASHRAE: American Society of Heating, Refrigerating and Air-Conditioning

Engineers

10.0 References

ANSI Z9.5- 2012 Laboratory Ventilation

ANSI Z10- 2012 Occupational Health and Safety Management Systems

ASHRAE 110-1995 Method of Testing Performance of Laboratory Fume Hoods

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Appendix 1: Hood Pass/Fail Criteria

			Commission		Routine Testing	
Sash	Туре	Sash Position	Satisfactory	Unsatisfactory	Satisfactory	Unsatisfactory
Vertical*	Standard/ Bypass 100 fpm	18" ht	80-120 fpm & pass dry ice test	< 80 fpm or > 120 fpm or fail dry ice test	80-120 fpm & pass dry ice test	< 80 fpm or fail dry ice test > 120 fpm
	VAV 100 fpm	18" ht	80-120 fpm & pass dry ice test	< 80 fpm or > 120 fpm or fail dry ice test	80-120 fpm & pass dry ice test	< 80 fpm or fail dry ice test > 120 fpm
		varying	Controls respond within 2-5 seconds and displays same as at 18"	Display doesn't stabilize within 10 seconds	Controls respond within 2-5 seconds and displays same as at 18"	VAV controls slow to respond
	80 fpm	18" ht	80 fpm and pass dry ice capture	<70 fpm and does not pass dry ice	80 fpm and pass dry ice capture	<70 fpm and does not pass dry ice
Horizontal*	All types	18" width	80-120 fpm & pass dry ice test	< 80 fpm or > 120 fpm or fail dry ice test	80-150 fpm & pass dry ice test	< 80 fpm or fail dry ice test
Combo*	Must meet both v	ertical and	horizontal criteria			
All	VAV and 2- Postion Bypass in Unoccupied mode	18" ht 18" width	≥65 fpm & pass dry ice test	< 65 fpm or fail dry ice test	≥65 fpm & pass dry ice test	< 65 fpm or fail dry ice test
Room Pressure	All types	NA	Negative to Hallway	Neutral or Positive	Negative to Hallway	Neutral or Positive

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Appendix 2: Face Velocity Measurement

The parameter for which a fume hood passes or fails a face velocity test is found in Appendix 1. The preferred readings should be about 100 fpm; except for those hoods that have been commissioned at 80 fpm.

The VelGrid attachment should be used with the Shortridge meter for taking measurements at 18" sash height. Testing should be in a grid pattern divided into even sections. Readings should be taken with the VelGrid flush against the top or bottom of the face opening. Align the VelGrid along the plane of the sash. Hold the probe as still as possible. Do not stand directly in front of the area being tested, as this will affect the air flow.

Record the readings directly into a hand held meter. The average of all the readings is taken and then transferred into the MAXIMO data base. Readings that EHS takes during routine testing are recorded in a spreadsheet and sent to a MAXIMO Administrator for input into MAXIMO. For commissioning, readings are recorded on the Fume Hood Inspection/Commissioning form. This information is also sent to a MAXIMO Administrator for input into MAXIMO.

VAV fume hood controls should be observed for responsiveness. Move the sash down from 18" stopping at different sash heights. If there is a digital control box, the face velocity should be seen to go up for a few seconds. But, it should settle at about 100 fpm.





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18 inches horizontal sash – 4 or more readings depending on the height of the hood



Test these hoods with an 18" horizontal opening. Try to make the opening toward the middle. Take a representative sample with the VelGrid staying at 3" inches from the left or right sides. Dry ice testing should be conducted in the middle, 6" from the plane of the sash.

Note: Units with combination sashes must satisfy both horizontal and vertical test criteria.

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Appendix 3: Special "Hoods"

A. Radiation Hoods

See Section 4.2.1 "Safety" of SOP Fume hood Commissioning and Routine Testing Procedures.

B. Double sash hoods

These hoods are like two hoods side by side but with no inside wall so that the sash height from one affects the face velocity of the other. These should be tested (face velocity and dry ice) while both sashes are at 18".

C. Auxiliary Air hoods

Auxiliary air hoods, in addition to pulling air, also have a blower that injects air into the hood. The dynamics are not easily tested so take the usual face velocity readings and **always perform a dry ice test**.

D. Fixed height sash/No sash

Fixed position sash- Test (face velocity and dry ice) the hood at that height and use standard/bypass criteria.

No sash- Test the face velocity along the imaginary grid of the open area and do the dry ice test in the working area.

Hoods with fixed position sashes or no sashes should have an "Eye Protection is **Required**" sticker placed on them.

E. Slanting sash

If the sash is slanting, test the face velocity on the **vertical plane** not the slanting plane. Dry ice testing should be conducted in the middle, 6" in from the vertical plane.



F. Ductless hoods

Ductless hoods as their name implies do not duct air to the outside but recirculate it to the room. They are equipped with chemical adsorbing filters such as charcoal to remove chemical vapors. Filters must be changed according to the manufacturer's recommendation. These hoods should have the filter change date posted prominently.

EHS does not routinely test ductless hoods.

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G. Vertical Sash Walk-in hoods

Walk-in hoods are large hoods and the openings can be 6 feet high. They are used with large apparatus that requires assembly such as distillation equipment. These hoods should **always be tested with visual capture (dry ice)** in the following way: Open the sash all the way. Prepare the dry ice and place it on the primary working surface and then slowly lower the sash until dry ice is captured. Place a **red arrow label** at this point and test the face velocity at this point as well.



Note that this is the only case where we use a **red arrow label**.

H. Clean hoods

Clean hoods are found in Duffield Hall. They are designed to keep the work clean by running the majority of the air through a HEPA filter from above and only a portion through the face, resulting in low face velocities. They also may have sinks in them. They are tested using dry ice capture visualization. For testing these hoods, contact the Laboratory Ventilation Specialist.



Appendix 4: Stickering and Postings



Vertical Sash Hood

- (1) **Inspection Sticker** Include Hood ID, inspector, inspection date and flow rate at sash height of 18".
- (2) "<u>Work Behind Tape for Best Practice</u>"- Place the tape 6" back from airfoil.
- (3) "<u>Be Safe: Lower Your Sash</u>"- (for standard/bypass hoods) or "Lower Your Sash: Save Energy" (for VAV hoods), 1 1/2" x 8", 1 1/2" x 8". Put on either the right or left side.
- (4) <u>**Telltale</u>** This is a 1" x 5" piece of green crepe paper. Attach with tape to the boom of the sash.</u>

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Combination Vertical/Horizontal Sash Hood



- (1) **Inspection Sticker** Include Hood ID, inspector, inspection date and flow rate at sash height of 18".
- (2) "<u>Work Behind Tape for Best Practice</u>"- Place the tape 6" behind the airfoil.
- (3) "Be Safe: Lower Your Sash"- (for standard/bypass hoods) or "Lower Your Sash: Save Energy" (for VAV hoods), 1 1/2" x 8". Put on either on the right or left side. Position such that the bottom of the sticker is about 1" above the airfoil (or, if no airfoil, the hood work surface)
- (4) <u>**Telltale</u>** This is a 1" x 5" piece of green crepe paper. Attach it with tape to the boom of the sash.</u>
- (5) "Don't Open Too Wide"- Position mid-way above sash on frame.

Horizontal Sash Hood



- Inspection Sticker. Position at about 18" above hood counter on frame. Includes Hood ID, inspector, inspection date and flow rate at sash width of 18" (standard/bypass hood/VAV) and 12.
- (2) "<u>Work Behind Tape for Best Practice</u>"- Place the tape 6" behind the airfoil.
- (3) "Don't Open Too Wide"- Position mid-way above sash on frame.

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Appendix 5: Fume Hood Testing & Inventory Checklist

- ___ Spreadsheet or Job Plan of hoods to be tested or commissioned
- ___ Unassigned asset numbers for commissioning new fume hoods
- ____ Make sure control shop or contractor is available to put room in unoccupied mode (commissioning VAV and 2-position bypass only)
- ___ Safety glasses and possibly a hard hat in construction zone
- __ ID/Badge
- ___ Facility code and floor plans
- ___ Building coordinator contact info
- ____ Shortridge (make sure it is charged). Other items include- inspection stickers, tape measure, marker, pen, inventory forms, tell-tales, tape, and other stickers
- __ Dry ice kit (Billing code: P76 4705-6650)
- ___ Key from Customer Service if necessary

<u>Testing</u>

- ___ Record initial sash height
- ___ Radioactivity: Have staff survey
- ___ Measure velocity (vertical & horizontal)
- __ Dry ice test (vertical & horizontal)
- __ Room pressure
- ___ Replace inventory sticker
- ___ Add stickers/telltale
- ___ Enter data (inspection or commission)
- ___ Send report to Maximo Administrator

Ordering/Obtaining Stickers and Postings:

1. Red arrow stickers and eyewear stickers. We use very few of these, so it is most efficient to print them in the office using the color laser printer and matt white polyester adhesive film (<u>http://www.presslabel.com/page/PL/PROD/Laser-Film/MWLP</u>) or white vinyl adhesive film (<u>http://www.presslabel.com/page/PL/PROD/Laser-Film/PSP-WLV8511</u>). The templates can be found at G:\RESEARCH & RADIATION SAFETY\LRS\Research Safety\Hoods\Labels.

 The" inspection" stickers and the "Hood Use Double Green Arrow" sticker can be ordered from: Quadra Flex Corp 1955 Route 13 North PO Box 286 Cortland, NY 13045

607-758-7066

3. The "Keep Your Sash Low – Energy Poster", "Don't Open Too Wide – Energy Poster", "Be Safe: Lower Your Sash, "Lower Your Sash: Save Energy" and "Don't Open Too Wide" can be printed and laminated by Cornell Printing Services.

4. Green Arrow sticker. To print them in the office using the color laser printer and matt white polyester adhesive film (<u>http://www.presslabel.com/page/PL/PROD/Laser-Film/MWLP</u>) or white vinyl adhesive film (<u>http://www.presslabel.com/page/PL/PROD/Laser-Film/PSP-WLV8511</u>).

5. "Work Behind Tape" rolls can be purchased from Uline: <u>http://www.uline.com/cls_02/Tape</u>.

6. Telltales- This is green crepe paper that can be purchased at any arts supply store. Cut into 1" x 5" strips.

Appendix 6: Job Plan for Fume Hood Annual Inspection

Task ID	Description		
10	Safety- attach SOP		
	Required training is up-to-date.		
	Safety Glasses and other personal protective equipment (PPE) as necessary.		
	Cleaning materials and equipment.		
20	Note any observations in the "Work Log" of the task it pertains to.		
30	Check to see if hood is available, if not, check with user of hood to see when it will be av ailable.		
40	Call EMCS to ensure all building systems are running (5-5777).		
45	Ensure flow monitor is within 10% of readings.		
50	Record initial sash height if sash is not closed.		
52	Record hood use in "Task Work Log" if hood is being used for any of the following. (che mical, biological, radiation, perchloric acid, hydrofluoric acid)		
57	If hood is being used for radioactive purposes please ask the lab personnel to conduct a meter survey or show survey results.		
60	Note physical deficiencies of fume hood: lights, audible alarms, VAV responsiveness, Hood Housekeeping Score (see Commissioning and Testing SOP)		
	Hood Housekeeping Score (HHS) Table here		
159	As found lab differential pressure.		
170	As found face velocity per SOP.		
299	As left lab differential pressure.		

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310	As left face velocity at 18 inches sash height.
420	Perform dry ice capture test (see Commissioning and Inspection SOP).
425	If all tests pass, replace inspection sticker with updated information. (Use alternate green sticker for Green hoods).
430	Replace postings.
440	Close the sash when finished.
460	Hood Rating: Pass, Fail or Recommended? Note in the "Task Work Log".
470	Action Taken: Ticket issued, responsible party. Note in the "Task Work Log".

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Last revised by: Ellen Sweet

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