Laboratory Ventilation & Containment Testing Services

Georgia Institute of Technology

Effective Date: 8/2016

2016 Bid Revision

Table of Contents

A. Purpose

This document seeks to establish the scope of work and methods for the following tasks to be performed on the on the Georgia Institute of Technology (Georgia Tech or GT) campus and the GT Cobb County Campus:

- Performance testing of all fume hoods and other forms of local exhaust ventilation; and
- Certification of all biological safety cabinets (BSC), ductless fume hoods, cage change stations, and laminar flow hoods (LFH).

B. Scope

1) This document applies to all of the fume hoods, elephant trunk exhausts, canopy hoods, slot/plenum devices, BSCs, duct-less fume hoods, cage change stations, and LFHs as specified in Appendix A.
2) Testing and/or certification is to be performed according to the schedule outlined in Appendix A.
3) This document also applies to an additional ~100 exhaust ventilation devices, BSCs, cage change stations, ductless fume hoods, and LFHs that may be added/specified over the course of the 12 month period of the service contract.

C. Tasks to be Performed

1) Performance testing of fume hoods and local exhaust ventilation devices as specified in Sections G-K of this document.
2) Inspection and certification of BSCs in accordance with NSF/ANSI 49.
3) Inspection and certification of LFHs, ductless fume hoods, and cage change stations (tested to manufacturer's specifications).
4) Reporting of device performance to GT Environmental Health and Safety (EHS) as discussed in Section L of this document.
5) Record keeping on all work performed as discussed in Section N.

D. Contractor Requirements

1) ***General Requirements:***

a. Contractor must identify the specific key personnel assigned to GT EHS within 15 days of contract execution.

b. Contractor is required to notify GT EHS personnel within one month of technician change so verification of manufacturer and safety certifications can be obtained.

c. Georgia Tech may request, at any time, that contractor employees be replaced if they are not satisfying the level of service required by the contract.

d. Contractor is required to provide proof of safety training for all employees assigned to GT. This training must include:

i. Occupational Safety and Health Administration (OSHA) Hazard Communication (HAZCOM) (29 CFR 1910.1200)

ii. Lab Safety 101 (*per GT EHS)

iii. Radiation Hazard Awareness (*per GT EHS)

iv. Biological Materials Hazard Awareness (*per GT EHS)

* EHS will provide training to ensure compliance

e. Contractor's employees must receive training by GT EHS personnel or proof of equivalent (as determined by GT EHS) prior to working in labs. This can be supplemented by the training specifically discussed in item 1.b above.

f. All contractor's personnel will adhere to all GT rules regarding conduct, attire and personal protective equipment (PPE) while in laboratories. See Appendix B for rules on appropriate apparel. Additionally, contractor's employees will wear branded shirts, jackets, and/or name tags that identify them to the lab occupants as being employees of the company authorized to conduct performance testing.

g. PPE and lab attire to be worn in the laboratories at all times includes safety glasses (donned at the door/entry to the lab), closed-toed shoes and long pants. Other PPE may be required as specified by the lab and the hazards/process(es) ongoing in that lab. This includes, but is not limited to, nitrile gloves, face shields, and/or lab coats. Comprehensive lab attire/PPE is outlined in Appendix B.

h. Contractor will coordinate with EHS as to dates and times they will work in specific buildings as outlined in Section M.

i. Variances from the procedures outlined in Sections G-O must be pre-authorized in writing by GT EHS.

j. Contractor must have multiple service technicians within 30 miles of GT.

k. Contractor must provide 24 hour emergency response service.

l. Contractor must be trained, certified, and experienced in testing/certifying in clean rooms and animal rooms.

m. Contractor must not be affiliated with any HEPA and/or other air filtration business concerns.

n. Contractor and their employees must perform all work from 8:00 AM until 6:00 PM EST, Monday through Friday. Any work to be performed on weekends or holidays must be approved by the EHS technical contact.

o. Contractor must coordinate with the GT EHS technical contact on disposal of any materials.

p. The contractor may not enter into subcontracts with third parties for the performance of any part of the Contractor's duties and obligations. This includes time where the contractor may be unable to perform service due to vacation or sick leave.

q. Storage space is not available for contractor supplies, materials, or equipment. Such items and their storage are the sole responsibility of the contractor. GT assumes no responsibility for loss or theft of items left on-site.

r. Contractor must obtain their own parking permit(s) from GT Parking and Transportation and must park in approved/authorized locations.

s. Contractor must bring their own equipment on-site to perform their work. Equipment and materials must not be borrowed from GT with the exception of out of service tags, which will be provided by GT EHS (see Appendix E).

t. Contractor must have at least five years of experience in lab ventilation and containment equipment performance testing/ certification.

2) ***Fume Hoods and Other Local Exhaust Ventilation Requirements:***

a. Contractor must have working knowledge of GT fume hood controllers per manufacturer specifications. This includes, but is not limited to, TSI Sureflow, Triatek, Alnor, and Hood Trol II controllers.

3) ***BSC, Cage Change Stations, Ductless Fume Hoods, and LFH Requirements:***

a. Contractor and personnel must have working knowledge and experience to test and certify BSCs, cage change stations, ductless fume hoods, and LFHs. Contractor may be required to provide certification documents to the GT EHS technical contact.

b. Contractor and personnel must be able to test/certify BSCs to the NSF/ANSI 49 Standard.

c. Contractor and personnel must be able to test /certify cage change stations, ductless fume hoods, and LFHs to the manufacturer's specification.

d. Contractor must have the capability and be experienced in utilizing vaporized hydrogen peroxide (VHP) decontamination methods.

e. Contractor must be able to provide service for repairs, VHP decontaminations, and filter replacements.

E. Payment

1) Contractor will invoice GT EHS for all completed testing and certifications on a monthly basis, based on the number of units tested/certified during that month.

2) Contractor will quote and invoice BSC, LFH, ductless fume hoods, and cage change station owners directly for the cost of repairs, VHP decontaminations, and filter replacements related to their equipment.

F. Failure to Perform Work as Specified and/or as Scheduled

1) Failure to perform work as specified in Sections G, H, J, K, L, M, N, and O unless pre-authorized by EHS, may result in an immediate termination of the contract. Contractor will forfeit payment of all unpaid work to date.

2) Failure to complete all work as scheduled per Appendix A over two consecutive months may result in an immediate termination of the contract.

3) Failure to report work completed by the last working day of the following month as specified in section L may, at the owner's discretion, may result in the termination of the contract.

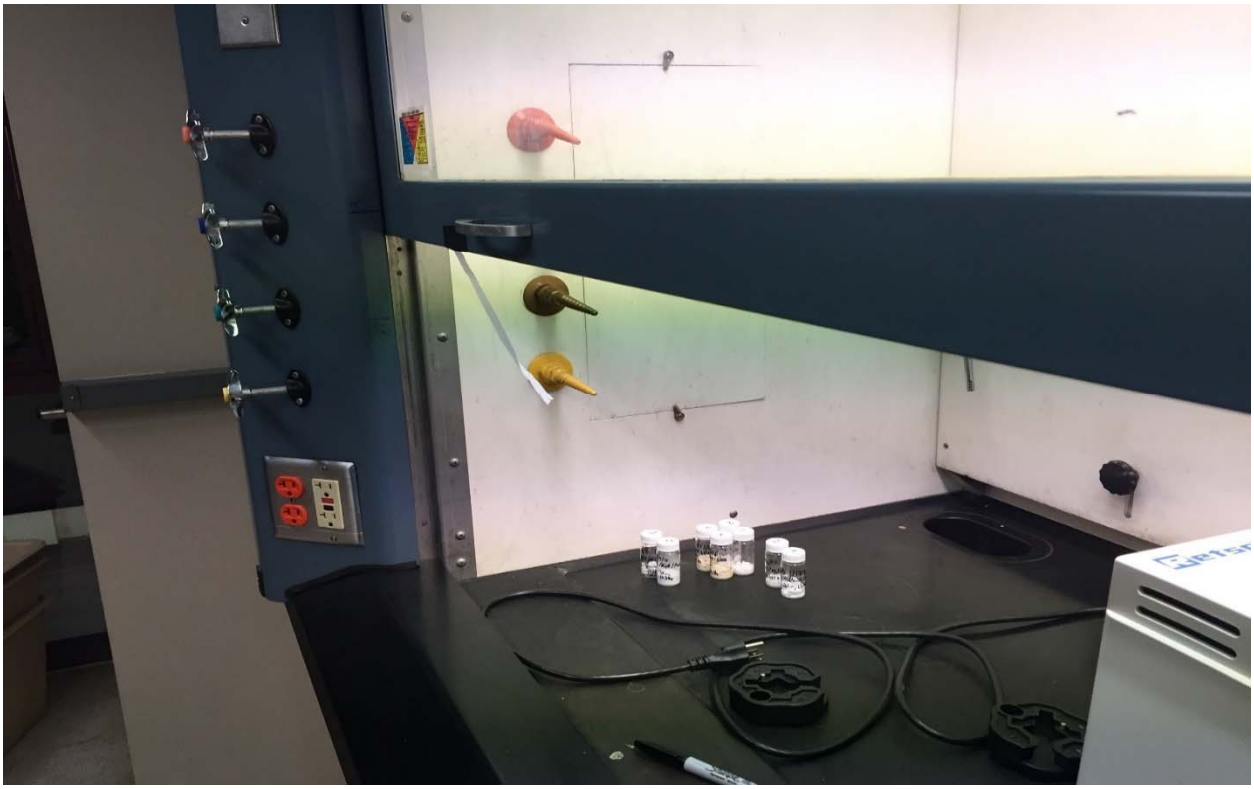
G. Basic Fume Hood Testing Procedures

1) Face velocity or "pitot traverse" methods are acceptable techniques for measuring ventilation system performance. Performance acceptable ranges and limits are discussed and specified in Section I of this document.

2) Sash Positions (for bench top style, California-style, or walk-in type hoods)

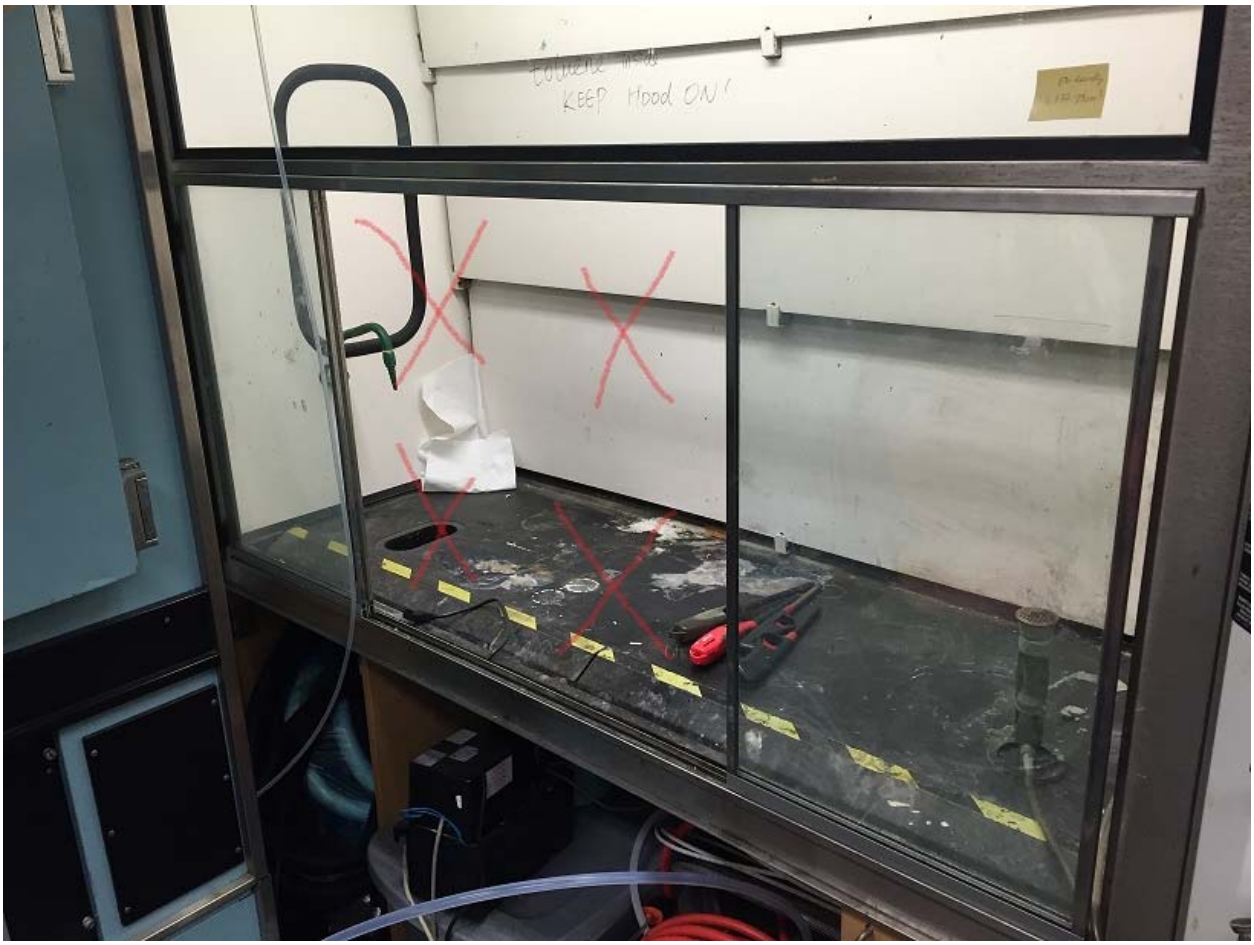
   a. Hoods with vertical-rising sashes shall be tested where the sashes are lifted to 18 inches. Many of these types of hoods are equipped with a sash-catch at the 18 inch level. If the sash catch (devices designed to keep sash from going above a set height during user operation) is positioned roughly (eyeball estimate) halfway between the bench and top of the hood opening, then this position can be assumed to be 18 inches. Other hoods with vertical-rising sashes not equipped with sash catches must be measured (sash position) opened to 18 inches of height. Contractor must be equipped with a measuring device to be able to accurately find the 18 inch sash height.

A hood with the sash positioned approximately to the 18 inch level.



   b. Horizontal sliding sashes will be opened to two sash widths and checked in the center. This will be done by averaging four measurements in various positions in the center, but no less than two measurements.

Horizontal sashes opened; red "X" marks denote measurement locations



c. Combination sashes (having both horizontal and vertical sash-opening capabilities) shall be tested with the horizontal sections closed and the vertical sash raised to 18 inches. Exceptions to this are permitted only when tubing, power cords, or other physical obstructions prevent the hood sash from being lifter vertically.

d. Walk-in hoods (floor-mounted, California-style hoods) will be tested with the bottom sash down and the top sash raised to 18 inches above the top of the bottom sash.

e. Check sash operation by moving sash(es) through the full range of travel. Movement should not be labored, but rather smooth and easy. Vertical sashes shall hold any height without creeping up or down unless designated otherwise (see manufacturer's specifications). Contractors shall report any sash problems to Facilities.

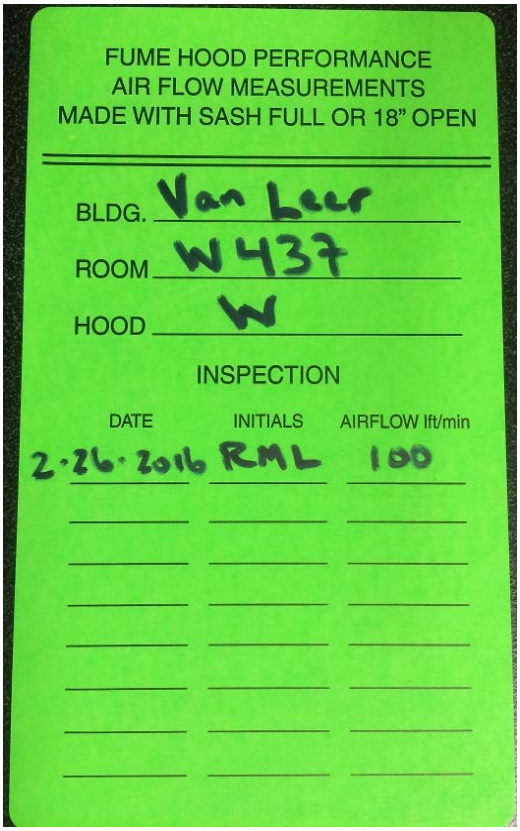
f. If a sash is broken, cracked, or missing, the Contractor must report the issue to Facilities.

3) Face Velocity Measurements

a. Face velocity on bench top-style or walk-in style hoods will be measured using an anemometer velocity matrix, grid-style attachment. When a velocity matrix covering ~1 ft^2 is used, readings will be taken at equal distances across the face of the hood. Therefore, a 6-ft hood will require five readings, a 5-ft hood will require four readings, and so on.

b. The average of the readings shall constitute the documented/reported face velocity reading. See item 5, subsection E for details.

GT EHS fume hood inspection tag



4) Containment Checks

a. Containment and verification of proper air flow will be checked by appropriate smoke devices as described in Scientific Equipment and Furniture Association (SEFA) 1.2 in the instance that a face velocity ≥ 120 linear feet per minute (FPM). This includes:

i. Releasing visible smoke in the fume hood chamber to observe airflow patterns in and around the fume hood.

ii. Smoke released outside of the fume hood entering in to the hood smoothly, exhausted through the baffle slots, and out through the exhaust duct.

iii. The smoke should not escape from the chamber, nor should any turbulence, stalling, reverse flow or dead spots be observed. If any of

the aforementioned is observed, it should be noted and would constitute a failed smoke test.

5) Electronic Controller and Monitor Checks

a. The controller/monitor reading will be checked against the average face velocity reading obtained. If the reading is not within 10% of the face velocity result, the electronic controller/monitor (if present) must be calibrated. Inaccurate monitors must be reported to Facilities by the Contractor on the GT form or an approved substitute (see Appendix D) if not corrected by calibration attempt. Broken monitors (i.e., not working, unreadable display, etc.) must also be reported to Facilities.

Triatek controller displaying normal functionality.

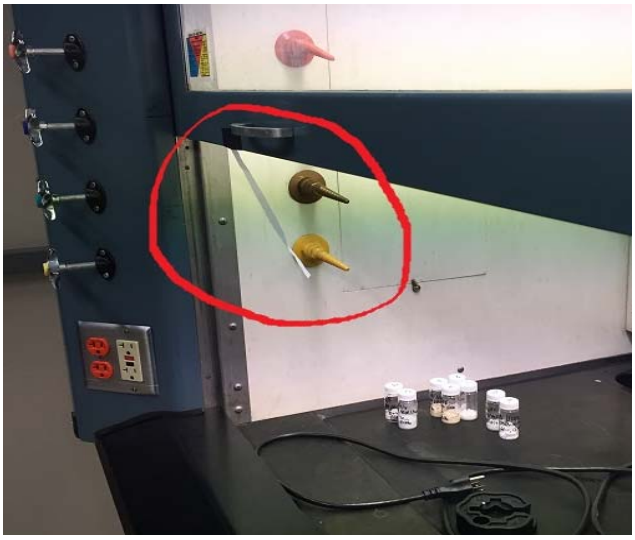
b. The controller manufacturer's specifications will be used to calibrate the controller. These can be provided by GT EHS.

c. The visual indicator should be in the normal (green) range for monitors that do not have numeric read-out displays.

Alnor AirGard 335 w/ no face velocity numeric read-out

d. Those fume hoods not having electronic/digital indicators can be verified with a physical indicator, such as a tissue affixed to the bottom of the sash

Fume hood equipped w/ tissue indicator affixed to bottom of the sash.



e. Face velocity readings, as measured, will be recorded on a tag posted on the fume hood.
f. The emergency flow setting (if hood is equipped with this) shall be checked to ensure proper function. Any fume hood possessing an emergency flow button should be assumed to have this capability/function.

TSI SureFlow™ equipped with emergency flow setting (red button on bottom left.)

g. High sash alarms will be checked as appropriate to ensure proper function.
    i. Position sash above sash catch height (typically greater than18 inches) to check that both the visual (display on controller/monitor read-out, usually also coupled with an “alarm” light) and audible (loud “beep” noise) alarms are triggered. Move sash back below the sash catch position to verify that alarms have disengaged.

6) Auxiliary Air Hoods

a. Auxiliary air hoods shall be checked as per the procedure described in ANSI/AIHA Z9.5-2003 6.3.4

Auxiliary air hood on GT's campus

Auxiliary air hood air flow schematic

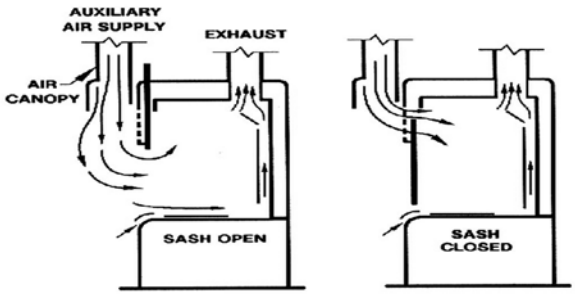


Image courtesy of oregonstate.edu

7) Other Checks

a. Lights: Broken/non-functioning lights (those that illuminate the interior chamber of the hood) will be reported to Facilities via email (see Appendices C and D).

b. Sash catches: broken or missing sash catches must also be reported to Facilities via email (see Appendix C).

c. General condition of hood: hazardous conditions will be noted and reported to EHS along with any conditions which may adversely affect fume hood function. Hazardous conditions include, but are not limited to:

i. Spilled materials

ii. Excessive chemical storage (to the point of obstructing air flow)

iii. Large equipment obstructing operational air flow

iv. Open waste containers

d. Cross drafts: contractor should make note of possible sources of cross drafts (poorly positioned air diffusers, doorways, etc.) and report to EHS.

e. Static pressure measurements shall also be recorded (usually given in column inches of water). Where colored (usually orange), bars are set to indicate the acceptable range. Any variation above or below that range shall be reported to Facilities (see Appendix C).

Photohelic gauge indicating static pressure in inches of water and FPM.

Image courtesy of www.coleparmer.com

H. Pitot Traverse Methods

1) Pitot traverse measurements will be performed per the procedures described in Industrial Ventilation (American Conference of Governmental Industrial Hygienists; Cincinnati, Ohio; 2001.)

    a. This method (pitot traverse) is to be used only when there is a ducted exhaust that cannot be measured via normal face velocity measurement, as described previously.

I. Acceptable Limits

2) General purpose laboratory fume hoods will be considered acceptable with an average face velocity of 80 lft/min to 150 lft/min, optimal range being 100-120 lft/min.

3) Hoods in laboratories with carcinogens or extremely hazardous materials will be considered acceptable with an average face velocity of 120 lft/min ±10%. EHS will communicate this information to the vendor whenever possible.

4) Fume hood performance will not be considered acceptable if any single face velocity reading is less than 80 lft/min and will be tagged with a red and black "DANGER HOOD IS NOT WORKING! DO NOT USE!" tag. Report per Section L.

5) Fume hood performance will be considered unacceptable if any single face velocity reading is greater than 120 lft/min and will be tagged with a red and black "DANGER HOOD IS NOT WORKING! DO NOT USE!" tag. Report per section L.

6) Velocities in excess of 120 lft/min require additional testing by smoke to verify that nothing is exiting the hood.

7) Refer to Industrial Ventilation for acceptable ventilation system performance for non-laboratory hood ventilation systems and/or refer to original specifications for the installed ventilation system (See Section P for reference).

8) If a ventilation system does not perform according to criteria, a work order to repair the ventilation system be initiated by the contractor (see Section L).

J. Other Exhaust Ventilation Systems

1) Canopy Hoods

   a. Will be checked by pitot traverse whenever possible.

   b. When a pitot traverse is not possible, a macromanometer may be used to measure air velocity at a distance of six inches from the duct opening.

   c. If the average of these readings has decreased more than 10% from the previous readings, then a work order shall be issued as per Section L.

2) Elephant Trunks

   a. Will be checked by pitot traverse whenever possible.

   b. When this is not possible, a hot wire anemometer may be used at the aperture.

   c. If the average of these readings has decreased more than 10% from the previous readings, then a work order shall be issued as per Section L.

3) Slot and Plenum

   a. Will be checked by pitot traverse whenever possible.

   b. When this is not possible, a hot wire anemometer may be used at slot center.

   c. If the average of these readings has decreased more than 10% from the previous readings, then a work order shall be issued as per Section L.

4) Ventilation to exterior via a grated net (other "Local Exhaust Vent Devices")

K. Periodic Testing Ventilation Devices

1) Chemical Fume Hoods and Local Exhaust Ventilation Devices:

   a. Testing shall be repeated every 6 months as per the schedule provided (See Appendix A)

2) BSCs, Ductless Fume Hoods, Cage Change Stations and LFHs:

   a. Testing shall be repeated annually as per the schedule provided (See Appendix A).

   b. Re-testing should occur after repairs are made and after the unit is relocated to a new laboratory.

3) When units cannot be tested because they are in use such that conducting the test would be hazardous to the contractor, or because testing would interfere with an experiment in progress, it is the contractor's responsibility to coordinate with the researcher to return and complete the testing within one week. If the contractor is still unable to complete the test after making the second attempt, the contractor is to contact EHS to intercede in arranging a time to complete the tests.

L. Reporting

1) General Reporting Requirements:

    a. Upon completion of testing scheduled for that month, contractor will provide certification results for each device tested in the form of a Monthly/Building Report (electronic) to EHS no later than the 15th of the following month. The format of the report to be specified by EHS and developed in cooperation with the contractor.

2) Chemical Fume Hoods and Local Exhaust Ventilation Devices:

    a. Fume hoods with face velocities outside the parameters found in Section I that cannot be corrected by adjusting the controller require the contractor to submit a work order to Facilities within 24 hours of the test using a "Fume Hood Inspection Work Request" form or equivalent specified by EHS and developed in cooperation with the contractor. (See Appendix D for an acceptable example).

    b. Changes in face velocity or Static Pressure (pitot traverse) of more than 10% from the previous reading that cannot be corrected by adjusting the controller require the contractor to submit a work order to Facilities within 24 hours of the test, using the Fume Hood Inspection Work Request form (see #1 above).

    c. Other deficiencies, such as problems with lights or sashes, or controller/monitor issues, etc. also require the contractor to submit a work order to Facilities within 24 hours of the test using the Fume Hood Inspection Work Request form.

    d. Contractor is to carbon copy EHS on all work orders emails to Facilities.

3) BSCs, Ductless Fume Hoods, Cage Change Stations and LFHs:

    a. Units that have failed certification require the Contractor to submit a quote for repair to the unit owner within 24 hours of the failure. EHS should be carbon copied on all communications with the unit owner regarding the repair.

M. Communication

1) Contractor will determine the day and order of the buildings to be tested each month and communicate this information to EHS not less than 3 weeks in advance.

2) GT EHS will pre-notify labs/buildings of intent to inspect and test equipment no less than two weeks prior to start date.

3) EHS will provide contractor with Facilities Area Maintenance contact information for work request submission. (Appendix C).

4) Contractor is to provide EHS with the names and training documentation of all new personnel prior to their arrival at Georgia Tech.

N. Record Keeping

1) Fume hood certification will be recorded on a sticker affixed to the fume hood to include date, average face velocity, and initials and company of the person performing the test at the time the test is completed.

2) BSCs, LFH, ductless fume hood, and cage change station certification results will be recorded on a sticker affixed to the unit indicating at least the following pieces of information: date of certification, building, room number, manufacturer, model number, serial number, and name of certifier.

3) After BSC decontamination is performed, the Contractor will affix a copy of the decontamination certificate to the sash of the BSC.

4) When units fail certification, the Contractor will affix a Danger Do Not Use tag to the equipment (see Appendix E). These tags will be provided by GT EHS.

5) Test results will be recorded in the EHS database (by EHS personnel).

O. Follow-Up Procedures

1) EHS will do quality control checks on up to 10% of all chemical hoods and local exhaust devices.

2) GT EHS will follow-up with appropriate Facilities Area Maintenance within two weeks to ascertain the status of fume hood repairs.

3) Fume hoods which have been repaired will be rechecked by EHS and tags will be updated/removed as appropriate.

4) BSCs, LFHs, ductless fume hoods, and cage change stations will be re-certified by the Contractor upon completion of repairs.

P. References

1) American Conference of Governmental Industrial Hygienists, Industrial Ventilation Cincinnati, Ohio, 2001.

2) American National Standards Institute-American Industrial Hygiene Association, Standard Z9.5-2003 Laboratory Ventilation.

3) National Research Council, Prudent Practices in the Laboratory, National Academy Press, Washington, DC. 1995.

4) Scientific Equipment & Furniture Association Standard 1.2-1996, Laboratory Fume Hoods, Recommended Practices.

Appendix A. Schedule of Testing by Facility

Fume Hoods and Local Exhaust Ventilation Devices				
Building Name	***Building Number***	***Current Number of Fume Hoods***	***Schedule***	***Area #***
Daniel Laboratory	22 & 22A	21	January/July	4
Marcus Nanotechnology	181	31	January/July	3
Fac. Waste Storage (HazMat)	161	6	January/July	2
Student Center and Post Office	104	2	January/July	1
Knight Aerospace	101	1	January/July	4
ESM	41	5	January/July	4
Pettit MiRC	95	5	January/July	3
Weber SSTI	84	2	January/July	4
Cherry Emerson Biology	66 & 66A	32	February/August	3
Carbon Neutralization Energy Solutions (CNES)	199	13	February/August	5
Mason CE	111	4	February/August	3
College of Computing	50	30	February/August	3
U.A. Whitaker BME	165	18	February/August	2
Ford ES&T	147	153	March/September	2
MRDC 1	135	24	March/September	1
IBB	146	69	March/September	2
IPST	129	69	March/September	1
Boggs	103	130	April/October	3
MS&E	167	211	April/October	2
Technology Enterprise Park (TEP)	785	12	April/October	5
CCRF I and II	801 & 802	16	May/November	5
Love (MRDC II)	144	39	May/November	1
Baker Building	99	29	May/November	2
Bunger Henry	86	67	May/November	3
CULC	166	22	May/November	4
MARC	126	22	June/December	1
Howey Physics	81	14	June/December	3
Van Leer Elec. & Comp. Eng.	85	3	June/December	3
Nara Food Proc. TRC	159	1	June/December	5
14th St. Engineering Center	850	41	June/December	5
EBB	195	46	June/December	2

BSCs, LFHs, Ductless Fume Hoods and Cage Change Stations						
Building Name	***Building Number***	***Current # of BSCs***	***Current# of LFHs***	***Current # of Ductless Fume Hoods***	***Current # of Cage Change Stations***	***Schedule***
Daniel Laboratory	22 & 22A	1	1	0	0	July
Marcus Nanotechnology	181	6	0	3	0	July
Pettit MiRC	95	1	23	0	0	July
Weber SSTI	84	0	00	0	0	July
Cherry Emerson Biology	66 & 66A	7	3	0	0	July
U.A. Whitaker BME	165	29	5	0	0	July
Ford ES&T	147	18	15	1	0	July
MRDC 1	135	0	2	0	0	July
IBB	146	57	2	0	6	July
IPST	129	3	5	0	0	July
Boggs	103	3	1	0	0	July
MS&E	167	13	9	0	0	July
Technology Enterprise Park (TEP)	785	6	2	0	0	April
Love (MRDC II)	144	1	2	0	0	July
Baker Building	99	2	7	0	0	July
Bunger Henry	86	0	7	0	0	July
MARC	126	0	0	0	0	July
Howey Physics	81	0	1	0	0	July
Van Leer Elec. & Comp. Eng.	85	0	0	0	0	July
Nara Food Proc. TRC	159	1	0	0	0	July
14th St. Engineering Center	850	1	0	0	0	July
EBB	195	20	4	0	0	July
CULC	166	2	0	0	0	July

Appendix B. Appropriate Lab Attire

Personal attire while in the laboratory plays a major role in determining the level of risk of exposure to hazardous agents and of physical injury. Appropriate clothing provides an extra layer of protection against spills and splashes of hazardous materials. Appropriate clothing covers the torso, legs, and feet. Therefore, the following practices shall be adhered to in Georgia Tech wet bench laboratories. The table below is only a basic guide and the full Georgia Tech Personal Protective Equipment and Attire in Laboratories policy can be found at: http://www.ehs.gatech.edu/sites/default/files/ppepolicy.pdf

Allowed	Not Allowed	Explanation
Hair must be kept away from the eyes. Long hair must be tied back. Hair longer than 6 inches from the nape of the neck must also be pinned up (Use of hair nets or hats is acceptable).	Hair must not impede vision, come in contact with the work, or open flames.	Hair can impede vision. Long hair can fall onto the lab bench/come in contact with chemicals or biologicals. Long hair is also a hazard around rotating equipment and open flames such as Bunsen Burners or alcohol burners.
Ties and scarves that do not hang loose outside of the lab coat.	Neckwear such as ties and scarves that hang loose.	Dangling neckwear may come in contact with chemicals, biologicals, or open flames. These also are a hazard around rotating equipment.
Baseball caps and other headgear as long as they are kept far enough back on the head so that vision is not impaired and also do not interfere with protective eyewear.	Caps worn low over the eyes so as to impede vision.	Avoiding accidents means staying aware of one's surroundings at all times. Unimpeded visual observation is key in this regard.
	Use of iPods, MP3 players, or other electronic devices is not allowed in laboratories and is highly discouraged in laboratory buildings.	Laboratorians must be aware of their surroundings at all times which includes being able to hear alarms, sirens, run away reactions, and other people calling for help.
Shirts/tops that cover upper torso.	Cropped shirts, plunging necklines, spaghetti straps, or ripped shirts.	Layered clothing is a safety asset in that it provides an extra layer of protection against spills and splashes.

Allowed	Not Allowed	Explanation
Clothing that accommodates lab coat use.	Loose or flowing tops with wide/bell sleeves; outerwear s/a coats or shawls that make it difficult to don a lab coat.	Wearing this type of clothing makes it difficult/uncomfortable to wear a lab coat: The wearer may be tempted to do without the lab coat. Loose sleeves may also be dragged across the bench becoming contaminated and are a hazard around rotating equipment and open flames.
Long pants that cover the wearer to the ankle.	Ripped jeans, shorts, capris, or skirts.	Chemicals splash up after they hit the floor; likewise shattered glass bounces up and can inflict injury on unprotected skin. Persons who must wear skirts due to personal considerations should speak with their supervisors to determine an appropriate strategy for addressing this rule.
Completely enclosed shoes that cover the instep of the foot: preferably, of leather which can be wiped clean.	Sandals, open toe, open back, or open weave shoes; shoes with holes in the top or sides; No Birkenstocks, Mary Janes, cloth shoes, or Crocs.	Shoes need to protect the wearer from chemicals, hot liquids, and shattered glass. Cloth shoes can absorb chemicals or hot liquids and hold them against the skin until they can be removed.

Other Recommendations Regarding Lab Clothing Choices:

Recommendation	Explanation
Choose clothing made of natural fibers, especially cotton whenever possible.	Natural fibers are more fire resistant than synthetic fibers.
Avoid wearing pantyhose.	Fire and some chemicals may cause the nylon to melt to the skin increasing risk of serious injury.
Keep a change of clothes, including shoes, in a desk drawer.	After an exposure, the victim will not be allowed to re-don contaminated clothing and will need something to wear home.

Appendix C. Facilities Maintenance Contact Information

Facilities Area	Contact Information	Facilities Area Manager
Area I	Sandra Garvin customerserv1@facilities.gatech.edu	Garry Lockerman garry.lockerman@facilities.gatech.edu
Area II	Kayla Barber customerserv2@facilities.gatech.edu	Bill Halabi bill.halabi@facilities.gatech.edu
Area III	Jasmine L. Robinson customerserv3@facilities.gatech.edu	Terry Williams terry.williams@facilities.gatech.edu
Area IV	Christena Hammett customerserv4@facilities.gatech.edu	David Tate david.tate@ehs.gatech.edu
Area V	Sonia Rosa customerserv5@facilities.gatech.edu	Andy Sheffield andy.sheffield@facilities.gatech.edu

Appendix D: Fume Hood Inspection Work Request Sample

Georgia Institute of Technology
Environmental Health & Safety

FUME HOOD INSPECTION WORK REQUEST

Building: VAN LEER ELEC & COMPUTER ENG.

Building No: 85

	Room Hood ID	PI	Date Inspected	Avg. Face Velocity lft/min	Comments	Recommendations
VAN LEER ELEC & COMPUTER ENG.	W437 E	Mark Allen Richard Shafer	22-Jan-16	183	High face velocity. Safe for use, not tagged, indicated by observation of smoke test. No accumulation of smoke in hood, even when sash is closed. No smoke out of the face of the hood. Follow up after Facilities re-adjustment and light replacement.	Follow-up w/ Kevin Marks (Area III Facilities) and re-test/check light when ready.
VAN LEER ELEC & COMPUTER ENG.	W437 W	Mark Allen Richard Shafer	22-Jan-16	178	High face velocity. Safe for use, not tagged, indicated by observation of smoke test. No accumulation of smoke in hood, even when sash is closed. No smoke out of the face of the hood. Follow up after Facilities re-adjustment and light replacement.	Follow-up w/ Kevin Marks (Area III Facilities) and re-test/check light when ready.

Total Number of Hoods = **2**

Tuesday, February 23, 2016 9:05 AM HOOD INSPECTION REPORT - FOLLOW-UPS NEE Page 1 of 1

Appendix E: Ventilation Tag-Outs (Provided by GT EHS)