

Georgia Tech Laboratory Personal Protective Equipment and Appropriate Attire Policy

August 2011

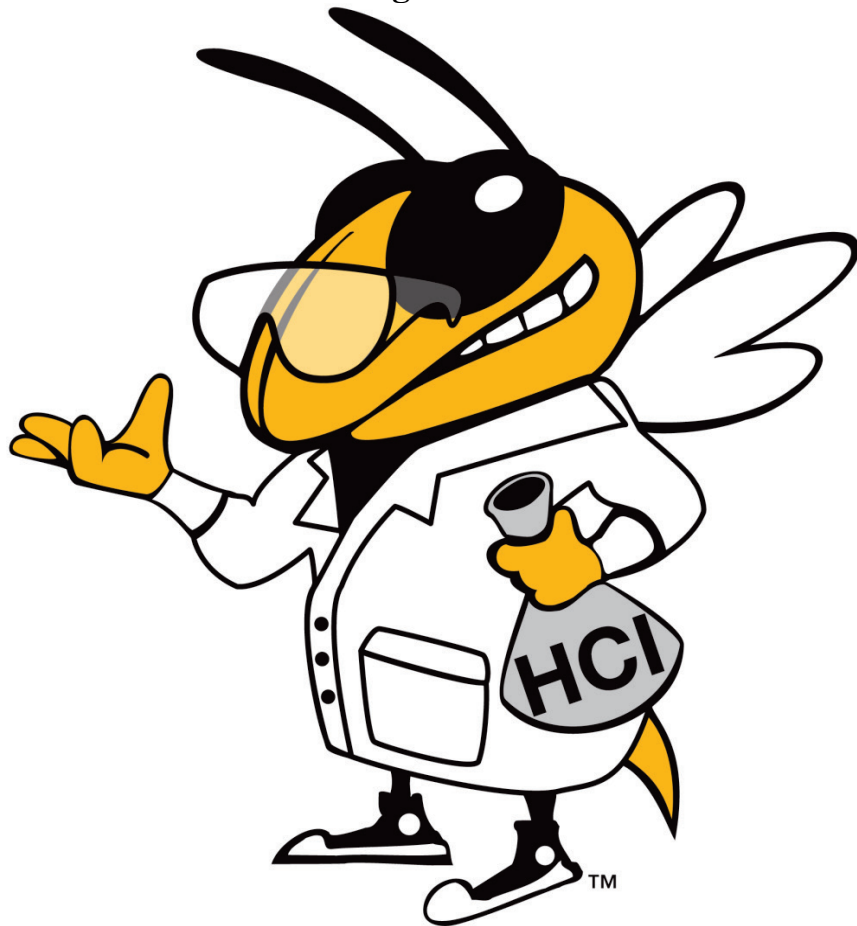


Table of Contents

1. INTRODUCTION:	3
2. PURPOSE:	3
3. AUTHORITY:	3
4. APPROPRIATE LAB ATTIRE:	4
5. OTHER RECOMMENDATIONS REGARDING LAB CLOTHING:	5
6. VISITOR ATTIRE:	6
7. PERSONAL PROTECTIVE EQUIPMENT (PPE):	6
7.1. Eye Protection.....	6
7.2. Contact Lenses.....	7
7.3. Lab Coats	7
7.4. Laundering Lab Coats	8
7.5. Face Protection	8
7.6. Hand Protection	8
7.7. Lab Coats and Gloves Outside the Lab.....	9
7.8. Respirators.....	9
8. NON-COMPLIANCE	10
9. REFERENCES	10

1. Introduction:

Policy Summary: It is the policy of Georgia Tech that all individuals in wet-bench laboratories, as defined herein, wear appropriate attire and Personal Protective Equipment (PPE). Appropriate attire and PPE includes, but is not limited to, safety glasses, goggles, face-shields, lab coats, gloves, hearing protection and respirators, depending on site-specific conditions. These items are described in Section 7.

As a premier research and learning institution, it is incumbent upon Georgia Tech to ensure that its policies and practices for laboratory safety:

- Establish a culture of safety among GT faculty, staff and students - which will be reflected as the students take their places in industry and research.
- Mirror standard practices in industry and other prominent research institutions.

2. Purpose:

The purpose of this document is to outline the Georgia Tech requirements for appropriate attire and the use of PPE in wet-bench laboratories. Wet bench laboratories are defined as any lab where chemicals, biologicals, or radiologicals are used, stored, or manipulated; or any place where materials of a biological or chemical nature are poured, transferred, pipetted, reacted, incubated, heated, or in any way manipulated or stored.

This document does not apply to:

Labs where the primary hazard is exposure to Class 3B or 4 lasers.

Kitchens, break rooms, areas where food is stored and prepared

Areas where the only chemicals are “Consumer Products” (such as cleaning solutions) which are exempt from the Georgia Right to Know Law

Clean rooms where alternative “clean room-friendly” protective garments, such as plastic aprons, are provided

Animal handling (non wet-bench) activities, which have their own situation-specific attire and PPE requirements.

3. Authority:

This Document has been reviewed, approved by the Georgia Tech Chemical and Environmental Safety Committee April 6, 2011 and ratified by the Georgia Tech Institute Council for Environmental Health and Safety August 1, 2011.

4. 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:

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 a 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 with head-phones 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.

ALLOWED	NOT ALLOWED	EXPLANATION
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.
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 reasons should speak with their supervisors to determine an appropriate strategy for 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.

5. Other Recommendations Regarding Lab Clothing:

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

Recommendation	Explanation
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.

6. Visitor Attire:

Visitors to the lab but who are not working in the lab (not touching anything), are required to wear clothing that completely covers the torso and legs (to the ankle), enclosed shoes, and safety glasses (see below).

7. Personal Protective Equipment (PPE):

PPE includes, but is not limited to, safety glasses, goggles, face shields, gloves, lab coats, aprons, ear plugs, and respirators. Additional PPE such as ear plugs and respirators should only be used as a “last resort” if the potential exposures cannot be eliminated with properly-designed engineering controls. PPE is carefully selected to ensure that it is compatible with the chemicals and the process used.

7.1. Eye Protection

- 7.1.1. Safety glasses or chemical goggles must be donned before entering any wet bench lab, including cell culture labs. This applies to lab visitors, GT maintenance and custodial workers as well as staff and students
- 7.1.2. Safety glasses must meet the ANSI Z87.1 standard for impact resistance and have side shields for splash protection.
- 7.1.3. Safety glasses should be chosen to conform to the wearers face and minimize gaps around the glasses.
- 7.1.4. Chemical goggles may be required for certain processes where safety glasses are deemed inadequate: Safety Glasses do not provide protection from chemical vapors, liquids, or caustic dust hazards which may bypass safety glasses. When exposure to these hazards cannot be avoided by use of engineering controls, chemical goggles shall be worn.
- 7.1.5. Safety glasses or goggles must be worn over prescription glasses and must be of a type intended to be worn over prescription glasses.
- 7.1.6. Prescription safety glasses are acceptable as long as they have side shields for splash protection and conform to the wearer’s face.

7.1.7. Safety glasses or goggles are required in all labs where soldering or machining/grinding occur.

7.2. Contact Lenses

7.2.1. Do not provide protection against chemicals or particulates and are allowed in laboratories only with appropriate eye protection

7.2.2. Per the National Institutes of Occupational Safety and Health, wearing contact lenses does not appear to require enhanced eye and face protection.

7.2.3. OSHA recommends against the use of contact lenses when working with the following chemicals: acrylonitrile, methylene chloride, 1,2 dibromo-3-chloropropane, ethylene oxide, and methylene dianiline.

7.2.3.1. OSHA has not published documentation supporting this recommendation.

7.2.3.2. GT EHS recommends working with these materials only inside a fume hood and has no objections to contact lens use in laboratories where these chemicals are present.

7.3. Lab Coats

7.3.1. Shall be donned before handling chemicals, biologicals or radiologicals.

7.3.2. Must be in good condition and reasonably clean so as to not create a hazard.

7.3.3. Shall cover the wearer to the knees

7.3.4. Lab coats of 100% cotton are required in all undergraduate labs where chemicals, biologicals, or radiologicals are used including labs for Chemistry, Biology, Material Science Engineering, Chemical and Biomolecular Engineering, Biomedical Engineering.

7.3.5. Lab coats made of polyester-cotton blends (no less than 35% cotton) are acceptable in labs where no open flames are present.

7.3.6. Lab coats must be made of 100% cotton or flame resistant material in labs where open flames are used (such as alcohol burners)

7.3.7. Lab coats of flame resistant (FR) material are required in labs where pyrophoric materials are handled. Persons working with pyrophoric liquids are also required to wear 100% cotton clothing underneath the FR lab coat on days that they handle these materials in the lab.

7.3.8. Flame Resistant lab coats must meet the following criteria for the purpose of minimizing injury in the event of a splash of pyrophoric liquid:

7.3.8.1. 9oz fabric weight

7.3.8.2. Arc Rating: 12.4 ATPV.

7.3.8.3. Meets NFPA 70E Hazard Risk Category (HRC)

7.4. Laundering Lab Coats

- 7.4.1. Laboratorians are expected to keep lab coats in good condition and reasonably clean so as to not create a safety hazard.
- 7.4.2. Lab coats which meet the Georgia Tech specifications can be purchased at the VWR store located in room L2320 of the ES&T building. (hours of operation are Monday- Friday 8 am to 4:30 pm).
- 7.4.3. As of August 2010, there were no identified laundry services in Atlanta that would accept lab coats from chemistry labs, however: Some labs at GT use a uniform service to both supply and launder their lab coats (includes pick up and delivery). If you would like more information about this service (which was found to be very cost effective) please contact EHS Chemical and Laboratory Safety at 404-894-4635 or (www.ehs.gatech.edu)

7.5. Face Protection

- 7.5.1. Face shields worn over safety glasses may be required for certain processes as determined by the Principal Investigator (PI) and/or GT EHS. These include but are not limited to cryogenic operations and soldering.
- 7.5.2. Face Shields must always be worn over safety glasses or goggles, not instead of safety glasses or goggles
- 7.5.3. The use of face shields over safety glasses are required with processes involving high pressure reactors (>30 PSI) or pneumatic lines (>30 PSI), machining operations.

7.6. Hand Protection

7.6.1. Chemically-Resistant Gloves

- 7.6.1.1. Appropriately resistant gloves must be worn when handling chemicals, biologicals, or radiologicals.
- 7.6.1.2. Gloves shall be chosen to be appropriately chemically resistant but also to be appropriate for the process, e.g. gloves shall not put the wearer at risk by causing:
 - 7.6.1.2.1. Loss of dexterity,
 - 7.6.1.2.2. Risk of ergonomic injury (s/a increased muscle strain from gloves that are too heavy or stiff for pipetting, handling small objects, etc.)
 - 7.6.1.2.3. Increased risk of being caught in rotating equipment (from gloves that are too loose on the user's hands)
- 7.6.1.3. Nitrile exam gloves shall be used in all general purpose chemistry labs as the "general purpose glove".

7.6.2. Other Types of Gloves

7.6.2.1. Protective gloves must be selected as appropriate for their processes to protect from physical trauma including but not limited to:

- 7.6.2.1.1. Thermally protective gloves for hot or cold processes
Lineman rubber gloves for electrical hazards
- 7.6.2.1.2. Appropriate gloves for protection against abrasions and cuts
- 7.6.2.1.3. Gloves must be chosen so as to not create a hazard around moving machinery.

While there is no single glove material that provides 100% protection from all chemicals, a good all purpose glove is the nitrile exam glove. Latex gloves, which have been the most commonly used glove in labs for many years are not resistant to many of the most common solvents found in laboratories. Additionally, latex is a natural product and is also a powerful allergen which readily becomes airborne on glove powder each time a glove is removed. Most hospitals have banned the use of powdered latex gloves. Many institutions have banned latex gloves entirely

Consult the Material Safety Data Sheet section on chemical handling instructions before selecting gloves. Some, but not all MSDSs contain glove selection information. If you have questions about appropriate glove selection, contact EHS Chemical and Laboratory Safety at 404-894-4635 or www.ehs.gatech.edu. Be sure to include the name of the chemical and CAS number.

7.7. Lab Coats and Gloves Outside the Lab

- 7.7.1. Wearing a lab coat and gloves outside of the lab is acceptable when transporting chemicals, biologicals, or radiologicals between labs or from the chemical stock room. However:
 - 7.7.2. The gloves must be clean- change to clean gloves before leaving the lab.
 - 7.7.3. Whenever possible, leave one hand ungloved to open doors and push elevator buttons.
 - 7.7.4. Use service elevators whenever they are available.
 - 7.7.5. Whenever possible, lab coats are to be hung in the lab before exiting. When this is not possible, laboratorians are advised to bag lab coats in zip-seal plastic bags when leaving the lab.
 - 7.7.6. Lab coats and gloves are not to be worn in offices, lunch rooms, break rooms, rest rooms, conference, or meeting rooms.

7.8. Respirators

- 7.8.1. Respirators are a last resort for protecting people in the workplace. Under The Georgia Tech Respiratory protection program

<http://www.ehs.gatech.edu/chemical/respiratory.rtf>) and the Federal Respiratory Protection Standard (29 CFR 1910.134) employers are required to determine that no other method of protecting the employee is feasible before resorting to the use of a respirator.

7.8.2. Employees and students of Georgia Tech may not purchase or use respirators on their own, including N-95 filtering face pieces, without first consulting with GT EHS. Upon request of a respirator, a Respiratory Hazard Evaluation by EHS will be conducted. If the evaluation indicates that respirator use is warranted, then the next steps are:

1. Medical Clearance Exam
2. Respirator Fit Testing, and
3. Training.

Contact EHS Chemical and Laboratory Safety at 404-864-4635 or www.ehs.gatech.edu to schedule a Respiratory Hazard Assessment.

8. Non-Compliance

Penalties for non-compliance with this policy may include removal from the laboratory, suspension of laboratory privileges, grade reduction, and dismissal, as appropriate to the conditions and severity of the violation

Willful and/or repeat violations of this policy will be referred to the Department Chair and, if warranted, the Office of Student Integrity for disciplinary action.

PI's who willfully and/or repeatedly fail to implement this policy in their labs may be subject to disciplinary action.

Funding agencies and industry sponsors / partners often require adherence to Occupational Safety and Health Administration (OSHA) regulations and other standard safety practices and may withdraw funding from individual projects, or the Institute as a whole, when researchers are found to be in violation of industry-standard safety practices and rules.

9. References

American College of Occupational and Environmental Medicine, Guidance Statement - Use of Contact Lenses in an Industrial Environment, 2008

Code of Federal Regulations 29 CFT 1910.134 Respiratory Protection

Georgia Tech Respiratory Protection Program, www.ehs.gatech.edu

Georgia Tech Human Resources Manual Georgia Tech Human Resources Manual,
section 5.9, (<http://www.admin-fin.gatech.edu/?page=human>

National Institutes of Safety and Health, Contact Lens Use in a Chemical Environment,
Publication No. 2005-139, 2005

National Institutes of Safety and Health, Pocket Guide to Chemical Hazards, 2007