

Guidance Document

Laboratory Coat Selection, Use, and Care

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Background: The purpose of this document is to provide guidance for selection, use and care of lab coats. The Chemical Hygiene Plan (CHP) template for 2010 will state: "A laboratory coat is required for work with particularly hazardous substances (PHS's), unsealed radioactive materials, and certain biological agents. It is strongly advised that researchers wear a laboratory coat when working with hazardous substances. In some cases laboratory supervisors may identify situations where the use of lab coats or more protective apparel is **mandatory**."

Particularly hazardous substances (PHS's) is a term used by OSHA to refer to select carcinogens, reproductive toxins, and substances with a high degree of acute toxicity. More information on PHS's is provided in the CHP template. Certain biological agents refers to agents at Biosafety Level 2 or greater risk level and bloodborne pathogens or other potentially infectious materials such as human blood or body fluids.

In general, protective clothing, including lab coats, should not be used as a substitute for engineering controls such as a fume hood, a glove box, process enclosure, etc., or as a substitute for good work practices and personal hygiene. It may also be necessary to supplement lab coat use with additional protective clothing, for example, a rubber apron for handling large quantities of corrosives or hydrofluoric acid.

Lab coats:

- Provide protection of skin and personal clothing from incidental contact
- Prevent the spread of contamination outside the lab (provided they are not worn outside the lab)
- Provide a removable barrier in the event of an incident involving a spill or splash of hazardous substances

Lab coats are not designed to be the equivalent of chemical protection suits for major chemical handling or emergencies. With the exception of a splash resistance requirement under the OSHA bloodborne pathogen standard, there are no specific requirements in standards or guidelines for the type of protection that a lab coat is to provide. What this means is that:

- Lab coats are not tested for typical conditions that might be encountered in a research lab with respect to chemical use, or combined research activities.
- There is little or no information provided by manufacturers or distributors about the capability of a lab coat for a combination of hazards. A coat that is "flame resistant", such as treated cotton, may not be chemical resistant or acid resistant.
- A coat that is advertised as flame resistant has not been tested with criteria involving flammable chemicals on the coat. The term "flame resistant" refers to the characteristic of a fabric that causes it not to burn in air. The testing criteria involves applying an open flame to the bottom edge of a strip of fabric in a test chamber for 12 seconds and then looking at char length, after flame, and after glow, testing the self extinguishing properties of the fabric. The flame resistance test criteria were intended to simulate circumstances of a flash fire, or electric arc flash, not a chemical fire.

Selection. With the limitations above in mind, lab coats are made of different materials, and it is important to select a coat of appropriate material for the types of hazards in the lab. The first step in this selection process is to determine the types of hazards that exist in your lab and the reasons for the lab coats. The CHP Template contains a lab specific SOP form that can be used for assessing the hazards. Another assessment tool is available at: http://web.mit.edu/environment/pdf/ppe_form.pdf

Some questions to consider are the following:

- Does your lab work primarily with chemicals, biological agents, radioisotopes, or a mix of things?
- Are there large quantities of flammable materials (>10 gallons) or pyrophoric materials used in the open outside a glove box?
- Are there open flames or hot processes along with a significant amount of flammables?
- How are hazardous chemicals used and what engineering controls are available, e.g. a fume hood or glove box?
- Is there a significant risk of splash or splatter for the tasks being done?
- What is the toxicity of chemicals used?
- Is there a concern of inadvertent spread of contamination?

Once you determine hazards, you can review information on some typical lab coat materials in the Lab Coat Table at the end of this document and determine options for your lab. One coat may not work for all lab operations.

Some people may want to provide a basic Poly/Cotton blend coat for most operations, but have available lab coats of treated cotton or Nomex for work involving pyrophoric materials, extremely flammable chemicals, or large quantities of flammable chemicals. If chemical splash is also a concern, use of rubber apron over the flame resistant lab coat might be an option for these circumstances. There are also options for reusable, limited use, or disposable one time use lab coats. There are options for button front or snap front coats, and for open sleeves or knit sleeves.

The table at the end of this document provides information on some typical lab coat materials available, with guidance on use and limitations. As noted above, there is limited criteria for testing lab coat materials with respect to typical lab use scenarios, and some of the information is anecdotal. As more information becomes available, this table will be updated.

Lab Coat Use. An appropriate size should be selected. Lab coats are available in small, medium, large or extra large. Some lab coat services also offer custom sizes (e.g., extra long sleeves, tall, or woman's fit). Lab coats should be worn with sleeves down and fully buttoned. Wear lab coats only when in the lab or work area. Lab coats should be removed when leaving the lab/work area to go home, to lunch, to the restroom, or meetings in conference rooms, etc.

Cleaning. Non-disposable lab coats should be cleaned routinely, by use of a laundry service or work area washers and dryers. Frequency of cleaning will depend on the amount of use and contamination. Information on laundry services available is at the end of this document. Usually these companies provide the lab coats as part of their laundry service, though in some cases, you can arrange for occasional cleaning. Personnel should not be laundering lab coats at home. EHS is investigating the feasibility of a centralized service.

Emergency spill or splash. In the event of a significant spill of a hazardous material on the lab coat, it should be immediately removed. If skin or personal clothing is impacted, it will be necessary to proceed to an emergency shower. Any contaminated clothing should also be removed. Guidance should be sought from EHS about whether the coat and clothing should be cleaned or discarded as hazardous waste.

Emergency fire. The action will depend on circumstances of the fire. If only the lab coat is on fire, remove it, leave area, and call 100 or activate fire alarm. If lab coat and clothing are on fire, shout for help then stop, drop, and roll; or proceed to an emergency shower (if close by) to extinguish fire. If the area is on fire, leave area, closing doors as you leave. Activate fire alarm or call 100. Seek follow-up medical attention.

Laundry service information. Most area laundry services routinely provide and launder poly/cotton coats (80/20 or 65/35) with a per coat charge for weekly service. (For a chemical research lab, the 65/35 may be preferable). Laundry services also often provide 100% cotton coats, but the charge per coat is greater for these. It may be possible to arrange for laundering other types of coats, such as flame resistant coats. You will need to work with the provider for specific arrangements, but the two companies below have some flexibility for working to provide a service that meets your needs. The vendors below provide services to other labs and have procedures for processing coats based on type of contamination expected. In negotiating with a vendor, you should be sure they understand the possible contamination that may be on the lab coat. Do not use a local dry cleaner as they generally are not familiar with proper handling of potentially contaminated items.

1. Cintas, Chelmsford, MA. Contact: Chris Angelo ((203)901-3423)

65/35% Poly/cotton and 80/20% Poly/cotton options.
Weekly service, 40cents per coat.

Cintas Uniform has a line of Fire Resistant clothing and arrangements could be made for purchase or lease of fire resistant lab coats and a cleaning service for them.

2. Uni First – Contact: John Dzindolet ((888)-427-2806, ext. 121))

80/20 poly/cotton (Type coat normally provided as a service)

65/35 poly/cotton and 100% cotton also available. Can provide Nomex lab coats, and is working with other schools to provide 80/20, with a few Nomex coats for special applications as part of rental service that includes laundering.

3. Falvey Linen Supply : <http://www.falveylinen.com/index.htm>

Lab Coat Information Table

Material/Source	Splash Resistance/Chemical Resistance	Flame Resistance	Comfort	Uses/Comments
<p>Non-disposable Polyester/Cotton Blend 80/20 or 65/35 or 40/60 common. (recommend at least 65%/35% for chemical research lab setting.)</p> <p>(Available from VWR stockroom or ECAT, or from laundry service companies)</p>	<p>Yes, splash resistant.</p> <p>Unknown chemical resistance. Anecdotally, better for work with acids than cotton.</p>	<p>No. Coats with more cotton will burn less readily.</p>	<p>Lightweight breathable. The more cotton, the more breathable.</p>	<p>Good for clinical settings (hospitals, clinical labs) and labs handling biological materials and small amounts of flammables.)</p>
<p>100% Cotton</p> <p>(Available from VWR stockroom in 56 and through ECAT and laundry service companies listed.)</p>	<p>Not splash resistant or fluid proof. Degraded by acids. Anecdotally, more resistant to solvents.</p>	<p>No. Burns less readily than poly/cotton blends</p>	<p>Lightweight breathable</p>	<p>Good for labs where acid handling is limited and splash resistance is not a concern, and there is some work with flammables, heat and flame. Should supplement with an apron for acid handling.</p>
<p>Cotton treated with flame retardant.</p> <p>Not available from VWR.</p> <p>Sources: Lab Safety Supply Company, Workuniform.com</p>	<p>Not necessarily fluid proof. Degraded by acids. More resistant to solvents. Not generally tested for chemical resistance.</p>	<p>Yes</p>	<p>No information.</p>	<p>Appropriate for lab settings where there may be a significant fire hazard, with an understanding of the limitations of the testing criteria for flame resistance (see background). May be appropriate to supplement with an apron for acid handling. More costly. Will not lose flame resistance with laundering over typical use life of coat. No bleach should be used by the laundry service.</p>
<p>Dupont Nomex</p> <p>Not available from VWR.</p> <p>Available from Lab Safety Supply, Fisher Scientific and Workuniform.com</p>	<p>Unknown splash and chemical resistance. There is a claim for chemical resistance, including acids, alkalis, and most solvents, but specific testing information could not be found.</p>	<p>Yes</p>	<p>Breathable.</p>	<p>Expensive. Flame resistance is maintained even with laundering, provided bleach is not used. Good for settings where there may be an arc flash or flash fire. Used in petrochemical industry.</p>
<p>Polypropylene lab coat.</p> <p>Available from VWR through ECAT.</p>	<p>No</p>	<p>No</p>	<p>Yes</p>	<p>Intended for protection from dirt, grime, dry particulates in relatively non-hazardous environment such as animal handling and clean rooms. Burns readily.</p>
<p>VWR Microbreathe Lab Coat (Disposable available from VWR through ECAT)</p>	<p>Splash resistant for blood and body fluids and chemicals.</p>	<p>No</p>	<p>Yes</p>	<p>For clinical and biological lab settings, and some chemical labs. Snap front, so can be readily removed. Not good for settings with significant fire hazard.</p>