BACKGROUND

This guidance is issued as a result of questions raised by several departments regarding the suitability of lab coats for various procedures, including those involving use of flames or other sources of ignition with flammable liquids.

Personal Protective Equipment (PPE) is worn to protect laboratory workers from injury. The Occupational Health and Safety Act has specific requirements regarding Personal Protective Equipment. The Act requires that employees wear protective equipment based on the hazards that they are exposed to. Employers must also ensure that employees are trained in the proper use and care of PPE and that the employee wears the equipment properly.

The choice of style and fabric of lab coats provided must be arrived at as a result of risk assessment of the nature and quantities of the hazards involved and the circumstances of use. The following guidance is intended to assist Schools in making that choice.

Reasons for Wearing a Lab Coat

A lab coat is worn to give you maximum protection in the following ways:

- The lab coat must be able to absorb or deflect splashes or spills so that harmful materials are kept off your skin.
- Lab coats can serve a number of purposes – protection from chemical splash, fire resistance, or clothing protection.
- The lab coat should offer some protection against flash and fire so that even if the coat starts to burn or char, you should escape without injury or with less serious injuries.

There are a wide variety of lab coats available. This document is not intended to be a comprehensive look at lab coats – if you want more information, check with a coat vendor. In 2009, a young researcher using a pyrophoric liquid at UCLA was killed when her synthetic sweater caught fire; she was not wearing a lab coat. The related issue of proper laundering of lab coats is also addressed in this document.
Lab Coats and Fire-resistance (in approximate order of decreasing fire resistance)

1. **Nomex** - offers the highest level of lab coat protection from fire. Highly fire-resistant because the fabric thickens, carbonizes and remains intact under fire conditions. Used widely in occupations where fire is a real hazard. **Other Advantages:** strong, flexible, good resistance to tearing, resistant to most solvents and to acids and alkalis, can be cleaned at home or commercially. **Disadvantages:** Nomex decomposes if exposed to chlorine bleach; can be hot in certain situations (e.g., outdoors); more expensive

2. **Fire-resistant cotton** - cotton coats are available that are treated with a fire-resistant material. However, this capability may dissipate after repeated laundering (brand dependent). 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. May be appropriate to supplement with an apron for acid handling. Mid-way in price between untreated cotton and Nomex.

3. **100% Cotton** - superior to synthetic blends for fire-resistance, but inferior to those above. **Advantages:** comfortable, cheaper than coats above. **Disadvantages:** rarely last more than a year with daily use; can be degraded by acids. **These lab coats can be purchased at the University Bookstore.**

4. **Synthetic/Cotton Blends** - 100% polyester coats, or cotton/polyester blends are the most combustible and are not considered appropriate for working with flammables. Good for clinical settings (hospitals, clinical labs) and labs handling biological materials

5. **Disposable** – for use in clinical and biological lab settings, and some chemical labs. Snap front, so can be readily removed. Splash resistant for blood and body fluids and chemicals. Not good for settings with significant fire hazard.

Lab coats are **not** designed to be the equivalent of chemical protection suits for major chemical handling or emergencies. There are no specific requirements in standards or guidelines for the type of protection that a lab coat is to provide. This lead to taking the following into point:

- 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.1

**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 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 determine options for your lab. One coat may not work for all lab operations. Some people may want to provide a basic Poly/Cotton1 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.

**Things to Look for in a Good Lab Coat**

**Closures**

Lab coats typically opened at the front and close using buttons, zippers or snap closures. Snap closures are recommended since they can be removed quickly in the event of fire, chemical, radiological or biological spills.

Lab coats must be worn completed buttoned up.

**Pockets and Slits**

Coat pockets should be convenient placed preferably NOT with side-slits that allow easy access to any pocket worn underneath.

---

1 Department of Environmental Health and Safety, Queen’s University
GUIDANCE ON CHOICE OF LAB COAT
STYLE AND MATERIAL

Effective Date: September 2013
Revision Date: Version 1.0

Sleeves
Lab coats are provided with long sleeves to protect the upper and lower arms. Lab coats should never be worn with the sleeves rolled up.

If there is a hazard with lab coat sleeves becoming entangled/catching on equipment lab coats with knitted/elasticised cuffs may be purchased.

Short sleeved lab coats should NOT be used in laboratories.

Length
Lab coats should extend to or slightly below the knee. Any exposed skin below the lab coat must be covered.
Frequently Asked Questions

*How do we go about getting our lab coats washed? Do we take them home and wash them there, or have to wash them in the lab, or do we have to send them to some place for washing? Does the university have a service?*

**Answer**

There is no University-wide provision for laundering personal protective equipment. Some Faculties and Departments have laundry facilities, but those are not open to others outside their section. Providing appropriate PPE is the responsibility of the department, and the individual supervisor. One or a combination of these must assume the expense for laundering (or replacing) contaminated personal protective equipment (i.e. lab coats, smocks, coveralls, etc.).

If an item is contaminated with hazardous materials (biological, chemical, radiological), then under the requirements of the “Policy for Personal Protective Equipment (PPE) in Research Laboratories and Teaching Labs” and regulatory considerations, the item may **NOT** be taken home for cleaning, nor may it be sent out to the cleaners without special information and handling instructions. Some people launder their lab coats in the lab sink and hang them in the lab to dry. Some groups have contracted laundry pick-up and delivery services with local commercial laundries.

*Is there an alternative to using a laundering service?*

**Answer**

An alternative to laundering is to dispose of the item(s) and buy new ones. In some cases, some people launder their lab coats in the lab sink and hang them in the lab to dry. If the item is contaminated to the extent that it fits the definition of hazardous waste (biological, chemical, or radiological), it must be disposed of as hazardous waste. If it is not, it may be disposed of in the regular trash.

*Can you summarize what to do with contaminated and non-contaminated lab coats?*

**Answer**

- No Overt Contamination
  - For coats that are dirty, but not chemically contaminated – the owner may choose to wash the coat at home.
    - If an item is not contaminated with hazardous chemicals (or human pathogens, or radioisotopes), then it is merely soiled with normal daily dirt and dust and there is not a restriction upon laundering it at home.
GUIDANCE ON CHOICE OF LAB COAT STYLE AND MATERIAL

Effective Date: September 2013
Revision Date: Version 1.0

• Carry the lab coat home in secondary bag.
• Wash the coat by itself, in a washing machine, according to the manufacturer's instructions.

- Contaminated Coats
  • Can be washed by a commercial laundry service.
  • When using a commercial laundry service, it is the responsibility of the lab coat owner or the person arranging laundry service to:
    ▪ Contact the commercial service, explain the specific contamination concern and verify that the laundry service can handle cleaning that lab coat.
    ▪ Bag the lab coats in the lab and if necessary label the bag. If the lab coats are wet or pose a leak hazard, they must be placed into a leak-proof container for transport.
    ▪ If the coats have a blood borne pathogens hazards (contaminated with human blood, blood products, human cells or tissues, etc.) the container holding the lab coats must be labeled with the biohazard symbol.

- Disposable Lab Coats
  • Use if contamination is routine and you do not use a laundry service.

- Disposal of Lab Coats
  • Both regular and disposable lab coats will eventually need to be disposed of in the appropriate waste stream.
  • Typically lab coats can be disposed of as regular solid waste; however, in some cases they should be disposed of as hazardous waste. Contact the Safety Office if you are unsure of the proper disposal method.