Laboratory coats and aprons

Posted by Anonymous on Wed, 2019-02-27 13:06

Laboratory coats and aprons: What types of lab coats or aprons should be used in a school laboratory? What should they be made of? Are there any standards that pertain to the type or quality of lab coats used in a school laboratory?

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7
8
9
10
Senior Secondary
Laboratory Technicians:
Laboratory Technicians

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Submitted by on 27 February 2019

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The type of personal protective equipment (PPE) selected, used and maintained in laboratories is done so in accordance with relevant legislation, Australian standards and codes of practice, along with the completion of a risk assessment to determine suitability for the nature of the work and any hazards associated with the work.[1,2] Note that these are general guidelines for all laboratories and there is nothing specific pertaining to high school science laboratories.

In general, when laboratory coats/aprons are used correctly, they should:

- protect the skin and regular clothing of the user from hazardous spills, splashes, dust, dirt and contamination from chemical and biological sources
- protect the environment and personnel outside of the laboratory from any transfer of contamination
- provide easy removal in the event of a hazardous substance spill or fire.

Schools should consider the following:

- The style of protective clothing and the type of materials used. This should be based on a risk assessment, to provide protection that is relevant to the task at hand and the associated hazards.
- For many activities in the school science laboratory, a lab coat/apron is not required. When chemicals are used, small splashes of low molarity acid can put a hole in some clothing and most dyes can stain clothing, so a protective coat or apron is appropriate. Senior chemistry classes require a higher level of protection.
- Science teachers and technicians who are handling pure chemicals and concentrated acids are at greater risk of exposure to hazardous chemicals and need to ensure that they are suitably protected.

General guidelines for clothing in laboratories:

Regular clothing:

- can be a hazard in a laboratory if loose, made of a synthetic material and free flowing.
- should be close fitting. Accessories such as ties or scarves should be prevented from hanging loose.[3]

Laboratory coats/gowns/aprons if required should be:

- a suitable size and reasonably comfortable for the person wearing it,
- worn correctly. i.e., buttons and/or ties fastened securely,
- easily removed in the event of an emergency,
- used so as not to create new hazards,
- removed when leaving the laboratory,
- inspected, well maintained and cleaned regularly to keep in good order,
- laundered separately to prevent any chemicals/biological materials that might be on the coats contaminating other clothes.

Laboratory coats or aprons should be appropriate to the task being undertaken, both in design and material.

- **Laboratory coats.**
    -

Cotton or cotton/polyester blend laboratory coats provide good protection for clothing and are suitable for general laboratory work in schools.
    - Length should be knee length or longer for effective coverage and protection[4].
    - Sleeves should not be gaping in order to minimise the likelihood of knocking equipment over or incurring splashes on the arm. Some laboratory coats have cuffs or buttons to minimise the gaping.
    - High top buttoning provides the most effective coverage and protection.
    - Fastenings should be easy to undo to facilitate quick removal if necessary.
- **Laboratory gowns.**
    - Laboratory gowns with rear fastenings are more suitable for microbiological work and tend to be used in university and clinical laboratories.
- **Laboratory aprons.**
    - Aprons provide full coverage at the front, but do not protect the upper most body, shoulders and arms.
    - Aprons are made from different materials such as cotton, vinyl, rubber, nitrile, PVC and neoprene. They offer varying degrees of protection from chemicals, tear resistance and general durability.

Special consideration should be given to the materials to ensure they are compatible with the hazards at hand. For example, a laboratory coat made of a thicker cotton material offers better protection from work that involves the use of chemicals such as acids, bases and flammable materials[1]. In general, the more polyester, the less protection from absorption of liquids and increased flammability (See information in AS/NZS 2243.1-2021 section 4.2.2, below)

Contact your laboratory coat manufacturer or supplier for specific information regarding protective properties of laboratory coats and aprons.

Some universities have produced documents which discuss Personal Protective Equipment (PPE) and include comparisons of different types of protective clothing for the laboratory which are worthwhile reading.[1,3,4]

What the Standards say:

> **AS/NZS 2243.1-2021** states "*A risk assessment in conjunction with information from relevant SDSs and other parts in the AS/NZS 2243 series, shall determine what PPE is required. Typical PPE worn in a laboratory may include clothing (see Clause 4.2.2), protective eyewear (see clause 4.2.3) and closed shoes (see clause 4.2.6)*."[5]

> **AS/NZS 2243.1-2021** states "*Laboratory personnel shall use the protective clothing appropriate to the task being undertaken. To reduce the risk of contamination of non-laboratory areas, safety clothing and equipment shall be removed on leaving the laboratory.*

The use of long-sleeved cotton or cotton/polyester laboratory coats, wrap-around, back opening gowns or boiler suits is recommended for general laboratory work. The use of quick release textile fastenings is recommended for wrap-around laboratory gowns. Care should be exercised in the choice of the garment material. Nylon is not recommended because it is easily destroyed by heat or acid. Many synthetic fibres offer poor protection against liquids, which can pass through the fibres with little or no absorption. In a fire, synthetic textiles tend to melt and cause burns to the body. Consideration should also be given to any static electricity hazard produced by synthetic clothing.

NOTE: Protective clothing should not be laundered domestically."[6]

References and further reading:

[1] UNSW website, (2021, March 4), '*HS659 Personal Protective Equipment Guideline*', retrieved from, https://safety.unsw.edu.au/personal-protective-equipment-ppe (pages 4-6)

[2] Safe work Australia website, (2018, May 1), '*Model Code of Practice: How to manage work health and safety risks*', retrieved from https://www.safeworkaustralia.gov.au/doc/model-code-practice-how-manage-work-health-and-safety-risks

[3] University of Alabama in Huntsville website, (2013), '*Guidelines for Selection, Use and Care of Laboratory Coats*, retrieved from https://www.uah.edu/images/OEHS/biologicalsafety/Laboratory_Coat_Guidelines_2013.pdf

[4] Massachusetts Institute of Technology website, (2018, February), '*Lab coat selection, use and care at MIT*', retrieved from https://labcoats.mit.edu/guidance/

[5]Standards Australia, (2023), 'AS/NZS 2243.1-2021 *Safety in Laboratories – Planning and operational aspects*, Section 4.2.1'. This excerpt is reproduced by ASTA with the permission of Standards Australia Limited under licence CLF1222asta. Copyright in AS/NZS 2243.1-2021 vests in Standards Australia and Standards New Zealand. Users must not copy or reuse this work without the permission of Standards Australia or the copyright owner.

[6] Standards Australia, (2023), 'AS/NZS 2243.1-2021 *Safety in Laboratories – Planning and operational aspects*, Section 4.2.2'. This excerpt is reproduced by ASTA with the permission of Standards Australia Limited under licence CLF1222asta. Copyright in AS/NZS 2243.1-2021 vests in Standards Australia and Standards New Zealand. Users must not copy or reuse this work without the permission of Standards Australia or the copyright owner.

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CLEAPSS website, (2001), '*CLEAPSS Laboratory Handbook, Section 03 – Personal Safety'*, retrieved from https://science.cleapss.org.uk/Resource/Handbook-Section-3-Personal-Safety.pdf (Member access only)
