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[Home](#) > [Laboratory coats and aprons](#)

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?

Voting:



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Year Level:

7
8
9
10

Senior Secondary

Laboratory Technicians:

Laboratory Technicians

Showing 1-1 of 1 Responses

Laboratory coats and aprons

Submitted by sat on 27 February 2019

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, laboratory coats/aprons when used correctly 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 substances spill or fire.

Schools should consider the following.

- The style of protective clothing and the type of materials used should be based on a risk assessment, to provide protection that is relevant to the task at hand and the associated hazards.
- For most activities in the school science laboratory a lab coat/apron is not required. Most schools do not use coats or aprons for general science classes, but small splashes of low molarity acid can still put a hole in some clothing and most dyes can stain clothing. Chemistry classes may 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 protection⁴.
- 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.
 - Chemical resistant laboratory aprons provide good protection and may be worn over a laboratory coat for additional protection, especially when there is a risk of chemical splash (E.g. when handling corrosive chemicals such as concentrated acids).
 - Disposable plastic aprons are a very suitable alternative for biological work such as dissections or microbiology.

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 materials¹. In general, the more polyester the less protection from absorption of liquids and increased flammability (See information in AS/NZS 2243.1-2005 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.^{1,4,5}

What the Standards say:

AS/NZS 2243.1-2005 states “*Minimum requirements for PPE in a laboratory shall be laboratory clothing (see Clause 4.2.2), protective eyewear and closed shoes unless lesser requirements can be justified by a risk assessment.*”⁶

AS/NZS 2243.1-2005 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 should be removed on leaving the laboratory.*”

The use of long-sleeved cotton or cotton/polyester boiler suits, wrap-around gowns or laboratory coats 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. 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. Also, 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.”⁷

References and further reading:

¹ UNSW. 2016. *HS659 Personal Protective Equipment Guideline*, UNSW website, <https://www.gs.unsw.edu.au/policy/documents/HS659.pdf> (page 7)

² ‘Model Code of Practice: How to manage work health and safety risks’, Safe Work Australia website, <https://www.safeworkaustralia.gov.au/book/model-code-practice-how-manage-work-health-and-safety-risks> (25 May 2018).

³ CLEAPSS. 2004. *CLEAPSS Laboratory Handbook*, Section 03 – Personal Safety. CLEAPSS website, <http://science.cleapss.org.uk/Resource-Info/Handbook-Section-3-Personal-...> (Member access only)

⁴ University of Alabama. 2013. *Guidelines for Selection, Use and Care of Laboratory Coats*, University of Alabama in Huntsville website, https://www.uah.edu/images/OEHS/biologicalsafety/Laboratory_Coat_Guideli...

⁵ ‘Lab coat selection, use and care at MIT’, Massachusetts Institute of Technology website, <https://labcoats.mit.edu/guidance> (February 2018)

⁶ Standards Australia. 2005. AS/NZS 2243.1-2005 *Safety in Laboratories – Planning and operational aspects*. Section 4.2.1. Sydney: NSW. Reproduced with permission from SAI Global Ltd under Licence 1407-c117.

⁷ Standards Australia. 2005. AS/NZS 2243.1-2005 *Safety in Laboratories – Planning and operational aspects*. Section 4.2.2. Sydney: NSW. Reproduced with permission from SAI Global Ltd under Licence 1407-c117.

Queensland Department of Education. 2018. *Personal protective equipment*, Queensland Department of Education website, <https://education.qld.gov.au/initiativesstrategies/Documents/fact-sheet-personal-protective-equipment.pdf>

‘Safety in the science classroom, Personal Protective Equipment’, National Science Teachers Association website, <https://www.nsta.org/safety/ppe.aspx> (September 2017)

Standards Australia. 2008. AS/NZS 4501.1:2008. *Occupational protective clothing. Guidelines on the selection, use, care and maintenance of protective clothing*. Sydney: NSW.

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