



# Laboratory building standards

**NZASE**  
resource

*NZ standards are agreed specifications, in this case for lab design, health and safety. These documents are essential references when storing and using new lab supplies, and during refurbishment and new builds. We need to become familiar with these standards so that our labs are designed to be safe for staff and students. NZASE Science Communicator Mike Stone summarises key things to be aware of from nine standards.*

*This article is **not** a substitute for reading and familiarising yourself with the standard details. Remember ‘**shall**’ requirements are mandatory, while ‘**should**’ indicates a recommendation.*

**N**ZASE has paid for a subscription so that members can have free access to these [nine relevant standards](#). To access these, [email NZASE Administrator Donna Sellers](#).

These standards are living documents that are reviewed and amended. As it is important to ensure the current standard is being used, there are strict guidelines for access, which limit how the standard is stored, for how long and who has access.

## Lab design: General [ASNZ 2982]

Materials used for benches, floors and walls shall be smooth, impervious, easy to clean and resistant to the chemicals used. Benches shall also be scratch- and heat-resistant with all joints (eg, wall and sink) sealed. Floors shall also be slip resistant, with joints sealed and intersections (eg, walls/plinths) covered.

Aisles shall be at least 1200mm to allow both workers and through-traffic. For schools, lab design needs to also consider wider aisles that allow larger numbers to exit, as well as clear, prominent signage, storage for student bags and safe preparation areas.

Shelving shall be resistant to degradation when exposed to the goods stored. All shelving should be secured, including adjustable shelving. In areas prone to earthquakes, shelves need lips. The height of the top shelf should be less than 1700mm, and shelf depth less than 500mm.

Labs should not be sited adjacent to non-lab spaces on the same floor, and should be designed to allow control of all access points. Standards 2243-3 and 2243-4 both require a closable and presumably lockable door to the lab. Two points of egress are also mandated.

When labs are being built or refurbished, schools need to provide designers with a brief about lab requirements with many things listed, otherwise they set the agenda; Appendix A of 2982 lists some ideas. HoDs stress the importance of the lab manager and/or HoD having a voice in meetings with architects to ensure lab design meets the standards requirements.

Labs also need a first aid kit, storage for lab coats, eye protection, gloves, contaminated waste, and spill kits. Staff who

*Rangiora High School Laboratory, Central Heating NZ.*



*Above: Side aisles in an AGGS lab.*

*Left: Lipped storage shelves at AGGS.*

*All photos: Mike Stone.*



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Representing the needs of science teachers

**Top right:** work in isolation shall be provided with a means of summoning help (2243-1, 2, 4).

*Bulk storage in spill trays, AGGS, Centre right: Eye wash station, Northcote College.*

## Electrical

All electrical apparatus not permanently wired should be protected by a transformer or RCD (2243-1).

Electrical sockets shall be arranged to avoid ingress of water. If not protected from residual current they shall be at least 300mm above floor or bench, and labelled 'Not RC protected'. Fluorescent lighting shall be fitted with colour corrected tubes (2982).

## Eyewash

Emergency eyewash stations are listed as requirements in several standards. An eyewash station and safety shower shall be in close proximity to the lab; within 15m and 10s is good practice.



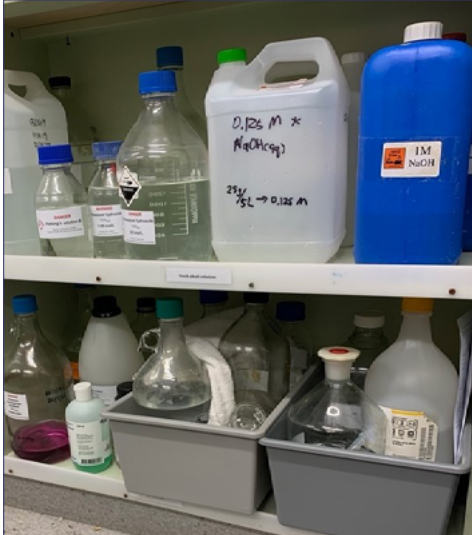
## Hazardous chemicals

Lab design needs to allow for cabinets to store 250mL of flammable liquids for day-to-day needs (ASNZS 1940), under bench space for up to 30L, and if needed, a dangerous goods store for up to 500L. These are mandatory requirements (2982, 2243-1).

More than 20L of class 8 substances shall be stored in a dedicated acids cabinet (2243-10). Hazardous chemical storage shall have its own mechanical or natural ventilation (2928). Emergency shut offs shall be prominently labelled and accessible on an egress path (2982).

## Fume cupboard: Fixed (2243-8) and mobile (2243-9)

Fixed fume cupboards (FC) are designed to draw in air to remove hazardous fumes, so their siting within the lab is crucial to avoid turbulence. FC shall be 1m from traffic routes, 3m if in continual use; 1.5m from an opposing bench (ie, behind user); 1.8m from opposing wall, at least 300mm from a sidewall; and the side pf the FC should be at least 1m from a door.



It should not be placed under an air conditioner or near a fan, heater or draught. The FC shall not be in the route of a fire exit.

A risk assessment shall be carried out before purchase and once siting is decided. After installation, the FC shall be tested before use (see 2243-8 and appendices).The exhaust

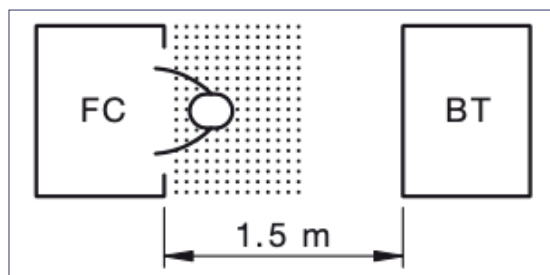
from fixed fume cupboards shall be discharged at least 3m above the roof.

Filters and scrubbers remove the hazards but with fine particles providing a large surface area, the filters (often carbon) pose a significant fire risk.

Regular inspection and maintenance is mandatory for safe operation; this means that FC exhaust systems, filters and scrubbers need to be accessible.

A fire extinguisher rated at 5B:E shall be kept close, but not attached to the FC. Gas

*Below: Spacing where the same operator uses the fume cupboard and the benchtop, or where occasional traffic only is anticipated. Standard 2243-8.*



*Bottom left: Mobile fume hood at AGGS. Bottom right: Fixed fume cupboard, Northcote College.*





and water outlets shall be individually controlled, with controls on the outside.

Fumehoods are mobile. Their power lead shall be detachable by a jack system, so the trolley can't be pulled over if moved while attached. Similar siting requirements apply, and once determined the fume hood (FH) cannot be placed elsewhere without another risk assessment and set of pre-use tests.

### Gas cylinders

Compressed cylinders shall be stored in a purpose-built compound, upright and constrained in a rack or stand, away from sources of heat, ignition and combustible material.

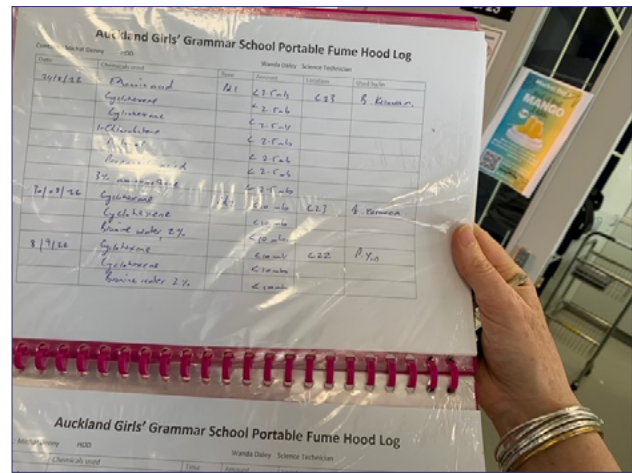
### Ionising radiations (2243-4)

The lab becomes a Designated Radiation Area (DRA) if it receives a dose of 0.1mSv/yr or more, eg, from sealed sources.

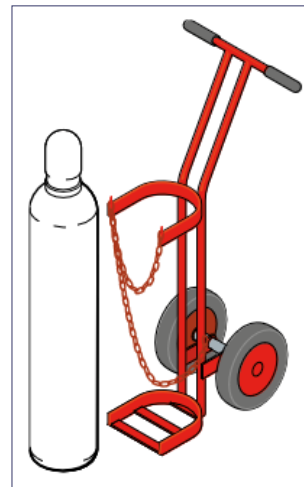
When not in use, these sources shall be stored in secure and adequately shielded containment,

with signs. If schools also use other radiation sources, there are many stringent requirements with which they must comply.

A sealed radioactive source. Westlab.



Fume hood logs at AGGS.



Gas cylinder and trolley, BOC Guidelines for gas cylinder safety.

### Ventilation (2982)

Ventilation shall be provided, and needs to be kept separate from adjacent non-lab areas. If using windows for natural ventilation, they need an openable area of at least 10% of the floor area.

Mechanical ventilation shall prevent the uncontrolled dispersion of hazardous airborne contaminants. Where possible these shall be removed from the lab at source.

**Ngā Kupu**

- Hauhau** – Ventilation
- Hiko** – Electrical, electricity
- Hoahoa** – Architectural design
- Kāpata haurehu tāoke** – Fume cupboard
- Kuneroa tangata** – Human evolution
- Mōrearea** – Hazardous
- Paerewa** – Standard
- Taiwhanga pūtaiao** – Science lab
- Tohutoro** – Reference
- Whakature** – Compulsory, mandatory.

Te Aka Maori Dictionary and Peakupu

**QUALIFIER**

This article has identified only features important to lab design. The standards also detail many health and safety practices that are worth noting, some in more detail than the 2023 Safety in Science guide. Examples include fume cupboard training, paper chromatography ventilation, using *Bacillus spp.*, student age limits on access to sealed radiation sources, and many more.

*This article benefited by critique from Jacqui Alcock, Jane Lieshout and Doug Walker.*