

ASSIST INFORMATION SHEET

School science laboratory gas-fitting requirements

The installation and supply of gas to school science laboratories should be according to:

- AS/NZS 1596:2014 *The storage and handling of LP Gas*
- AS/NZS 2982:2010 *Laboratory design and construction*
- AS/NZS 5601.1:2013 *Gas installations Part 1: General installations*

These Australian/New Zealand standards set out the minimum requirements for installations and are subject to the local technical regulators for each state and territory, which may have additional requirements that exceed the requirements as stated in the Australian Standards. Some relevant aspects to be considered in school science laboratory settings are detailed below.

Isolation devices and signage

An isolation device is mandatory and can be either a manual or automatic shut-off valve that is readily accessible and well signed. A manual shut-off needs to be a single action lever of the quarter turn type, where the gas supply is open when the handle is in line with the pipe and closed when the handle is across the pipe.

Current requirements for secondary school science laboratories specify an appropriately located push-button shut-off, with key operated manual reset. It should ideally be located adjacent to the main electrical shut-off near the teacher's bench on an egress path.

Clear signage that is legible and durable is required. Suggested wording for the notice is:

'GAS ISOLATION: Turn off when gas is not in use or in the case of emergency. Before turning on, ensure all Bunsen burners are turned off'.

Attachment of Bunsen burners to the gas outlet

There are two styles of fittings permitted:

1. Push-on connectors

The 'push-on connectors' are also referred to as 'fixed turret type outlets' or 'laboratory gas turret cocks'. These types of fitting, operate on low gas pressure and the Bunsen burner tubing slides over the special 'fir tree' fitting and is held on by friction. This style has many advantages over the bayonet style fitting. The tubing from the Bunsen burner connects easily straight onto the fitting. Once this is secure, the gas can easily be turned on using the lever in the fitting to enable easy lighting of the Bunsen burner. It is clear to see that the tap is on or off. The experience of many decades of their use in school science areas indicates that they are safe, and rarely if ever accidentally dislodged. However should this happen, the gas supply is quickly and easily cut off by the tap in the turret.

2. Quick-connect devices (also referred to as bayonet fittings)

These devices are subject to some local requirements. For example, they are not permitted in schools in Victoria. They are not commonly used in Australian school science areas.

Whilst the bayonet style fittings might be permitted, it is recommended that a local risk assessment be conducted regarding the use of these fittings taking into consideration the following:

- There are difficulties involved with connecting the 'quick-connect devices'. It usually requires at least two operators to be involved in the procedure: one to push in the connector and the second person to light the Bunsen. It has also been reported in some schools that teachers and students require additional help to push in and twist the connection in place, sometimes requiring the use of pliers to assist.
- Where inline valves/taps are connected to the hosing between the bayonet fitting and the Bunsen burners, stability of the Bunsen burner can be affected causing it to tip over, creating a serious fire hazard.
- The bayonet style fitting has no tap or valve for each outlet, so in the event of an incident such as a burning leak from a split hose, the individual gas supply cannot be turned off.

Regarding the tubing required for Bunsen burners, the following points should be considered:

- The statements in the SDSs for both LPG and LNG give instructions not to use natural rubber flexible hoses.
- It is important to have a flexible tubing adequate for the function.
- PVC tends to be rigid and has a memory for coiling, which can create a hazard of the Bunsen burner falling over.
- Silicone tubing appears to be a very suitable alternative to rubber tubing for use with Bunsen burners. Although more expensive, it has a much longer life span and is more heat resistant. It is also not prone to splitting or becoming brittle.
- All tubing should be checked periodically for cracks, hardening and other damage.

Regarding reduced gas flow through the Bunsen burner, one or both of the following can cause this:

- Blockages in the jets – these may need to be cleaned due to possible blockages or replaced. This is the most common cause.
- A reduced gas pressure that is coming through the reticulated service – the gas pressure may need to be tested and the gas regulator adjusted or replaced.

Science ASSIST recommendations

Whilst both push-on connectors and bayonet type gas fittings are permitted, Science ASSIST recommends the use of push-on connectors in conjunction with silicone tubing.

References

AS/NZS 1596:2014 *The storage and handling of LP Gas*

AS/NZS 2982:2010 *Laboratory design and construction*

AS/NZS 5601.1:2013 *Gas installations Part 1: General installations*

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