



Biological Safety Cabinets: What you need to know for their installation and maintenance

The **OGTR guidelines for certification of a PC2 Laboratory** refer to the following Standards in regards of the installation and maintenance of BSC:

- **AS 2252.4 - 2010:** *Controlled environments Part 4: Biological safety cabinets Class I and II – Installation and use*

Previously known as AS2647-2000, this Standard is an adoption from British Standard BS 5726:2005 with modifications for Australia outlined in the Appendix. This Standard is an excellent source of reference when looking to organise BSC installation in the laboratory. The Standard provides detailed recommendations for BSC position in different laboratory settings so that disturbances to the safety cabinet and its operators are kept minimised. The Standard also discuss considerations of air make-up and room ventilation systems when installing safety cabinet in order to ensure they do not compromise the safety cabinet's performance, hence the safety of operators.

- **AS 2252.2 – 2009:** *Controlled environments Part 2: Biological safety cabinets Class II – Design*

The Standard states that periodic critical performance tests of cabinet shall be conducted at least annually and on any change to cabinet position and function. Carefully sliding a cabinet away from the wall does not constitute a change to cabinet position.

In this Standard, tests for BSC are classified into two groups: Critical performance tests which are required to confirm the cabinet functioning properly and non-critical tests which relate to operator comfort and safety. In the description for each of the tests, reference is made back to the Standard for testing of safety cabinet AS 1807-2000. These reference numbers of AS 1807 Standard are often listed on the sticker issued by the contractor.

Critical performance tests for cabinet function	Reference to AS 1807.0-2000 <i>Methods of test for safety cabinet</i>
HEPA filter installation integrity	AS 1807.6
Containment at the aperture	AS 1807.22 or AS 1807.26
Work zone integrity	AS 1807.5
Air velocity and uniformity in the work zone	AS 1807.1
Alarm operational adjustment	Subject to manufacturer's instructions
Gas tightness of outer shell	AS 1807.25

Tests related to operator comfort and safety	Reference to AS 1807.0-2000 <i>Methods of test for safety cabinet</i>
Vibration	AS 1807.18

Sound Level	AS 1807.20
Lighting	AS 1807.15
Ultraviolet radiation	AS 1807.23

- **What are the critical tests? How do you carry out the tests?**

As listed above, there are 6 critical tests related to the cabinet function. With the exception of “gas tightness of outer shell” which only needs to be done upon installation or relocation; all other critical tests must be conducted during the annual testing and registered as “pass” in order to confirm the cabinet is functioning properly. Other non-critical tests are optional.

- **Effect of having small instruments (i.e: vortex, microcentrifuge) running within the cabinet whilst working in the cabinet**

If you need to use vortex or microcentrifuge inside the BSC, you must inform the contractor so that they can perform the testing with these instruments running inside the cabinet. This is to ensure the instruments do not disrupt the airflow inside the cabinet, hence affecting the operators’ safety.

- **How long does it usually take to test 1 cabinet?**

Depending on the state of the cabinet, it usually takes 45 minutes to an hour. This does not include the time required for decontamination step, Hydrogen Peroxide takes approximately 3 hours but Formaldehyde takes overnight.

- **What is KI testing? Why some cabinets need this testing and some don’t?**

The critical test “containment at the aperture” refers to testing of the protective air barrier at the aperture. As listed in the table below, this test can be done using either of the methods listed: AS 1807.22 or AS 1807.26 (the Potassium iodidediscus test, i.e KI test). Whilst AS 1807.22 is Australian Standard test, some cabinets made from overseas would have trouble passing this test. If this is the case, KI test can be used instead.

- **UV light in BSC, yes or no?**

This is more of a personal preference. If the BSC is used correctly, get decontaminated after each work then UV light is more of a hazard than help.

- **Decontamination using Hydrogen Peroxide vs Formaldehyde**

Depending on the microorganisms that you’re working with in the BSC, decontaminant may change. Whilst Formaldehyde decontamination takes much longer, it is sometimes preferred over Hydrogen Peroxide due to its effectiveness against the particular microorganism.

- **Any changes in BSC standards anticipated in 2017?**

None.

- **Do you replace the HEPA filter every time? Or assessing its integrity first to see replacement is required? If so, how do you assess (visual inspection)?**

It is not a requirement to change HEPA filter every time. Instead, HEPA filter integrity is usually inspected using specific testing instrument first prior to deciding whether a change is required.

- **As users, what can we do to maintain containment of the cabinet?**

Do not place things in the cabinet that would obstruct the laminar air flow, decontaminate the cabinet prior to and post work. Most of the cabinets now have alarm that indicates the breach of cabinet integrity, do not ignore this warning and do not use the cabinet until someone investigates what had turned on the alarm.