



STANDARD OPERATING PROCEDURE

SOP NUMBER FSN-005-01	SOP TITLE OPERATING PROCEDURE FOR BIOQUELL CLASS 2 SAFETY CABINET
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PART 1

Author	Author
Pierre Micallef Lab Manager – RSSD	Aaron Busuttil Lab Officer – Food Sciences & Nutrition

PART 2

Approver	Approver
Dr. Claire Sillato Copperstone Head of Dept. – Food Sciences & Nutrition	Prof. Vasilis Valdramidis Associate Professor – Food Sciences & Nutrition
Approver	Approver
Joseph Mark Gatt Assist. Lab Manager – Faculty of Health Sciences	Louis Coleiro Health & Safety Officer
Approver	
Deborah Duca Senior Manager – RSSD	

PART 3

Authorizer	Date of Issue:
Dr. Axel Steuwer Director – Research Support Services Directorate	Date of next revision:

PART 4 (To be filled in by OOS, QSU or RSSD)

<input type="checkbox"/> This procedure has been revised and is no longer valid as from: (Write date)	<input type="checkbox"/> Date of NEXT REVISION is extended until: (Max. 4 years)	<input type="checkbox"/> SOP rendered obsolete on: (Write date)
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1. Reason for revision

- 1.1. Not applicable. New SOP

2. Purpose and scope

- 2.1. The SOP is intended to provide a guideline to the proper use of the biosafety cabinet together with any safety precautions that need to be observed during its operation and maintenance. However it is imperative to note that in no way does this procedure replace either the manufacturer's detailed User Operating Manual (which should also be readily accessible in the lab) or a proper on-site training by qualified staff on how to operate the autoclave.
- 2.2. Within the scope of implementation of this SOP are all laboratory personnel authorized and trained to use the safety cabinet.

3. Definitions

- 3.1. SOP - Standard Operating Procedure
- 3.2. UV - Ultra violet
- 3.3. HSO - Health and Safety Officer
- 3.4. IPA - Isopropyl alcohol
- 3.5. BSC – Bio Safety Cabinet

4. Responsibilities

4.1. User's responsibilities

The user is responsible for ensuring safe and proper techniques are employed at all times whenever operating the safety cabinet. These include namely:

- Keeping the unit clean both externally and internally on a daily basis as described in section 6.6.1 The cabinet should be wiped with a damp cloth using a bactericidal solution both at the beginning and at the end of each day.
- The front viewing panel should be kept clean so as to ensure a clear view of the work being performed inside the cabinet.
- Ensuring that the audible alarm and all indicators are functioning properly by pressing the 'TEST' button prior to commencing each day. Any faults are to be corrected before the cabinet can be used.
- Reporting any major spillages to the Head of the lab in charge and subsequent notification of incidents to the HSO in such an eventuality.
- Entering a record in the Equipment Log Book as per SOP ZRH-OP-002 **each time** work is performed in the cabinet

4.2. **Health and Safety Officer's responsibilities**

The HSO should be the primary point of contact to ensure that the cabinet is safe to use following major dangerous biohazardous spillages inside the cabinet requiring decontamination. A log of any major incidents needs to be recorded with the Health & Safety Office together with a report of the decontamination process that was carried out to render it safe to use again.

4.3 **Assistant Lab Manager/ Head of Lab**

Main responsibilities, but not limited to include:

- Ensuring that the cabinet is in good and safe working order at all times prior to use.
- Approval of all decontamination and cleaning procedures of the safety cabinet.
- Annual inspection check on the cabinet is carried out to ensure its proper functioning status and integrity of all its safety features. A report for the checks that were made, results and any corrective interventions needs to be archived either in soft or hard copy for reference purposes.

5. **Health and Safety Requirements**

- 5.1 Care must be taken to avoid impact damage to the bottom edge of the Front Sliding Window as cracking of the glass may result.
- 5.2 When using the UV lamp, the cabinet operator should avoid any exposure to UV radiation. If operators are working in close vicinity of the cabinet whilst the lamp is switched on, it is recommended that UV protection glasses be worn during this period.
- 5.3 Disposable gloves and an over coat are to be worn at all times when using the Laminar flow safety cabinet.
- 5.4 When carrying out a decontamination exercise involving biohazardous materials, it is advisable to wear an extra pair of household heavy duty gloves on top of the latex / nitrile gloves.
- 5.5 Switch off and disconnect the cabinet from the power supply whenever replacing either fluorescent tubes or UV lamps.
- 5.6 Decontaminate any filters prior to their removal and ensure these are bagged and disposed of in a safe and appropriate manner.


6. **Procedure**


6.1 **Control Panel**


The touch controls are located on the Control Panel (Fig. 1) and are described in the following paragraphs.




Figure 1: Touch Control Panel

6.1.1  **Mains Power Indicator:** The blue indicator is lit when the mains supply has been connected to the cabinet. The indicator remains lit at all times.

6.1.2  **Alarm indicator:** The alarm indicator flashes whenever an alarm condition occurs. Additionally, unless muted by pressing the MUTE button, the buzzer emits an alternating two tone signal to give warning of an alarm condition.







6.1.3  **Fan Control:** Operation of this switch causes the cabinet's internal or external fan together with the airflow control system to operate. Alarms are muted for a period of about 1 minute during which time the display will show the message '**STABILISING FLOW**'. If after this time no alarms are active the correct airflow will have been established and the display will show an appropriate message, for example '**CABINET SAFE**'.

A second press of the fan button causes the fan(s) to be switched off. Alternatively, one of the other fan controls, or the vaporisation cycle can be selected to provide the desired action.

6.1.4  **Fan Off Delay:** Pressing this button when the fan has been running (LEDs of buttons with numbers (1) or (3) lit) will switch off the fan after expiry of a timed period. Pressing this button a second time cancels the remaining delay time and switches off the fan(s).

Once the fan delay is activated, it can alternatively be cancelled by pressing either of the other two fan functions: buttons (1) or (3). This will initiate the relevant function.

The delay period is configurable from the set-up software. (Refer to Bioquell Safety Cabinet User Manual- Section 10 - '*Control System: Customisation and Calibration*').

- 6.1.5  **Fan 100%:** Pressing this button will cause the cabinet's internal or external fan to operate at full speed. This facility is intended for emergency use after a spillage or other inadvertent activity.
- A second press of this button will switch the cabinet's internal or exhaust fan off. Alternatively, either of the other two fan buttons can be pressed in order to select the desired action.
- 6.1.6  **Alarm Mute:** When an alarm condition occurs, the buzzer will sound. Pressing this button will cause the buzzer to be muted for a configurable time period of between 0 and 255 minutes. The default setting is 4 minutes. The intermittent beeping that accompanies: 'FLOW STABILISATION', 'EXPIRED SERVICE DATE' messages, or attempts to select incompatible conditions are not muted.
- 6.1.7  **Test:** Correct operation of button indicators and the audible alarm may be checked by pressing the 'TEST' button; all indicators should light and the buzzer should sound with a continuous tone. The 'TEST' function serves the secondary purpose of allowing the 'HOURS RUN' and 'SERVICE DATE DUE' information to be displayed. This data is useful in the planning of maintenance operations.
- 6.1.8  **Fluorescent Lights:** Pressing this button turns on the cabinet's fluorescent lighting. With power connected to the cabinet, the lights can be switched on at any time. If UV lamp is in use or the UV lamp switch has been pressed (UV lamp switch LED lit), it will automatically be switched off when the fluorescent light is selected.
- 6.1.9  **UV Lamp: WARNING: DUE TO ITS HAZARDOUS EFFECTS, THE CABINET OPERATOR SHOULD AVOID ANY EXPOSURE TO UV RADIATION.** When selected, the UV lamp will remain on for a configurable time period after which it will automatically switch off. The default setting is 15 minutes. The time period for which the UV lamp remains on can be changed (refer to Bioquell Safety Cabinet User Manual; Section 10 - 'Control System: Customisation and Calibration').
- 6.1.10  **Vaporisation Cycle:** Pressing this button initiates the decontamination process. This function is currently not in use due to lack of extraction ducting to the exterior. Refer to Bioquell Safety Cabinet User Manual; Section 7 'Decontamination of the Cabinet'.

6.1.11



Gas Supply: As a safety feature, in series with the gas supply tap is a solenoid valve, which is controlled from the control panel. Thus, the gas supply can only be selected if the airflow is in a safe condition (i.e. no alarms are active).

Once the valve has opened, gas supply can be controlled via the tap inside the cabinet in the usual way.

Caution: The solenoid valve will automatically close the gas supply, if an alarm occurs during the time it is selected.

6.1.12



Keylock: This button provides the facility to lock the buttons associated with fan control. Then whenever the fan control is to be altered, (e.g. to turn it OFF or ON), the PIN must be entered.

PIN Number Activation and Change

Press the button followed by entering the appropriate PIN (default 1111). This will prompt the user to either **Change** the PIN or **Lock** the cabinet. If 'Lock the cabinet' is chosen then it is necessary to press the key lock button and enter the PIN and unlock the cabinet before the fan can be operated.

6.2 Preparation for Use

- 6.2.1 Plug in the power lead, if applicable. Switch on power at the switch located at the power entry point.
- 6.2.2 Confirm that the blue LED on the control panel is lit, indicating that mains power is applied to the cabinet.
- 6.2.3 Press and hold down the 'TEST' button. All LEDs on the keypad should light and the buzzer should sound. If not, the cabinet should not be used and maintenance advice sought.
- 6.2.4 Open the front window to operating position and press the 'FAN' button (#1). The fan will take about 1 minute to stabilize, during this period the alarms are muted.
- 6.2.5 It is possible that after the stabilizing process, the buzzer sounds and the display advises of an airflow alarm. The possible causes are as follows:
 - (i) The environment of the cabinet is at the extremes of its operating temperature (10 - 35°C).
 - (ii) If the cabinet's airflow pattern has been recently disturbed, e.g. exhaust obstructed.
 - In any of these cases, the alarm can be expected to clear and after waiting a few extra seconds.
 - If an airflow alarm is still displayed after 3 minutes from switching on the cabinet, the unit should not be used and advice sought from the Supplier.

6.3 Sliding Window and Fan Operation

6.3.1 To open the Front Sliding Window from the closed position:

- (i) The cabinet will be displaying the following message: **'WARNING Screen locked shut'**.
- (ii) Release the door frame by turning the two black 'T' handles on either side of the window, a half of a turn anti-clockwise. The frame will move 20 – 30 mm outwards. It is important the both 'T' handles are turned, so that the red dot is at the top (Figure 3).
- (iii) The cabinet will start to alarm with the following message **'WARNING: LH Unlatched'** and **'WARNING: RH Unlatched'**



Figure 2

Window frame CLOSED
Red dot at BOTTOM




Figure 3

Window frame OPENED
Red dot at TOP

- (iv) With both sides released the glass window can be moved using the handles on the glass up to the operating position.
- (v) As the window is raised the fan(s) will start to operate. When the glass reaches the operating position a stop will prevent it from being raised any further, in addition there is a label indicating where the bottom of the glass ought to be. It is important to raise the pane to the pointer mark on the yellow label to deactivate the acoustic alarm.
- (vi) Then push the window frame inwards and turn the two 'T' handles clockwise half a turn to re-secure the window onto its seal (Figure 2).

If the window is not at the correct height or the two 'T' handles have not locked correctly, the following alarm messages will continue to be displayed **'WARNING: LH Unlatched'** and **'WARNING: RH Unlatched'**.

- (vii) To operate the fan, press the fan button  on the keypad to start the fan. The fan will take approximately a minute to stabilize and will display **'STABILISING FLOW'**, then the following message is displayed **'CLASS II SAFE'** stating that the cabinet is safe.

6.3.2 To close the Front Sliding Window from the opened position:

- (i) To close the window carry out the same procedure in reverse.

- (ii) The fan ought to be stopped by pressing the fan button before closing the window.

If the fan is not stopped the cabinet will alarm when the 'T' handles are released and the fan will stop when the window is shut. **This method can lead to potential damage to the window so is not recommended.**

- (iii) The hinged front sliding window can also be opened from the hinge by pulling the frame outwards until it stops, then letting it back slowly, the window will come to a hold.
- (iv) To shut it again, pull the window frame fully open again, and it will unlatch allowing it to close.
- (v) When wishing to leave the cabinet, the fan can be switched off by pressing the fan button, or the window can be closed which will also turn off the fan.

6.4 Cleaning procedure

- 6.4.1 It is recommended that the cabinet be kept clean and free of dust by swabbing down or washing down with a suitable disinfectant (e.g. 40% ethanol).
- 6.4.2 Ensure full surface contact of the disinfectant especially in poor access points (e.g. corner of liners, folds and recesses in the tray) – use of cotton buds is recommended for these areas.
 - **Disposable gloves should be worn for this task.**
 - **Do not use any Chlorine based cleaning agents –this will cause staining of the stainless steel and other metal surfaces.**
- 6.4.3 Plastic items and painted metal surfaces should only be cleaned using a mild liquid detergent.
- 6.4.4 The cabinet should be kept clean and free of unnecessary equipment.

6.5 Decontamination procedure

Decontamination is necessary at the following times:

- (i) Before carrying out any maintenance work.
- (ii) Before changing high efficiency filters.
- (iii) Before and after each use as part of the Good Laboratory Practice and MB Aseptic techniques.
- (iv) Before moving, relocating or in any way disturbing the cabinet.
- (v) Before instituting a change in the work program.
- (vi) After any gross spillage. If this involves dangerous biohazardous material, the incident needs to be reported to the H &S office.
- (vii) To decontaminate any equipment or materials before their removal from the cabinet.

Refer to **Appendix 1 for the Decontamination Procedure of the Bio Safety Cabinet.**

6.6 Preventive maintenance and cleaning

The Biological Safety Cabinet should be cleaned and inspected at regular intervals to ensure that its safety integrity has not been compromised prior to use as well as to keep corrective maintenance to a minimum.

All maintenance activities are to be recorded on the Equipment Logbook (SOP ZRH-OP-002).

6.6.1 Daily Cleaning

- (i) Keep the unit clean externally as well as internally. The internal working area should be wiped over with a damp cloth using a proprietary bactericidal solution at the start and end of the day when in use. The front viewing panel should be kept clean so that the operator always has a clear view of work being performed inside the cabinet.
- (ii) Ensure that the audible alarm and all indicators are functioning by pressing the 'TEST' button. Any faults should be corrected before the cabinet is used.

6.6.2 Monthly

- (i) Visually check for damage to the seal on the front of the cabinet which is compressed by the glass of the front window.
- (ii) Inspect all mains cables to the cabinet, or to any extras that may have been fitted, for damage or wear. In the event of any fault being discovered, contact the local BIOQUELL approved servicing company.

6.6.3 Annual Maintenance

It is recommended that the annual service visit is carried out by the local distributor. The service shall consist of the following:

- (i) Visually check the cabinet internally and externally for surface defects, cracks or other damage. Check the window and its operation and seals.
- (ii) All alarms to be checked and tested, and re-calibrate the down flow and exhaust airflow sensors if required.
- (iii) Filter and seal integrity checks. If there are two exhaust filters they ought to be checked independently.
- (iv) Down flow and air inlet velocity
- (v) HEPA Filter changed (or as required if alarm is triggered before).
- (vi) Full function and keypad test.

IMPORTANT: Prior to any maintenance or service intervention carried by the authorized distributor, the cabinet must be properly decontaminated and the F18 Decontamination certificate (Appendix 2) completed.

6.6.4 Filter Servicing

This is to be done only by a trained service provider. When changing filters it is important that both main and exhaust filters are replaced at the same time. In this way, the resistance of the filters and therefore the proportion of down flow to

inflow will remain constant. Failure to change both will be likely to upset the balance and therefore affect the protection factors.

**WARNING: FILTERS MUST BE DECONTAMINATED PRIOR TO REMOVAL.
WHEN REMOVED THEY MUST BE BAGGED AND DISPOSED OF IN A SAFE MANNER**

7. References

- 7.1. ADVANCED BIO SAFETY CABINET CLASS II ; TM020-O&M-001 ; Revision 5
- 7.2. SOP ZRH-OP-002: Equipment logbook

8. List of Appendices/Worksheets

- 8.1. Appendix 1: Decontamination Procedure
- 8.2. Appendix 2: Decontamination Certificate

Appendix 1

Decontamination Procedure

1. This procedure should be performed ideally using working gloves on top of disposable gloves. Appropriate precautions should be taken not to inhale fumes or dusts generated by the decontamination procedure and not to harm operator with the sharp metal edges and the irritant chemicals used.
2. Turn on the BSC in normal operational mode with the internal blower and light as prescribed in the operating section, without the UV, as the radiation is hazardous for eyes and skin.
3. Spray 70% iso-Propanol on the outside glass and frame of the BSC.
4. Release window locks and pull up the working glass cover.
5. Pull the BSC front cover out, until this lock out in place.
6. Turn Off the Alarm sound, since the BSC left and right latches are disconnected
7. Allow flow stabilize and spray 70% disinfectant on a biohazard waste bag and place it close to the working area outside the BSC, to collect the used absorbent materials. Consider these disposed materials as contaminated waste.
8. Working from left to right and top to bottom, spray the 70% IPA disinfectant on all internal surfaces including side and back walls. Allow sometime for the disinfectant to soak in, wipe the visible surfaces and dispose of tissues used.
9. Before conducting the next step, spray the work bench next to the BSC and the internal working glass of the BSC. Attention should be made due to electrical wiring, light connections and sensors.
10. Place absorbent material on the bench next to BSC, covering the whole desk area. Ensure that several layers of absorbent materials (e.g., lab bench protectors, soakers or tissues) are placed on the bench and floor to soak up the disinfectant being used. It is also a good idea to have a partner help to move the heavier removable parts in and out of the BSC.
11. Re-spray 70% IPA and wipe again all the surfaces and internal glass and the frame supporting the cabinet.
12. Remove carefully the side panels of the BSC next to the internal main work area. Place these on the absorbent material.
13. Next, remove the internal working area with care, attention should be made due to the heavy nature of the surface and the sharp edges by design of the equipment. It is also a good idea to have a partner help to move the heavier removable parts in and out of the BSC.
14. Carefully remove the final - front 'grated' plate in the front part of the BSC.

15. Spray the 70% disinfectant in the internal frame of the BSC and wiping the visible surfaces whilst removing debris or any other item found in this area. Any items should be disposed of in the hazardous waste bag (Step 7).
16. Apply a hypochlorite mould cleaner to the BSC internal frame and the previously removed grids, wiping the all the areas with the kitchen cloth whilst removing and crust.
17. Apply a Peroxide solution and wipe this around the whole surface area of the BSC and the previously removed grids, wiping the all the areas with the kitchen cloth.
18. If the removable work areas of the BSC require further cleaning or treatment, please consult with laboratory manager
19. Wipe all the surfaces with sterile water or with 70% IPA as a final rinse.
20. Carefully release window and pull the glass up. Carefully bend inside the BSC making sure all the work, visible and invisible areas are clean and free of visible contamination.
21. Before reassembly: clean window internally and externally using the household glass/window cleaner.
22. Soak a cloth in sterile water and spray 70% IPA on top, and gently wipe the black runner that supports the front cover with the stand of BSC.
23. Reassemble firstly the perforated grated sheet, taking care that 'grid foot rest are placed in the outer part of the BSC'.
24. Reassemble the middle work areas, which should be supported by the grid front grid. The side panels should also be placed and all of this should create the actual work area of BSC
25. Gently lift the BSC front window up to release the door-lock mechanism, and close the BSC.
26. Switch off Fan and pull down the working window. Lock both latches.
27. Collect all the absorbent material and disinfect the work area, disposing all of the items in the waste bag from Step 7.
28. Refer to decontamination by sterilization SOP for the disposal of the waste-bag
29. Before leaving the room, switch on the UV lamp of the BSC.

Appendix 2



Decontamination Certificate

Customer: _____

Department: _____

Type of Equipment	Model No.	Serial No.	Manufacturer

Contamination Information

Materials used:

Please tick:

Carcinogen	<input type="checkbox"/>	Pathogen	<input type="checkbox"/>
Chemical Hazard	<input type="checkbox"/>	Radioactive	<input type="checkbox"/>
Biological Hazard	<input type="checkbox"/>	Toxic Substance	<input type="checkbox"/>
Bacteria	<input type="checkbox"/>	Other	<input type="checkbox"/>
Virus	<input type="checkbox"/>	Non Hazardous Substance	<input type="checkbox"/>
Fungus	<input type="checkbox"/>		<input type="checkbox"/>

Use of Equipment:

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Decontamination Procedure

Method / Procedures Followed / Ref. No	Date	Signature

I hereby confirm that the above equipment has been thoroughly cleaned and decontaminated and the information supplied on this form is complete and accurate.

Name In Blocks _____

Signature _____

Date _____

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