AES ENVIRONMENTAL

JAN 2025

ULTIMA® CLASS II BIOLOGICAL SAFETY CABINET

OPERATION AND MAINTENANCE MANUAL

bsi ISO 9001 Quality Management Systems CERTIFIED

CLYDE-APAC

EMAIL AIRHANDLING

VOKES Filtration Technology

CONTENTS

1. INTRODUCTION

Thank you for your decision to purchase this ULTIMA® Class II biological safety cabinet manufactured by AES Environmental. Our desire to manufacture a robust, reliable and fully compliant product in Australia, coupled with the availability of improved manufacturing, engineering and production technologies, has resulted in the development of the ULTIMA® series.

The ULTIMA® series is specifically designed to comply with Australian Standard AS2252 Part 2 - 2009, that specifies all critical performance, safety and design requirements for Class II cabinets. Our choice to use the Australian Standards as a benchmark for our products provides our customers with the confidence and knowledge that they are indeed purchasing a reliable product.

AES laminar flow and HEPA filter products are manufactured in Australia. All stages of manufacture are subjected to rigorous checks to ensure that specified quality standards are maintained. HEPA filters are individually tested and certified for efficiency, integrity and pressure drop before installation in cabinets. Each cabinet undergoes stringent testing of filter installations, airflows and other performance aspects. A NATA-accredited factory laboratory using calibrated apparatus and test procedures conducts all tests.

Backed by a comprehensive warranty covering the quality and performance of materials and workmanship, ULTIMA® Series cabinets are designed to provide many years of safe operation.

Your investment in this cabinet and its vital contribution to laboratory safety should be protected by regular specialised inspection, testing and certification. AES maintains fully equipped field service laboratories in major Australian centres. Service centres and distributors are located in New Zealand, Hong Kong, Singapore, Indonesia, Malaysia, Taiwan, Thailand and Great Britain.

These laboratories provide comprehensive on-site commissioning, testing and certification services for any brand/model safety cabinets, laminar flow systems, cleanrooms and all HEPA filter installations.

2. CABINET APPLICATIONS, SELECTION AND LIMITATIONS

2.1 APPLICATIONS

Surveys have shown that a significant number of laboratory-acquired infections are due to exposure to aerosols that may be produced from common microbiology laboratory procedures. Aerosol containment techniques and facilities appropriate to the microorganisms being handled should be provided. Australian Standard AS2252.2 defines biological safety cabinets as the primary barrier against exposure to airborne contamination.

2.2 SELECTION OF CABINETS AND LIMITATIONS

2.2.1 General

Class I and II biological safety cabinets are open-fronted, ventilated containment enclosures, intended for work with microorganisms classified in AS2243.3 as Risk Groups 2, 3 and 4, and which can be deactivated by formaldehyde, hydrogen peroxide or other approved types of decontaminate. Cabinets incorporate HEPA filters and variable-speed fans. They are self-contained work stations and operate independently of other air-handling systems. They will recirculate approximately 70% of the intake air flow and exhaust the remaining 30%. This is commonly referred to as a Class II Type A2 BSC. The selection of cabinets should be based on the consideration of existing and possible future work programmes. Class I cabinets should be specified for non-sterile work with such microorganisms. Class II cabinets should be specified where sterility and cross-contamination control is needed in work involving the handling of potentially hazardous biological materials.

Class II Cabinets can be used or converted for use in 'Class I' applications, however Class I cabinets CANNOT be converted to Class II

2.2.2 Class I Cabinets

Class I cabinets are 100% exhaust enclosures with HEPA filtration of exhaust air and inward air velocity at the work opening of 0.5-0.8 m/s. An inward flow of room air through the work opening sweeps aerosols generated during the work process into a two-stage filter system. Air is directed into a pre-filter and a HEPA filter before being exhausted to the room.

Class I Cabinets provide personnel and environment protection, but do not protect products (materials within the cabinet).

2.2.3 Class II Cabinets

ULTIMA® Series Class II cabinets are part-recirculating laminar air flow enclosures with HEPA filtration of exhaust air and an air barrier at the work opening. Separate fan/HEPA filter systems are provided for exhaust and laminar air flow. An inflow of room air into a full-width grille in the work opening creates an air barrier. HEPA- filtered vertical laminar air flow, which is recirculated in the work zone, creates a biologically- clean work environment. The barrier air mixes with the recirculated Laminar flow air in a sump underneath the work surface, and is exhausted to the room via a HEPA filter.

Class II cabinets provide personnel, environmental and product protection.

2. CABINET APPLICATIONS, SELECTION AND LIMITATIONS (CONT.)

2.2.4 Laminar flow cabinets

Laminar flow work stations or cabinets, sometimes called 'clean benches', are horizontal or vertical flow clean work enclosures. Pre-filtered room air is supplied to the work zone via a HEPA filter in a non-turbulent laminar flow manner. Laminar Flow Cabinets do not provide personnel or environmental protection, as aerosols from the work zone are directed towards the operator.

2.2.5 Radioactive and toxic materials

Radioactive materials

Work in safety cabinets involving radioactive materials requires careful consideration of the risks posed to personnel. The fitting of internal and/or external shielding to cabinets may be required. The National Health and Medical Research Council have published recommendations for handling such materials and relevant legislation exists in all States. AS2243.4 specifies safe practices and environments for work where sources of ionizing radiation are used.

Toxic materials

Biological safety cabinets as specified in Australian Standards are unsuitable for use with cytotoxic drugs and other toxic chemicals as these materials cannot be deactivated by fumigation. Aerosols of the materials, which are recirculated within the cabinet, contaminate fans and internal plenums. Therefore, if used for handling such materials, cabinets suffer permanent contamination of internal surfaces. This precludes safe internal maintenance. Australian Standard AS2252.5 deals with requirements for cytotoxic drug safety cabinets.

3. CABINET OPTIONS AND INSTALLATION

3.1 OPTIONS

Factory options available for the ULTIMA® Series cabinets are:

- Air tap.
- Floor stand manual
- Vacuum tap with microbiological filter.
- Exhaust discharge on left hand side, front or top.
- Gas tap with solenoid control.
- Electric floor stand
- Additional power outlet.
- Fumigation adaptor panels for work opening and exhaust
- Uninterrupted Power Supply (UPS)
- Pass-Through Ethernet and cable ports
- Communication with Building Management System (BMS)

Although these options attract modest additional cost when supplied with a new cabinet, fitting of some items to installed cabinets can be very difficult and costly.

3.2 INSTALLATION

3.2.1 Location

Cabinets should be located in a clean, draught-free area, not subject to air turbulence from air conditioning inlets, room exhausts, personnel traffic and other sources. All windows should be fixed. Temporary loss of air barrier containment can be caused by air turbulence in front of Class II cabinets. Partitions to minimise effects from personnel traffic can be installed, and excessive velocities from room air inlets can be inhibited by regulating dampers and/or blanking or baffling.

3.2.2 Services

Electrical power and other reticulated services which are required for cabinet operation (such as gas and vacuum) should be provided at the cabinet installation site. Significant fluctuations in electrical power supply may adversely affect the function of cabinet alarms and visual indicators. Conditioning of the power supply should be considered in locations where such fluctuation is experienced. External vacuum pumps require in-line filtration to provide microbiological isolation. The accessory vacuum tap on your ULTIMA® safety cabinet is factory-fitted with a replaceable 0.2µm membrane filter. Compliance with local regulations for services such as gas should be confirmed.

3.2.3 Exhaust Air Discharge

Clearance in the direction of exhaust discharge should be at least 40cm, in order to minimise airflow resistance, and to allow access for maintenance and testing of the cabinet exhaust HEPA filter installation.

4. NATA TESTING AND CERTIFICATION

Your new cabinet has been tested and calibrated in a NATA Accredited Laboratory. Using testing or measurement services accredited by NATA provides you with greater confidence in the laboratory's technical capability, and in the reliability of the test data they provide to you. The laboratory that performed your test or calibration has been thoroughly evaluated and accredited by NATA as meeting the technical competence requirements of internationally recognized standard ISO/IEC 17025:2017 (which includes the management requirements of the ISO 9001:2015 standards).

Not all laboratories are NATA accredited so always look for the NATA logo and endorsement on your test reports or confirm the NATA accreditation of the laboratory. The specific tests, calibrations or measurements that the laboratory has achieved accreditation for can found on its Scope of Accreditation.

This document can be obtained from the laboratory itself or from NATA. The Scope of Accreditations can also be found in NATA's Annual Directory of accredited facilities or in the on- line Directory on NATA's website at www.nata.com.au Measurements and calibrations performed by NATA Accredited Laboratories are also traceable to Australia's national standards of measurement, and thereby to international standards. NATA (National Association of Testing Authorities) is Australia's government endorsed accreditor and NATA endorsed test reports are widely recognized by many sectors of the Australian government and industry. NATA is also a signatory to the mutual recognition agreements of the International Laboratory Accreditation Cooperation (ILAC) and the Asia-pacific Laboratory Accreditation Cooperation (APLAC). This means that NATA endorsed test reports are accepted by many of Australia's trading partners in:

- Europe
- North America
- South Africa
- Asia Pacific Region

So your NATA-endorsed report gives you increased confidence in the data, combined with greater acceptance of your test results both within Australia and internationally.

4.1. GENERAL

All testing procedures should be conducted in accordance with AS1807 and AS2252 Part 2, using calibrated apparatus.

4.2 FREQUENCY

Cabinets are tested in the factory and further testing is recommended as follows:

I. After any electrical or mechanical maintenance.

II. After filter replacement.

III. After re-location.

IV. At least annually.

V. In special circumstances such as a significant change in the work programme, Or where unsafe cabinet operation is suspected.

4. NATA TESTING AND CERTIFICATION (CONT.)

4.3 PRE-TESTING PROCEDURES

Mechanical maintenance and testing of used cabinets should only be conducted after disinfection of the work zone and decontamination of the cabinet by fumigation. Refer to 2.2.1 . If decontamination was performed by the user, the service organisation should be provided with written assurance that effective decontamination has been carried out.

All testing of cabinet airflows should be performed with the room ventilation system operating in the normal mode.

4.4 TESTS RELATING TO SAFETY

AS1807 lists ten (10) tests that can be performed on biological safety cabinets, and most of these are applicable to installed cabinets. However, tests on Class II cabinets relating to personnel and environmental protection are limited to the following:

4.5 PERFORMANCE TEST REQUIREMENTS

The ULTIMA series is designed to be compliant with AS 2252.2 and by extension compliant with BS EN ISO 12469, ISO 14644 and NSF49. The Australian Standards provide the basic operating parameters of the ULTIMA BSC shown in the table below

4.5.1 Table 1

Downflow Velocity	The Down Flow Velocity (Laminar Velocity) is to be set at between 0.40 and 0.45 m/s
Exhaust Velocity	Typical exhaust velocities will be between 0.65 and 1.1m/s for a correctly functioning BSC depending on the installation location
Air Barrier Containment	The ULTIMA uses the test methods contained in AS 1807 for determination of the work zone air barrier. This is a direct challenge test using a test aerosol and photometer. Please contact your local agent for further instruction.
Leak Test	The HEPA filters are tested for leakage. Test should be conducted with HEPA volumetric flow rates at or below 0.60 m/s but above 0.35 m/s for best results. 100% concentration can be sampled from the test tubes located below the sump area of the work zone and all screens are designed to be removable for accurate scanning.
Gas Tightness	The outer shell of the ULTIMA shall be gas tight. This test should be performed immediately after installation on-site and can be subsequently performed after major works or movement. The cabinet is to be sealed and pressurised to 140 pa a soap solution is then used to determine if the out seals of the shell are gas tight
Work Zone Integrity	The integrity of the work zone is determined by utilising an aerosol source and photometer. The aerosol source is used to challenge the window frames and any other seals in the work zone.

4. NATA TESTING AND CERTIFICATION (CONT.)

Sound Level	Sound level should be no greater than 62 dbA on first installation or when new HEPA filters have been installed and 65 dbA at annual test intervals.
LUX Levels	Light levels in the work zone of the ULTIMA shall be great than 650 lux and no point shall be lower than 400 lux.
UV Levels	UV is determined to be effective at a rate of 400 mWm2 or greater
Air Cleanliness	While not a specific test method, the air cleanliness within the work zone shall be a minimum ISO Grade 5

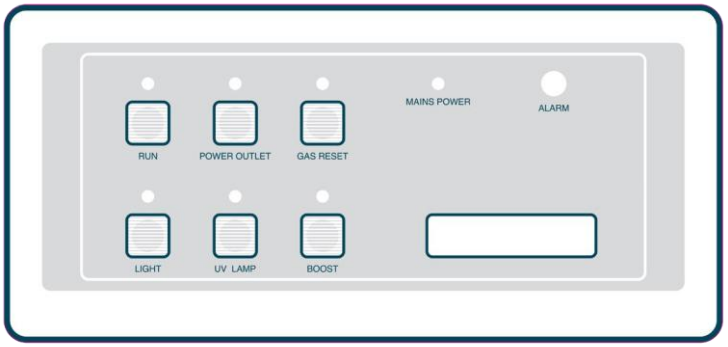
For further information on performing the above tests on site, please contact you local agent

5. CONTROLS AND MONITORING SYSTEMS

5.1 GENERAL

ULTIMA® Series cabinets are fitted with a purpose-designed, integrated electronic controller which incorporates function switches and indicators, system diagnostics, fan speed controllers, audible and visible alarms and a visual display panel (VDP).

Low voltage touch-control switches operate standard cabinet functions and optional gas and ultraviolet (UV) lamp services. Light-emitting diodes (LEDs) and an audible signal indicate the status of all switched functions. A micro-processor-based system continuously monitors five system conditions, with any malfunction shown in the VDP as an error message.



5.2 CONTROL SWITCHES AND INDICATORS

5.2.1 Description:

Switches are of the momentary touch-pad type with toggle operation. A short 'pip' sound accompanies any toggle operation. A short 'pip-pip-pip' sound accompanies any operation that has been ignored. LEDs indicate the status of switched functions.

UV lamps and gas taps are optional fittings. On cabinets not fitted with these services, the relevant switch functions are not operative.

5.2.2 Switch functions and indicators

a. 'RUN' switch for fans and operating modes:

This switch controls the laminar flow and exhaust fan systems A single actuation of the touch pad turns the fans on and off.

AUTOMATIC BOOST MODE:

If the viewing window is opened when the cabinet is running, a boost mode, which activates maximum airflow and the alarm system, is automatically selected. In this mode, the VDP displays the message 'WARNING! WINDOW OPEN', the audible alarm sounds and the 'ALARM' LED flashes. This mode is cancelled by closing the windows.

DAO (post-Purge) Timer:

Press and Hold the 'RUN' Button on the touchpad for 3 seconds or longer selects the post-use over-run feature. When this has been Activated, ,The fans and fluorescent lamps will switch off after the pre-set period of 10 minutes. In this mode, the VDP counts down the minutes during the DAO period. The Post-Use Timer is a post-purge function designed to purge the work zone of contaminants prior to shut-down of the BSC

5. CONTROLS AND MONITORING SYSTEMS (CONT.)

b. 'LIGHT' switch for fluorescent lamps:

This switch controls the fluorescent lamps, which provide work zone illumination. Operating this switch when the optional UV lamp is on, toggles the UV to off.

c. 'POWER OUTLET' switch for work zone power outlet(s):

This switch provides remote control of the standard splash-proof, general-purpose power outlet (GPO) and optional additional GPOs in the work zone.

d. 'UV LAMP' switch for UV lamp:

This switch controls the optional germicidal UV lamp which is fitted to enhance work zone sterility. The UV lamp can only be switched on when the cabinet is not running. Operating this switch when the fluorescent lamps are on will toggle the fluorescent lamp to off.

e. 'GAS RESET' switch for optional gas tap:

This switch re-establishes supply of gas to the optional gas tap if the solenoid safety valve has interrupted supply of gas to the tap. The optional gas tap is connected via a solenoid valve, which cuts off gas supply to the tap if the cabinet has been turned off or if mains power supply has been interrupted.

f. 'BOOST' switch:

This switch enables manual selection of the maximum-exhaust boost mode, which is automatically activated by opening the window with the cabinet running. In this mode, the VDP displays the message 'BOOST MODE'. This switch has a toggle function between the boost mode and normal operation. The boost mode is cancelled by momentarily touching the switch.

g. 'RUN TIME' display panel (VDP):

The VDP operates in the default mode as an hour-meter (elapsed hours meter) when the cabinet is connected to mains supply and when no error condition exists, or non-standard mode is selected. See 5.2.3 below.

h. 'ALARM' LED and audible alarm:

The VDP will visually and audibly alarm in the event of failure, unsafe operating conditions or loss of power

i. Hour Meter:

The hour-meter cannot be reset by the user. It displays the total hours that the BSC has been in operation for.

5. CONTROLS AND MONITORING SYSTEMS (CONT.)

5.2.3 VPD display messages

5.2.3.1 Description

in the default mode, the VDP functions as a hour-meter, which displays total elapsed running hours. If there is an identified malfunction in the conditions monitored by the controller, the VDP displays an error message, and the alarms are activated. The VDP also displays a message to indicate the selection or activation of a special mode. A latched error condition can be cleared by the actuation of any touch pad. Clearing of any error resets the controller to the default condition.

5.2.3.2 Error messages:

A reduction in exhaust airflow will generate the error message 'ERROR! EXHAUST LOW'. Full exhaust fan speed is selected, the laminar flow fan speed is maintained, the optional gas supply is shut off and the alarm is activated.

A reduction in laminar airflow will generate the error message 'ERROR!MAIN LOW'. Full exhaust fan speed is selected, the laminar flow fan speed is maintained, the optional gas supply is shut off and the alarm is activated.

An increase in laminar airflow will generate the error message 'ERROR!MAIN HIGH'. Full exhaust fan speed is selected, the laminar flow fan speed is maintained, the optional gas supply is shut off and the alarm is activated.

5.2.4 Mains supply and default mode operation

On connection of mains power to the cabinet, the 'MAINS POWER' LED is illuminated and the following default conditions are set:

- Power outlet control to off.
- Optional UV control to off.
- Fluorescent lamps to off.
- Boost mode selector to off.
- Fan control to off.
- Gas supply is off.
- The VDP display operates in the default mode and displays the total elapsed running hours of the cabinet and the message 'POWER ON'.
- The controller is not in an error mode.

5.2.5 Alarm

The alarm system provides audible and visual indication of operating system malfunctions.

The audible alarm and the 'ALARM' LED are activated by pressure sensors in the exhaust and laminar flow filter plenums. Any significant variation in airflow will produce a change in plenum pressure. This will activate the alarm.

If the viewing window is opened when the cabinet is running, a boost mode which activates maximum exhaust airflow and the alarm system is automatically selected. In this mode, the VDP displays the message 'WARNING! WINDOW OPEN', the audible alarm sounds and the 'ALARM' LED flashes.

The alarm will also be activated if an error condition was pending on initial start-up, if mains power supply is interrupted while the cabinet is running, or in the event of failure of the controller. The cabinet should not be used until any identified fault is rectified.

5.2.6 Manometer

A Pressure gauge mounted on the rear work zone panel monitors the pressure differential between the laminar flow and exhaust filter plenums.

This gauge is of the 'centre-zero' type, and acts as a pressure-balance indicator.

During testing, to determine effective air barrier containment and the specified average laminar flow velocity, careful and progressive adjustment of the laminar flow and exhaust fan speed controllers is necessary in order to achieve an airflow balance between the two fan/filter systems.

Typically, the final settings for the laminar flow and exhaust fans produce a higher pressure in the exhaust filter plenum than in the laminar flow filter plenum. The Pressure gauge indicates this difference.

Any subsequent change in exhaust and/or laminar airflow will produce a change in the indicated pressure differential. After the final adjustment of the fan speed controllers, the Pressure gauge pointer is set to the centre 'zero' position.

If, with the cabinet running, this gauge shows a significant movement from the centre 'zero' position, a malfunction is indicated, and the cabinet should not be used until the fault is rectified. Additional indication of the malfunction will be given by the other indicators and alarms.

5.2.7 Fuses

The cabinet electrical system is protected by individual fuses on all switched circuits. The fuses are located on the power board inside the control panel. The cabinet must be disconnected from mains supply before the control panel is opened.

5.2.8 Service Mode

Authorised service technicians are able to access a service mode which provides a diagnostics facility and enables various cabinet settings to be changed. These include the following:

- Fan speeds
- Pressure switch settings
- Diagnostics and events
- Isolation of fans for test procedures
- DAO time settings

5.3 RUN MODE STABILISATION

When the 'RUN' switch is operated the fans are switched on and the pressure-sensing switches activated. The fans require approximately 20 seconds for it to develop normal operating pressure and airflow.

The main (laminar flow) fan is not started until the exhaust fan system has reached normal operating pressure. During this period, the alarm is activated and the VDP displays the message 'WARNING! STABILISATION'.

5. CONTROLS AND MONITORING SYSTEMS (CONT.)

5.4 ELECTRONIC SASH WINDOW

The ULTIMA® Series cabinets feature a controllable electronic sash window. Its opening is set to a specific height for optimal barrier conditions per AS2252 standards. This window removes the need for a UV cover and reduces obstructions when loading materials in and out of the biological safety cabinet.

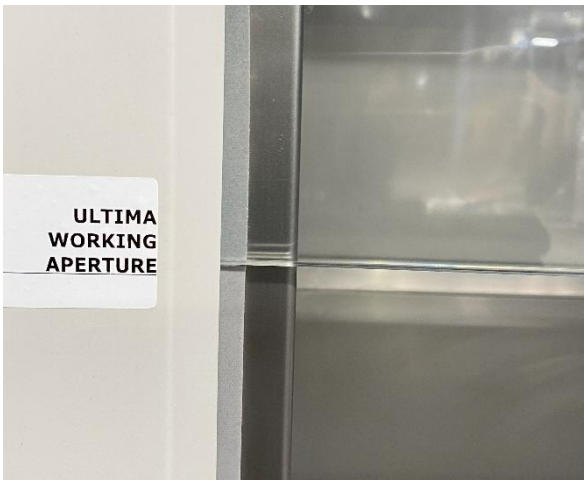
5.4.1 VIEWING WINDOW CONTROL

The electronic sash window uses lead screw actuators for a smooth movement, controllable via the arrow buttons on the front panel. The user must hold the button until the window reaches the desired position. Note that the window contains bump detection, this can cause the window to stop and reverse. This can sometimes be triggered by increased friction from the seal around the opening.

Ensure no objects are in the window's path to avoid injury or damage.

5.4.1 VIEWING WINDOW OPENING POSITION

The window is programmed to stop at the correct opening position, allowing the air barrier to function properly. This position is approximately 180mm from the grille. To pause the window at the correct height, hold the direction button, and the software will stop the movement once it reaches the right position. This is marked on both side panels as seen below. Note that the window alarm will activate if it is not in the correct position.



6. WORKZONE

6.1 VIEWING WINDOW

The viewing window is operated by actuators that slide the sash vertically. To open the window Press the arrow buttons to the left of the front panel Hold the up arrow until in the desired position. If the viewing window is opened when the cabinet is running, a boost mode, which activates maximum exhaust airflow and the alarm system, is automatically activates maximum exhaust airflow and alarm system, is automatically audible alarm sounds and the 'ALARM' LED flashes. When the window is fully open, the alarms may be muted (de-activated to allow lengthy procedures such as cleaning to be conducted without the sound of the alarms. This mode is selected by selecting any touch pad.

6.2 FRONT GRILLE

To remove the grille, lift it off the locating pins, which engage its underside.

6.3 WORK TRAY

The work tray is designed to allow its partial rotation for cleaning within the cabinet with the cabinet running. After removal of the front grille, lift the leading edge of the work tray and rotate it so that its underside is exposed for cleaning. Removal from the cabinet is possible after removal of the front grille.

7. TECHNIQUES FOR EFFECTIVE CABINET USE

7.1 GENERAL

The function and limitations of cabinets should be clearly understood and should be covered in staff training programmes, as should techniques for effective use and cleaning. Cabinets are open-fronted enclosures and rely on stable, unimpeded airflows and good user technique in order to provide design levels of protection.

7.2 PROTECTIVE GARMENTS

Cabinet users should wear suitable clothing, such as a continuous-fronted garment with adjustable or elasticised wrist closures. Front-buttoned laboratory coats are not recommended.

Thin protective gloves are required for some work.

7.3 USE OF THE CABINET

7.3.1 Pre-use Checks

a. Check the test label or certificate to ensure that it is less than 12 months old.

b. Check that the power supply is suitably connected.

c. Check that the exhaust air outlet is not obstructed.

d. Check that the viewing window is closed and free from obstruction.

e. Switch on the cabinet and check the operation of:

   i. The control panel VDP and indicator;

   ii. The fans and alarm systems;

   iii. The manometer, to ensure that the reading is in the normal range;

   iv. The fluorescent lamps;

   v. Any fitted services, such as gas or vacuum; and

   vi. The rear grille for any loose material.

7.3.2 Error messages:

a. Remove unnecessary items from the cabinet.

b. Wipe down the work zone surfaces with a suitable disinfectant. (See 8 below).

c. Run the cabinet for at least 5 minutes so as to clear away any residual aerosols.

d. If necessary, use plastics-backed, absorbent sheeting to reduce clean-up between procedures

e. Plan work so as to place all materials in, or close to the cabinet and within easy reach of the operator. Use of a stainless-steel trolley for materials is recommended. Wipe down the external surface of all items of equipment with a suitable disinfectant before placing them in the cabinet.

f. Allow the cabinet to run for a further 5 minutes before use.

7. TECHNIQUES FOR EFFECTIVE CABINET USE (CONT)

7.3.3 Cabinet services

a. Bunsen burners should not be used in Class II cabinets as they may disrupt the laminar flow and barrier air. However, many users wish to use some form of gas burner. If routine use of a gas burner is required, the burner should be of the type, which has a pilot light, and only produces full flame on actuation of a touch control. Hose to connect gas supply inside the cabinet should be of the two-ply, reinforced type.

b. Hoses and power leads should not be introduced into cabinets through the work opening.

c. Reticulated vacuum services connected to cabinets should be microbiologically isolated by means such as a membrane filter.

d. The optional vacuum tap on ULTIMA cabinets are protected by a 50mm inline 0.2um hydrophobic filter.

e. Centrifuges should not be operated in cabinets, but filling of tubes and the loading and unloading of buckets and rotors should take place within cabinets.

7.3.4 Techniques for cabinet operation:

a. Use good microbiological practice when working in the cabinet.

b. Avoid unnecessary hand and arm movements in and near the work zone. This can disrupt airflows.

c. Take care in busy laboratories to avoid cross-contamination between specimens. Disinfect work zone surfaces and allow the cabinet to run for at least 5 minutes to purge the cabinet and nearby area of residual aerosols.

d. At the end of the work, leave the cabinet running and conduct the following procedures:

i. Transfer cultures to a container for storage or incubation.

ii. Disinfect and remove all unnecessary materials to reduce the potential for cross-contamination and interruption of airflows; cabinets are not designed for protracted storage of materials.

iii. Wipe the work zone surfaces with a fresh disinfectant solution.

iv. Remove gloves for sterilisation or disposal as contaminated waste.

v. Allow the cabinet to run for at least 5 minutes with manual switch-off or use of the DAO mode.

vi. Fit the work opening cover.

vii. The sump of Class II cabinets should be cleaned weekly, or after a spill.

7. TECHNIQUES FOR EFFECTIVE CABINET USE (CONT)

7.3.5 Breakdown Procedures

If the cabinet stops running, or develops a malfunction in a monitored system, the alarm system is activated. The following procedures should be followed:

a. Stop all work, securing all hazardous material.

b. Turn off all cabinet services, such as gas and vacuum.

c. Withdraw hands and wash with a disinfectant solution. Safely dispose of gloves.

d. Switch off the cabinet and fit the work opening cover.

e. Switch off power supply to the cabinet.

f. Mark the cabinet clearly as being unsafe for use.

g. Notify the supervisor or laboratory manager and call authorised service organisation.

7.3.6 Decontamination

1. Prior to maintenance or testing.
2. Prior to relocation.
3. When occupational health and safety requirements make it appropriate.
4. In special circumstances requiring increased assurance of preserving sterility.
5. After spillage where appropriate.
6. As indicated by workload and nature of hazardous material being handled.

8. CLEANING AND DISINFECTION

When cleaning, a disinfectant should be determined according to the micro-organisms being handled in the cabinet. Surfaces must remain wet for the duration of the recommended contact time, after which the surface should be cleaned and left dry.

In the event of a spill of a clinical sample, a number of possible micro-organisms may be anticipated. Where corrosive disinfectants are used for some uncommon microorganisms, e.g. Creutzfeldt-Jacob Disease virus, chemical neutralisation is required to prevent corrosion of the cabinet surfaces.

AS2243.3 details the properties of common disinfectants and antiseptics. Some disinfectants and cleaning agents, although widely used in cabinets, present problems unless their limitations are understood and their use is controlled, e.g.:

a. Hypochlorite solutions can corrode stainless steel and wet residue of this material should not be left on cabinet surfaces.

b. Alcoholic solutions pose a fire hazard and should only be used sparingly and with the cabinet running.

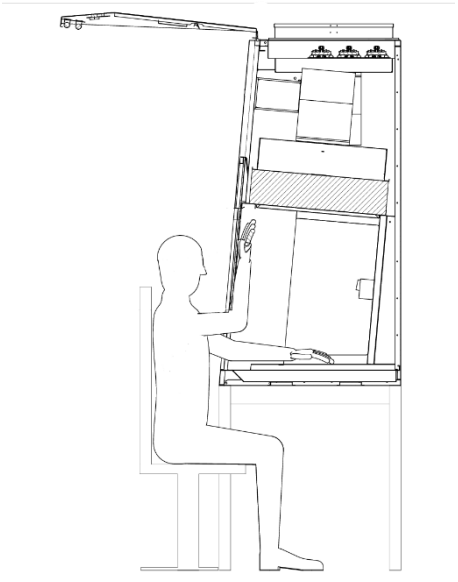
c. Abrasive compounds may degrade stainless steel and painted surfaces.

d. Work-safe Australia has recommended revised work practices for the use of glutaraldehyde, now classified as a toxic chemical.

e. The grade and quality of stainless steel used in cabinet construction has a high degree of resistance to staining and corrosion, but may be degraded by the use of unsuitable cleaning agents.

8.1 CLEANING THE WINDOW

To maintain proper visibility and minimize the possible buildup of microorganisms or other hazardous materials, the window should be cleaned regularly. It is recommended to first remove the inlet grille to allow for more space while wiping the inside of the window. The window should be moved to the working aperture as illustrated in 5.4.1. Lab procedures should then be followed to ensure correct materials and methods are used.



9. HEPA FILTERS

HEPA filters, which arrest sub-micron particles, are the physical containment barrier in safety cabinets. They incorporate a very fragile filter medium which is easily damaged by physical contact and which may suffer degradation if splashed with liquid.

HEPA filters can not be cleaned and are normally replaced when their increased resistance to airflow impairs cabinet performance, when excessive leak repair is necessary, or when heavy surface contamination occurs.

Replacement filters should be suitable for use in critical applications and should be individually tested and certified in a NATA-accredited laboratory. Arrestance efficiency should be not less than 99.997% in accordance with AS4260. Additionally, filters should be certified for integrity (free from pin-hole leaks) in accordance with AS1807.

Determination of the in-situ integrity of HEPA filters and their installation is a critical testing procedure for cabinets. Cabinets with suspected filter damage should not be used until testing of filter integrity has been carried out.

10. UV LAMPS

Class II Biological Safety Cabinets are supplied with a germicidal UV lamp fitted within the work zone, as shown below. The intended use and occupational health and safety aspects of UV should be understood by laboratory managers and cabinet users, i.e.

i. UV can be a useful adjunct to surface cleaning procedures, but should not be seen as a panacea that can replace good cleaning technique.

ii. UV lamps should be used for 20 to 30 minutes at the beginning and end of work programmes. They should not be left on for extended periods.

iii. Personnel should avoid exposure to UV radiation. Exposure may cause eye damage and erythema. Work opening covers should be in place whenever UV lamps are in use.

iv. Radiation intensity reduces over time due to degradation and external staining of lamps. Where the use of UV is a significant element of surface decontamination procedure, regular testing of lamp intensity and lamp replacement should be specified.

v. UV radiation degrades nitrile, plastics and rubber products and organic coatings, such as those used in typical cabinet construction

11. WARRANTY AND REPLACEMENT PARTS

11.1 WARRANTY

This cabinet is protected by a 24-month warranty covering all materials, components and workmanship.

We will honour this warranty on advice to an AES branch or authorised distributor with full details of the cabinet, including date of purchase, serial number and the nature of the fault.

Items which have a limited service life, such as fan motors, fluorescent and ultraviolet lamps and HEPA filters, are not covered in respect of normal degradation over time. Servicing of the cabinet by other than AES technicians or authorised service agents may wholly or partially invalidate the warranty.

11.2 REPLACEMENT PARTS

Only genuine AES replacement parts should be used in this cabinet. The use of nongenuine parts may significantly compromise the protection afforded by the cabinet and may invalidate the warranty.

Continuing factory availability of all replacement items is maintained. To obtain replacement parts, contact your nearest AES branch or distributor with the following information:

1. Full description of part(s).
2. Cabinet model.
3. Cabinet serial number.

REPLACEMENT PARTS

Replacement HEPA, Lamps and UV for each model

Items	Qty	Part No.
9X7 FANS	2	1687-0530/1AFMC
1200mm LED TUBE LIGHT	2	1687-0540/2LED
GPO	1	1687-0543/1
S2000 CONTROL KIT	1	252005-DP SET
DYWER PRESSURE SWITCH	3	253207
MAGHELIC PRESSURE GUAGE 125-0-125	1	1687-0522/6
UV TUBE 895mm	1	70430
m16 cable glands	6	257506
610x500x149 H14 HEPA	1	1589-7182/319
594x1219x149 H14 HEPA	1	753332

12. TROUBLESHOOT GUIDE

When contacting AES environmental, please have the cabinet model and serial no. (found on the side of the cabinet next to power connection)

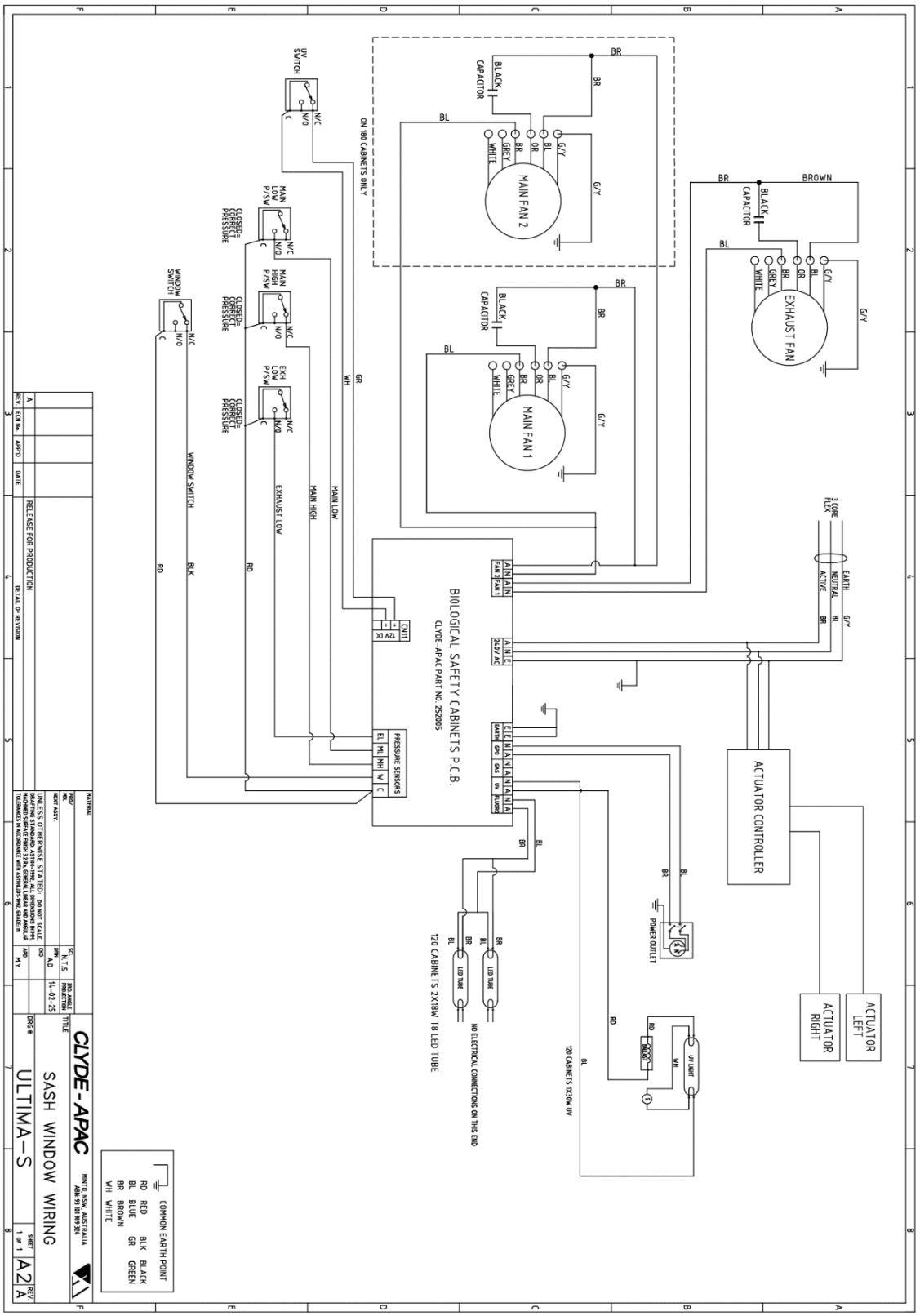
NO.	PROBLEM	POSSIBLE REASON	SOLUTION
P1	Unable to start BSC	Occurs when cabinet is not receiving power	1. Ensure cabinet is plugged into wall 2. Ensure wall plug is switched on 3. Try a different wall socket 4. See problem 3
P2	Warning message "Error Power Failure"	Occurs when the cabinet detects an issue with power	1. First try solution to problem one 2. Press 'BOOST' button for one second 3. See problem 3
P3	VDP buttons inoperable	The button overlay or the switch underneath may be damaged	To check: • Ensure buttons are only pressed for 1 second • Visually inspect the overlay for damage • See if different buttons are pressing in • See if button press is firm • Excessive force is used to get button to work If buttons appear to have any of the above problems, contact AES
P4	BSC fail to shut down	Can happen for the following reasons: 1. 'RUN' button has not been pressed 2. DAO mode is on 3. Boost mode is on 4. Buttons appear to not work 5. Cabinet displays "Error power failure"	See cabinet LCD screen to see what mode it is running in or if an error message appears. 1. Press 'RUN' button for 1 second to turn cabinet off 2. See solution to problem 5 3. See solution to problem 6 4. See solution to problem 3 5. See solution to problem 2
P5	BSC in post-use overrun mode (DAO)	Occurs when 'RUN' button is pressed and held down	Press and hold the 'RUN' button while cabinet is on until the cabinet enters regular run mode
P6	BSC in boost mode	The pressure sensor measured a deviation in pressure or boost button was pressed by accident	Press 'BOOST' button for 1 second. If cabinet continues to enter 'BOOST' mode, contact AES

12. TROUBLESHOOT GUIDE (CONT.)

P7	Warning message on VDP: "Laminar High" "Laminar Low" "Exhaust Low"	The pressure sensor measured a deviation in pressure	1. Switch cabinet off by pressing 'RUN' button (NOTE: If cabinet in boost mode see P6) 2. Unplug cabinet from wall socket 3. Wait 30 seconds 4. Plug cabinet back into wall socket 5. Switch cabinet on and see if problem persists 6. If problem persists repeat steps 1-5 but wait for 1 second in step 3 If steps 1-6 do not solve problem, contact AES
P8	BSC shuts down unexpectedly	Check for accidental operation of post-use overrun mode (DAO)	See solution to problem 5
P9	UV light does not turn on	Can occur for the following reasons: 1. UV cover is not on or positioned correctly 2. UV button not pressed correctly 3. Magnet is not present on cover	• Ensure cover is pushed back, sitting on the grille and, flush with viewing window • Press 'UV' button for 1 second • Inspect UV cover for a magnet, if missing contact AES If magnet is present and step 1 and 2 do not resolve the issue contact AES.
P10	BSC work zone power inoperable	Can occur for the following reasons: 1. 'POWER POINT' button not on 2. Switch on power point itself is not on	1. Press 'POWER POINT' button for 1 second. A light above the button will turn on 2. Flick the switch on the GPO in the on position If the above steps do not resolve the issue, contact AES.
P11	Warning message on VDP "Warning! Window Open"	Can occur for the following reasons: 1. Viewing window is open 2. Magnet is not present on window	1. Close the viewing window 2. Inspect the inside of the window frame for a magnet. If not present, contact AES. If magnet is present and step 1 does not resolve the issue contact AES.
P12	'STABILISING' takes longer than normal	Occurs when air resistance in the cabinet has increased	1. If cabinet goes into 'BOOST' mode, see P6 2. Switch cabinet off by pressing the 'RUN' button 3. Switch cabinet on and see if cabinet stabilises If the above steps do not resolve the issue, contact AES.

13. APPENDIX

WIRING DIAGRAM



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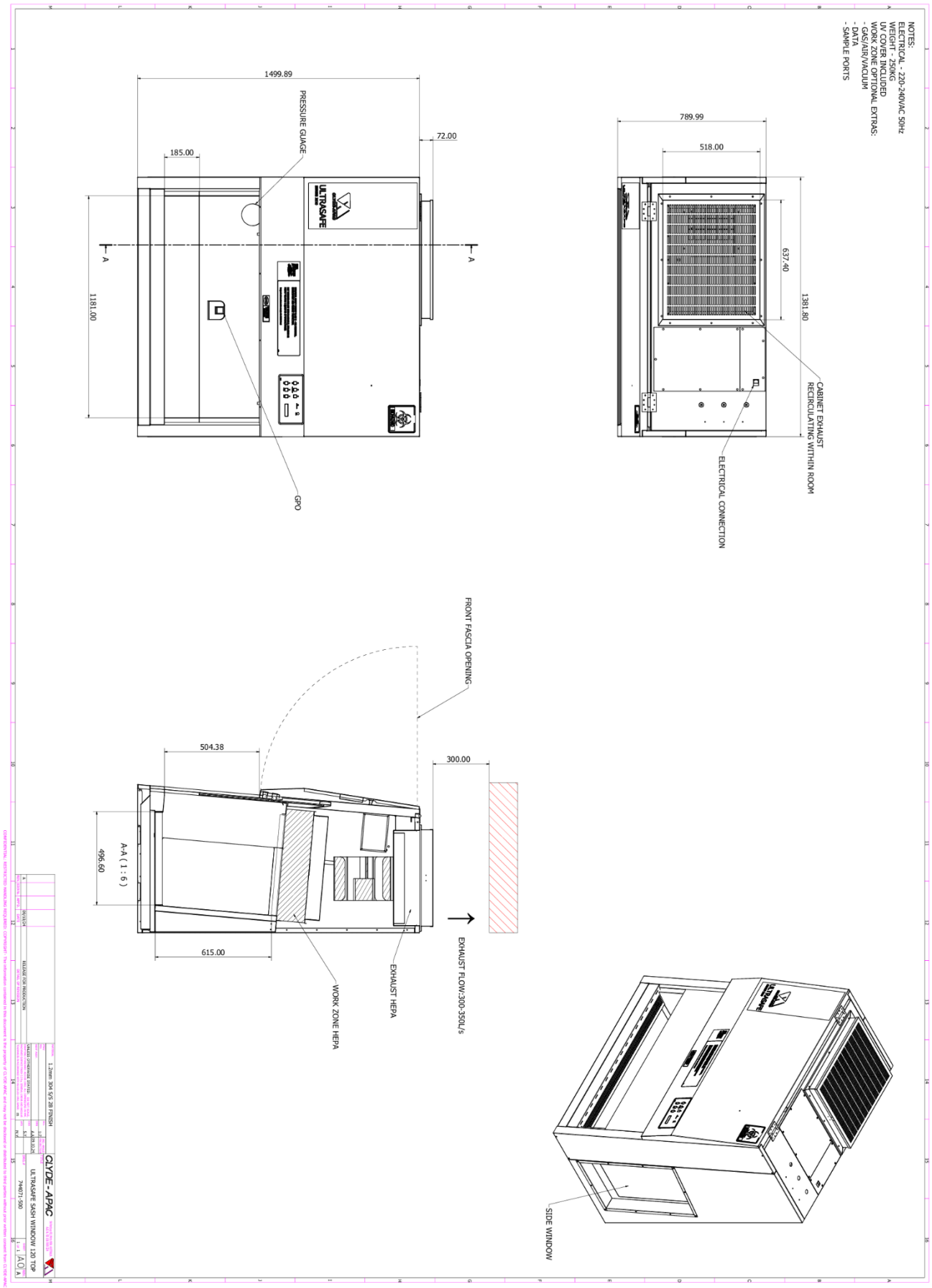
13. APPENDIX (CONT.)

TOP EXHAUST ULTIMA



NATA CERTIFICATE

NATA ACCREDITED LABORATORY

National Association of Testing Authorities, Australia

(ABN 59 004 379 748)

has accredited

AES Environmental

Vokes Air Filtration Pty Ltd

following demonstration of its technical competence to operate in accordance with

ISO/IEC 17025

This facility is accredited for the tests shown on the *Scope of Accreditation* issued by NATA

Jennifer Evans
Chief Executive Officer

Date of issue: 12 June 2020
Date of accreditation: 07 January 1975
Accreditation number: 1146
Site number: 1139

NATA is Australia's government-endorsed accreditor of laboratories, and a leader in accreditation internationally. NATA is a signatory to the international mutual recognition arrangements of the International Laboratory Accreditation Cooperation (ILAC) and the Asia Pacific Accreditation Cooperation (APAC).
AP8-1-9 / Issue 5 / May 2019

Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2015

This is to certify that:

AMCCS Pty Ltd
trading as AES Environmental
9A Pembury Road
Minto NSW 2566

Holds Certificate Number: **FS 604110**

and operates a Quality Management System which complies with the requirements of ISO 9001:2015 for the following scope:

Design and manufacture of air filtration equipment, including biological cabinets, cytotoxic cabinets, laminar flow cabinets, electrostatic filters, HEPA (high efficiency particulate arrestance) filters and related special products.

For and on behalf of BSI:

Michael Lam - Managing Director Assurance, APAC

Original Registration Date: 1993-06-21
Latest Revision Date: 2022-03-14

Effective Date: 2022-02-25
Expiry Date: 2025-02-28

Page: 1 of 1

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Information and Contact: BSI, Kitemark Court, Davy Avenue, Knowlhill, Milton Keynes MK5 8PP. Tel: + 44 345 080 9000
BSI Assurance UK Limited, registered in England under number 7805321 at 389 Chiswick High Road, London W4 4AL, UK.
Information and Contact: BSI Group ANZ Pty Limited, ACN 078 659 211: Suite 1, Level 1, 54 Waterloo Road, Macquarie Park, NSW 2113
A Member of the BSI Group of Companies.

GET IN TOUCH!

For more informaiton on replacement parts, cabinet servicing or testing get in contact with us!

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SCAN HERE