Microbiological Safety Cabinets

CLASS II Microbiological Safety Cabinets

Type 2A & 2B

Defining Biological Hazards, Biosafety Levels and Biohazard Cabinets.

The Labaire Biohazard range includes Class 1, II & III cabinets. These cabinets are designed and manufactured to be used when working with Hazardous Micro-Organisms defined as:

> "an infectious agent or part thereof presenting a real or potential risk to the well-being of man, animals and/or plants, directly through infection or indirectly through disruption of the environment".

Levels 1,2,3 or 4 known as Biosafety Levels have been created which are combinations of safety equipment and facilities required and laboratory practices and techniques to be implemented when working with these Biological Hazardous Micro-Organisms.

Biosafety Level 1

Level 1specifies that:

- Laboratory practices, safety equipment and facilities that are appropriate for work with defined and characterized strains of viable micro-organisms not known to cause disease in healthy adult humans.
- The laboratory is not necessarily separated from the general traffic patterns in the building.
- Work is generally conducted on open bench tops using standard microbiological practices.
- Special containment equipment or facility design is neither required nor generally used.
- Laboratory personnel have specific training in the procedures conducted in the laboratory and are supervised by a scientist with general training in microbiology or a related science.
- A Biological Safety Cabinet is generally not required for work involving these agents.

Infectious Agents	Examples of Agents	Practices and techniques	Safety equipment as Primary Barriers	Facilities as secondary Barriers
Not known to consistently cause disease in healthy adults	Bacillus subtilis, Naegleria gruberi, Infectious canine, Hepatitis virus, E.coli	Standard Microbiological practices	None Required.	Open benchtop sink required.

Biosafety Level 2

Level 2 differs to level 1and specifies that:

- Laboratory practices, safety equipment and facilities appropriate for work done with a broad spectrum of indigenous moderate-risk agents present in the community and associated with human disease in varying severity.
- Laboratory personnel have specific training in handling pathogenic agents and are directed by competent scientists;
- Access to the laboratory is limited when work is being conducted;
- Extreme precautions are taken with contaminated sharp items;
- Certain procedures in which infectious aerosols or splashes may be created are conducted in biological safety cabinets or other physical containment equipment.
- A Class I or Class II Biological Safety Cabinet is highly recommended for work involving these agents.

Infectious Agents	Examples of Agents	Practices and techniques	Safety equipment as Primary Barriers	Facilities as secondary Barriers
Associated with human disease. Primary hazards are percutaneous injury, ingestion, mucous membrane exposure	Measles virus, salmonellae, Toxoplasma spp, Hepatitis A, B and C Viruses, HIV, Cytotoxins	*Level 1 plus:* •Limited access •Biohazard warning signs •"Sharps" precautions •Biosafety manual defining any needed waste decontamination or medical surveillance policies •Respiratory protection as required	*Primary barriers:* •Class I or II BSCs or other physical containment devices used for all manipulations of agents that cause splashes or aerosols of infectious materials. •*PPE:* lab coats, gloves, face protection as needed.	*Level 1 plus:* •Autoclave available

Biosafety Level 3

Level 3 has additional conditions and specifies that:

- Laboratory practices, safety equipment and facilities appropriate for work done with indigenous or exotic agents with a potential for respiratory transmission which may cause serious and potentially lethal infection.
- More emphasis is placed on primary and secondary barriers to protect personnel in the contagious area, the community, and the environment from exposure to potentially infectious aerosols.
- A Class I or Class II Biological Safety Cabinet is required for work involving these agents.

Infectious Agents	Examples of Agents	Practices and techniques	Safety equipment as Primary Barriers	Facilities as secondary Barriers
Indigenous or exotic agents with potential for aerosol transmission, disease may have serious or lethal consequences	M. Tuberculosis, St. Louis encephalitis virus, Coxiella Burnetii, Bacillus anthracis	*Level 2 plus:* •Controlled access •Decontamination of waste •Decontamination of lab clothing •Baseline serum samples of lab personnel	*Primary barriers:* •Class I or II BSCs or other physical containment devices used for all open manipulations of agents. •*PPE:* lab clothing, gloves, respiratory protection as needed.	*Level 2 plus:* •Physical separation from access corridors •Self-closing, double door access •Exhaust air not recirculated •Negative airflow into laboratory

Biosafety Level 4

Level 4 includes that:

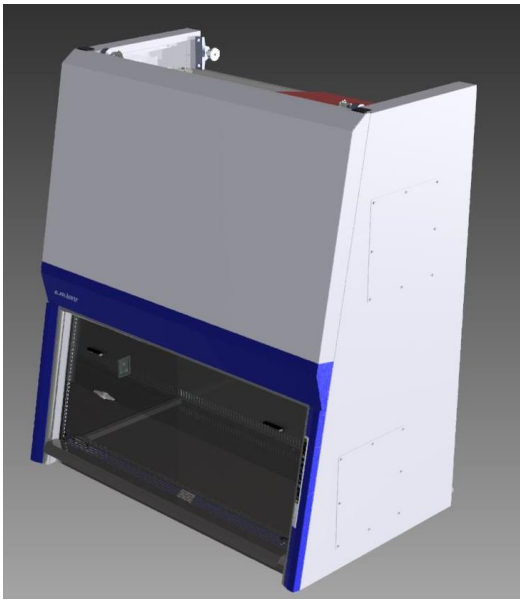
- Laboratory practices, safety equipment and facilities appropriate for work done with dangerous and exotic agents which pose a high risk of life threatening disease.
- May be transmitted via the aerosol route, and for which there is no available vaccine or therapy.
- Members of the laboratory staff have specific and thorough training in handling extremely hazardous infectious agents and they understand the primary and secondary containment functions of the standard and special practices, the containment equipment, and the laboratory design characteristics.
- They are supervised by competent scientists who are trained and experienced in working with these agents.
- Access to the laboratory is strictly controlled by the laboratory director.
- The facility is either in a separate building or in a controlled area within a building, which is completely isolated from all other areas of the building.
- A specific facility operations manual is prepared or adopted.
- A Class III biological safety cabinet is required for work involving these agents.

Infectious Agents	Examples of Agents	Practices and techniques	Safety equipment as Primary Barriers	Facilities as secondary Barriers
Dangerous / exotic agents that pose a high risk of life threatening disease. Aerosol-transmitted lab infections or related agents with unknown risk of transmission	Numerous virus that cause hemorrhagic disease (Ebola, Marburg, Lassa fever, hantavirus, etc.), H5N1 (bird flu) and Yersinia pestis.	*Level 3 plus:* •Clothing change before entry into lab •Shower on exit •All material decontaminated on exit from lab	*Primary barriers:* All procedures conducted in Class III or I or II BSCs in combination with full-body, air-supplied, positive- pressure personnel suit.	*Level 3 plus:* •Separate building or isolated zone •Dedicated supply/exhaust vacuum, and decontamination systems •Additional requirements as outlined in Biosafety in Microbiological and Biomedical Laboratories

Class I Biological Safety Cabinets

The Class I cabinet is the most basic design of all Biological Safety Cabinetry. A stream of laboratory moves through the cabinet work opening and through the work area picking up aerosols generated during microbiological manipulations. It then passes through a filtration system that traps all airborne particles and contaminants. Finally, clean, decontaminated air is exhausted from the cabinet into the laboratory or is ducted to atmosphere. The filtration system usually consists of a pre-filter and a HEPA (High Efficiency Particulate Air) or ULPA (Ultra Low Penetration Air) filter. The Class I cabinet protects the operator and the environment from exposure to Biohazards but it does not prevent product/sample being handled in the work area from coming into contact with airborne contaminants in the laboratory air being drawn through the work aperture. Cross contamination of this handled product/sample is also possible. The scope and application of Class I cabinets is limited and it is largely considered obsolete.

Class II Biological Safety Cabinets



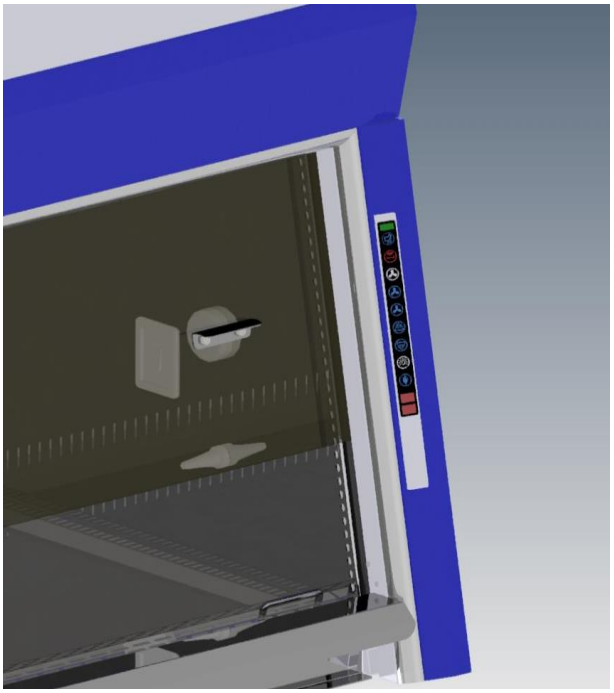
Similar to a Class 1 cabinet, the Class II cabinets have a stream of inward air moving through the work opening however it does not move through the work area. This **in-flow** air forms a barrier with the **down-flow** air and moves downwards through the front openings of the work area preventing the aerosols generated during microbiological manipulations from escaping into the laboratory. None of the unfiltered laboratory **in-flow** air enters the work area of the cabinet, so the product inside the work zone is not contaminated by the **in-flow** air. A feature unique to Class II cabinets is a vertical laminar (unidirectional) HEPA-filtered air stream that descends downward over the entire work area of the cabinet. This continuously flushes the cabinet interior of airborne contaminants and protects samples being handled within the cabinet from contamination from the **in-flow** air and limited cross contamination- it is known as the **down-flow** air. Thus the Class II cabinets protect the operator, handled products and atmosphere. The difference between the various Class II cabinets available is primarily the percentage of **exhaust** air to that of **re-circulated** air within the cabinet- the down-flow and in-flow air remain constant, except in Type II B2 where all the air is extracted, and no air is recirculated. Usually used for Cytotoxic work. Class II cabinets also protect product samples from contamination during microbiological manipulations within the cabinet interior and are all suitable for work with agents assigned to biosafety levels 1, 2 and 3.

Class III Biological Safety Cabinets

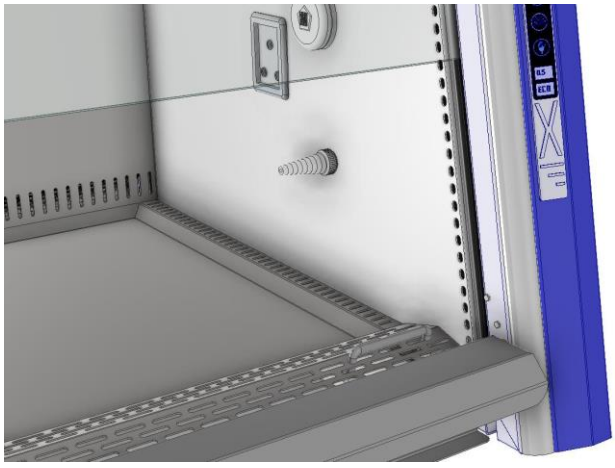
The Class III Biological Safety Cabinet provides an absolute level of safety, which cannot be attained with Class I and Class II cabinets. All Class III cabinets are designed to be gas tight. Work is performed through glove ports in the front of the cabinet. During routine operation, negative pressure relative to the ambient environment is maintained within the cabinet. This provides an additional fail-safe mechanism in case physical containment is compromised.
On all Class III cabinets, a supply of HEPA filtered air provides product protection and prevents cross contamination of samples. Exhaust air is usually HEPA filtered and incinerated. Alternatively, double HEPA filtration may be utilized. Samples are transferred into the cabinet using a pass-through hatch installed on the side of the work area. Class 3 cabinets usually exhaust air back to the laboratory. Suitable dedicated ducting is installed for work employing toxic chemicals as well as microbiological processes. All Class 3 biological safety cabinets are suitable for work with microbiological agents assigned to biosafety levels 1, 2, 3 and 4. They are frequently specified for work involving the most lethal biological hazards.

Class II Type 2A Biohazard Cabinets

- Negative pressure plenum surrounds contaminated positive pressure zones.
- Dual supply and exhaust ULPA filters with zero leak proof mounting 99,999% efficiency 0.1 micron particle.
- Electronic Monitoring Mode and Monitoring & Control mode.
- 10° angled sliding front viewing sash with magnetic positioning sensors.
- Fully lowered the sash seals against a gasket for decontamination or sleep mode.
- Enhanced Laminar Flow product protection with patented air distribution screen technology.
- Complete stainless steel interior and sump with removable single piece or segmented work surface
- Raised front and side work surface perforations with perforations on the side and rear walls of the work area ensures maximum product and operator protection..
- Hinged front panel with red coded removable service access panels to electrics, electronics, fan and filters.
- Removable side & rear service access panel
- Front sash can be lowered below cabinet providing a gap at the top for sash cleaning.
- Display panel and controls poisoned on the right hand side for easy viewing and operation.
- Raised arm rest provides comfort while preventing air intake blockage.
- All non stainless steel parts finished in an Anti-Microbial baked powder paint.



Control and Monitoring Panel positioned on the RHS. Internal electrical socket and gas outlet. Sash raised to working height.



Air entering the work area moves through the front opening in a controlled manner due to the aerofoil sides and work front

- Electronically Commutated Motor (ECM) provides a quiet and efficient operation with minimal vibration, heat generation, noise while maximum energy saving.
- Our energy efficient systems saves on expensive ULPA filter life
- External LED lighting provides daylight and nighttime lighting modes.
- Night mode operation with reduced air volumes and velocities for energy and filter lifesaving operated manually or on a timer.
- Cabinet supplied with or without a stand and foot rest.

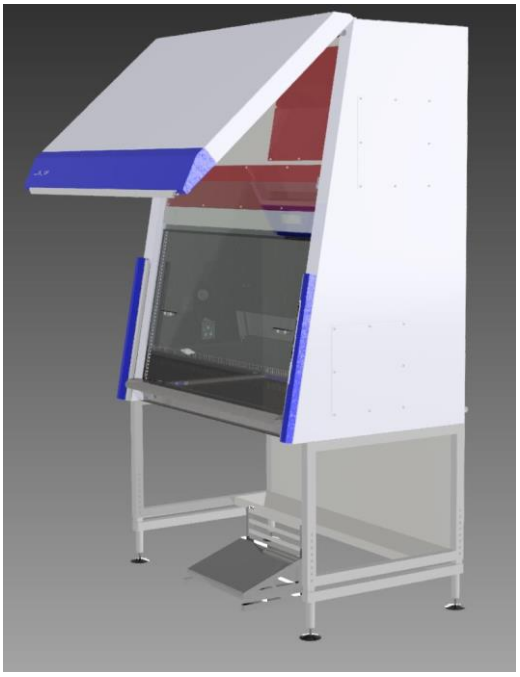
Features Type 2A

The LABAIRE Class II, Type A Microbiological Safety Cabinet provides operator, product and environmental protection against Biosafety levels 1, 2 and 3. It is not recommended for this cabinet to be used for handling Biosafety Level 4 however, provided that the operator wears a positive pressure suite, the LABAIRE Class II Type A can be used under controlled conditions.

Engineering

The LABAIRE Class II Microbiological Safety Cabinets include many features not found on our standard MSC2 cabinet that greatly enhances the design and performance of the LABAIRE cabinet. These include:

- A 10 ° angled cabinet that ensures:
  - a larger work area
  - better viewing
  - better reach into the cabinet
- Sliding sash with alarm limits
- Optional motorized sash with object sensors
- Electronic control with alarms and limits.
- ECM fan motor (see detailed energy saver)
- Unique Laminar Flow protection with screen technology.
- Tri-wall sides allowing return air to move and still have access to wet, dry and electrical services.
- ULPA filter to replace HEPA filters.
- Increased lux and decreased reflexivity from front externally mounted LED fittings.
- Internationally accepted electrical harness
- RS 232 data output port enables remote monitoring.



Class II cabinet with open front hinged door- Red service panels behind door.

Containment & Protection

The LABAIRE Microbiological Safety Cabinet can vary the percentage recirculation air to exhaust air ratio from 65-75% recirculation to 35-25% Depending on the operating conditions. This is achieved with a pre-set internal variable damper.

- Room air enters the front perforations of the work surface through the sash opening at 0.38-0.5m/s.
- Downward flow is set at 0.4-0,5m/s.
- The raised arm rest limits the possibility of blockage by the operator.
- The patented Laminar Flow Distribution screen ensures absolute laminar flow with < 5% downward air velocity variance.
- The faces at air in-flow work opening are aerofoiled for smooth in-flow patterns.
- The side wall perforations remove eddies and dead air zones behind the sliding sash.
- The inflow and down flow are precision tuned with the combination of the laminar flow screen technology and the strategic positioning of the perforations in the work area. The balancing damper, once set, maintains this equilibrium.

Filtration

The exhaust and supply ULPA filters, with an efficiency of 99,999% on 0,1 micron particle sizes are clamped into position with a zero leak factor. Contaminated air cannot bypass the filters and escape from the cabinet into the laboratory.

- Both supply and exhaust ULPA filters are protected with expanded metal grids.
- The filer frame is of extruded aluminium section with a moulded gasket- no joins.
- Zero leak technology ensures that no contaminated air may escape from the cabinet.
- Mini-pleat filter construction ensures maximum air volumes at efficient pressure drop and eliminates the possibility of filter media rupture by separator filter construction.
- The ULPA filters are preceded by a primary filter that arrests the larger particles. This pre-filter can be easily removed and cleaned or changed. It is housed in an expanded metal grid that collects tissues and the likes that have been inadvertently sucked into the return air stream.
- A pressure sensor monitors the pressure drop across the filters and system giving a visual indication of the cabinets functional state.
- Provision is made for easy scanning of the ULPA filters during the periodic cabinet integrity testing.
- No electronics are positioned in a contaminated or unfiltered zone.

Features Type 2B

The LABAIRE Class II, Type 2B Microbiological Safety Cabinet provides operator, product and environmental protection against Biosafety levels 1, 2 and 3. It is not recommended for this cabinet to be used for handling Biosafety Level 4 however, provided that the operator wears a positive pressure suite, the LABAIRE Class II Type 2B can be used under controlled conditions.

Engineering

The LABAIRE Class II Microbiological Safety Cabinets include many features not found on our standard MSC2 cabinet that greatly enhances the design and performance of the LABAIRE cabinet. These include:

- A 10 ° angled cabinet that ensures:
  - a larger work area
  - better viewing
  - better reach into the cabinet
- Sliding sash with alarm limits
- Optional motorized sash with object sensors
- Electronic control with alarms and limits.
- ECM fan motor (see detailed energy saver)
- Unique Laminar Flow protection with screen technology.
- Tri-wall sides allowing return air to move and still have access to wet, dry and electrical services.
- ULPA filter to replace HEPA filters.
- Increased lux and decreased reflexivity from front externally mounted LED fittings.
- Internationally accepted electrical harness
- RS 232 data output port enables remote monitoring.

Class II Type 2B cabinet with open front hinged door- Red service panels behind

Containment & Protection

The Type 2B LABAIRE Microbiological Safety Cabinet has 100% exhaust air with no recirculation. The exhaust duct is under negative pressure and the volume of exhaust air is controlled from the cabinet. Exhaust air will always be higher than supply to maintain work area opening inward velocity.

- 65% of the room air enters through the top of the cabinet.
- 35% of the room air enters the front opening through the perforations on the work surface and side panels at 0.38-0.5m/s.
- 100% of the room air exhausted to atmosphere.
- Downward flow is set at 0.4-0,5m/s.
- The raised arm rest limits the possibility of blockage by the operator.
- The patented Laminar Flow Distribution screen ensures absolute laminar flow with < 5% downward air velocity variance.
- The faces at air in-flow work opening are aerofoiled for smooth in-flow patterns.
- The side wall perforations remove eddies and dead air zones behind the sliding sash.
- The inflow and down flow are precision tuned with the combination of the laminar flow screen technology and the strategic positioning of the perforations in the work area. The balancing damper, once set, maintains this equilibrium.

Filtration

The exhaust and supply ULPA filters, with an efficiency of 99,999% on 0,1 micron particle sizes are clamped into position with a zero leak factor. Contaminated air cannot bypass the filters and escape from the cabinet into the laboratory.

- Both supply and exhaust ULPA filters are protected with expanded metal grids.
- The filter frame is of extruded aluminium section with a moulded gasket- no joins.
- Zero leak technology ensures that no contaminated air may escape from the cabinet.
- Mini-pleat filter construction ensures maximum air volumes at efficient pressure drop and eliminates the possibility of filter media rupture by separator filter construction.
- The ULPA filters are preceded by a primary filter that arrests the larger particles. This pre-filter can be easily removed and cleaned or changed. It is housed in an expanded metal grid that collects and protects the ULPA filters.
- A pressure sensor monitors the pressure drop across the filters and system giving a visual indication of the cabinets functional state.
- Provision is made for easy scanning of the ULPA filters during the periodic cabinet integrity testing.
- No electronics are positioned in a contaminated or unfiltered zone.

Construction

The LABAIRE cabinet is a robust construction with triple side walls which ensures that all contaminated zones are surrounded by negative pressure zones. The structure has removable panels where required for service access. It is fully functional when shipped ready for installation and operation. It would require a service technician to set up and hand over if requested or instructed by local standards.

- The cabinet exterior is manufactured from 1,6mm mild steel and finished in a white anti Microbial baked epoxy paint.
- The work interior and sump are manufactured from 1,6mm stainless steel allowing no for cracks or crevices where contamination can collect.
- The work surface is easily removable with handles on both side- unless a segmented work surface has been supplied.
- The walls have coved corners for efficient cleaning.
- The sump with its coved corners and drain point can be wiped down, disinfected and drained to waste.
- The front hinged panel is supported with gas struts and allows the technician easy access to electrics, electronics and controls.
- All access panels are red coded to indicate entry to the contamination zone.
- The front sash is of 6mm tempered safety glass and is frameless. It seals against a closed cell gasket allowing no air to bypass when in operating position or fully closed.
- The sliding sash moves up and down with a counter balance system that ensures sash cannot drop down and injure the operator.

Ergonomics

- The angled view enhances the reach into the cabinet while maintaining minimum glare & maximum comfort.
- The instant start LED lighting operate to reduce heat and conserve energy while maintaining a constant interior lighting with minimal glare.
- The arm rest is raised above the work surface to improve comfort and to minimize the blockage of the forward perforations and thus destabilising the forward air intake.
- The sliding sash can be fully opened to allow large equipment to be inserted and removed.
- The control face is angled for easy viewing and reach.
- The optional stand provides variable work surface height control.
- The optional foot rest can be set to your comfortable height.

Control

The LABAIRE cabinet is electronically controlled. The ECM fan is a standard and hence the electronic speed control is automatically set. This is a safety precaution to ensure that nobody can interfere with the air flow patterns and protection factor of the cabinet.

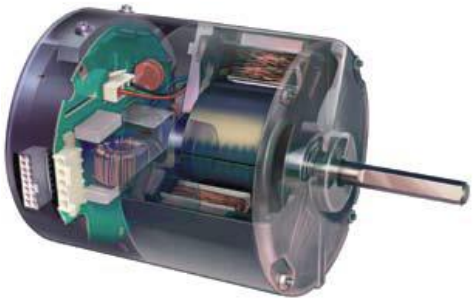
- The cabinet is switched on by depressing the fan button. The alarm will automatically activate until the air velocities have reached their correct levels. These have been pre-set.
- The sash has to be opened to the correct height in order for the alarm to switch off.
- The LED lights should be switched on and the UV light switched off.
- The downward and exhaust air velocity are maintained via the increased rotation of the ECM fan as the pressure builds up due to filter blockage.
- Once the sash is in the correct position and the alarm has stopped the sash must be located in its position by pulling the two toggle clamps down. These are located on either side of the cabinet.
- The pressure differential is electronically indicated on the display mounted on the control panel.
- Magnetic switches monitor the sash position. These switches only allow the UV light to be activated when the sash is fully closed.
- The mute button allows the operator to raise or lower the sash without activating the alarm.
- The gas outlet is connected to a solenoid valve which has to be manually re-set in the event of the alarm being activated. This means that the re-set button has to be depressed at start-up and when the alarm de-activates.
- The electronic control of the cabinet replaces the rocker switches and pressure gauge. Start-up and shut down times are set with LED and UV lights. The monitoring of the air velocities and filter status is displayed on a Liquid Crystal Display (LCD). Manual activation of the fan and lights is still available.

ECM Energy saver

ECM or Electronically Commutated Motor technology provides huge energy savings along with convenient control and low noise and vibration levels. All these factors are of primary importance to the Microbiological Safety Cabinet and its operator.

ECM fans differ from other fans primarily due to the efficiencies that they operate at compared to voltage-controlled asynchronous motor fans. We summarize the operational advantages and differences:

- Our previous cabinet included an AC external rotor motor with a variable speed controller utilising a 0-10V signal.
- This variable speed is a requirement for filter blockage for all cabinets to utilize maximum filter life- the most expensive part of maintaining a Microbiological Cabinet.
- Various electronic programs have been developed to automatically speed up the motor and fan- each with its own shortcomings or technology reliability (there is not always a technician locally available to sort out electronic programmable problems)
- The ECM includes the electronic technology as part of fan. Thus a simple potentiometer can be used to maintain the volume of air delivered as the pressure builds up.
- The operator or laboratory technician merely has to switch the fan and lights on, open the sash and commence procedures. The pressure gauge is still there for visual indication offering that "comfort zone".
- To add to all of this the fan delivers at 90% efficiency compared to 30% to 60% for AC type fans.
- While the fan and motor are the same physical size the life span as a percentage of total load capacity is 250% as against 180%.
- The efficiency relates to a considerable drop in power consumption with a saving of 45%.
- This efficiency also dramatically reduces the vibration levels and hence that transferred to the work surface.
- Similarly noise levels are reduced by 45%.
- These fans, imported from Germany have a 10 year warrantee due to their reliability. They are readably available and are being used throughout industry for many different applications- air handling units, air curtains, refrigeration condensers, generators etc.

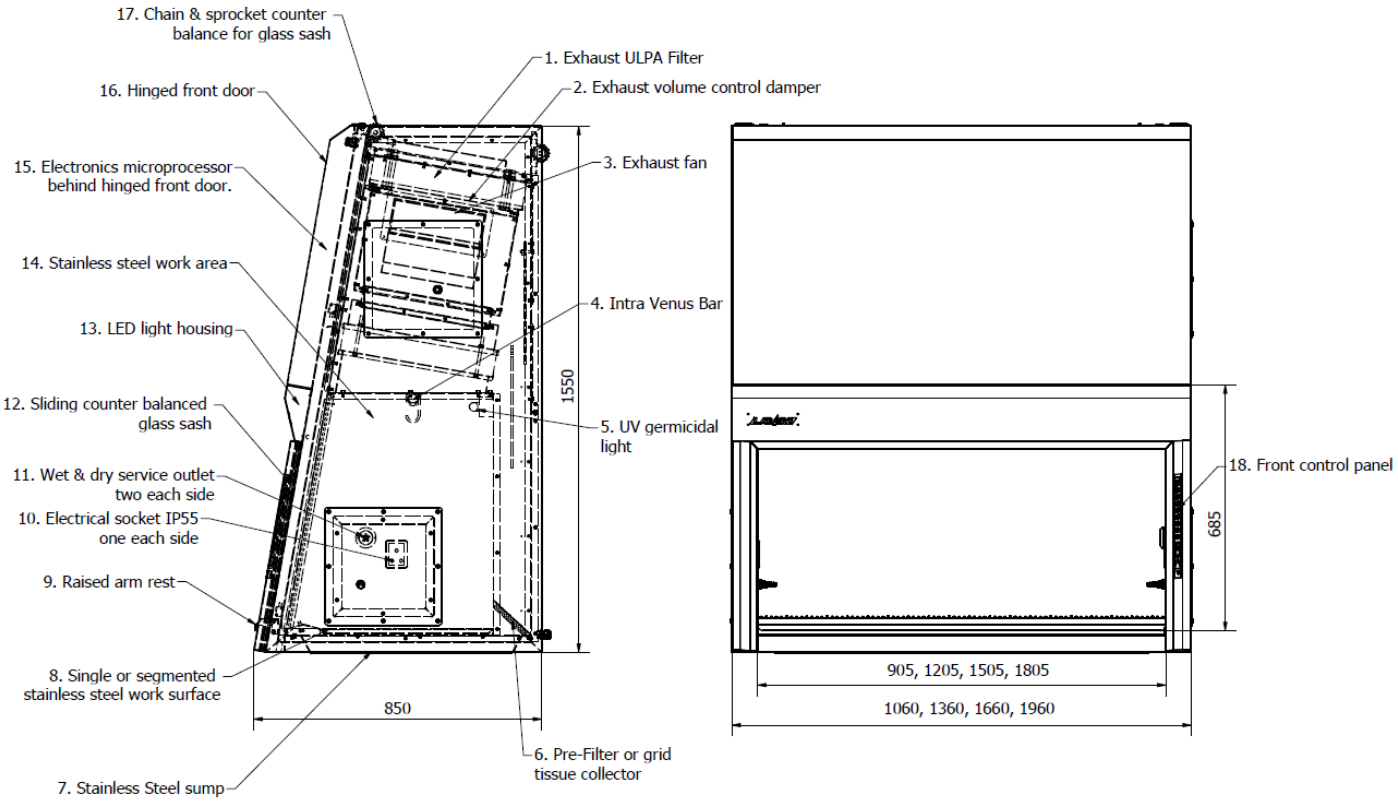


AC PSC	Alternating Current Permanent Split Capacitor
DC ECM	Direct Current Electronically Commutated Motor
DC	Direct Current
AC 3-Phase	Alternating Current 3 Phase motor

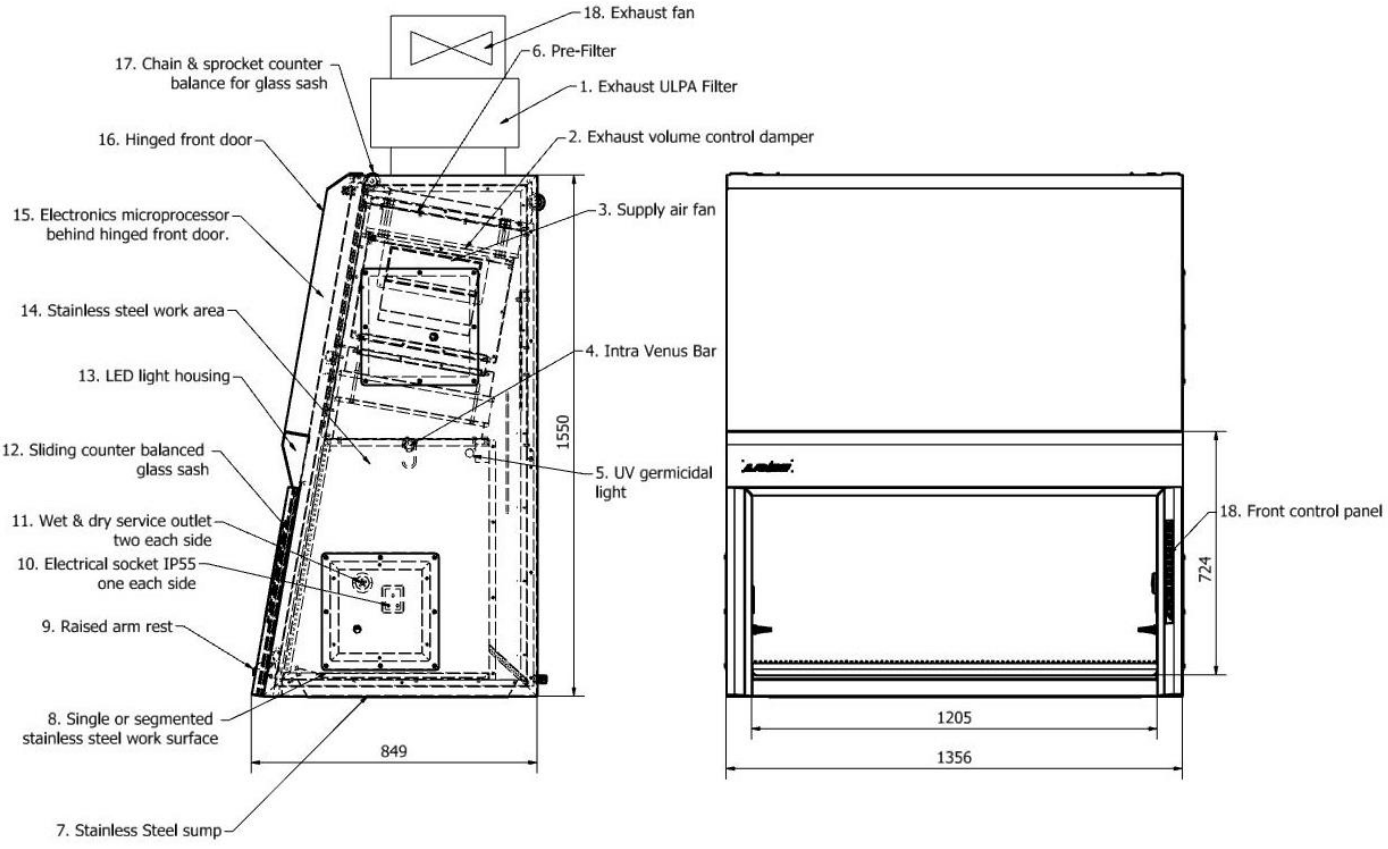
Noise	**AC PSC**	**DC ECM**	**DC**	**AC 3-Phase**
Fan (RPM)	1100-1700	800-1400	1400-2200	800-1400
Motor (Harmonics)	Yes	No	No	No
Energy Costs				
Watts	564	311	163	414
KW	0.564	0.311	0.163	0.414
KW-HR	4927	2724	1424	3617
% Increase to DC ECM	45%	0%	-48%	25%
Filter Loading				
Years to change out	7	10	4	10
Vibration				
Fan (RPM)	Higher	Lower	Higher	Lower

Conclusions	
AC PSC	The PSC motors are being replaced by the more efficient motors.
DC	The DC motors provide the lowest operating cost but perform at the highest vibration levels. The fan is efficient but the ULPA filter loading capacity is far behind. Filters would have to be replaced 2-3 times as often
AC 3 Phase	The AC 3-Phase motors are an improvement over AC PSC motors, however, they cost more to operate than DC or DC ECM motors. Although vibration levels and filter loading is equivalent, the fan motor efficiency is lower. 3 phase current is not always available in a laboratory environment. Speed control is complicated and expensive.
DC ECM	The DC ECM motor when optimally designed into the Microbiological Safety Cabinet provides the best results when combining fan motor efficiency, energy savings, ULPA filter capacity and reduced noise and vibration

Class II Type A2 Biological Safety Cabinets				
MODEL	**L3B2A**	**L4B2A**	**L5B2A**	**L6B2A**
External Dimensions (WxDxH)mm	1060x815x1550	1360x850x1550	1660x815x1550	1960x815x1550
(WxDxH) inches	41.5”x33.5”x61”	53.5”x33.5”x61”	65.5”x33.5”x61”	77.5”x33.5”x61”
Internal Work Area (WxDxH) mm	906x608x685	1206x608x685	1506x608x685	1806x608x685
(WxDxH) inches	35.7”x24”x27”	47.5”x24”x27”	59.5”x24”x27”	71.5”x24”x27”
Internal work area m² (ft²)	0.55 (5.87)	0.733 (7.8)	0.916 (9.77)	1.1 (11.74)
Work opening height mm(inches)	200 (8”)	200 (8”)	200 (8”)	200 (8”)
ULPA efficiency (0.1µ)	99.999%			
Pre-filter arrestance %	80%			
Average inflow m/s	0.4m/s			
Average down flow m/s	0.3m/s < +-5% variance at pre-set velocity			
Air Volume- Inflow m³/hr.	260 (153)	350 (207)	440 (260)	530 (312)
Down Flow m³/hr.	600 (354)	800 (472)	1000 (590)	1200 (708)
Total m³/hr.	860 (507)	1150 (679)	1440 (850)	1730 (1020)
Noise Levels EN 12469 dBA	60	60	60	60
Lighting Lux(ft-candles)	1000 (95)	1000 (95)	1000 (95)	1000 (95)
Electrics	115V/220V, 15A, 50 Hz			
Shipping Mass kg(lbs)	300 (660)	350 (770)	400 (990)	500 (1100)
Shipping Dimensions mm(inches)	1220x915x1900	1520x915x1900	1820x915x1900	2120x915x1900



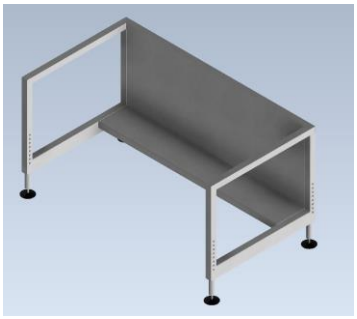
Class II Type 2B Biological Safety Cabinets				
MODEL	**L3B2B**	**L4B2B**	**L5B2B**	**L6B2B**
External Dimensions (WxDxH)mm	1060x815x1550	1360x850x1550	1660x815x1550	1960x815x1550
(WxDxH) inches	41.5”x33.5”x61”	53.5”x33.5”x61”	65.5”x33.5”x61”	77.5”x33.5”x61”
Internal Work Area (WxDxH) mm	906x608x685	1206x608x685	1506x608x685	1806x608x685
(WxDxH) inches	35.7”x24”x27”	47.5”x24”x27”	59.5”x24”x27”	71.5”x24”x27”
Internal work area m² (ft²)	0.55 (5.87)	0.733 (7.8)	0.916 (9.77)	1.1 (11.74)
Work opening height mm(inches)	200 (8”)	200 (8”)	200 (8”)	200 (8”)
ULPA efficiency (0.1µ)	99.999%			
Pre-filter arrestance %	80%			
Average inflow m/s	0.4m/s			
Average down flow m/s	0.3m/s < +-5% variance at pre-set velocity			
Air Volume- Inflow m³/hr.	260 (153)	350 (207)	440 (260)	530 (312)
Down Flow m³/hr.	600 (354)	800 (472)	1000 (590)	1200 (708)
Total m³/hr.	860 (507)	1150 (679)	1440 (850)	1730 (1020)
Noise Levels EN 12469 dBA	60	60	60	60
Lighting Lux(ft-candles)	1000 (95)	1000 (95)	1000 (95)	1000 (95)
Electrics	115V/220V, 15A, 50 Hz			
Shipping Mass kg(lbs)	300 (660)	350 (770)	400 (990)	500 (1100)
Shipping Dimensions mm(inches)	1220x915x1900	1520x915x1900	1820x915x1900	2120x915x1900

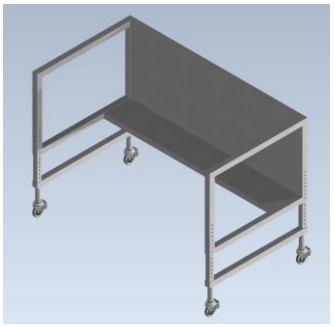


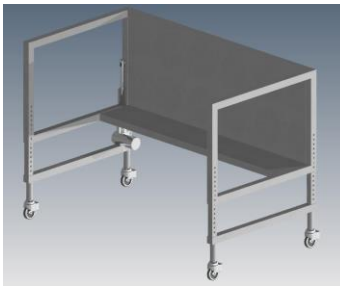
Accessories

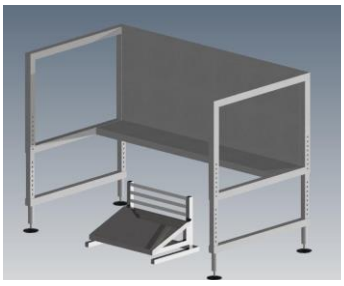
The following accessories are available with the Labaire Class II Biohazard cabinets:

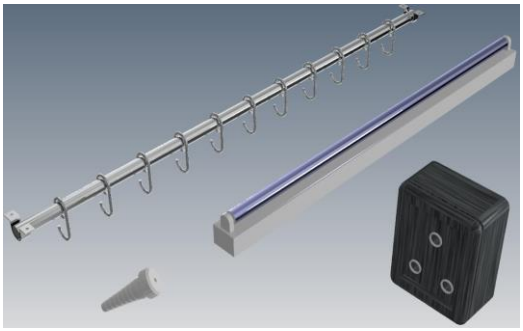
- Fixed height stand
  - Levelling feet or castors
  - Height of 700mm or 850mm
  - Working height is 750mm or 900mm
  - White powder coated
  - Maximum 600kg load
- Variable height stand
  - Levelling feet or castors
  - Height of 700mm to 850mm
  - Working height is 750 to 900mm
  - White powder coated
  - Maximum 600kg load
- Linear actuated variable height stand
  - Activated with a hand held control
  - 24V DC actuator with battery backup
  - Height adjustment from 700-850mm
  - Levelling feet or castors
  - White powder coated
  - Maximum 500kg load
- Foot rest
  - Easy posture positioning for long hours of sitting
  - Height setting
- Germicidal UV Light
  - Controlled by microprocessor control panel
  - Band width emission of 253.7 nanometres for efficient decontamination
  - Lamp is positioned away from operator line of sight for safety and proper exposure to interior surfaces.
- Gas outlet
  - Nozzle with remote control
  - Nozzle with internal control
- Intravenous bar with hooks
  - Stainless steel bar positioned beneath Laminar Flow distribution screen
  - Stainless steel hooks
- Electrical sockets fitted to suite
  - IP55 protection











Labaire
129 5th Street, Wynberg, Sandton
Gauteng, South Africa
Web page: www.labaire.co.za
Email: sales@labaire.co.za
Cell: 27 79 397 9038

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