



Incorporating all the latest design features available on Esco's NSF-listed Labculture® Class II Type A2 biohazard safety cabinet, Esco Labculture® Class II Type B2 biohazard safety cabinets are designed to provide product, operator and environment protection and are suitable for general microbiological work with agents assigned to biological safety levels 1, 2, or 3.

In a Class II Type B2 cabinet, all inflow and downflow air is exhausted via ductworks after HEPA/ULPA filtration to the external environment without recirculation within the cabinet.

*These cabinets are supplied with an integral exhaust collar that allows the cabinet exhaust to be ducted to the external environment via dedicated ductwork. Because they incorporate a non-recirculating **total exhaust design**, Class II Type B2 cabinets are **suitable for work with toxic chemicals** when these may be used as adjunct to microbiological processes. Total exhaust also serves as an additional fail-safe in case exhaust ULPA-filtration fails to ensure containment. The Labculture® Class II Type B2 cabinet is now available with **Esco's latest Sentinel™ Microprocessor Cabinet Control** system which further enhances the cabinet function, usage and security features.*

Labculture® Class II Type B2 biosafety cabinet incorporates **BioCote® anti-microbial powder-coating on the cabinet body**, which employs silver ions as the active ingredient to prevent surface contamination in the laboratory.

MAIN FILTRATION AGENTS

► **ISO Class 3 air cleanliness** within work zone as per ISO 14644.1 (equivalent to Class 1 as per US Federal Standard 209E, 100 times "cleaner" than the usual Class 100 classification on cabinets offered by other manufacturers).

► High-quality **ULPA downflow filter with a typical efficiency of 99.9997% at MPPS, 0.3 and 0.12 microns** provide the best product and operator protection in the world, while **HEPA exhaust filter** with a typical efficiency of 99.99% at 0.3 microns provides environmental protection. Typical filter lifespan is more than 3 years.

CONTROL FEATURES

► **Esco Sentinel™ microprocessor-based control system** with true airflow velocity sensing technology and temperature compensation for improved sensor accuracy.



► Cabinet downflow / exhaust airflow volumes are continuously displayed on the backlit LCD screen for constant monitoring.

► **The cabinet is equipped with two separate airflow sensors, designed to monitor exhaust airflow and downflow airflow. Audible and visual alarms** are activated when exhaust and / or downflow airflows are below or above the safe operating range. If the exhaust airflow is lower than the minimum safe range and / or the downflow airflow is higher than the maximum safe range, the Sentinel™ control system automatically shuts down the cabinet internal fan. This interlocking system prevents the reduction of inflow which can compromise operator protection.

► For maximum safety, in case the sash is moved from the safe operating height, thus compromising containment, built-in **Esco Sentinel™ Microprocessor control system** will automatically shut down the cabinet internal fan and alert the operator with **audible and visual alarms**.

► All cabinet operating parameters can be customised and configured based on the requirements of the user.

► **An Admin. PIN** can be set by the laboratory supervisor to restrict access to all critical menu functions. **A Fan PIN** can be set to restrict access to the cabinet internal fan, thereby preventing cabinet usage by unauthorized personnel.

► **Blower Hour Meter** tracks the total number of cabinet usage hours, thereby allowing the user to gauge when the ULPA/HEPA filter would require replacing.

► Airflow calibration can be done easily using the microprocessor control on the front panel of the cabinet.

ERGONOMIC FEATURES

► **The sleek, ergonomically styled 10-degree sloped front** eliminates glare and increases operator-reach into work zone with less physical strain. The 5000k colour temp fluorescent lamps are used for less glare and greater operator comfort. A large 203 mm / 8 inch (258 mm / 9.8 inch, measured from work surface) work access opening allows easier access into the work zone.

► The warm white fluorescent lighting is **electronically ballasted** for lower heat output, higher energy efficiency, and zero-flicker (as compared to conventional electromagnetic ballasts), thus improving operator comfort. (Cont. on page 2.)

IMPORTANT NOTICE: The suitability of this product for your application should always be assessed by a trained biological safety professional or laboratory safety officer. Refer to the section on **Site Installation Requirements** on page 3 of this catalogue for further information which may help determine the suitability of this cabinet for your applications.

ERGONOMIC FEATURES (CONT.)

- 2 optional electrical outlet provisions are provided on the sidewalls (one on each wall) instead of on the back wall for easier reach.



- Service fixtures provisions are **offset and staggered** for easier reach and access.

- The **laminated glass sliding front sash** is shatter-proof and provides greater operator protection.

- The position of the laminated safety glass window, monitored by the cabinet control system, has to be in the fully closed position before the UV lamp will activate.

- The counterbalanced safety glass sash is frameless for maximum visibility into the work zone and easy cleaning (no joints for contamination to accumulate in). The front sash can also be closed fully to keep the cabinet interior clean during periods of non-use as well as to prevent exposure to harmful UV radiation during UV decontamination.

CONSTRUCTION FEATURES

- Single-piece stainless steel work tray is easily removed from the work zone. Lifting the tray or removing it from the work zone will not affect the operator protection of the cabinet.

- A conveniently accessible paper-catch is integrated in the air return area in order to prevent wipes and small items from entering the blower.

- Attractive single-piece inner liner** means the interior work zone of the cabinet is easy to clean and does not have any crevices or joints for potential contaminants to collect, while the work tray edges are radiused for better containment and easy cleaning.

- Front armrest is raised above the air grille perforations to prevent the operator's arms from blocking air inflow during usage. In addition, front perforations are curved to prevent users from placing any objects on the grille itself.

- The sidewall design enhances cleanability. There are no hard to reach hidden areas where contaminants can accumulate. Especially unique is the single joint between the side wall liners and the lower drain pan which is sealed rather than left open as is usually the case with other designs.

- The cabinet sidewall is under negative pressure.** This means, as a system, the cabinet is inherently safe. Even in the event both internal and external

walls are punctured, there will still be no leakage of contamination from the cabinet. Single wall designs employed by many other brands can result in safety hazards if seals fail.

- Inherently safe design** maintains containment for protection even with some or all work trays removed, thus preventing hazardous exposure during cleaning and maintenance.

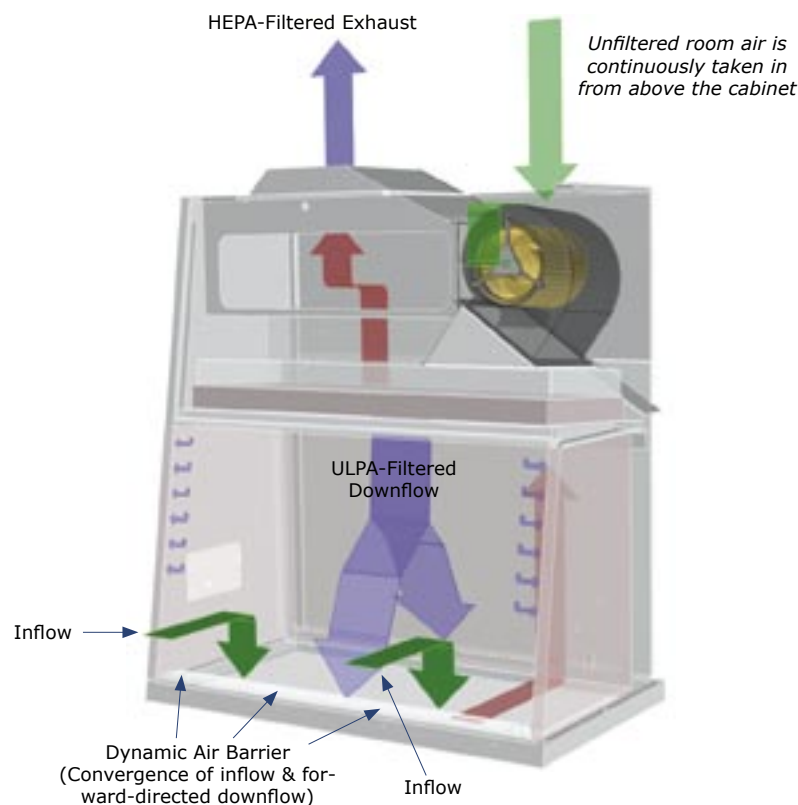
- Aerodynamically designed front airflow intake zone eliminates turbulence and the possibility of loss of containment. In addition, potential air leakages are prevented by the **enhanced side capture zones** between the work surface and the cabinet sidewalls.

- No screws are present on the front and sides of the cabinet, inside the work zone, and below the work surface in the drain pan, thus making the entire assembly visually appealing and all exterior and interior surfaces easy to clean.

- Lower drain spillage trough is fabricated in one single-piece, thus eliminating any joints that could potentially result in the leakage of contaminated liquids. The trough has wide-open angles (superior to radii) for maximum cleanability.

- The electrical system of the cabinet has been designed in accordance with the requirements of the following standards: IEC 61010-1, EN 61010-1, UL 61010A-1 and CSA C22.2 No.1010.1-92. All components are UL-listed or recognized.

ESCO LABCULTURE® CLASS II TYPE B2 BIOHAZARD SAFETY CABINET AIRFLOW PROFILE DESCRIPTION



- An inflow air curtain into the cabinet with an average velocity of 0.53 m/s or 105 fpm provides operator protection from any biohazardous aerosols that may be generated within the cabinet during microbiological manipulations.

- Air taken in from above the cabinet passes through perforations and a downflow ULPA filter. Moving into the main chamber of the cabinet in a laminar (unidirectional) air stream with an average air velocity of 0.33m/s or 65 fpm, it provides product protection from airborne particulate matter and cross contamination. This vertical laminar flow air stream is also known as the downflow.

- Close to the work surface, the downflow air stream "splits" with a portion entering grilles towards the front or back of the cabinet. Combined with the inflow air curtain, air is moved within the cabinet to a common air plenum; from which all the air is HEPA-filtered and exhausted through a dedicated ductwork system. (NB: Ducting system and exhaust blowers are NOT supplied with the cabinet.)

SITE INSTALLATION REQUIREMENTS

The Esco Labculture® Class II Type B2 Biological Safety Cabinet, by virtue of its total exhaust design requires a high level of expertise in order to install and maintain successfully. This is the most challenging product, in terms of technical requirements on the part of the distributor, of all the products that we manufacture, because other products will basically operate properly "out of the box" (even though on-site commissioning is required), a B2 cabinet must be specially checked and adjusted before it will operate.

Important: While Esco will provide support in installing all systems sold, please understand that if you fail to observe these recommendations we will not be liable for any installation problems, and that our manufacturer's warranty will also be rendered null and void. In order to ensure a successful and safe installation of the Labculture® B2 cabinet may we draw your attention to the following recommendations:

1. Ensure your applications do indeed require a Class II Type B2 and not the more common Class II Type A2 re-circulating cabinets. Should you require the safety cabinet to provide protection from trace amounts of volatile toxic gases (which are not removed by the exhaust HEPA filter) an Class II A2 re-circulating type cabinet fitted with an exhaust connection may also be used.

2. Class II Type B2 cabinet is useful if toxic gases / chemicals are not

permitted to re-circulate into the work zone. If such re-circulation is permitted, as long as the gases do not enter the laboratory room, then Class II Type A2 can be used for that application. A trained biological safety professional or a laboratory safety officer should be consulted for this recommendation.

3. Read and understand the site requirements (see literature) in terms of exhaust / makeup air volumes, and appropriate exhaust system sizing allowing sufficient capacity for exhaust HEPA filter resistance etc.

4. If your facility already has a central exhaust system installed, communicate the B2 cabinet's site requirements clearly to the facilities department in writing. It is the responsibility of the end-user organization's facilities department to provide the necessary exhaust and make up airflows and that without this the B2 cabinet will not function.

5. If you have purchased the ducting connection as part of a package, ensure that you have the in-house expertise to install the ductwork and exhaust fan systems. Or alternatively subcontract this portion of the work to a competent HVAC contractor. The HVAC / exhaust system is an integral part of the facility, and will require coordination with your organization's facilities department for the installation. (For example to ensure sufficient makeup air is available, or with regards to placement of exhaust fans and duct runs etc.)

6. If a certification company is not available or if local certification companies do not have experience commissioning B2 cabinets, contact your local Esco distributor to undertake the initial commissioning of the system once the cabinet has been sited in the laboratory and connected to a properly specified exhaust system.

The initial commissioning of B2 cabinets consists of at least taking downflow / inflow velocity measurements and setting the exhaust flow interlock, although additional tests (such as HEPA filter leak tests) are always recommended.

7. After the initial installation, regular on-site checkups (at least once per year and in the event of special situations like filter changes, cabinet relocation etc.) are mandatory to ensure proper functioning of the cabinet. The annual checkup consists largely of the same tests which are also performed during the initial commissioning.

8. Please note that Esco does not provide ductwork necessary to complete the installation, although on special request we may provide the exhaust fan(s).

IMPORTANT: For detailed site installation recommendations for the LB2 cabinet, visit our website's Technical Papers section: <http://biotech.escoglobal.com/technicalpapers.htm> Or visit the following link to directly download the recommendation article: <http://biotech.escoglobal.com/PDF/B2installation.pdf>

► **Servicing your cabinet is a breeze with Esco's unique hinged maintenance panel.** Simply remove the fasteners at both sides of the panel, lift it up, and mount it on self-supporting struts. The fluorescent lamps (mounted out of the air stream for perfect airflow uniformity), electrical components, electronic boards, display and keyswitch are mounted behind the panel.

► **Colour-coded panels:** access panels to electrical system and filter/blower internal plenum are colour-coded red to caution users of potentially dangerous/contaminated parts.

► **Minimal downtime:** all maintenance can be performed from the front of the cabinet thus eliminating the need for the unit to be physically relocated or disconnected from service connections. Complete isolation of all cabinet components (except the ULPA filter and the blower) from contaminated spaces means that maintenance can be performed safely without the need for time-consuming and costly fumigation / chemical decontamination.

► **For filter and blower maintenance,** remove the access cover (secured and gasketed to the cabinet carcass) mounted on the front of the cabinet. Notice the lifting grip provisions that allow this cover to be removed with minimal physical effort. Your service provider can then access the internal plenum for filter replacement and blower maintenance.

► **The modular electrical system** can be replaced quickly with snap together connectors in case of any electrical fault, thus reducing downtime.

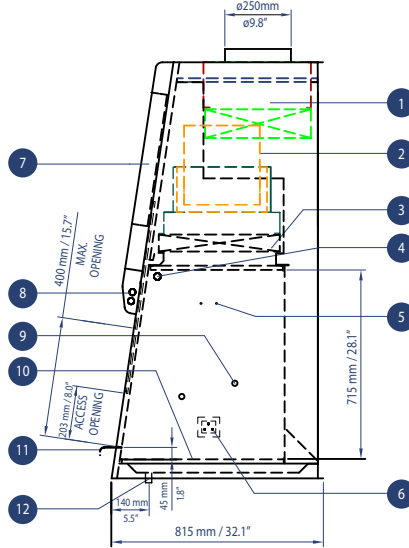
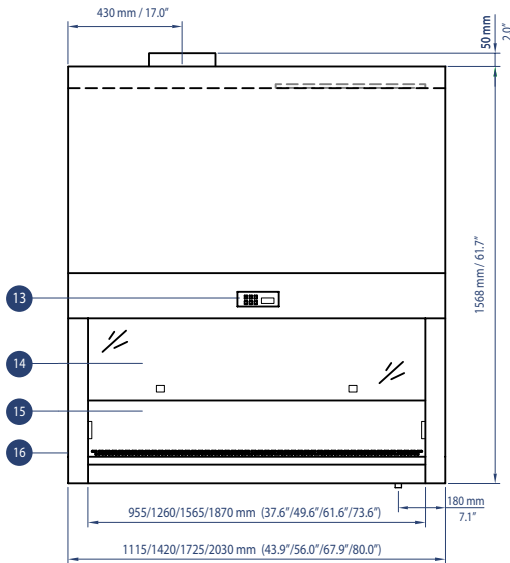
STRINGENT PERFORMANCE TESTING AT ESCO

Each individual unit shipped is extensively tested for performance and safety and delivered with a detailed test report and certificate of performance. Every single Labculture® Class II Type B2 cabinet manufactured is tested and validated with the following test methods:



- a. Inflow / downflow velocity tests
- b. PAO Aerosol challenge test for filter integrity
- c. Light / noise / vibration tests
- d. Airflow pattern visualisation test
- e. Electrical safety to IEC61010-1
- f. **KI-Discus Containment Testing** (for further information, refer to pg.10 of this catalogue)
- g. **Microbiological testing** performed on statistical sampling basis

Esco performs testing in accordance with more than 20 of the world's most recognized standards, of local, regional and international scopes. In particular, testing in our laboratory is most frequently conducted based on the European Standard EN12469, US standard NSF49 and IEST RP. An NSF-Accredited Biohazard Cabinet Field Certifiers are available in-house full-time to supervise all testing work.



- 1 Exhaust HEPA Filter
- 2 Blower
- 3 Downflow ULPA Filter
- 4 Standard UV Light Retrofit™ Kit Provision
- 5 Standard IV-Bar Retrofit™ Kit Provision
- 6 Electrical Outlet Retrofit™ Kit Provision
(3ft Model - One Single Outlet in Work zone)
(4&6ft Model - Two Single Outlets in Work zone)
- 7 Electrical and Electronics Panel
- 8 Fluorescent Light
- 9 Plugged Service Fixture Provisions (2 on each side)
- 10 Stainless Steel Single-piece Work Tray
- 11 Stainless Steel Armrest
- 12 Drain Valve Retrofit™ Kit Provision
- 13 Esco Sentinel™ Microprocessor Control System
- 14 Laminated Glass Sliding Sash Window
- 15 Single-piece Stainless Steel Back Wall and Side Walls
- 16 Removable Side Panel for Plumbing Access

General Specifications		LB2-3BX	LB2-4BX	LB2-5BX	LB2-6BX	
External Dimensions (L x W x H)		1115 x 815 x 1568 mm 40.7" x 33.3" x 61.7"	1420 x 815 x 1568 mm 52.7" x 33.3" x 61.7"	1725 x 815 x 1568 mm 64.7" x 33.3" x 61.7"	2030 x 815 x 1568 mm 80.0" x 33.3" x 61.7"	
Internal Work Zone (L x W x H)		955 x 603 x 715 mm 37.6" x 21.3" x 28.1"	1260 x 603 x 715 mm 49.6" x 21.3" x 28.1"	1565 x 603 x 715 mm 61.6" x 21.3" x 28.1"	1870 x 603 x 715 mm 73.6" x 21.3" x 28.1"	
Standards Compliance		Air cleanliness: ISO 14644.1 Class 3, IEST-G-CC1001, IEST-G-CC1002 and other equivalent requirements Filter performance: IEST-RP-CC034.1, IEST-RP-CC007.1, IEST-RP-CC001.3 and EN1822 Electrical safety: IEC 61010-1 / EN 61010-1 / UL 61010A-1 / CSA C22.2 No. 1010.1-92				
Average Airflow Velocities	Inflow	Initial setpoint: 0.53 m/s or 105 fpm				
	Downflow	Initial setpoint: 0.33 m/s or 65 fpm (uniformity is within +/- 20% from the average downflow velocity)				
Airflow Volumes At Initial Airflow Velocity Setpoints	Inflow	372 cmh / 219 cfm	492 cmh / 288 cfm	608 cmh / 358 cfm	726 cmh / 427 cfm	
	Downflow	714 cmh / 420 cfm	945 cmh / 556 cfm	1168 cmh / 687 cfm	1395 cmh / 774 cfm	
	Total Cabinet Airflow	1086 cmh / 629 cfm	1437 cmh / 846 cfm	1776 cmh / 1045 cfm	2121 cmh / 1248 cfm	
Pressure Drop Requirements for Exhaust Ducting		580 Pa / 2.33 inH ₂ O	500 Pa / 2.01 inH ₂ O	475 Pa / 1.91 inH ₂ O	465 Pa / 1.87 inH ₂ O	
Cleanliness Within Working Area		ISO14644.1 Class 3, US Federal Standard 209E Class 1 / M1.5, AS1386 Class 1.5, JIS B9920 Class 3, BS5295 Class C, Class M10,000 as per KS27030.1 and equivalent classes of VDI2083 and AFNOR X44101				
Downflow Filter Type		ULPA filter with integral metal guards and filter frame gaskets; fully compliant with EN 1822 and IEST-RP-CC001.3 requirements (each cabinet has individual downflow and exhaust filters)				
Exhaust Filter Type		H13 HEPA filter with integral metal guards and filter frame gaskets; fully compliant with EN 1822 and IEST-RP-CC001.3 requirements				
Downflow Filter Efficiency Ratings		Minimum: 99.99962% at 0.3µm / 99.99965% at 0.12µm / 99.99946% at MPPS Typical: 99.9999% at 0.3µm / 99.9999% at 0.12µm / 99.9999% at MPPS				
Exhaust Filter Efficiency Ratings		Typical efficiency >99.99% at 0.3µm				
Noise Level		<62 dBA at initial blower speed setting (according to NSF49, reading based on 4 feet model, subject to acoustic properties of test environment)				
Light Intensity		>1000 Lux / >93 foot candles, measured at work surface level (zero background) as per NSF49 test grid				
Main Body Construction		1.5mm / 0.06" / 16 gauge electro-galvanised steel with white oven-baked epoxy powder-coated finish				
Net Weight (Approximate)		217 kgs / 478 lbs	256 kgs / 564 lbs	305 kgs / 672 lbs	353 kgs / 778 lbs	
Max Shipping Weight		328 kgs / 723 lbs	360 kgs / 794 lbs	420 kgs / 926 lbs	515 kgs / 1135 lbs	
Maximum Power Consumption / Current	220-240VAC / 50Hz 1Ph	Cabinet Power / Current	346W / 2A	360W / 2A	380W / 2A	396W / 2A
		Outlet Power / Current	1000VA / 5A	1000VA / 5A	1000VA / 5A	1000VA / 5A
	110-130VAC / 60Hz 1Ph	Cabinet Power / Current	600W / 5.7A	614W / 5.7A	634W / 5.7A	650W / 5.7A
		Outlet Power / Current	500VA / 5A	500VA / 5A	500VA / 5A	500VA / 5A
Max Shipping Dimensions (L x W x H)		1350 x 1100 x 1930 mm 53.1" x 43.3" x 76.0"	1650 x 1100 x 1930 mm 65.0" x 43.3" x 76.0"	1950 x 1100 x 1930 mm 76.8" x 43.3" x 76.0"	2250 x 1100 x 1930 mm 88.6" x 43.3" x 76.0"	
Max Shipping Volume		2.86 cbm / 101.0 cbf	3.50 cbm / 123.6 cbf	4.14 cbm / 146.2.1 cbf	4.78 cbm / 168.8 cbf	

ESCO® Esco Biotechnology Equipment Division

Esco Biotech is a highly focused manufacturer of laminar flow, biohazard safety and other HEPA-filtered cabinets for the laboratory with a history of quality cabinets since 1978. We are predominantly oriented towards the international marketplace, with sales in more than 60 countries and 90% of turnover exported. Our products have been independently tested to standards such as NSF49, EN12469, and AS1807.5. Products are manufactured under an ISO 9001 registered quality system.



Your local distributor: