



# Labculture®



*Esco Labculture Laminar Flow Clean Bench  
Model LHC-4A\_*

AS 1386.5, EN12469 (Microbiological Testing Method)

## **Laminar Flow Clean Benches, Horizontal and Vertical** *The Leading Solution for Research Laboratories*



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WORLD CLASS. WORLDWIDE.



### Main Features

- Esco **ISOCIDE™** antimicrobial surface on all painted surfaces.
- Sentinel™ Microprocessor controller supervises all functions.
- Sterile work zone environment created for optimum product protection.
- Long-life ULPA filter for supply airflow.
- Spillage-retention work surface with recessed central area.
- Available in 0.9, 1.2, 1.5 and 1.8 meter models (3', 4', 5' and 6')



Labculture Horizontal Laminar Flow Clean Bench  
Model LHC-4A\_

### Esco Experience

Esco Laminar Flow Clean Benches are the premium selection for the discerning researcher, offering a combination of value, high quality construction, low operating noise levels, and a wide product range to suit all budgets. Esco is the world's largest supplier of laminar flow clean benches to the life sciences and laboratory markets.

### Horizontal and Vertical Laminar Flow Clean Benches

Esco Labculture Laminar Flow Clean Benches are available in both horizontal and vertical flow models. In both models, air is taken in from above the cabinet and passed through a ULPA filter. In horizontal flow models filtered air is then passed

through the main chamber of the cabinet in a horizontal laminar (unidirectional) air stream and is exhausted through the front opening of the cabinet. In vertical flow models, filtered air is passed through the main chamber of the cabinet in a vertical laminar (unidirectional) air stream before being exhausted through the front opening of the cabinet.

In horizontal flow cabinets (Model LHC) there is a slightly reduced level of turbulence compared to vertical flow cabinets (Model LVC) due to the airflow not striking the work surface. However vertical flow cabinets generate less turbulence around large pieces of equipment as compared to horizontal flow cabinets.



Labculture Vertical Laminar Flow Clean Bench  
Model LVC-4A\_

# Labculture®

Laminar Flow Clean Benches • Laminar Flow Clean Benches, Horizontal and Vertical

Touchpad data entry buttons permit control settings and access to diagnostics, default settings and hierarchical menus.

Color coded indicator lamps display green for primary function (fan operation); blue for secondary function (fluorescent lights and electrical outlet); and orange for caution (UV lamp ON).

Programmable automatic UV light timer simplifies operation, enhances contamination control, extends UV lamp life and saves energy.

A graphical interface indicates cabinet performance.

Digital read-out with alpha-numeric display indicates all input, status and alarm functions.

All functions can be user activated through touch-pad programming access; see Operations Manual.



Sentinel Microprocessor Control System, Programmable

- When programmed ON, the start-up sequence confirms status with Air Safe and local time display.
- When programmed ON, the Personal Identification Number (PIN) access restricts unauthorized adjustments.
- When programmed ON, an airflow alarm warns of deviations from normal velocities.

## Applications

Uses include applications where there is no generation of biohazardous materials and operator protection is not required.

- Mycology
- Food microbiology
- Plant and mammalian cell culture.
- Clinical pharmacy and hospital protocols
- Cleanrooms, semiconductor assembly, pharmaceutical, aerospace, and medical devices industries

## Designed for Enhanced Usability

Esco Laminar Flow Clean Benches incorporate a number of features to ensure operator comfort and enhanced productivity.

- The cabinet interior is constructed of stainless steel, making the work zone easy to clean. The interior surface will not chip, rust or generate particles.
- The spillage-retention work top design with a recessed central area ensures that all liquid spills are contained.
- The ergonomically designed work surface with a curved front edge is designed for maximum operator comfort. On our horizontal flow models a raised edge at the back of the work zone prevents spills from damaging the filter.
- Built-in warm white, electronically ballasted, 5000k lighting provides excellent illumination of the work zone and reduces operator fatigue. The reliable lighting system is zero-flicker and instant start.

- The removable perforated filter diffuser on all models provides protection to the filter and improves airflow uniformity. On the horizontal flow benches, the diffuser provides additional protection in the event of an accidental spillage and is easy to clean.

## User-Friendly Control System

The Esco Sentinel microprocessor-based control system supervises all cabinet functions. The controls are easily configurable to meet user requirements and come equipped with a number of enhanced features.

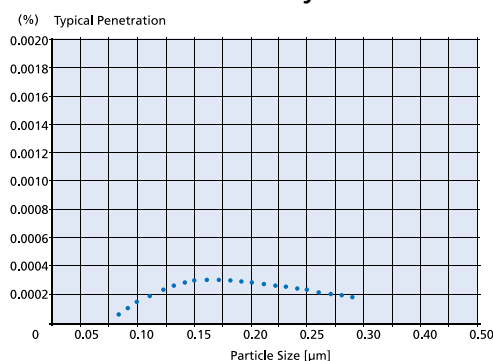
- Accurate true airflow velocity sensing technology, measures all critical cabinet airflow parameters allowing superior monitoring. Temperature compensated sensors ensure increased accuracy.
- Built-in solid state variable speed controllers, with integral RFI and noise filters, are superior to conventional "step" controllers and offer infinite adjustment from zero to maximum setting.

- Password-protected administration can be set to restrict access to the main menu.
- Audible and visual alarms ensure product protection by alerting the user in the event of low airflow.
- A bright, easy-to-read, LCD display provides continuous monitoring of cabinet airflow.
- The intelligent blower system automatically adjusts to maintain airflow as the filter becomes loaded with particulates, eliminating the need for constant adjustment and ensuring optimum performance and product protection.

## Enhanced Filtration System

The enhanced filtration system on both horizontal and vertical flow cabinets is designed to provide the highest level of air quality within the work zone, meeting all relevant standards (see technical specifications for details).

## Esco ULPA Filter Efficiency

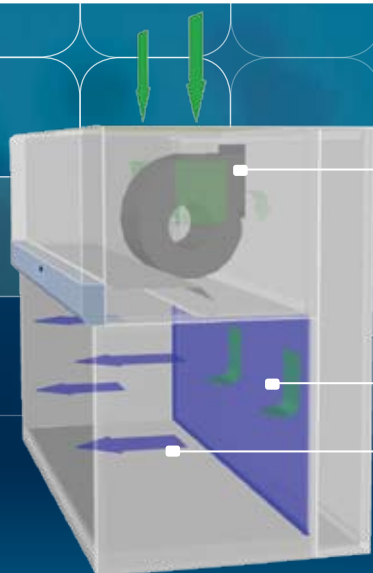


Esco cabinets use ULPA filters (per IEST-RP-CC001.3) instead of conventional HEPA filters commonly found in biological safety cabinets. While HEPA filters offer 99.99% typical efficiency at 0.3 micron level, ULPA filters provide >99.999% typical efficiency for particle sizes of 0.1 to 0.3 micron level.

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### Horizontal Laminar Flow Clean Bench

- Blower
- Supply ULPA Filter
- Horizontal Laminar Flow of Clean Air

- Room air is taken in from the top of the cabinet through a disposable pre-filter with 85% arrestance, trapping larger particles and prolonging the life of the main filter.
- Air is forced evenly through an ULPA filter resulting in a stream of clean, horizontal, laminar air within the main chamber with a velocity of 0.475 m/s (95 fpm), flushing all contaminants from the work zone.

- ULPA-filtered air
- Room air / Inflow air

- The purified air travels across the work zone in a horizontal (unidirectional) stream and is exhausted through the entire open front of the cabinet.

- All Esco laminar flow cabinets provide ISO Class 3 air cleanliness within the work zone as per ISO 14644.1, significantly cleaner than the usual Class 5 classification on cabinets offered by the competition.
- High quality ULPA filters, utilizing an improved minipleated separation technique to maximize surface area (improving efficiency and extending the life of the filter), operate at a typical efficiency of >99.999% at 0.1 to 0.3 micron sizes, providing superior product protection over conventional HEPA filters.
- An additional disposable pre-filter on all models traps large particles in the inflow air prior to reaching the main filter, protecting it against damage and prolonging its life.
- Esco's vertical flow cabinets incorporate Auto-Purge™ slots at the back of the work zone which recirculate air back into the blower plenum, minimizing turbulence, eliminating dead air zones, prolonging main filter life and enhancing product and cross-contamination protection.

#### Mini-pleat Separatorless Filter (left) vs. Conventional Aluminium Separator Filter (right)



Esco cabinets use Swedish Camfil Farr® mini-pleat filters without aluminum separators to increase filter efficiency, minimize the chance of leakage, and to prolong filter life. Filters include a lightweight aluminum frame for structural stability and elimination of swelling common to conventional wood frames.

### The Highest Quality Cabinet Construction

All Esco products are manufactured for the most demanding laboratory applications.

- All components are designed for maximum chemical resistance and enhanced durability for a long service life.
- The main body of the cabinet is constructed of industrial-grade electrogalvanized steel.

- All cabinet components are clean room compatible.
- Isocide eliminates 99.9% of surface bacteria within 24 hours of exposure.

### Blower Efficiency

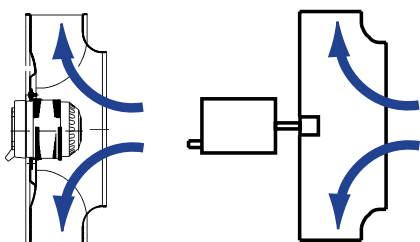
- Esco Laminar Flow Clean Benches incorporate permanently lubricated direct drive centrifugal blowers.
- The energy efficient external rotor motor design reduces operating costs and has extremely low noise and vibration levels.
- The intelligent blower system maintains airflow as the filter becomes loaded, ensuring optimum efficiency and product protection.

### Designed and Built to Exceed Safety Criteria

All components used in Esco products meet or exceed all applicable safety requirements.

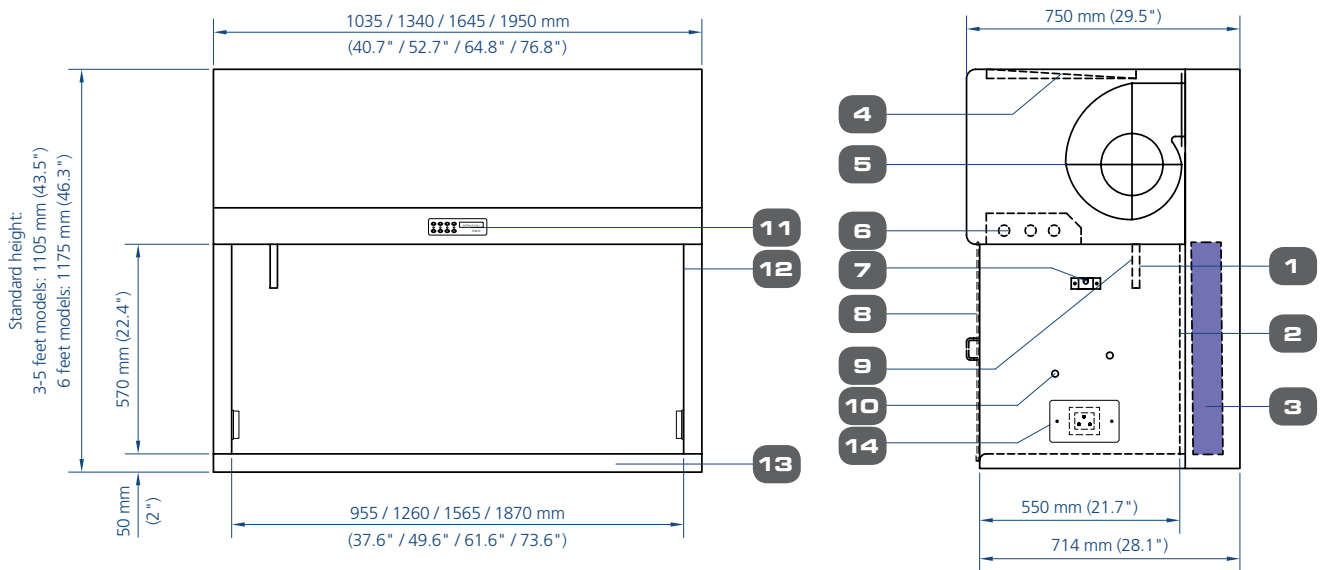
- Each clean bench is individually factory tested for safety and performance in accordance with international standards.
- All electrical components are UL listed or UL recognized, ensuring superior electrical safety for the operator.
- All Esco Laminar Flow Clean Benches meet general safety requirements set by independent testing laboratories (see technical specifications for details).
- Esco LHC models have been type-tested to the EN12469:2000 for cross-contamination and product protection using microbiological testing methods.

### Esco Centrifugal Fan with External Rotor Motor (left) vs. Conventional Fan with Standard Motor (right)



- Esco cabinets use German made **ebm-papst**® permanently lubricated, centrifugal motor/blowers with external rotor designs.
- Integrated blades narrow the profile and eliminate need for a motor shaft.
- Motors are selected for energy efficiency, compact design, and flat profile. The completely integrated assembly optimizes motor cooling.
- All rotating parts are unitized and balanced for smooth, quiet, vibration-free operation.

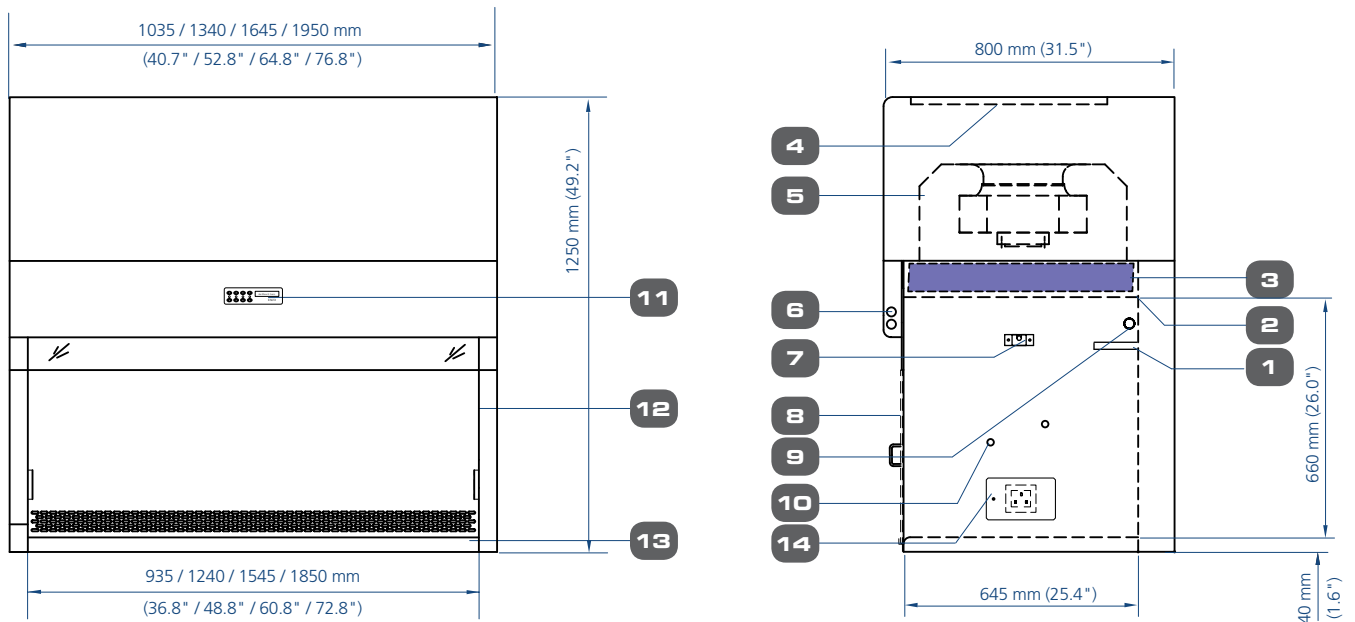
## Model LHC Horizontal Laminar Flow Clean Bench Technical Specifications



- |                              |  |  |  |
|------------------------------|--|--|--|
| 1. Airflow sensor            | 6. Fluorescent lamp  | 11. Esco Sentinel microprocessor control                   | 14. Electrical outlet Retrofit Kit provision<br>(LHC-3: 1 single outlet;<br>LHC-4 and above: 2 single outlets) |
| 2. Removable filter diffuser | 7. IV Bar Retrofit Kit™ provisions                               | 12. Internal stainless steel side panel                    |  |
| 3. ULPA filter               | 8. Front cover Retrofit Kit                                      | 13. Stainless steel work surface with<br>Front curved edge |  |
| 4. Pre-filter                | 9. UV light Retrofit Kit provision*                              |  |  |
| 5. Blower                    | 10. Service fixture Retrofit Kit™<br>provisions (2 on each side) |  |  |

## Model LVC Vertical Laminar Flow Clean Bench Technical Specifications

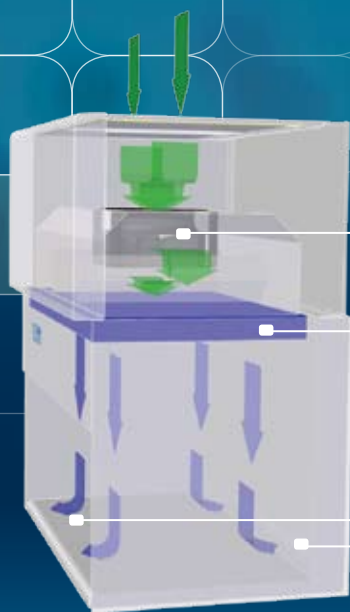
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- |                             |  |  |  |
|-----------------------------|--|--|--|
| 1. Downflow velocity sensor | 6. Fluorescent lamp  | 11. Esco Sentinel microprocessor control                   | 14. Electrical outlet Retrofit Kit provision<br>(LVC-3: 1 single outlet,<br>LVC-4 and above: 2 single outlets) |
| 2. Downflow filter diffuser | 7. IV bar Retrofit Kit provision                               | 12. Internal stainless steel panel                         |  |
| 3. ULPA filter              | 8. Optional front cover  | 13. Stainless steel work surface with<br>curved front edge |  |
| 4. Pre-filter               | 9. UV lamp Retrofit Kit provision                              |  |  |
| 5. Blower                   | 10. Service fixture Retrofit Kit<br>provision (2 on each side) |  |  |

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## Vertical Laminar Flow Clean Bench

- Blower
- Supply ULPA Filter
- Vertical Laminar Flow of Clean Air
- Auto-Purge™ Slots

- ULPA-filtered air
- Room air / Inflow Air

- Room air is taken from the top of the cabinet through a disposable pre-filter with 85% arrestance, trapping larger particles and prolonging the life of the main filter.
- Air is forced evenly through a ULPA filter resulting in a stream of clean, vertical, laminar air within the main chamber with a velocity of 0.475 m/s (95 fpm), flushing all contaminants from the work zone.

- The purified air travels across the work zone in a vertical (unidirectional) stream and is exhausted through the entire open front of the cabinet and through Auto-Purge slots in the back wall. The Auto-Purge slots are designed to eliminate air turbulence and dead-air corners in the work zone. In addition, the Auto-Purge Slots prolong the filter life.

## Warranty

All Esco Labculture vertical and horizontal flow clean benches come with an extended 3 year warranty, excluding consumable parts and accessories. Contact your local representative for specific warranty details.

## Accessories and Options

Esco offers a variety of options and accessories to meet local applications. Contact Esco or your local Sales Representative for ordering information.

## Support Stands

- Fixed height, available 710 mm (28") or 860 mm (34")
  - With leveling feet
  - With casters
- Adjustable height, hydraulic range 710 mm (28") to 860 mm (34")
  - Manual or electrical lift
  - With leveling feet
  - With casters
- Telescoping height, nominal range 660 mm (26") to 960 mm (37.8")
  - Adjustable in 25.4 mm (1") increments

## Electrical Outlets and Utility Fixtures

- Electrical outlet, ground fault, North America
- Electrical outlet, Euro/Worldwide
- Petcock (air, gas, vacuum)
  - North America (American) style
  - Euro/Worldwide style DIN 12898, DIN 12919, DIN 3537

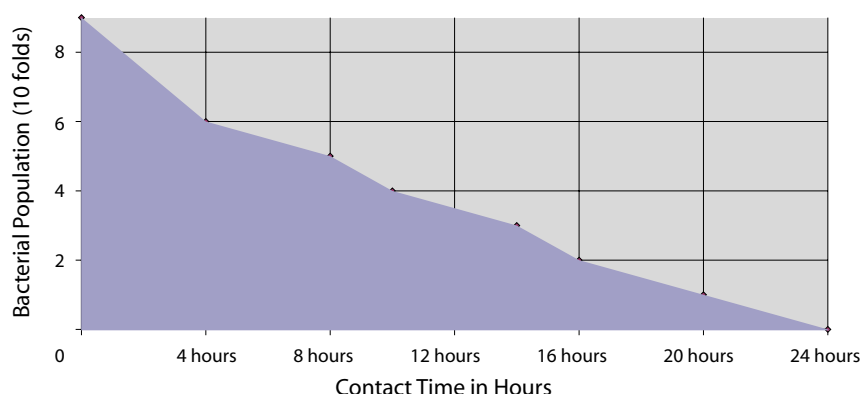
## Cabinet Accessories

- Germicidal UV lamp
- Transparent front cover (recommended when UV lamp is used)
- PVC armrest
- Height-adjustable lab chair
- Ergonomic foot rest
- IV Bar, with hooks

Standards Compliance	General Requirements	Air Quality	Filtration	Electrical Safety
	AS 1386.5, Australia EN 12469:2000*, Europe IEST-RP-CC002.2, Worldwide	ISO 14644.1, Class 3, Worldwide IEST-G-CC1001, Worldwide IEST-G-CC1002, Worldwide	EN-1822 (H14), Europe IEST-RP-CC001.3, Worldwide IEST-RP-CC007.1, Worldwide IEST-RP-CC034.1, Worldwide	UL-C 61010A-1, USA CSA C22.2, No.1010-92, Canada EN 61010-1, Europe

\*Type-tested for cross-contamination and product protection using the microbiological testing methods described in the standard.

## ISOCIDE™ Antimicrobial Powder-Coating



All exterior painted surfaces are powder-coated with Esco Isocide, an antimicrobial inhibitor to diminish contamination. Isocide is integrated into the coating substrate and cannot wash out or diminish by repeated cleaning. Performance results are available upon request. Contact Esco or your Esco Sales Representative for details.

## General Specifications, Labculture Vertical Laminar Flow Clean Benches

Note to customer: Insert electrical voltage number into last model number digit \_ when ordering.

Model	LVC-3A_	LVC-4A_	LVC-5A_	LVC-6A_
Nominal Size	0.9 meters (3 ft)	1.2 meters (4 ft)	1.5 meters (5 ft)	1.8 meters (6 ft)
External Dimensions (W x D x H)	1035 x 800 x 1250 mm 40.7" x 31.5" x 49.2"	1340 x 800 x 1250 mm 52.8" x 31.5" x 49.2"	1645 x 800 x 1250 mm 64.8" x 31.5" x 49.2"	1950 x 800 x 1250 mm 76.8" x 31.5" x 49.2"
Internal Work Area, Dimensions (W x D x H)	935 x 645 x 660 mm 36.8" x 25.4" x 26.0"	1240 x 645 x 660 mm 48.8" x 25.4" x 26.0"	1545 x 645 x 660 mm 60.8" x 25.4" x 26.0"	1850 x 645 x 660 mm 72.8" x 25.4" x 26.0"
Laminar Airflow Velocity	0.475 m/s (95 fpm)			
Pre-Filter	Disposable, non-washable polyester fibre, 85% arrestance, EU3 rated			
ULPA Filter Typical Efficiency	>99.999% at 0.12µm			
Sound Emission	<60 dBA	<62 dBA	<65 dBA	<63 dBA
Fluorescent Lamp Intensity	>1460 Lux (>136 ft.candles)	>1510 Lux (>140 ft.candles)	>900 Lux (>84 ft.candles)	>1100 Lux (>102 ft.candles)
Cabinet Construction	Main Body	Electrogalvanized steel with white oven-baked epoxy powder-coated finish. Coated with Isocide antimicrobial coating		
	Work Zone	1.2mm (0.05") 18 gauge stainless steel grade 304		
Electrical*	Model		Voltage	
	LVC-3A1, LVC-4A1, LVC-5A1 & LVC-6A1		220-240V, AC, 50Hz, 1 ø	
	LVC-3A2, LVC-4A2, LVC-5A2 & LVC-6A2		110-130V, AC, 60Hz, 1ø	
	LVC-3A3, LVC-4A3, LVC-5A3 & LVC-6A3		220-240V, AC, 60Hz, 1 ø	
Shipping Weight**	150 kg (330 lbs)	214.5 kg (473 lbs)	224 kg (494 lbs)	251 kg (553 lbs)
Shipping Dimensions, Maximum (W x D x H)**	1100 x 850 x 1480 mm 43.3" x 33.5" x 58.3"	1400 x 850 x 1480 mm 55.1" x 33.5" x 58.3"	1720 x 850 x 1480 mm 67.7" x 33.5" x 58.3"	2010 x 900 x 1580 mm 79.1" x 35.4" x 62.2"
Shipping Volume, Maximum**	1.38 m³ (48.7 cu.ft)	1.76 m³ (62.2 cu.ft)	2.16 m³ (76.3 cu.ft)	2.8 m³ (98.9 cu.ft)

\*Additional voltages may be available; contact Esco for ordering information.

\*\*Cabinet only; excludes optional stand.

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## General Specifications, Labculture Horizontal Laminar Flow Clean Benches

Note to customer: Insert electrical voltage number into last model number digit \_ when ordering.

Model	LHC-3A_	LHC-4A_	LHC-5A_	LHC-6A_
Nominal Size	0.9 meters (3')	1.2 meters (4')	1.5 meters (5')	1.8 meters (6')
External Dimensions (W x D x H)	1035 x 750 x 1105 mm 40.7" x 29.5" x 43.5"	1340 x 750 x 1105 mm 52.7" x 29.5" x 43.5"	1645 x 750 x 1105 mm 64.8" x 29.5" x 43.5"	1950 x 750 x 1175 mm 76.8" x 29.5" x 46.3"
Internal Work Area, Dimensions (W x D x H)	955 x 550 x 570 mm 37.6" x 21.7" x 22.4"	1260 x 550 x 570 mm 49.6" x 21.7" x 22.4"	1565 x 550 x 570 mm 61.6" x 21.7" x 22.4"	1870 x 550 x 570 mm 73.6" x 21.7" x 22.4"
Laminar Airflow Velocity	0.475 m/s (95 fpm)			
Pre-Filter	Disposable, non-washable polyester fibre, 85% arrestance, EU3 rated			
ULPA Filter Typical Efficiency	>99.999% at 0.12µm			
Sound Emission	<61 dBA	<61 dBA	<61 dBA	<63 dBA
Fluorescent Lamp Intensity	>2600 Lux (>242 ft.candles)	>2600 Lux (>232 ft.candles)	>1600 Lux (>149 ft.candles)	>2300 Lux (>214 ft.candles)
Cabinet Construction	Main Body	Electrogalvanized steel with white oven-baked epoxy powder-coated finish. Coated with Isocide antimicrobial coating		
	Work Zone	1.2 mm (0.05") 18 gauge stainless steel, grade 304		
Electrical*	Model		Voltage	
	LHC-3A1, LHC-4A1, LHC-5A1 & LHC-6A1		220-240V, AC, 50Hz, 1 ø	
	LHC-3A2, LHC-4A2, LHC-5A2 & LHC-6A2		110-130V, AC, 60Hz, 1 ø	
	LHC-3A3, LHC-4A3, LHC-5A3 & LHC-6A3		220-240V, AC, 60Hz, 1 ø	
Shipping Weight**	191 kg (420 lbs)	204 kg (450 lbs)	217.5 kg (480 lbs)	243.5 kg (537 lbs)
Shipping Dimensions, Maximum (W x D x H)**	1090 x 820 x 1260 mm 42.9" x 32.3" x 49.6"	1380 x 820 x 1260 mm 54.3" x 32.3" x 49.6"	1720 x 820 x 1260 mm 67.7" x 32.3" x 49.6"	2020 x 820 x 1370 mm 79.5" x 32.3" x 53.9"
Shipping Volume, Maximum**	1.13 m³ (39.9 cu.ft)	1.43 m³ (50.5 cu.ft)	1.78 m³ (62.9 cu.ft)	2.27 m³ (80.1 cu.ft)

\*Additional voltages may be available; contact Esco for ordering information.

\*\*Cabinet only; excludes optional stand.

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#### Esco Biotechnology Products

Laminar Flow Clean Benches, Vertical, Horizontal, PCR  
 Biological Safety Cabinets, Class II, III  
 Cytotoxic Process Cabinets  
*In-Vitro* Fertilization Enclosures  
 Weighing Enclosures  
 Animal Containment Workstations  
 Custom Clean Air and Containment Workstations

Esco products are sold and serviced by more than 200 distributors in over 70 countries. For the name of your local Sales Representative visit [escoglobal.com/sales](http://escoglobal.com/sales).

NSF Standard 49 Biological Safety Cabinets • Animal Containment Workstations • Fume Hoods • Clean Benches

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Esco Technologies, Inc. • 3701 Market Street, 4th Floor • Philadelphia, PA 19104 USA  
 Toll-Free USA and Canada 888-375-ESCO • Tel 215-966-6240 • Fax 215-966-6001  
[www.escoglobal.com](http://www.escoglobal.com) • [usa@escoglobal.com](mailto:usa@escoglobal.com)

Esco Micro Pte. Ltd. • 21 Changi South Street 1 • Singapore 486 777  
 Tel +65 6542 0833 • Fax +65 6542 6920 • [mail@escoglobal.com](mailto:mail@escoglobal.com)  
[www.escoglobal.com](http://www.escoglobal.com)

Esco Global Offices | Singapore | Beijing & Shanghai, China | Dubai, U.A.E. | Houston & Philadelphia, USA | Johannesburg, South Africa  
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