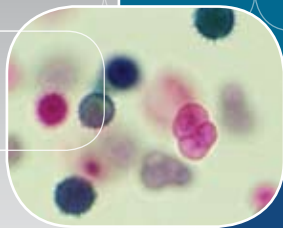


Airstream®



Esco Airstream Laminar Flow Clean Bench
Model AHC-4D_

Laminar Flow Cabinets, Horizontal and Vertical
The Leading Solution for Research Laboratories





Airstream Laminar Flow Clean Benches, Model AHC-4D.
Shown with optional caster wheels stand.

Main Features

- Esco Sentinel™ microprocessor controller supervises all functions.
- Long-life ULPA filter for supply airflow.
- Sterile work zone environment created for optimum product protection.
- Spillage-retention work surface with recessed central area.
- Ergonomically angled front improves reach and comfort.
- Optional UV lamp assists with work zone decontamination in between operating periods
- Esco **ISOCIDE™** antimicrobial coating on all painted surfaces minimizes contamination.
- Available in 0.6, 0.9, 1.2, 1.5 and 1.8 meter models (2', 3', 4' 5" and 6')



Esco Experience

Esco is the world leader in premium laminar flow clean benches for the global life sciences market. Since 1978, Esco has installed tens of thousands of laminar flow clean benches providing reliable protection for samples and work processes for a multitude of applications.

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, from the industry leader.



Airstream Vertical Laminar Flow Clean Bench,
Model AVC-4D.

Touchpad data entry buttons permit control settings and access to default settings.

Color coded indicator lamps display green for fan operation, fluorescent lights and electrical outlet; and red for caution (UV lamp ON).

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.

Esco T Series Sentinel Microprocessor Control System, Programmable

- When programmed ON, the start-up sequence will automatically monitor actual airflow and show it on the display
- When programmed ON, an airflow alarm warns of deviations from normal velocities.



Horizontal and Vertical Laminar Flow Clean Benches

Esco Airstream 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 clean bench 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 clean bench in a vertical laminar (unidirectional) air stream before being exhausted through the front opening of the clean bench.

In horizontal laminar flow clean benches (AHC) there is a slightly reduced level of turbulence compared to vertical flow clean benches (AVC) due to the airflow not striking the work surface. However vertical laminar flow clean benches generate less turbulence around large pieces of equipment as compared to horizontal laminar flow clean benches.

Applications

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

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

Designed for Enhanced Usability

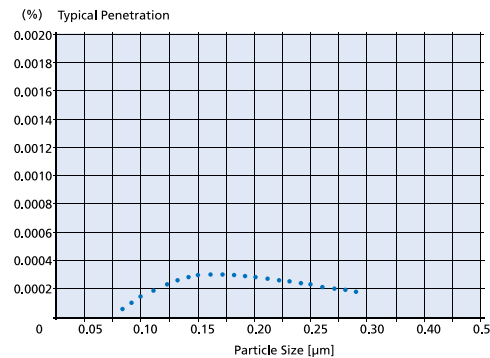
Esco laminar flow clean benches incorporate a number of features to ensure operator comfort and enhanced productivity.

- The clean bench work surface 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 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.

User-Friendly Control System

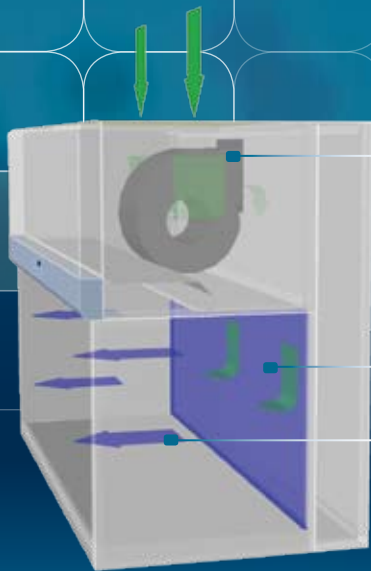
The Esco Sentinel™ microprocessor-based control system supervises all cabinet functions. Controls are easily configurable to meet user requirements and come equipped with a number of enhanced features.

- 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.
- Audible and visual alarms ensure product protection by alerting the user in the event of low airflow.
- A bright, easy-to-read, LED display provides continuous monitoring of cabinet airflow.



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.



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; this serves to trap larger particles and increase the life of the main filter.
- Air is forced evenly across the ULPA filter(s); the result is a stream of clean laminar air within the work zone; this dilutes and flushes all airborne contaminants from the interior.

- ULPA-filtered air
- Room air / Inflow air

- A nominal filter face velocity of 0.45 m/s or 90 fpm ensures that there is a sufficient number of air changes within the enclosed area of the cabinet in order to maintain cleanliness.
- The purified air travels across the internal work zone of the cabinet in a horizontal, unidirectional stream and leaves the main work chamber across the entire open front of the cabinet.

- 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.

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.

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 cabinet 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 AHC models have been type-tested to the EN12469:2000 for cross-contamination and product protection using microbiological testing methods.

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Enhanced Filtration System

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

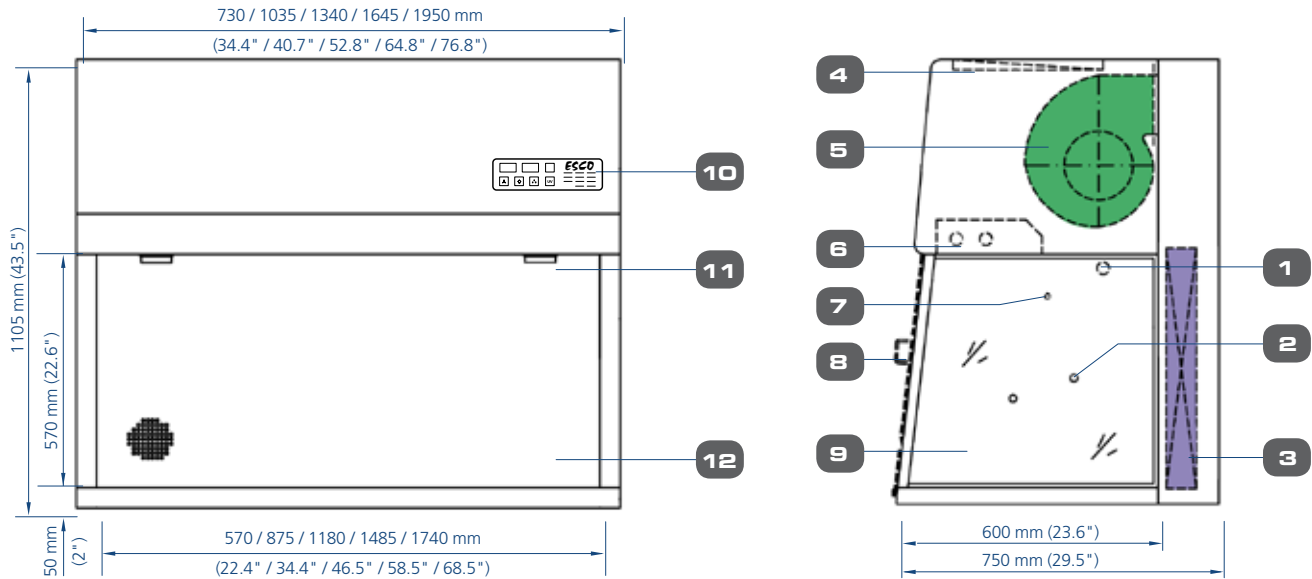
- All Esco laminar flow clean benches provide ISO Class 3 air cleanliness within the work zone as per ISO 14644.1, significantly cleaner than the usual Class 5 classification on cabinets offered by the competition.
- High quality ULPA filters utilizing an improved mini-pleated separation technique to maximizes surface area improves efficiency and extends the filter life. Filters 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 against damage and prolonging life.
- Esco's vertical flow clean benches incorporate Auto-Purge™ slots at the back of the work zone which eliminate turbulence and enhance product protection.

The Highest Quality Cabinet Construction

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

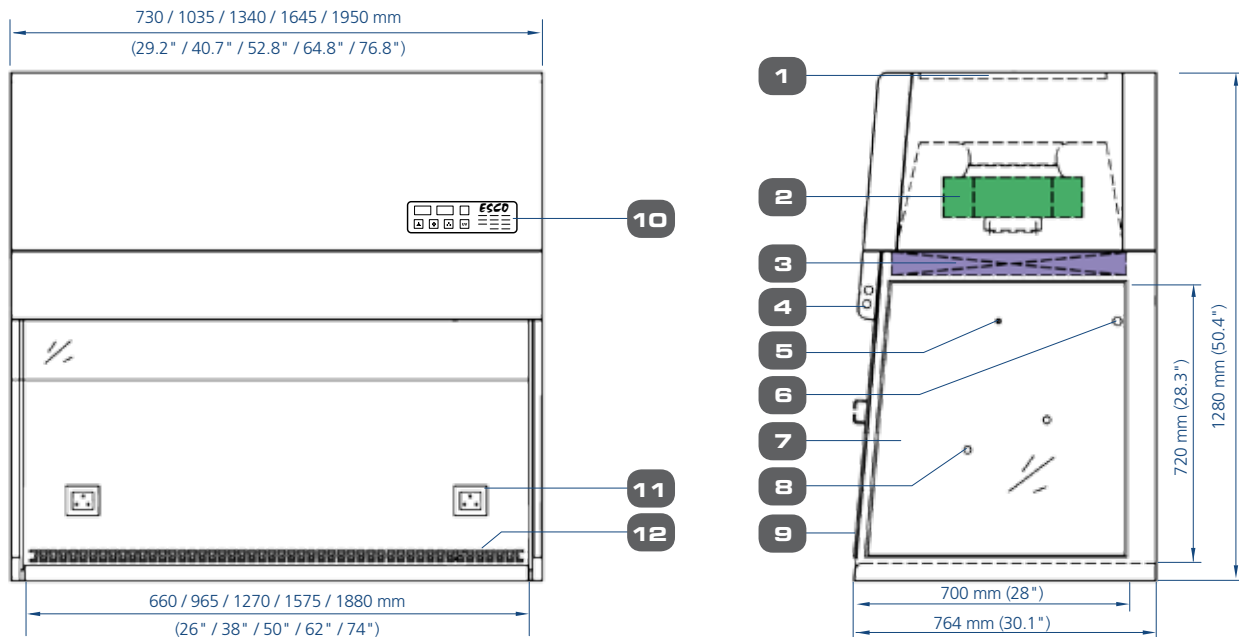
- All components are designed for maximum chemical resistance and enhanced durability for a long service life.
- The main body of the clean bench is constructed of industrial-grade electro-galvanized steel.
- All cabinet components are clean room compatible.
- Isocide eliminates 99.9% of surface bacteria within 24 hours of exposure.
- Transparent tempered glass side panels enhance visibility and create a more comfortable work environment for the operator as opposed to conventional stainless steel or painted steel sides.
- Tempered glass is scratch and abrasion resistant, does not particulate, and decontaminates easily.

Model AHC Airstream Horizontal Laminar Flow Clean Bench Technical Specifications

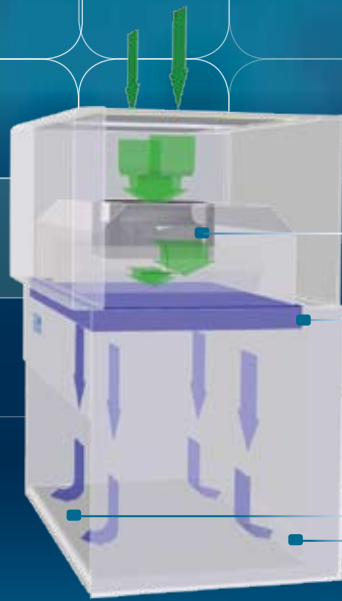


- | | | |
|---|---|---|
| 1. Standard UV Light Retrofit Kit Provision | 5. Blower | 9. Tempered Glass Side Panes |
| 2. Service Fixture Retrofit Kit Provision
(2 Holes On Each Side) | 6. Fluorescent Lamp | 10. Esco Microprocessor System, T-Series |
| 3. ULPA Filter | 7. Standard IV Bar Retrofit Kit Provision | 11. Standard Electrical Outlet Retrofit Kit Provision |
| 4. Pre-filter | 8. Optional Front Cover | 12. Stainless Steel Work Top |

Model AVC Airstream Vertical Laminar Flow Clean Bench Technical Specifications



- | | | |
|---|---|---|
| 1. Pre-filter | 6. Standard UV light Retrofit Kit provision | 10. Esco microprocessor system, T-Series |
| 2. Blower | 7. Tempered glass side Panels | 11. Electrical outlet Retrofit Kit provision
(1 for 2ft and 3ft models, 2 for 4ft and above) |
| 3. ULPA filter | 8. Service fixture Retrofit Kit provision
(2 holes on each side) | 12. Stainless steel work top with front curved edge |
| 4. Fluorescent lamp | 9. Optional front cover | |
| 5. Standard IV bar Retrofit Kit provision | | |



Vertical Laminar Flow Clean Bench

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

- Room air is taken in from the top of the cabinet through a disposable pre-filter with 85% arrestance; this serves to trap larger particles and increase the life of the main filter.
- Air is forced evenly across the ULPA filter(s); the result is a stream of clean laminar air within the work zone of the clean bench; this dilutes and flushes all airborne contaminants from the interior.

- ULPA-filtered air
- Room air / Inflow Air

- A nominal filter face velocity of 0.45 m/s or 90 fpm ensures that there is a sufficient number of air changes within the enclosed area of the cabinet in order to maintain cleanliness.
- The purified air travels across the working zone of the cabinet in a vertical, unidirectional stream and leaves the main work chamber across the entire open front of the cabinet and through Auto-Purge™ slots at the back wall of the work zone. Auto-Purge™ slots are designed to eliminate air turbulence and the possibility of dead-air corners in the work zone.

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General Specifications, Airstream Horizontal Laminar Flow Clean Benches

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

Model	AHC-2D_	AHC-3D_	AHC-4D_	AHC-5D_	AHC-6D_
Nominal Size	0.6 meters (2')	0.9 meters (3')	1.2 meters (4')	1.5 meters (5')	1.8 meters (6')
External Dimensions (W x D x H)	730 x 750 x 1105 mm 29.2" x 29.5" x 43.5"	1035 x 750 x 1105 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)	570 x 600 x 570 mm 22.4" x 23.6" x 22.4"	875 x 600 x 570 mm 34.4" x 23.6" x 22.4"	1180 x 600 x 750 mm 46.5" x 23.6" x 22.4"	1485 x 600 x 570 mm 58.5" x 23.6" x 22.4"	1740 x 600 x 570 mm 68.5" x 23.6" x 22.4"
Usable Work Zone	0.27 m ² (2.9 sq.ft)	0.43 m ² (0.43 sq.ft)	0.59 m ² (6.4 sq.ft)	0.75 m ² (8.1 sq.ft)	0.91 m ² (9.8 sq.ft)
Initial Airflow Velocity	0.45 m/s (90 fpm)				
Air Volume	660 m ³ /h (+/-70 m ³ /h) 390 cfm (+/- 42 cfm)	977 m ³ /h (+/-109 m ³ /h) 575 cfm (+/- 64 cfm)	1295 m ³ /h (+/-144 m ³ /h) 762 cfm (+/- 85 cfm)	1614 m ³ /h (+/-180 m ³ /h) 950 cfm (+/- 106 cfm)	1930 m ³ /h (+/-218 m ³ /h) 1136 cfm (+/- 130 cfm)
ULPA Filter Typical Efficiency	>99.999% at particle size between 0.1 to 0.3µm				
Sound Emission Per IEST-RP-CC002.2	<59 dBA	<60 dBA	<61.5 dBA	<62.5 dBA	<61.8 dBA
Fluorescent Lamp Intensity At Zero Ambient	>1550 Lux (>144 foot candles)	>1600 Lux (> 149 foot candles)	>1960 Lux (>182 foot candles)	>1600 Lux (>149 foot candles)	>1740 Lux (>162 foot candles)
Cabinet Construction	Main Body	1.2 mm / 0.05" / 18 gauge electro-galvanised steel with white oven-baked epoxy powder-coated finish.			
	Work Zone	1.5 mm (0.06") 18 gauge stainless steel, grade 304			
Net Weight**	101 kg (223 lbs)	125 kg (276 lbs)	150 kg (331 lbs)	169 kg (373 lbs)	190 kg (419 lbs)
Shipping Weight**	136.5 kg (301 lbs)	164 kg (362 lbs)	190 kg (419 lbs)	240 kg (529 lbs)	263 kg (580 lbs)
Shipping Dimensions, Maximum (W x D x H)**	860 x 860 x 1420 mm 33.8" x 33.8" x 55.9"	1120 x 860 x 1480 mm 44" x 33.8" x 58.3"	1430 x 860 x 1460 mm 56.3" x 33.8" x 57.5"	1720 x 860 x 1460 mm 67.7" x 33.8" x 57.5"	2050 x 860 x 1500 mm 80.7" x 33.8" x 59"
Shipping Volume, Maximum**	1.05 m ³ (37 cu.ft)	1.43 m ³ (50 cu.ft)	1.80 m ³ (64 cu.ft)	2.16 m ³ (76 cu.ft)	2.65 m ³ (94 cu.ft)
Electrical*	Model			Voltage	
	AHC-2D1, AHC-3D1, AHC-4D1, AHC-5D1 & AHC-6D1			220-240V, AC, 50Hz, 1 ø	
	AHC-2D2, AHC-3D2, AHC-4D2, AHC-5D2 & AHC-6D2			110-130V, AC, 60Hz, 1 ø	

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

** Cabinet only; excludes optional stand.

Standards Compliance	Cabinet Performance	Air Quality	Filtration	Electrical Safety
	AS 1386.5, Australia 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 adapted from this biological safety cabinet standard.

General Specifications, Airstream Vertical Laminar Flow Clean Benches

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

Model	AVC-2D_	AVC-3D_	AVC-4D_	AVC-5D_	AVC-6D_
Nominal Size	0.6 meters (2')	0.9 meters (3')	1.2 meters (4')	1.5 meters (5')	1.8 meters (6')
External Dimensions (W x D x H)	730 x 764 x 1280 mm 28.7" x 30" x 50.4"	1035 x 764 x 1280 mm 40.7" x 30" x 50.4"	1340 x 764 x 1280 mm 52.8" x 30" x 50.4"	1645 x 764 x 1280 mm 64.8" x 30" x 50.4"	1950 x 764 x 1280 mm 76.8" x 30" x 50.4"
Internal Work Area, Dimensions (W x D x H)	660 x 700 x 720 mm 26" x 27.5" x 28.3"	965 x 700 x 720 mm 38" x 27.5" x 28.3"	1270 x 700 x 720 mm 50" x 27.5" x 28.3"	1575 x 700 x 720 mm 62" x 27.5" x 28.3"	1880 x 700 x 720 mm 74" x 27.5" x 28.3"
Usable Work Zone	0.39 m ² (4.2 sq.ft)	0.59 m ² (6.3 sq.ft)	0.79 m ² (8.5 sq.ft)	0.98 m ² (10.54 sq.ft)	1.18 m ² (12.7 sq.ft)
Initial Airflow Velocity	0.45 m/s (90 fpm)				
Air Volume	660 m ³ /h (+/-70 m ³ /h) 390 cfm (+/- 42 cfm)	977 m ³ /h (+/-109 m ³ /h) 575 cfm (+/- 109 cfm)	1295 m ³ /h (+/-144 m ³ /h) 762 cfm (+/- 85 cfm)	1614 m ³ /h (+/-180 m ³ /h) 950 cfm (+/- 106 cfm)	1930 m ³ /h (+/-218 m ³ /h) 1136 cfm (+/- 130 cfm)
ULPA Filter Typical Efficiency	>99.999% at particle size between 0.1 to 0.3µm				
Sound Emission Per IEST-RP-CC002.2	<61 dBA	<63 dBA	<62 dBA	<64 dBA	<63.5 dBA
Fluorescent Lamp Intensity At Zero Ambient	>1130 Lux (>105 foot candles)	>990 Lux (>92 foot candles)	>1200 Lux (> 111 foot candles)	>1000 Lux (>93 foot candles)	>1100 Lux (>102 foot candles)
Cabinet Construction	Main Body	1.2 mm / 0.05"/ 18 gauge electro-galvanised steel with white oven-baked epoxy powder-coated finish.			
	Work Zone	1.5 mm (0.06") 18 gauge stainless steel, grade 304			
Net Weight**	106 kg (234 lbs)	162 kg (357 lbs)	152 kg (335 lbs)	188 kg (414 lbs)	152 kg (335 lbs)
Shipping Weight**	162 kg (357 lbs)	171 kg (377 lbs)	205 kg (452 lbs)	244 kg (538 lbs)	282 kg (622 lbs)
Shipping Dimensions, Maximum (W x D x H)**	860 x 860 x 1750 mm 33.8" X 33.8" X 68.9"	1130 x 860 x 1600 mm 44.5" x 33.8" x 63.0"	1430 x 860 x 1570 mm 56.3" x 33.8" x 61.8"	1740 x 860 x 1600 mm 68.5" x 33.8" x 63.0"	2050 x 860 x 1600 mm 80.7" x 33.8" x 63.0"
Shipping Volume, Maximum**	1.29 m ³ (46 cu.ft)	1.56 m ³ (55 cu.ft)	1.93 m ³ (68 cu.ft)	2.39 m ³ (84.4 cu.ft)	2.82 m ³ (99.6 cu.ft)
Electrical*	Model			Voltage	
	AHC-2D1, AHC-3D1, AHC-4D1, AHC-5D1 & AHC-6D1			220-240V, AC, 50Hz, 1ø	
	AHC-2D2, AHC-3D2, AHC-4D2, AHC-5D2 & AHC-6D2			110-130V, AC, 60Hz, 1ø	

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

** Cabinet only; excludes optional stand.

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Warranty

All Esco Airstream, vertical and horizontal flow clean benches are covered by an extended 3 year warranty, excluding consumable parts and accessories. Contact your local Sales Representative for 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 casters

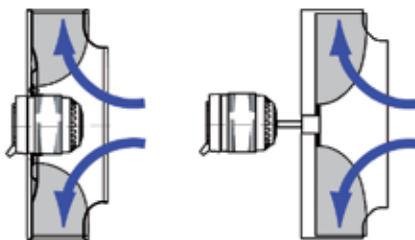
Electrical Outlets and Utility Fixtures

- 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

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.

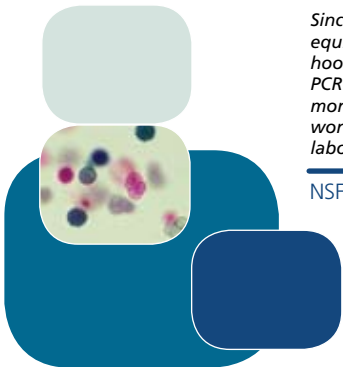


Esco Containment, Clean Air and Laboratory Equipment Products

- Biological Safety Cabinets, Class II, III
- Fume Hoods, Conventional, High Performance, Ductless Carbon Filtered
- Laminar Flow Cabinets, Horizontal, Vertical, PCR
- Animal Containment Workstations
- Hospital Pharmacy Isolators, Cytotoxic Safety Cabinets
- Specialty Workstations: *In-Vitro* Fertilization, Powder Weighing
- PCR Thermal Cyclers, Conventional, Real-Time
- Cleanroom Fan Filter Units, Modular Rooms, Air Showers, Pass Thrus

Since 1978, Esco has emerged as a leader in the development of controlled environment, laboratory and cleanroom equipment solutions. Products sold in more than 95 countries include biological safety cabinets, fume hoods, ductless fume hoods, laminar flow clean benches, animal containment workstations, cytotoxic cabinets, hospital pharmacy isolators, and PCR cabinets and instrumentation. With the most extensive product line in the industry, Esco has passed more tests, in more languages, for more certifications, throughout more countries than any biosafety cabinet manufacturer in the world. Esco remains dedicated to delivering innovative solutions for the clinical, life science, research and industrial laboratory community. www.escoglobal.com.

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



ESCO

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