ESCO *Airstream® Class III Biohazard Safety Cabinet*

Esco Airstream® Class III - 4 ft standard model

Esco Airstream® Class III biohazard safety cabinets offer the highest level of product, operator and environmental protection from infectious/biohazardous aerosols and are suitable for microbiological work with agents assigned to biological safety levels 1, 2, 3, or 4. Designed for an absolute level of containment, they are frequently used for work involving the deadliest biohazards, bacteria, viruses and microorganisms.
Manufactured to meet and exceed the latest Class III biohazard safety cabinet requirements of the EN 12469:2000.

• **Mini-pleat separatorless ULPA filter** technology reduces energy consumption and delivers increased laminar airflow uniformity for better product and cross contamination protection. ULPA filters are double scan-tested, at the time of manufacturing, and after installation.

• **Exhaust air is double-filtered** through high-quality ULPA filters with a rated efficiency of **99.999% at 0.3 microns**, thus ensuring complete product, operator and environmental protection from airborne biological hazards; a built-in pre-filter also extends main filter life.

• Built-in Esco Smart Control® system provides **visual / audible alarms for airflow by pressure monitoring;** a built-in manual pressure gauge is also included on the control panel for increased safety. Easy-to-clean membrane touch control panel is supplied with an airflow meter display.

• **State-of-the-art Hypalon® synthetic black arm-length gloves**; flame and abrasion-resistant, cleaner, and more resistant to chemicals than regular neoprene / latex gloves; each glove is individually tested for airholes. Glove ports are designed to make **glove-changing easy and most importantly, absolutely safe.**

• Exclusive vertical laminar flow design ensures that **air within the chamber is decontaminated in a consistent fashion**, thus preventing the accumulation of particulate contamination in "dead air corners". Product protection is guaranteed by the **ULPA-filtered vertical laminar air flow** within the cabinet workzone.

• **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 the competition). All materials used in our products are cleanroom compatible.

• **Integrated pass-through with interlocking doors** at side of main chamber allows materials to be transferred into the cabinet without the risk of environmental contamination.

• A sloped cabinet front ensures an ergonomic working posture for increased operator productivity and reduces glare from the glass surface.

• Durable and easy to clean stainless steel worktop will never rust or cause contamination.

• Built-in warm white, **electronically ballasted** lighting is comfortable to the eyes and offers excellent illumination throughout the work zone in order to reduce operator fatigue. Light tubes are mounted out of the air stream for better airflow uniformity.

• **UV-resistant tempered glass window** with built-in stainless steel glove ports (for the number of gloves ports, refer to engineering diagrams provided) is designed to be 100% leak-free.

• Complete welded construction ensures an **air-tight cabinet carcass** for absolute containment and operator/environmental safety.

• Industrial-grade support frame constructed of electro-galvanised steel with an abrasion-resistant oven-baked powder-coated finish.

• Permanently lubricated direct drive centrifugal blower(s); **energy efficient external rotor motor** type design reduces operating costs.

• Cabinet airflow is regulated by double fans (refer to diagrams on page 2 and 3), thus ensuring a fail-safe system that guarantees absolute safety.

• Built-in solid state variable speed controller (infinitely adjustable from zero to the maximum setting) with built-in RFI and noise filters is superior to conventional "step" controllers.

• Exclusive Dynamic Chamber™ design surrounds all contaminated air plenums with negative pressure plenums for additional safety. Unique airflow technology maintains **cabinet negative pressure at -274Pa / 1.1inWater** within the chamber under all circumstances for maximum safety and containment.

• **Magnehelic pressure gauge*** is mounted in the backwall of the workzone for monitoring negative pressure in the workzone during usage.

• All controls and fittings are mounted outside of the main biohazard safety cabinet chamber; down-time is minimized since servicing will not require cabinet decontamination.

• Designed to meet the safety requirements of IEC 61010-1 / EN 61010-1 / UL 3101-1 / CSA C22.2 No. 1010.1-92. Components are UL listed / recognised.

• Cabinet is shipped fully-assembled in wood crate; simply plug in the unit to a power source for operation - no local installation is required.

• **Extended warranty period of 3 years** excluding consumable parts and accessories.

*Registered trademark of Dwyer Instruments, Inc

Esco Airstream® Class III Biohazard Safety Cabinet

Esco Airstream® Class III - 6 ft model

Individual Performance Testing

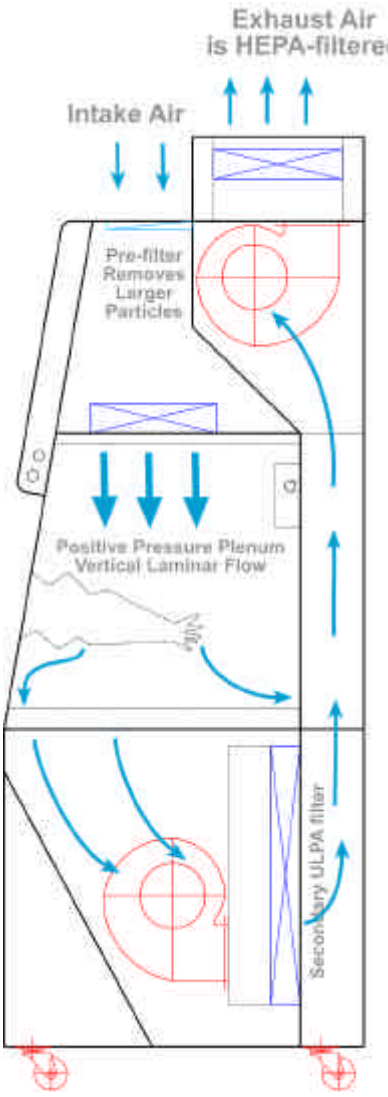
• ***Your safety means the world to us***: the following tests are performed individually at our in-house laboratory on every cabinet produced:

a. Airflow velocities
b. Cabinet leak test
c. Aerosol challenge test for filter integrity
d. Light intensity / noise / vibration levels
e. Airflow pattern visualisation test
f. Electrical safety tests

• A detailed report is included with every cabinet detailing the tests performed and results obtained.

• Extensive testing is continuously performed at our research and development laboratories to improve cabinet containment and performance.

• Recommended re-certification is 12 months from initial date of operation; in addition, we recommend that where possible, on-site testing after delivery and installation should be conducted in accordance with the following standard: EN12469:2000 (Section 6 Table 5).



Esco Class III Biohazard Safety Cabinet
Airflow Profile Description

• Air taken in from above the cabinet passes through a pre-filter and an ULPA filter. Moving into the main chamber of the cabinet in a vertical laminar (unidirectional) air stream, 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, providing a uniform downdraft over the entire working area of the chamber.

Esco's unique airflow design ensures that air within the cabinet is replaced consistently, eliminating excessive air turbulence and the accumulation of particulate contamination in "dead air corners".

• Air is moved within the cabinet below the work table, where is passes through two ULPA filters; one mounted below the work table, and the other above the main chamber. This provides a fail-safe mechanism in case any one of the ULPA filters fails to maintain containment.

Esco's unique blower system maintains negative pressure within the main work chamber under all circumstances. Unlike the competition, our Class III biohazard safety cabinets do not utilize supply blowers, which, when improperly balanced, may result in the working area being positively pressurized.

• All exhaust air is ULPA-filtered and exhausted directly back to the laboratory without re-circulation. Optionally, an exhaust collar can be fitted to allow air to be ducted via a dedicated ductwork system to the external environment.

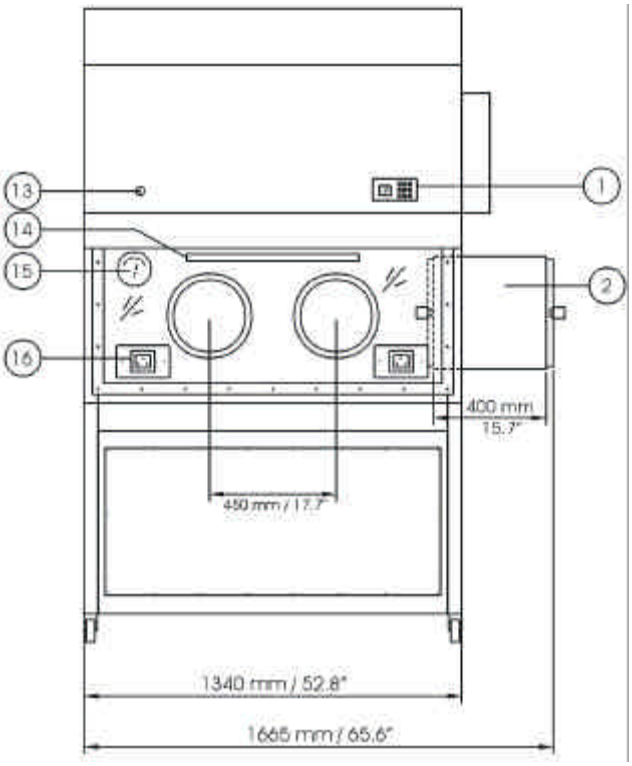
• Air velocity through an open glove port will be a minimum of 0.7m/s (140fpm) when a single port is open.

Class III Biohazard Safety Cabinets are commonly specified for use with the world's deadliest microbes. Drawing on the resources and expertise of our cleanroom engineering division, Esco is able to provide a complete turn-key service for the construction of critical environments to complement applications in which Class III cabinets may be used.

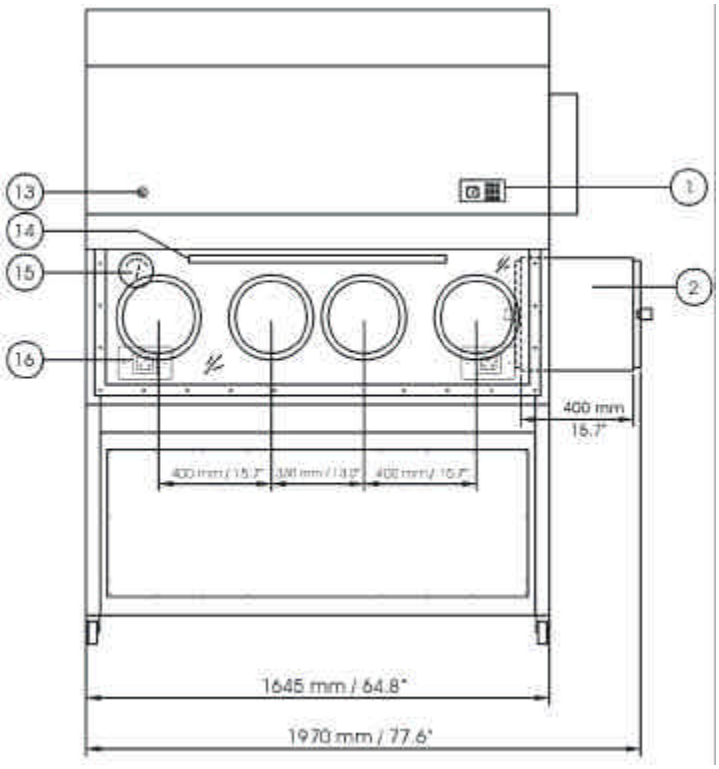
Although a Class III safety cabinet provides an unparalleled degree of operator and environmental protection, safety can still be increased by the construction of negative pressure cleanrooms and the use of isolation suits. When a Class III safety cabinet is operated within a negative pressure cleanroom, any failure in the Class III cabinet will still be isolated within the cleanroom. Assuming the cabinet fails, contamination from the cabinet will "spill-over" into the cleanroom but will not contaminate the general environment, since all air within the cleanroom is filtered before being exhausted to the external environment.

Engineering Diagrams for Available Sizes

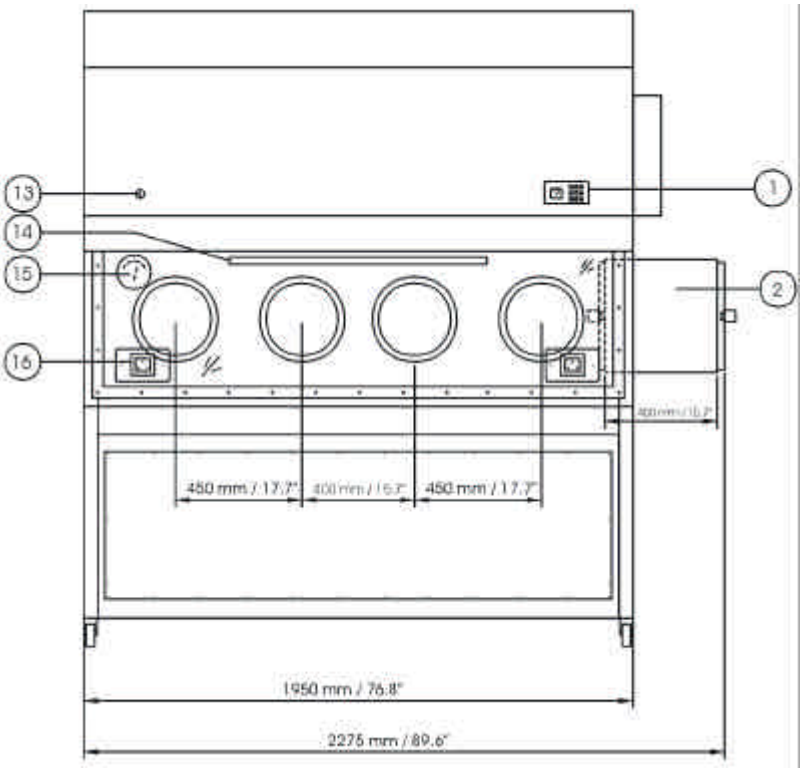
AC3-4 (Standard Model)
External Width: 1.34m / 4ft



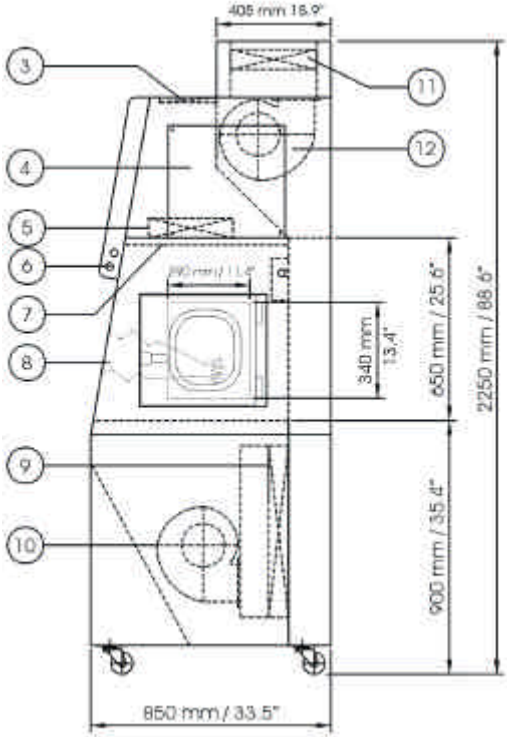
AC3-5
External Width: 1.645m / 5ft



AC3-6
External Width: 1.95m / 6ft



AC3 Side Diagram for All Sizes



Engineering Details

1. Esco Smart Control 2. Pass Box 3. Pre-filter 4. Electrical Panel 5. HEPA Filter(Downflow) 6. Fluorescent Light
7. Downflow Diffuser 8. Glove Ports 9. First Exhaust ULPA Filter 10. First Exhaust Blower
11. Second Exhaust ULPA Filter 12. Second Exhaust Blower 13. Key Switch 14. *Optional* UV Lamps 15. Pressure Gauge
16. *Work Zone Back Wall*: *Optional* Electrical Outlet Retrofit Kit™ Provisions: 2 outlets in work zone one on each side)

Site Installation Requirements

Class III cabinets are designed for total physical containment and are totally enclosed. Hence, room air currents have no effect on cabinet performance. Nevertheless, when selecting a location for your Class III cabinet, consider the following:

1. Cabinets should be located in a manner that allows for easy access for maintenance. In addition, a reasonable clearance along all sides of the cabinet should be enforced for this purpose.

2. A clearance of 15cm / 6 inches from the room ceiling above the cabinet is recommended.

3. There should be no opposing walls or other major obstructions in front of the cabinet.

4. Access to the cabinet (in which highly dangerous biohazards will be manipulated) should be highly restricted. Necessary safety precautions restricting personnel access should be enforced.

Optional Retrofit Kits™ and Accessories

The following optional Retrofit Kits™ are available from Esco for Airstream Class III biohazard safety cabinets. Esco's Retrofit Kit™ system allows the user to field-upgrade their cabinets with optional accessories post-purchase.
NOTE: Service fixtures are not allowed in Class III biosafety cabinets, as Class III biosafety cabinet construction is required to be airtight.

-***Germicidal UV lamp Retrofit Kit™***

-***Standard electrical socket outlet Retrofit KIts™*** (total 6A rating for all outlets in the work zone). GFCI (ground fault circuit interrupter) electrical socket outlets (115VAC units only).

-Hard (air-tight) duct exhaust collar

-Formalin vaporiser *(see image).* For biohazard safety cabinet decontamination.

General Specifications		AC3-4AX (Standard Model)	AC3-5AX	AC3-6AX
External Dimensions (Width x Depth x Height)		1340 x 850 x 2250 mm 52.8"" x 33.5"" x 88.6"	1645 x 850x 2250 mm 64.8" x 33.5" x 88.6"	1950 x 850 x 2250 mm 76.8" x 33.5" x 88.6"
Internal Work Zone (Width x Depth x Height)		1240 x 650 x 650 mm 48.8" x 25.6" x 25.6"	1545 x 650 x 650 mm 60.8" x 25.6" x 25.6"	1850 x 650 x 650 mm 72.8" x 25.6" x 25.6"
Number of Glove Ports		2 ports (refer to drawing on page 3)	4 ports (refer to drawing on page 3)	4 ports (refer to drawing on page 3)
Air Volume (At Initial Velocity)		603 cmh / 355 cfm	756 cmh / 445 cfm	902 cmh / 531 cfm
Cabinet negative pressure		274Pa / 1.1inH^2O (exceeds EN12469:2000 requirement of 199.3Pa / 0.8inH^2O and NSF49 requirement of 124.5Pa / 0.5inH^2O		
Standards Compliance		Individually performance tested and certified at factory under controlled conditions for: General requirements: IEST-RP-CC002.2 and AS1386.5 Air cleanliness: ISO 14664.1 Class 3, IEST-G-CC1001, IEST-G-CC1002 and other equivalent air cleanliness 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 3101-1 / CSA C22.2 No. 1010.1-92		
Air Cleanliness Within Working Area		ISO 14644.1 Class 3, US Federal Standard 209E Class 1 / M1.5, AS 1386 Class 1.5, JIS B9920 Class 3, BS5295 Class C, Class M10,000 as per KS 27030.1 and other equivalent cleanliness classifications of the VDI 2083 and AFNOR X44101		
Main Filter Type	Downflow	ULPA filter with integral metal guards and filter frame gaskets; fully compliant with EN1822 and IEST-RP-CC001.3 requirements		
	Exhaust	2 ULPA filters with integral metal guards and filter frame gaskets; fully compliant with EN1822 and IEST-RP-CC001.3 requirements		
Main Filter Efficiency Ratings	Downflow	Minimum: 99.997% at 0.3µm / 99.988% at 0.12µm / 99.987% at MPPS Typical: 99.99927% at 0.3µm / 99.9977% at 0.12µm / 99.9972% at MPPS		
	1st Exhaust	Minimum: 99.99962% at 0.3µm / 99.99965% at 0.12µm / 99.99946% at MPPS Typical: 99.999928% at 0.3µm / 99.99996% at 012µm / 99.999924% at MPPS		
	2nd Exhaust	Minimum: 99.99916% at 0.3µm / 99.9985% at 0.12µm / 99.9982% at MPPS Typical: 99.99983% at 0.3µm / 99.99979% at 012µm / 99.99971% at MPPS		
Pre-Filter		Disposable and non-washable polyester fibers with 85% arrestance / EU3 rated		
Noise Level		Typically <60 dBA at initial blower speed setting measured as per EN 12469:2000, based on 4 feet cabinet, subject to acoustic properties of test environment		
Light Intensity		>1200 lux / >111 foot candles, measured at work surface level (zero background) as per IEST-RP-CC002.2		
Main Body Construction		1.5mmt / 0.06"" / 16 gauge electro-galvanised steel with white oven-baked epoxy powder-coated finish		
Front Window Construction		Colourless and transparent UV-absorbing 8mm / 0.31" tempered glass		
Work Surface Construction		1.2mmt / 0.05"" / 18 gauge stainless steel grade 304		
Maximum Power Consumption /Current	220-240VAC / 50Hz 1Ph	1144W / 4.97A	1164W / 5.06A	1180W / 5.13A
	110-130VAC / 60Hz 1Ph	1632W / 13.6A	1652W / 13.77A	1668W / 13.9A
Net Weight (Approximate)		351.5kgs / 775lbs	439.4kgs / 969lbs	527.3kgs / 1163lbs
Max Shipping Weight		601 kgs / 1325lbs	751.2kgs / 1656lbs	901.5kgs / 1988lbs
Max Shipping Dimensions (W x D x H)		1995 x 1300 x 2750 mm 78.5" x 51.2" x 108.3"	2245 x 1300 x 2750 mm 88.4" x 51.2" x 108.3"	2550 x 1300 x 2750 mm 100.4" x 51.2" x 108.3"
Max Shipping Volume		7.13 cbm / 251.8 cbf	8.03 cbm / 283.6 cbf	9.12 cbm / 322.07 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 highly 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 AS1807.5 and EN12469. Products are manufactured under an ISO 9001 registered quality system.

Your local distributor:

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