



**Certified to the ANSI / ASHRAE 110-1995 Standard**

**Optimum Operator Protection and Performance:**  
Progressive Bypass Airflow System

**Wide Range of Construction Options**

**Available with Optional Microprocessor Control**

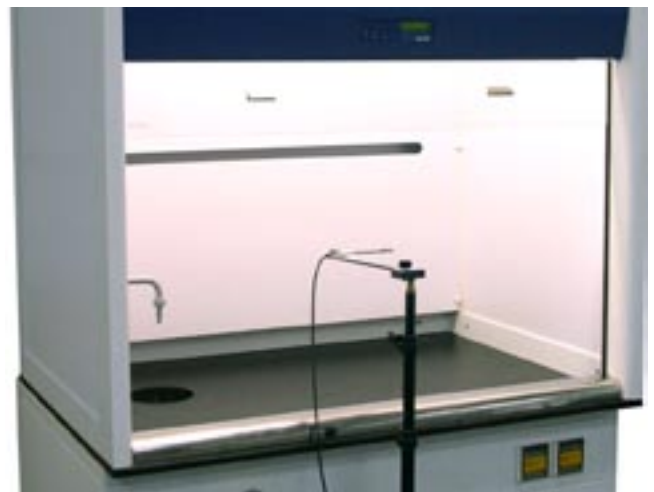
## ASHRAE Testing at Esco

Esco Fume Hoods have been independently certified by Invent-UK Ltd (Hertfordshire, UK) to meet and exceed the latest safety and performance requirements of the ANSI/ASHRAE Standard 110-1995. Esco's in-house ASHRAE testing laboratory at our Research and Development facilities is fully equipped to conduct performance tests on fume hoods according to the ASHRAE standard requirements.

The ASHRAE 110-1995 Standard is one of the latest and most comprehensive methods for testing the operator safety level of fume hoods, by determining quantitatively and repeatably how well fume hoods contain the gases and vapours released in the work zone. First published in 1985 and extensively revised in 1995, the method employs the following tests to evaluate fume hood performance.

**1. Tracer gas containment test:** Ensures gas generated inside the work zone is not inhaled by the operator. SF<sub>6</sub> (Sulphur Hexafluoride) tracer gas is released inside the workzone near the sash window opening (as close as 15 cm behind the sash window) at 4 litres/min. An SF<sub>6</sub> detector is mounted on a mannequin to simulate operator breathing (see illustration on the right). A cross draft velocity probe is mounted behind the mannequin during testing to check for cross drafts that may affect the test results.

**NOTE:** Tracer gas containment is the most stringent test method in testing the containment capability of a fume hood. Many other manufacturers only rely on face velocity measurements to check for personnel protection provided by fume hoods.



2. Face velocity measurement

**2. Face velocity measurement:** to ensure uniform face velocities at 25%, 50% and 100% sash opening settings. A velocity transducer is connected to a Data Acquisition System, which calculates the average of 300 velocity readings at each measurement location.

**3. Local smoke visualization:** tests along workzone joints and corners



1. Tracer gas containment test

The tracer gas containment test process consists of:

- **Static leak test:** Scans for SF<sub>6</sub> leakage at 25%, 50% and 100% sash opening at left, right and center of the fume hood workzone.
- **Sash movement effect:** Scans for SF<sub>6</sub> leakage with the sash window moved up and down at velocity between 0.3 and 0.5 m/s.
- **Face hood surface scan:** Scans for SF<sub>6</sub> leakage along the surface perimeters of the fume hood face and external joints to ensure operator safety.



4. Gross smoke visualization

**4. Gross smoke visualization:** tests overall cabinet airflow pattern. The above two smoke visualization tests ensure smooth and direct airflow inside the workzone towards the airflow outlet passages.



*Note: Bypass airflow system Esco Fume Hood with vertical-rising sash pictured with the optional Esco Sentinel™ Microprocessor Control and Esco base cabinet*

**Laboratory fume hoods are one of the most important components used to protect laboratory personnel from exposure to hazardous chemicals and agents used in the laboratory. They can provide an effective backup safety device for the containment and exhaust of toxic, offensive, or flammable materials when the containment of an experiment or procedure fails and vapours or dusts escape from the apparatus being used.**

- ▀ **Industrial-grade support structure constructed of electro-galvanised steel and aluminium with a corrosion and abrasion resistant oven-baked powder-coated finish.**

- ▀ **Internal liner is constructed of phenolic resin laminates;** more corrosion-resistant and durable than other common internal liner materials (refer to page 7 of this catalogue for the chemical resistance report / test results for the phenolic resin laminate material). **Single wall design** ensures the internal workzone width is maximized.

- ▀ **Instant-start electronically ballasted 5000k lighting system** is flicker-free and the warm glow of the lighting system is comfortable to the operator's eyes during extended hours of usage. Integral fluorescent lighting is isolated from the air stream in order to increase airflow uniformity.

- ▀ **Standard vertical rising fail-safe counterbalanced sash.** The sash will tilt and lock if a cable snaps; Optionally, horizontal sliding sashes or combination horizontal / vertical sashes are available; all sashes are constructed of tempered glass for maximum operator safety.

- ▀ **State of the art baffle system** constructed of phenolic resin laminates delivers maximum containment by ensuring airflow uniformity throughout the main chamber of hood.

- ▀ **Aerodynamic design eliminates air turbulence** within the hood which can otherwise compromise containment; noise levels and static pressure losses are also minimized. Aerodynamic curved side profile improves containment.

- ▀ **Corrosion-resistant stainless steel airfoil** provides spill retention and safely ventilates fumes generated towards the front of the hood for superior operator protection; the curved front edge also facilitates an ergonomic working position.



- ▀ Generously-sized work room due to improved positioning of the service fixtures.

- ▀ Black colour work surface resists staining. Work surface is included with *optional* base cabinet.

- ▀ No exposed metal screws are present in the work zone construction, which improves corrosion resistance of the body.

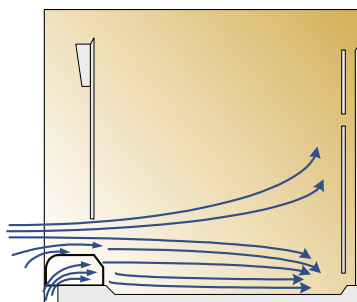
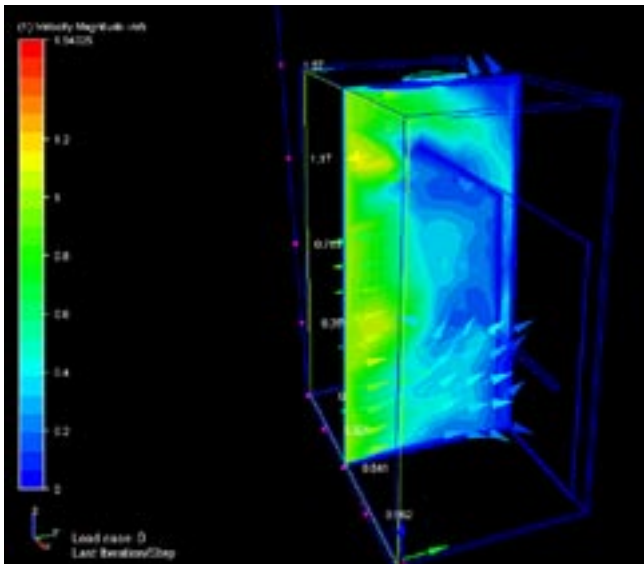
- ▀ Electrical system is designed to meet the latest international regulations and standards for safety.

- ▀ **Independently certified to the latest safety and performance requirements of the ANSI/ASHRAE Standard 110-1995;** when ordered with a modified control system, these units will also comply with the British / Australian / New Zealand standards BS 7258, AS 2243.8 and NZS 7203.

- ▀ Standard systems are shipped fully-assembled; however, units can also be shipped unassembled to lower freight handling costs; our industry-exclusive aluminium extrusion modular system makes re-assembly quick and efficient.

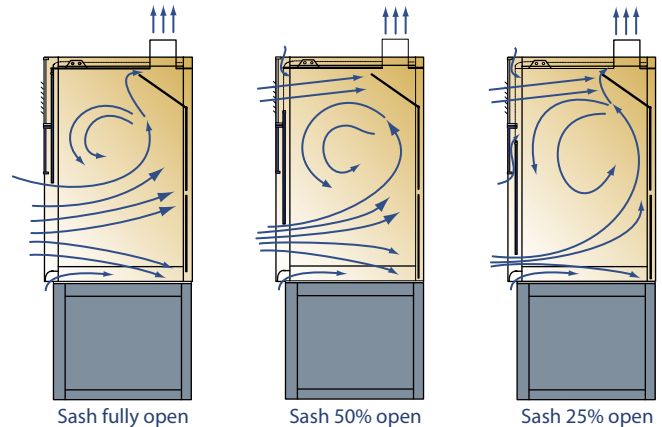
## COMPUTATIONAL FLUID DYNAMICS (CFD)

Leading-edge computational fluid dynamics software is used to visualize and analyse the airflow pattern in the fume hood, leading to an optimum product with an effective airflow bypass system design.



## PROGRESSIVE BYPASS AIRFLOW SYSTEM

The bypass system redistributes intake air when the sash is closed to prevent high velocity air streams which can cause turbulence and compromise chemical fume containment.



1. When sash is **fully open**, air flows in through front opening and via air foil.
2. When sash is lowered down to **50% front opening**, air flows in through front opening, gap at ceiling and louvres.
3. When sash is lowered down to **25% front opening**, air flows through all of the above and via gap between sash and front panel.

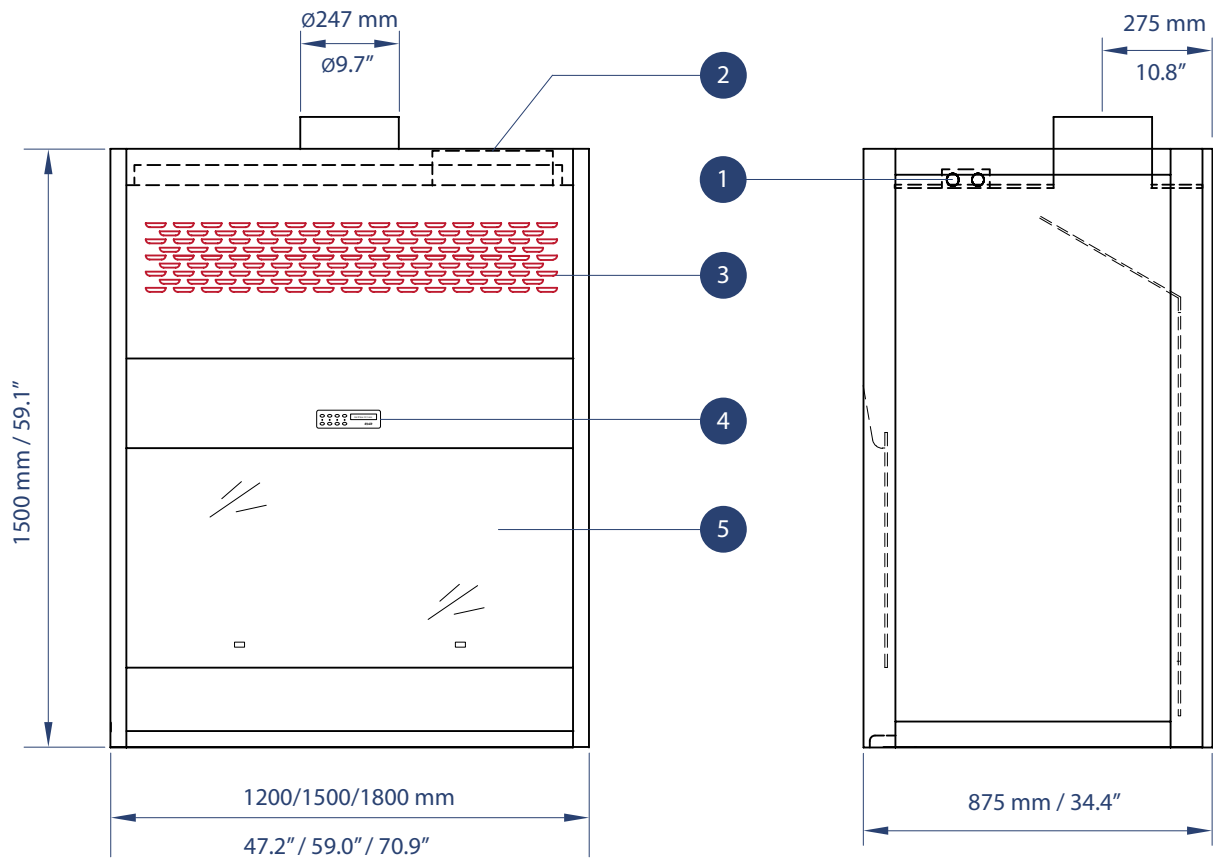
**Air Foil** minimises undesirable air turbulence entering the hood by its aerodynamic design. Smoothens the flow of air entering through air foil across the work surface and deflects it to the lower baffle opening.

Air foil also provides room for air flow when sash is completely closed.

## OPTIONAL CONTROL FEATURES



- ▀ Escos Sentinel™ Microprocessor control is fully configurable according to the user requirements.
- ▀ Easy-to-clean touch controls equipped with a tactile mechanism.
- ▀ Generously-sized LCD screen continuously displays airflow velocity for constant monitoring of hood performance. Air velocity can be displayed in either fpm or m/s. Control panel is sloped downwards to provide a sitting operator a better view of and an easier access to the controls.
- ▀ Audible and visual alarms for low / unsafe airflow velocities.
- ▀ 24 hour time display and stopwatch timer.
- ▀ Ambient temperature display both in Celsius and Fahrenheit.
- ▀ In-built temperature compensation function ensures airflow sensor is accurate in any ambient temperature.
- ▀ An Admin. PIN can be set by the laboratory supervisor to restrict access to all menu functions.
- ▀ A Fan PIN feature allows the supervisor to restrict access to fan control, thereby preventing usage of the hood.
- ▀ Blower hour meter helps you monitor total usage time of the external blower.
- ▀ Fail-safe control system equipped with a watchdog timer ensures the fume hood safety is not compromised even if the electronics hardware fails. In case of failure, the control will automatically reset the system and restore the hood to safe settings.
- ▀ The special **Maintenance mode** for servicing purposes, allows for by-pass of the fume hood control presets and complete control over the functions. All system interlocks and alarms are disabled, and all raw inputs and outputs can be viewed for troubleshooting purposes. (For authorized personnel only. Consult product manual before activating.)



**Engineering Details**

- 1. Fluorescent Light
- 2. Electrical Panel
- 3. Air Bypass System
- 4. Optional Sentinel™ Microprocessor Control
- 5. Sash Window

General Specifications	EFH-4AX	EFH-5AX	EFH-6AX
External Dimensions (L x D x H)	1200 x 875 x 1500 mm 47.2" x 34.4" x 59.1"	1500 x 875 x 1500 mm 59.0" x 34.4" x 59.1"	1800 x 875 x 1500 mm 70.9" x 34.4" x 59.1"
Internal Workzone Dimensions (L x D x H)	1120 x 680 x 1200 mm 44.1" x 26.8" x 47.2"	1420 x 680 x 1200 mm 55.9" x 26.8" x 47.2"	1720 x 680 x 1200 mm 67.7" x 26.8" x 47.2"
Maximum Sash Opening	580 mm / 22.8" (standard vertical rising sash)		
Recommended Maximum Exhaust Air Volume <i>For minimum face velocity of 0.5 m/s or 100 fpm at full-open hood sash position</i>	Required Fume Hood Exhaust Air Volume 1170 cmh / 690 cfm	Required Fume Hood Exhaust Air Volume 1480 cmh / 870 cfm	Required Fume Hood Exhaust Air Volume 1795 cmh / 1055 cfm
Recommended Minimum Exhaust Air Volume <i>For minimum face velocity of 0.5 m/s or 100 fpm at half-open hood sash position</i>	Required Fume Hood Exhaust Air Volume 585 cmh / 344 cfm	Required Fume Hood Exhaust Air Volume 740 cmh / 436 cfm	Required Fume Hood Exhaust Air Volume 900 cmh / 530 cfm
Inner Exhaust Outlet Diameter	252 mm / 10.0"	252 mm / 10.0"	305 mm / 12.0"
Outer Exhaust Outlet Diameter	266 mm / 10.5"	266 mm / 10.5"	319 mm / 12.6"
Light Intensity at Work Surface	780 Lux / 72 foot candelas		
Construction	Main body: Phenolic resin laminates Support frame: Aluminium extrusions with an oven-baked epoxy powder-coated finish Interior baffle system: Phenolic resin laminates Airfoil: Stainless steel grade 304		
Power Consumption	25W (Fluorescent Lighting Only) / 60W (Fluorescent Lighting & Microprocessor Control System)		
Net Weight	140 kg / 310 lbs	170 kg / 370 lbs	210 kg / 460 lbs
Crating Size (unassembled hood)	1550 x 1100 x 500 mm 61.0" x 43.3" x 19.7"	1850 x 1100 x 500 mm 72.8" x 43.3" x 19.7"	2150 x 1100 x 500 mm 84.6" x 43.3" x 19.7"
Crating Size (assembled hood)	1550 x 1100 x 1800 mm 61.0" x 43.3" x 70.9"	1850 x 1100 x 1800 mm 72.8" x 43.3" x 70.9"	2150 x 1100 x 1800 mm 84.6" x 43.3" x 70.9"



Specifically designed for use with Esco Fume Hoods.

Built-in black phenolic resin laminate tabletop; highly resistant to a wide variety of common laboratory acids, solvents and chemicals; phenolic resin is easy-to-clean, will not discolour, and will not corrode.

2 electrical socket outlets with splash-proof plastic covers (local type depending on country of use will be installed; please specify ordering code and operating voltage).

1 swan-neck remote control water faucet, 1 additional multi-purpose remote control fitting for air/gas/vacuum/

water/nitrogen. Fittings are BS 2874 / DIN Standard 12920 / DIN12898 compliant.

High-quality fittings ensure long service life and increased safety; for example, our gas fittings are fitted with a safety catch that provides a visual indication of valve position; designed in accordance with recognized international standards.

High-quality built-in PP drip cup is more durable and easy-to-clean than conventional plastic cupsinks.

An opening with a cover is provided at the backwall of the cabinet for convenient plumbing installation.

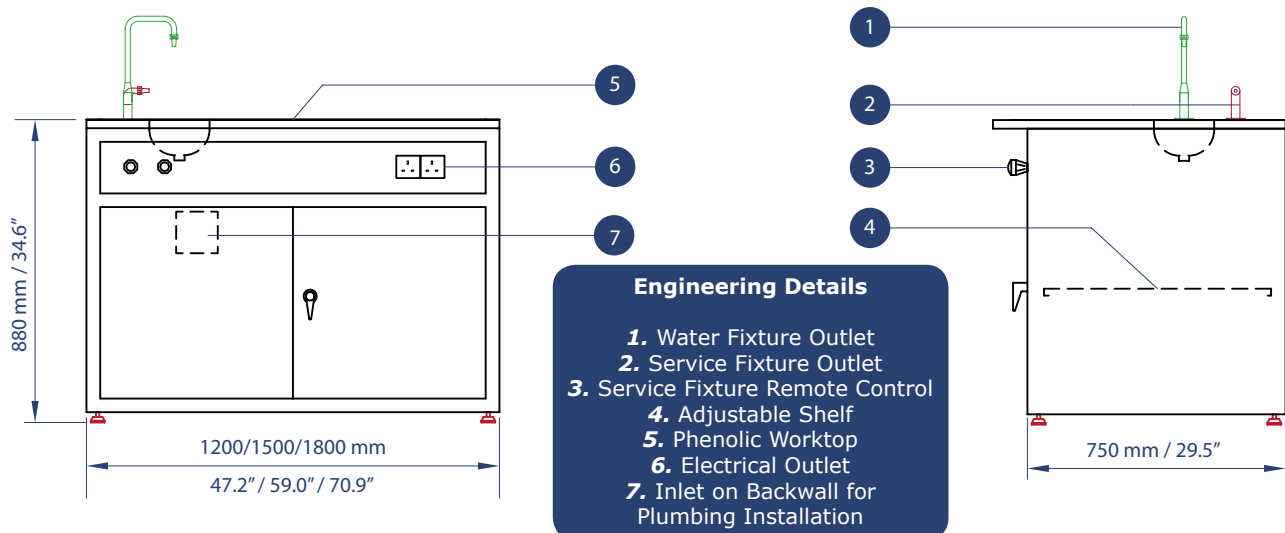
Designed for ergonomics and operator comfort: the cabinet depth is 100mm less than the fume hood, providing the operator with more leg-room.

Cabinet assembly maximizes storage space in the laboratory; convenient for solvents, acids and other laboratory chemicals. Each cabinet includes an adjustable white powder-coated steel shelf for storage purposes. Cabinet door is lockable.

Industrial-grade support structure constructed of electro-galvanised steel and aluminium with a corrosion and abrasion resistant oven-baked powder-coated finish.

Internal cabinet liner is constructed of phenolic resin laminates; more corrosion-resistant and durable than other common internal liner materials.

*Additional / customised service fixtures, electrical outlets and other accessories are also available on request. Please contact Esco or your local distributor for details.*



General Specifications	EBC-4AX	EBC-5AX	EBC-6AX
External Dimensions (L x H x D)	1200 x 850 x 800 mm 47.2" x 33.5" x 31.5"	1500 x 850 x 800 mm 59.1" x 33.5" x 31.5"	1800 x 850 x 800 mm 70.9" x 33.5" x 31.5"
Construction	Electro-galvanised steel with an oven-baked white epoxy powder-coated finish		
Power Supply Options	<b>Choose from the following options and specify option number (e.g. EBC-4A1) when ordering</b> <b>1.</b> 220-240VAC 50HZ, 1 phase <b>2.</b> 110-130VAC 60HZ, 1 phase <b>3.</b> 220-240VAC 60HZ, 1 phase <b>4.</b> 110-130VAC 50HZ, 1 phase <b>5.</b> 100-110VAC 50HZ / 60HZ		
Net Weight	120 kg / 260 lbs	150 kg / 330 lbs	190 kg / 420 lbs
Crating Size	1550 x 1100 x 1000 mm 61.0" x 43.3" x 39.4"	1850 x 1100 x 1000 mm 72.8" x 43.3" x 39.4"	2150 x 1100 x 1000 mm 84.6" x 43.3" x 39.4"

**PHENOLIC RESIN LAMINATES USED IN ESCO FUME HOODS  
Chemical & Stain Resistance Independent Test Report Results  
Reference Standard: BS EN 438: Part 2: 1991**

**A. Chemical Resistance Test  
(Solutions removed after 24hours)**

**Test Solutions**

1. Ammonium Chloride, 10%
2. Potassium Carbonate, 10%
3. Potassium Iodide, 10%
4. Potassium Iodide, 10%
5. Sodium Carbonate, 5%
6. Chloroform
7. Carbon tetrachloride
8. Sodium Bicarbonate, 5%
9. Sodium Chloride, 5%
10. Potassium Ferricyanide, 5%
11. Trisodium Phosphate, 1%
12. Ammonium Hydroxide, 10%
13. Ethanoic Acid, 5%
14. Barium Chloride Dihydrate, 10%

**Results**

- No visible change  
No visible change  
No visible change  
No visible change  
No visible change  
No visible change  
No visible change  
No visible change  
No visible change  
No visible change  
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No visible change

**B. Chemical Resistance Test  
(Solutions removed after 10 minutes)**

**Test Solutions**

1. Silver Nitrate, 5%
2. Hydrochloric Acid, 10%
3. Sulfuric Acid, 10%
4. Nitric Acid, 10%
5. Hydrogen Peroxide, 3%
6. Saturated Calcium Hydroxide
7. Phosphoric Acid, 85%
8. Caustic soda, 10%

**Results**

- No visible change  
No visible change  
No visible change  
No visible change  
No visible change  
No visible change  
No visible change  
No visible change

**C. Chemical Resistance Test  
(Solutions removed immediately after application)**

**Test Solutions**

1. Sulfuric Acid, 96%
2. Nitric Acid, 65%
3. Hydrochloric acid, 37%

**Results**

- No visible change  
No visible change  
No visible change

**OPTIONAL EXHAUST BLOWER**



- Plastic impeller and casing is highly resistant to chemicals and corrosion; specifically designed for fume hood applications.
- Self-supporting casing; thermoformed, automatically welded, available in polypropylene (PP) construction suitable for most general fume hoods, or poly-vinyl chloride (PVC) construction suitable for perchloric acid fume hoods.
- Injection moulded aerodynamic direct-drive impeller with 20 forward curved blades; available in PP (suitable for most general fume hoods) or PVDF (suitable for perchloric acid fume hoods).
- Torque transmission is enabled by a plastic aluminium hub which is isolated from the air stream; longer-service life and greater chemical corrosion resistance / durability.
- Solid sheet metal support with a powder-coated finish; built-in IEC-compliant motor running at 1500 rpm with B3 mountings is isolated from the air stream for maximum service life.
- Factory-prepared fan casing drainage holes; superior construction technology, mounting and balancing techniques ensure low noise levels and high energy efficiency.

General Specifications	EQR/FC-[ ]180	EQR/FC-[ ]200	EQR/FC-[ ]225	EQR/FC-[ ]250	EQR/FC-[ ]280
Inlet / Outlet Diameters	254 mm / 10" internal measurements; or 305 mm / 12" internal measurements				
Motor / Fan Speeds	1500 rpm (motor) / Approx. 1400 rpm (fan)				
Power Consumption	0.18 kW	0.37 kW	0.55 kW	0.75 kW	1.5 kW
Power Supply	220-240V, single phase, 50/60HZ; or 110-130V, single phase, 50/60HZ; or 220-240V/415V, 3 phase, 50/60HZ				

For polypropylene fans (suitable for most fume hoods), replace the brackets with "PP", for PVC fans (suitable for perchloric hood applications), replace the brackets with "PVC". For example, a valid ordering code is EQR/FC-PP200.

**OPTIONAL FUME HOOD FEATURES**

- Benchtop fume hood with service control knobs and electrical outlets mounted in a "mini base cabinet" that does not have storage space.
- Fume hood models with built-in fan available upon request
- Fiberglass internal liner in lieu of phenolic resin laminates
- Stainless steel internal liner and work surface in lieu of phenolic resin laminates
- PVC internal liner in lieu of phenolic resin laminates
- Transparent glass sidewalls in lieu of phenolic resin laminates
- Chemically resistant stainless steel construction (work surface and / or internal liner) in lieu of phenolic resin laminates. (*Choose from stainless steel grades 304 for regular resistance and 316 for extra chemical resistance*)
- Wash down system for perchloric acid hood applications
- Scrubber system for perchloric acid hood applications
- Floor-mounted walk-in fume hoods
- Variable air volume control systems
- Energy-saving horizontal sliding sashes
- Energy-saving sash height stops to restrict fume hood maximum sash operating height
- Custom designs and sizes

One of Esco's five main divisions, our **Laboratory Fume Hood Division** specializes in ASHRAE 110-1995 certified laboratory fume hoods for use in laboratories to protect operators and laboratory personnel during their operations and activities.

We invite you to learn more about how Esco can help you reduce capital and long-term costs, increase efficiency, and achieve only the highest levels of laboratory personnel protection.

- Lowest initial capital investment and life cycle costs; coupled with technical innovation recognized the world over.
- Compliance with the latest international standards for laboratory fume hoods and electrical safety.
- Fully integrated and mechanized manufacturing processes at our sheet metal processing centre utilizing only raw materials of the highest quality and the latest industrial production techniques.
- Competitive lead times with many items from stock.

Executive Member of:



[www.sefalabs.com](http://www.sefalabs.com)



All products are manufactured under a quality system registered to:

ISO 9001 TOTAL QUALITY MANAGEMENT  
 ISO 14001 ENVIRONMENTAL MANAGEMENT SYSTEM

Your local distributor: