

DPB/DFLH

Dynamic Pass Boxes and
Dynamic Floor Laminar Hatches



Dynamic Pass Boxes / Dynamic Floor Laminar Hatches (DPB / DFLH)

Esco DPB/DFLH is an aseptic architectural system used to prevent contaminants interfering the clean suites. It is utilized for transfer of materials into and out of the critical process environments by supplying a zone with the controlled particle counts. Esco DPB/DFLH acts as a Material Airlock (MAL) to ensure protection of higher-grade environment by effective flushing with an active filtered air supply as per Revised Annex 1 EU GMP.

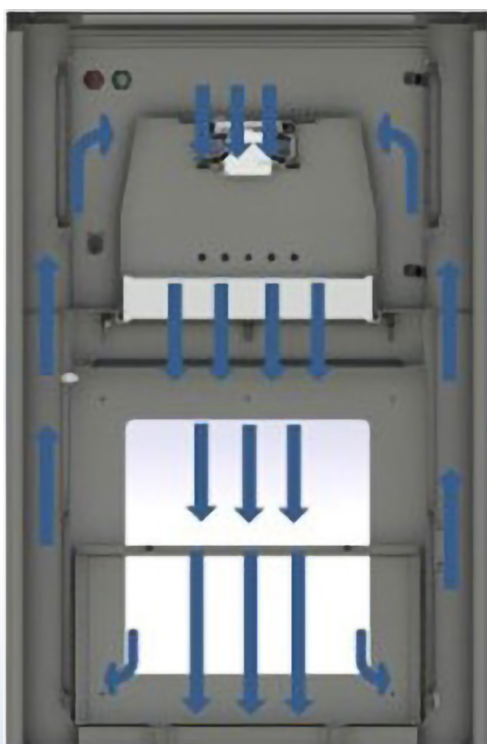
Esco DPB/DFLH is the best choice for ensuring your dynamic activities of delivering goods between 2 contrast cleanliness grade areas.

Application

- Manufacturing Facilities
- Pharmaceutical Industry
- Cleanroom and Controlled Environments
- cGMP facilities
- Nanotechnology
- Semiconductors Industry
- Space Industry
- Automotive Industry

Basic Principles

- Dynamic airflow provides an air barrier to prevent contaminants from entering into critical controlled environments during material transfers.
- Vertical purging removes any trace contaminants that could possibly enter into the cleanroom environment.
- Unit operates with a recirculating airflow and on-board fans, hence external ducting is not required.



Standard Features

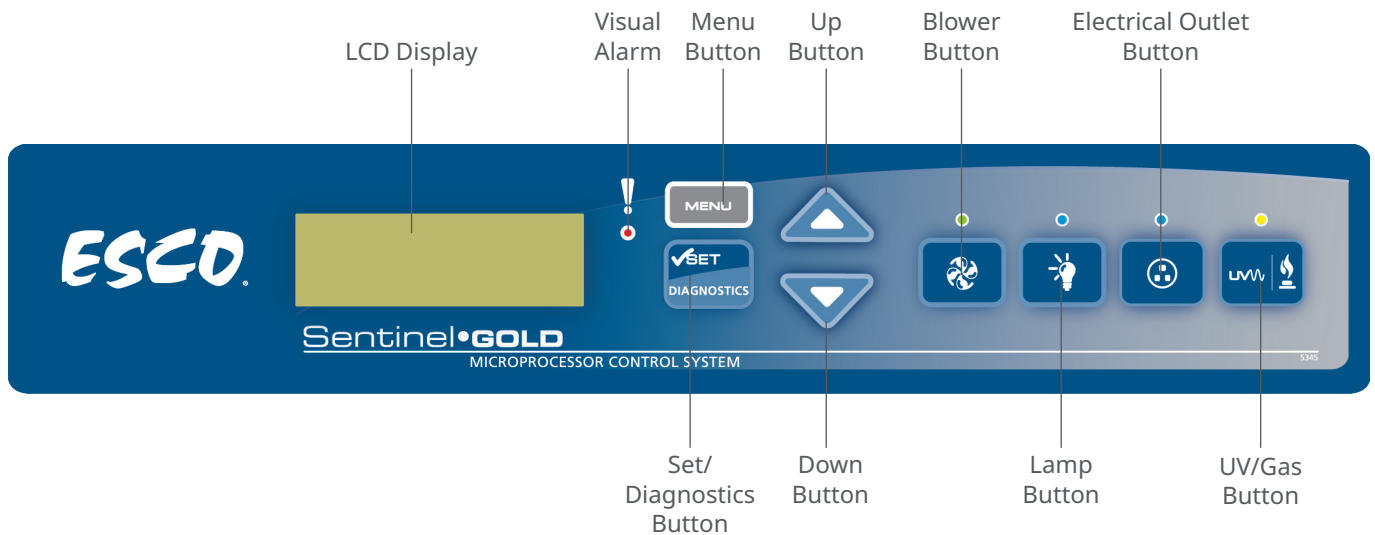
- **Cleanliness is assured during the transfer of materials**
Equipped with a HEPA (H14) knife-edge gel-sealed main filter and a G4 pre-filter to extend the lifespan of the main filter, providing superior ISO Class 5/Grade A environment within the chamber.
- **Comprehensible signal to indicate the quality of filter**
Selection between Pressure gauge or digital display of differential pressure value across filters (via Sentinel™ Gold microprocessor controller with filter load alarm).
- **Convenient operation by an identifiable indicator lights**
Red/green indicators lights to signal door and operation status.
- **Clear view to the internal chamber**
The Esco DPB/DFLH viewing window is constructed with durable tempered glass.
- **Validated electromagnetic interlocking doors with time-delayed purge**
Enhancing safety and Contamination Control Strategy with time-delay air purge and interlocking system that prevent both doors from being opened at the same time.
- **Optimal air change guarantee to chamber**
Safe containment construction allows the optimal air change inside the chamber recirculates via perforated grill system at the side walls.
- **Adaptable installation with no edge of gap on the wall cut-out**
Designed with flanges ensuring smooth and impervious wall-to-pass box finish.
- **Easy-to-clean construction**
Esco DPB/DFLH is constructed from full stainless steel and features cGMP-compliant coved corners at its base for easy cleaning. DFLH also supplies a floor mounted design for facilitating the wheeled cart application.
- **Safety-oriented application**
The emergency stop button is conveniently positioned on both sides of the unit, ensuring easy accessibility in the event of an unforeseen emergency.
- **Intuitive user-adaptable controller system**
Selection from simple rocker switch or Sentinel™ Gold microprocessor controller with audio/visual alarms for downflow velocity and filter loading.



*cGMP-compliant
covered corners*



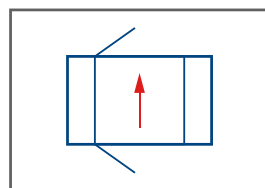
*Two emergency
stop buttons*



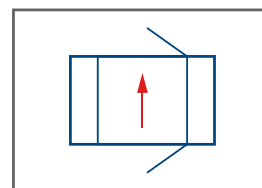
Optional Features

- Remote mounted main control panel
- Support stand or Base box (specify mounting height when ordering)
- Onboard LED light and/or UV light
- Internal shelves
- Door release buttons
- Interlock release rocker switches
- Buzzer system (to alert personnel on the opposite side during material transfer)
- Intercom system
- Fan fault alarms with customized blowers
- Lead shielding
- Roller Conveyors (only for DFLH)
- Auto sliding PVC doors (only for DFLH)
- Rails to hang gowns (only for DFLH)

Door Direction Options*



Door A



Door B

*Straight-through door opening direction should be determined according to the door direction code by Escso. Other straight-through door directions, L-shaped and 3-way door opening dimensions are to be advised upon ordering.

Guide to DPB/DFLH Model Code							
Models	DPB-S454545-C						
Product Code	-	MOC	Internal Dimensions			-	Customization
			Width (cm)	Depth (cm)	Height (cm)		
DPB/DFLH		A-EG Steel Exterior/Interior with SS304 base (non coved corner)	45	45	45		C-Customization No Customization
		S1-Full SS304	*	*	*		
		S2-Full SS316L	*	*	*		

Notes:

The minimum feasible customized internal chamber size is WxDxH 450x450x450 mm

The upgrade to SS316 material is classified as a customization.

Standard Sizes	External & Internal Dimensions (W × D × H)
DPB-S454545-C	Ext. Dimension (WxDxH): 700 x 530 x 1200 mm (27.6" x 20.9" x 47.2") Int. Dimension (WxDxH): 450 x 450 x 450 mm (17.7" x 17.7" x 17.7")
DPB-S555555-C	Ext. Dimension (WxDxH): 800 x 630 x 1300 mm (31.5" x 24.8" x 51.2") Int. Dimension (WxDxH): 550 x 550 x 550 mm (21.7" x 21.7" x 21.7")
DPB-S606060-C	Ext. Dimension (WxDxH): 850 x 680 x 1350 mm (33.5" x 26.8" x 53.2") Int. Dimension (WxDxH): 600 x 600 x 600 mm (23.6" x 23.6" x 23.6")
DPB-S606075-C	Ext. Dimension (WxDxH): 850 x 680 x 1500 mm (33.5" x 26.8" x 59.0") Int. Dimension (WxDxH): 600 x 600 x 750 mm (23.6" x 23.6" x 29.5")
DPB-S616161-C	Ext. Dimension (WxDxH): 860 x 690 x 1360 mm (33.9" x 27.2" x 53.5") Int. Dimension (WxDxH): 610 x 610 x 610 mm (24.0" x 24.0" x 24.0")
DPB-S757575-C	Ext. Dimension (WxDxH): 1000 x 830 x 1500 mm (39.4" x 32.7" x 59.0") Int. Dimension (WxDxH): 750 x 750 x 750 mm (29.5" x 29.5" x 29.5")
DPB-S909090-C	Ext. Dimension (WxDxH): 1150 x 980 x 1650 mm (45.3" x 38.6" x 65.0") Int. Dimension (WxDxH): 900 x 900 x 900 mm (35.4" x 35.4" x 35.4")
DPB-S110110180-C	Ext. Dimension (WxDxH): 1350 x 1180 x 2550 mm (53.1" x 46.5" x 100.4") Int. Dimension (WxDxH): 1100 x 1100 x 1800 mm (43.3" x 43.3" x 70.9")
DPB-S120150150-C	Ext. Dimension (WxDxH): 1450 x 1580 x 2250 mm (57.1" x 62.2" x 88.6") Int. Dimension (WxDxH): 1200 x 1500 x 1500 mm (47.2" x 59.1" x 59.1")
DPB-S140150170-C	Ext. Dimension (WxDxH): 1650 x 1580 x 2450 mm (65.0" x 62.2" x 96.4") Int. Dimension (WxDxH): 1400 x 1500 x 1700 mm (55.1" x 59.1" x 66.9")

General Specifications

Dynamic Pass Box/ Dynamic Floor Laminar Hatch

General Specifications Dynamic Pass Box/Dynamic Floor Laminar Hatch			DPB-S454545	DPB-S606060	DPB-S909090
Door Opening	Straight Through*		✓	✓	✓
	L-shape		✓	✓	✓
	3 way		✓	✓	✓
Base	With Base		✓	✓	✓
	Without Base**		✓	✓	✓
Onboard Lighting (LED)	With Onboard Lighting		✓	✓	✓
	Without Onboard Lighting		✓	✓	✓
UV Light	With UV light		✓	✓	✓
	Without UV light		✓	✓	✓
Electrical Code	220-240 VAC, 50/60 Hz		✓	✓	✓
	110-130 VAC, 50/60 Hz		✓	✓	✓
	100-110 VAC, 60 Hz		✓	✓	✓
External Dimensions (W × D × H)			700 x 530 x 1200 mm (27.6" x 20.9" x 47.2")	850 x 680 x 1350 mm (33.5" x 26.8" x 53.2")	1150 x 980 x 1650 mm (45.3" x 38.6" x 65.0")
Internal Dimensions (W × D × H)			450 x 450 x 450 mm (17.7" x 17.7" x 17.7")	600 x 600 x 600 mm (23.6" x 23.6" x 23.6")	900 x 900 x 900 mm (35.4" x 35.4" x 35.4")
Material of Construction (MOC)	Interior	A-EG Steel Exterior/Interior with SS304 base (no coved corner)	Customization		
		S1-SS304, 1.5 mm thickness	✓	✓	✓
		S2-SS316L, 1.5 mm thickness	Customization		
	Exterior	A-EG Steel Exterior/Interior with SS304 base (no coved corner)	Customization		
		S1-SS304, 1.5 mm thickness	✓	✓	✓
		S2-SS316L, 1.5 mm thickness	Customization		
	Handle		D-shape handle		
	Chamber Door		Double layer Tempered Glass, 4 mm per layer		
	Chamber Base		50 mm height with coved corner only at the base (only for DPB)		
	Flanges (if required)		A set (2 pcs) of removable flanges		
Operating Controller	Simple rocker switch with Pressure gauge		✓	✓	✓
	Sentinel Gold microprocessor controller with Differential Pressure and Airflow monitoring on display		Customization		
Blower Type***	Open Loop (AC blower)	Closed Loop (EC blower)	✓	✓	✓
Filter Package	Pre-Filter		G4 Pre-filter, Washable non-woven polyester fibers with 90% efficiency		
	Main Filter		H14 HEPA Filter, Efficiency 99.995% at Most Penetrating Particle Size (MPPS) as per EN1822		
Chamber Environment			ISO Class 5 (Grade A) during operation (when blower is ON)		
Door Lock System			Electromagnetic Interlocking Doors		
Surface Roughness	Interior		≤ 1.2 Ra		
	Exterior				
Lighting Level (if with LED lighting)			≥ 500 lux		
Sound Level			≤ 75 dBA		

Notes:

*Straight-through door opening direction should be determined according to the door direction code by Esco. Other straight-through door directions, L-shaped and 3-way door opening dimensions are to be advised upon ordering.

**Without base is applied for DFLH only. DFLH is equipped with thin plate for the base replacement and door drops seal.

***Open Loop is a manual system to control blower speed; Closed Loop is an auto-compensate blower speed to reach the 0.45 m/s air velocity.

Frequently Asked Questions (FAQs)

How do dynamic pass boxes (DPB) differ from dynamic floor laminar hatches (DFLH)?

- Our DPB is a wall-mounted unit, featuring coved corners and a 50 mm height base, can be customized with support stands for ergonomic, easy cleaning, and space-saving convenience. In contrast, the DFLH is a floor-mounted unit with a 1.5 mm stainless steel base plate or a floor-finished level (without a base) option, ensuring optimal accessibility for trolley pass-by scenarios.

What is the recommendation of pass box type whether Dynamic Pass Box (DPB) or Static Pass Box (SPB) to transfer material between the same cleanliness grade areas?

- For the same cleanliness grade rooms, the most suitable and affordable option is SPB. Moreover, DPB is not limited to the application for material transfer of 2 contrast cleanliness grade areas only. Using DPB for the same cleanliness grade areas will enhance the aseptic transfer environment.
- Dynamic pass boxes or dynamic floor laminar hatches (DPB/DFLH) have built in blower and filter and can provide ISO Class 5/ Grade A clean air within the unit. level (without a base) option, ensuring optimal accessibility for trolley pass-by scenarios.

What airflow pattern does DPB/DFLH operate in?

- Standard design of DPB/DFLH runs at a recirculating mode. During operation, room air is drawn to the DPB/DFLH unit and passed through a G4 prefilter, trapping larger particles and increasing the life of the main filter.
- Downflow air is then forced evenly through the H14 knife edge gel sealed filter resulting in a unidirectional stream of clean air projected vertically over the internal chamber.
- The purified air then recirculates via a G4 prefilter before passing through the H14 filter for downflow supply of air.
- Depending on the requirement, it is also possible to design DPB/DFLH to be single pass with air intake and exhaust. This may incur customization costs.

What is the typical efficiency of the filters used for DPB/DFLH?

- G4 prefilter with **90% efficiency**, and HEPA H14 filter with typical efficiency of >99.995% for particle sizes of 0.3 microns.

What is the standard operating sequence of DPB/DFLH?

- When one door is opened, the opposite door will be locked (indicator light is red)
- Once the door is closed, both doors will be locked in a specified amount of time to purge potential contaminants that may have leaked into the chamber. (indicator light is red)
- Once the purging time & purging process is done, both doors will remain closed but will be unlocked. Hence, either door is ready to be pulled open. (indicator light is green)
- In case the unit is customized to have an add-on optional door release button, the doors will always be locked. The only time a door can be pulled open is by pressing the door release button first to unlock a door. Once unlocked, only then can the door be pulled open.

How does DPB/DFLH differ from other pass-through cabinets offered by Esco?

- Esco Pharma has 4 types of pass-through cabinets with varying features and capabilities, these include:

Static pass boxes

- Esco Infinity Pass Boxes (EPB-A and EPB-B), Infinity Transfer Hatches (EPB-S), and Static Pass Boxes (SPB) are situated in between cleanroom or controlled environment to facilitate in the aseptic transfer of material/s in order to mitigate cross-contamination risks.

Dynamic pass boxes and Dynamic Floor Laminar Hatches (DPB/DFLH)

- Unlike the other pass boxes, DPB/DFLH are aseptic architectural systems that can provide ISO Class 5 as per ISO 14644-1 (Grade A as per EU GMP) environment within the chamber. DPB/DFLH are stand-alone units which have built-in pre-filters, HEPA filter and blower integrated within.

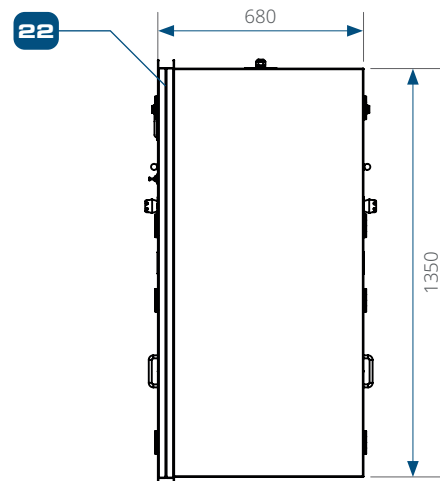
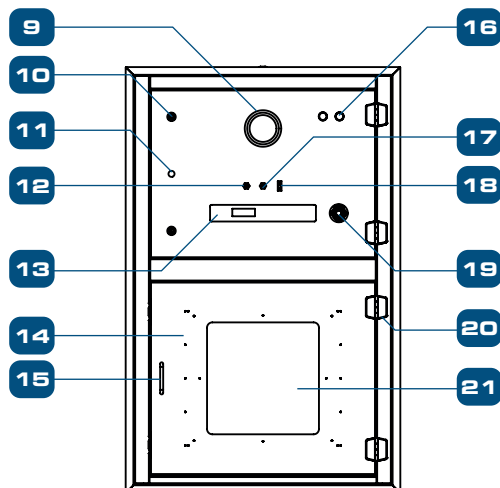
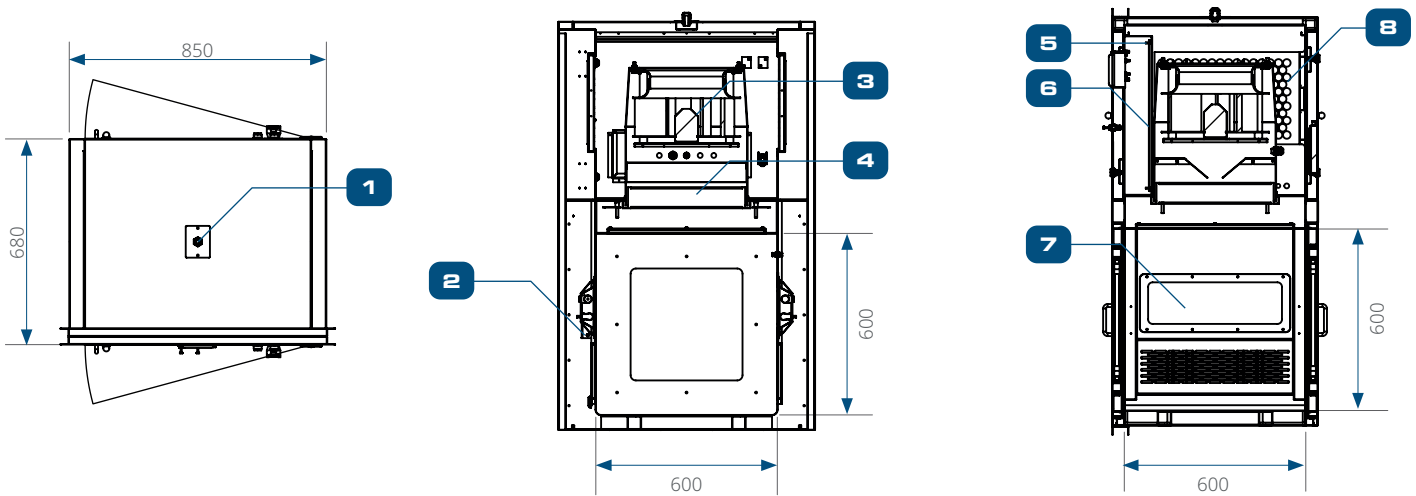
Esco air shower pass boxes (EAS-PB)

- EAS-PB works similarly to DPB/DFLH where air is being provided to the internal chamber of the unit except that for EAS-PB, air is only supplied for a limited duration.
- EAS-PB utilizes high velocity air jets which run at 25 m/s to provide a "scrubbing" effect to particulate matter or surface contaminants which may potentially be present on the material/s being transferred between rooms.

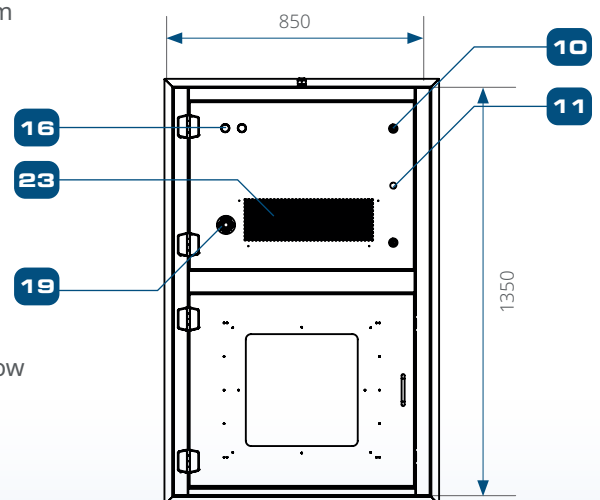
BioPass™ Pass Through

- The design of BioPass™ Pass Through is similar to a dynamic floor laminar hatch (DFLH) wherein both are floor standing units with built in blowers, and is maintained with an ISO Class 5 as per ISO 14644-1 (Grade A as per EU GMP) clean air supply within.
- In contrast to the other pass throughs, Biopass™ is integrated with a hydrogen peroxide (H₂O₂) based bio-decontamination system within and it is designed for passing through of relatively larger equipment/ materials into the chamber.

Engineering Drawing (Model: DPB-S606060-C)

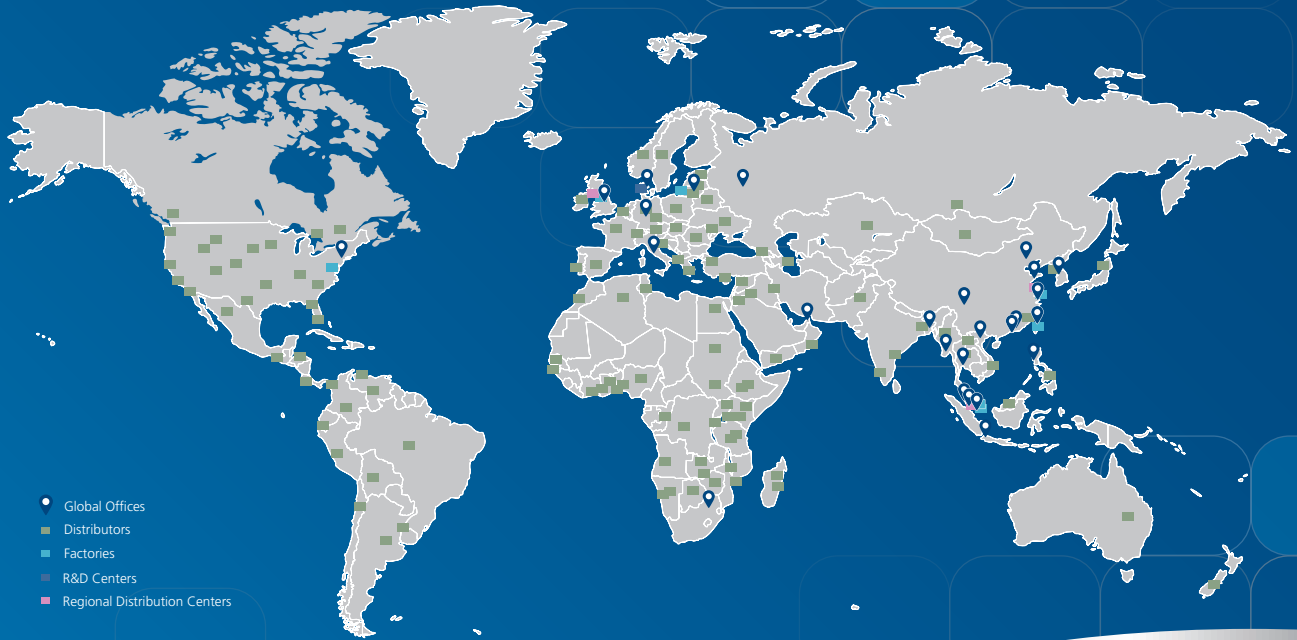


- | | |
|------------------------------|------------------------------------|
| 1. Pre-Wired Cable | 13. Sentinel Microprocessor System |
| 2. Electromagnetic Interlock | 14. Door |
| 3. Blower | 15. D-Shape Handle |
| 4. H14 HEPA Filter | 16. Green & Red Light Indicator |
| 5. Pao Injection Port | 17. Pao Sampling Port |
| 6. Electrical Panel | 18. Power On/Off Switch |
| 7. UV / LED Housing | 19. Emergency Stop |
| 8. G4 Pre-Filter | 20. Hinge |
| 9. Pressure gauge | 21. Tempered Glass Viewing Window |
| 10. Cam Latch | 22. Removable Flange |
| 11. Access Knob | 23. G4 Pre-Filter (Make-Up Air) |
| 12. Spare Port | |



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Air Shower
Aseptic Containment Isolator (ACTI)
Ceiling Laminar Airflow Units
Cleanroom Transfer Hatch
Containment Barrier Isolator (CBI)
Downflow Booth (DFB)
Dynamic Floor Laminar Hatch
Dynamic Pass Box
General Processing Platform Isolator (GPPI)
Laminar Flow Horizontal Trolley
Laminar Flow Vertical Trolley
Pass Box
Ventilated Balance Enclosure (VBE)
Weighing and Dispensing Containment Isolator (WDCI)

Since 1978, Esco has emerged as a leader in the development of controlled environment, laboratory and pharmaceutical equipment solutions. Products sold in more than 100 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.

ESCO

LIFESCIENCES

Esco Micro Pte. Ltd.
19 Changi South Street 1,
Singapore 486779
Tel: +65 65420833
Email: csis.pharma@escolifesciences.com

Esco Technologies, Inc.
2512 Metropolitan Drive, Suite 120 B
Feasterville - Trevoe, PA 19053-6738
Tel: +1 215 322 2155
Email: eti.pharma@escolifesciences.com

Esco GB Ltd
Unit 2 R-evolution @ Gateway 36, Kestrel
Way, Barnsley, S70 5SZ
Tel: +44 (0) 1226 360 799
Email: egb.info@escolifesciences.com

Esco Lifesciences Offices: Bangladesh | China | Denmark | Germany | Hong Kong | Indonesia | Italy | Lithuania | Malaysia | Myanmar | Philippines | Russia | Singapore | South Africa | South Korea | Taiwan | Thailand | UAE | UK | USA | Vietnam



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