ESCO PHARMA

Esco Pharmaceutical Products Catalogue

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Welcome to Esco!

PT Esco Bintan Indonesia
Cert. No: 651333/E

Esco Micro Pte Ltd
Cert. No: 651076

PT Esco Bintan Indonesia
Cert. No: Q2N130383797001

Esco's Vision is to provide enabling technologies for scientific discoveries to make human lives healthier and safer.

Since Esco was founded in 1978, our company has earned a reputation for innovations in laboratory equipment and in the pharmaceutical industry worldwide. Today, Esco has emerged as a market leader in containment, clean air, pharmaceutical, and laboratory equipment technologies with active sales in more than 100 countries and has direct company offices in the top ten geospecific markets.

From our headquarters in Singapore, Esco directs a highly efficient research, product development, manufacturing, and customer service program. We are the only company in the market that has completely configured to export most of what we manufacture. Our many languages and cultures, customs and traditions, and modern business management techniques blend into a single effort focusing on customer service, one customer at a time. As you learn more about Esco, you will understand why *World Class. Worldwide.* is more than just a phrase. It's part of who we are, where we are from, and where we are going.

Watch Esco's Corporate Video!

Research and Development

Esco engineers are located in different technology centers in Singapore, China, Europe, and the USA, managing extensive research and development programs. As we expand globally, so does our growing patent portfolio as Esco products reflect the best contemporary designs in our core competencies:

- Embedded system, sensor and software development and integration
- Containment engineering for biohazards, chemical vapors and hazardous powders
- Decontamination cycle development
- Computational fluid dynamics
- Temperature, humidity, gas and environmental control
- Imaging systems
- Wireless and remote monitoring
- cGMP laboratory design

PRODUCTS AND APPLICATION

Life Sciences Laboratory Equipment

Sample Preparation

- Class I Biological Safety Cabinets
- Class II Type A2 Biological Safety Cabinets
- Class II Type B1 Biological Safety Cabinets
- Class II Type B2 Biological Safety Cabinets
- Class III Biological Safety Cabinets
- Horizontal Laminar Flow Clean Benches
- Vertical Laminar Flow Clean Benches
- Laboratory Animal Research Workstations
- Laboratory Centrifuges

Sample Cultivation

- CO_2 Incubators, Direct Heat Air-Jacketed
- CO_2 Incubators with Cooling System
- CO_2 Incubators with Stainless Steel Exterior
- CO_2 Incubators (Water-Jacketed)
- Laboratory Shakers

Sample Analysis

PCR Thermal Cyclers

- Conventional Thermal Cyclers
- Real-time PCR Systems

PCR Sample Handling

- Microplate Shakers
- PCR Cabinets

Sample Storage & Sample Protection Solutions

- Ultra-low Temperature Freezers
- Lab Refrigerators and Freezers
- Sample Database Management Software
- Intelligent Remote Monitoring Application Protocol
- Remote Monitoring, Datalogging, Programming Software
- Wireless Monitoring System

Chemical Research

- Ductless Fume Hoods
- Laboratory Fume Hoods
- Fume Hood Airflow Monitors
- Exhaust Blowers
- Powder Weighing Balance Enclosures

General Equipment

Laboratory Thermostatic Products

- Laboratory Oven
- Laboratory Incubator
- Refrigerated Incubator
- Natural Convection Incubator

Forensic Sciences

- Evidence Drying Cabinet

Medical / IVF Equipment

Controlled Embryo Handling

- IVF Workstation
  - Stereo Zoom Microscope
- Anti-vibration Table

Safe Embryo Culture

- Benchtop Multi-room Embryo Incubators
- CO_2 Incubators

Innovative Time Lapse Imaging

- Time-Lapse Embryo Incubator

Accurate Quality Control

- CO_2 / O_2 Temperature Validation Unit

Healthcare

Esco Pharma Products

Airflow Containment Products

- Pharmacon® Downflow Booths
- Ceiling Laminar Airflow Units
- Laminar Flow Horizontal Trolley
- Laminar Flow Vertical Trolley
- Enterprise® Laminar Flow Straddle Units
- Garment Storage Cabinet
- Cytotoxic Safety Cabinets

Isolation Containment

- Aseptic Containment Isolator (ACTI)
- Weighing and Dispensing Containment Isolator (WDCI)
- General Processing Platform Isolator (GPPI)
- Containment Barrier Isolator (CBI)
- Turbulent Flow Aseptic (Grade A) Isolator (TFAI)
- Isoclean® Healthcare Platform Isolator (HPI)
- Streamline® Compounding Isolators (SCI)
- Technetium Dispensing Isolators
- Blood Cell Labeling Isolators
- Open and Closed Restricted Barrier Access Systems (RABS)

Cross Contamination Facility Integrated Barrier

- Cleanroom Air Showers
- Infinity® Air Shower Pass Box
- Infinity® Cleanroom Transfer Hatch
- Infinity® Pass Boxes
- Soft Capsule® Soft Wall Cleanroom
- Dynamic Passboxes and Dynamic Floor Laminar Hatches
- Esco BioPass™ Pass Through

Ventilation Containment

- Ventilated Balance Enclosure
- Extraction Hoods/Enclosures
- Local Exhaust Ventilation Systems

VacciXcell Products

Bioreactors and Fermenters

- CelCradle™
- TideCell®
- StirCradle™
- StirCradle™-Pro
- VacciXcell™ Hybrid bioreactor

Cell Culture Monitoring, Media and Consumables

- Super Plus™
- Plus™ Vero
- Plus™ MDCK
- Plus™ MDCK II
- BioNOC™ II macrocarriers
- GlucCell® Glucose Monitoring System
- CVD Kit

Filling Line Equipment

- Asepticell®
- Traditional Filling Line

Integrated Solutions

- Cell Processing Isolator
- Cell Processing Center

TaPestle Rx Products and Services

PRODUCTS

Pharmacy Automation and Compounding Supply

- Compounding Pharmacy Isolators (SCI, HPI, CBI, GPPI)
- Safety Cabinets and Enclosures (Class II BSC, VBE, LFC)
- Radiopharmacy Hoods and Isolators
- Automated IV Compounding System*
- Aseptic Filling Systems

**Southeast Asian Markets only*

Healthcare and Laboratory Construction Components

- Prefabricated Walls (Airecell®)
- Prefabricated Containerized Facility (Prefab™)
- Series Ceiling Systems
- Hygienic/Hermetic Door Systems
- Surgical Scrub Sinks
- Vinyl Tiles and Epoxy
- Laboratory Fit-outs
  - Worktops
  - Frames
  - Specialty Storage cabinets
  - Service Spines & Reagent Shelving

SERVICES

- Conceptualization
- Planning
- Procurement
- Installation

FACILITY DESIGNS

- Process Architecture
- Biocontainment/Biosafety
- Pharmacy Compounding/Nuclear Medicine
- Cleanroom, Vaccine and Cell Processing
- Laboratory
- Containerized Facility
- ART/IVF
- Cold Chain

PHARMA PRODUCT RESEARCH AND DEVELOPMENT

Esco Pharma R&D is carried out entirely in our new dedicated facility in Loretta, Pennsylvania, USA.

Our Esco Pharma dedicated R&D engineers have a combined 30 years of experience in systems design of a variety of containment and aseptic process equipment. Compared to industry averages, Esco invests a significant percentage of annual revenues in research and development. As a result of our investment with continuous feedback and idea evaluation among our research, global sales, marketing, purchasing, and manufacturing teams, Esco products had become the best contemporary designs in terms of performance, ergonomics, and customer satisfaction.

MANUFACTURING

Quality, Cost, Productivity, Effectiveness, Timeliness

Esco's manufacturing advantage stems from our extensive degree of vertical integration, enabled by our world-leading throughput. All processes, with a few exceptions, are performed in-house. This allows us to achieve quality and reliability that is truly world-class. Our plant capabilities include:

- Incoming materials inspection and warehousing.
- CNC-controlled sheet metal fabrication and welding.
- Environment-friendly powder coating lines.
- Electromechanical final product assembly.
- Electrical / electronics sub-assembly.
- Multi-step electrical and physical performance testing.
- Independent quality control at each step in the production cycle.
- Microbiology, chemistry, containment test labs.

Esco's focus on quality and timeliness is relentless. Continuous improvement is a mantra. Cross functional teams from Esco Production, R&D, Quality Assurance, Senior Management, are regularly assembled to review and implement areas for improvement.

Pharmacon™

Downflow Booth

Introduction

Downflow Booths provide operator, process and / or product protection by utilizing HEPA filtered unidirectional laminar downflow to maintain an ISO Class 5 environment at rest within the work zone and capture particulates during open handling processes.

The standard Esco DFB G2 has over 420 possible dimensional models and approximately 3.5 million possible system configurations ensuring that Esco can provide a standard solution to fit your specific process and facility requirements. Should a standard option not fit your requirements, Esco can offer a customized solution.

The DFB G2 is designed such that through the different configurations it can be applied; but not limited to, the following markets:

- Pharmaceutical
- Cosmetic
- Nutraceutical
- Food
- Biological
- Animal
- Robotic
- Electronic

Basic Principles

- Laminar airflow velocity of 0.45m/s ± 20% (89 ft/min) measured 150mm (6") from terminal HEPA filter or diffuser face.
- Containment Performance Target (CPT's) ≤ 100 µg/m³ over an 8 hour Time Weighted Average (TWA) when used with proper operator techniques. CPT's of ≤ 10 µg/m³ over an 8 hour TWA are achievable with the use of a high containment screen.
- ISO Class 5 work space environment at rest conditions
- Enhanced cGMP practices
- Cross contamination control through negative and positive pressure environment option.

Standard Features

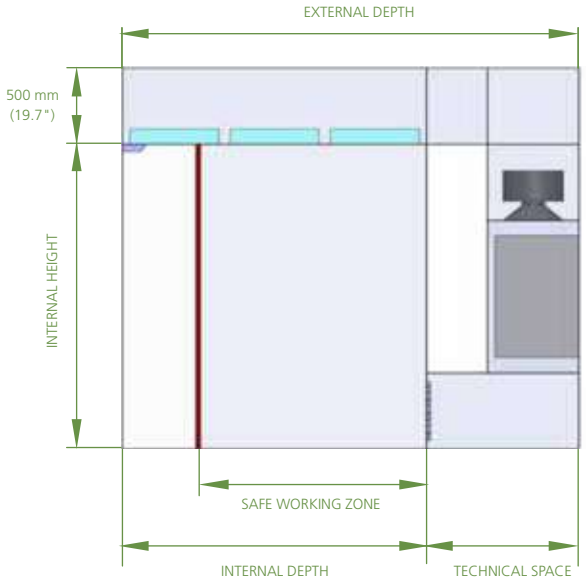
- cGMP modular design with minimized joints and seams
- Six different configurations are available utilizing combinations of G4, F8, Carbon, H13, H14 and PLF screens.
- Gel Seal HEPA filters
- Integrated filter challenge ports

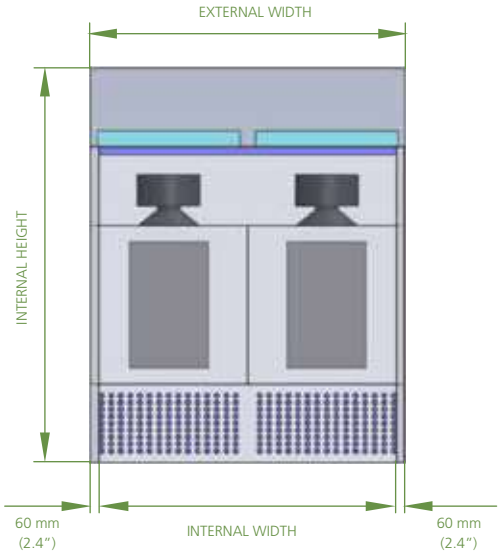
Key Features

- Safe Change filter configurations are available for potent products, selectable to change either internally or externally from the booth.
- Open loop or closed loop fan control configurations.
- Recirculating or single pass airflow configurations allowing use for powder or solvent applications.
- Optional cooling coil systems to provide operator comfort.
- PVC strip curtains available
- Energy efficient EC fan units available to minimize operating costs.
- Optional hazardous area configurations to meet ATEX and NEC 505 requirements.
- Multiple control system options (HMI, Push Button or Sentinel™ Gold Microprocessor interfaces).
- Modular design allows future system adjustment without full booth replacement.

GENERAL SPECIFICATIONS

Configurations	Options	Model		
		0.3 m Back Stack	0.6 m Back Stack	1.0 m Back Stack
Series	Option SC: Safe Change	NA	NA	✓
	Option SCNB: Safe Change No-Bag	NA	NA	✓
	Option ST: Standard	✓	✓	NA
Explosive Rating	Option SA : Safe Area	✓	✓	✓
	Option ED: Explosive Dust	NA	✓	✓
	Option EG: Explosive Gas	NA	✓	✓
Dimensional Option	Internal Height Options (m)	2.1, 2.5	2.1, 2.5	2.1, 2.5
	External Width Options (m)	1.6, 1.8, 2.0, 2.4, 2.6, 2.8,	1.6, 1.8, 2.0, 2.4, 2.6, 2.8,	1.6, 1.8, 2.0, 2.4, 2.6, 2.8,
		3.0, 3.2, 3.4, 3.6, 3.8, 4.0,	3.0, 3.2, 3.4, 3.6, 3.8, 4.0,	3.0, 3.2, 3.4, 3.6, 3.8, 4.0,
		4.2, 4.4, 4.6, 4.8, 5.0	4.2, 4.4, 4.6, 4.8, 5.0	4.2, 4.4, 4.6, 4.8, 5.0
	Internal Depth Options (m)	0.8, 1.2, 1.6	0.8, 1.2, 1.6, 2.0, 2.4	0.8, 1.2, 1.6, 2.0, 2.4, 2.8
Filter Arrangement Options	Option A - G4,F8,H13,H14,PLF	NA	NA	✓
	Option B - G4,F8,H13,H14	NA	NA	✓
	Option C - G4,F8,H13,PLF	NA	NA	✓
	Option D - G4,F8,H14	NA	✓	NA
	Option E - Carbon,H14	✓	NA	NA
	Option F - Front	✓	NA	NA
Fan / Filter Access	Option A - Internal to Booth	✓	✓	✓
	Option B - External Area	NA	NA	✓
Airflow Arrangement	Option R - Recirculating	✓	✓	✓
	Option S - Single Pass	NA	NA	✓
Bleed Position	Option T - Top	NA	NA	✓
	Option F - Front	✓	✓	✓
M.O.C. Options	Option P: Ceiling Plenum	A: SS 316, B: SS 304, C: White P.C. EG Steel	A: SS 316, B: SS 304, C: White P.C. EG Steel	A: SS 316, B: SS 304, C: White P.C. EG Steel
	Option Q: Side Panels, Rear Wall	A: SS 316, B: SS 304, C: White P.C. EG Steel	A: SS 316, B: SS 304, C: White P.C. EG Steel	A: SS 316, B: SS 304, C: White P.C. EG Steel
	Option R: Filter Housings, Fan Boxes, Spacer (if present) & Transition	A: SS 316, B: SS 304, C: White P.C. EG Steel	A: SS 316, B: SS 304, C: White P.C. EG Steel	A: SS 316, B: SS 304, C: White P.C. EG Steel
	Option S: Plinth	A: SS 316, B: SS 304, C: White P.C. EG Steel	A: SS 316, B: SS 304, C: White P.C. EG Steel	A: SS 316, B: SS 304, C: White P.C. EG Steel
	Option T: Exhaust Grilles	A: SS 316, B: SS 304, C: White P.C. EG Steel	A: SS 316, B: SS 304, C: White P.C. EG Steel	A: SS 316, B: SS 304, C: White P.C. EG Steel
	Option U: Exterior Side Panels	A: SS 316, B: SS 304, C: White P.C. EG Steel	A: SS 316, B: SS 304, C: White P.C. EG Steel	A: SS 316, B: SS 304, C: White P.C. EG Steel
PVC Curtains	Option T - Top	NA	NA	✓
	Option F - Front	✓	✓	✓



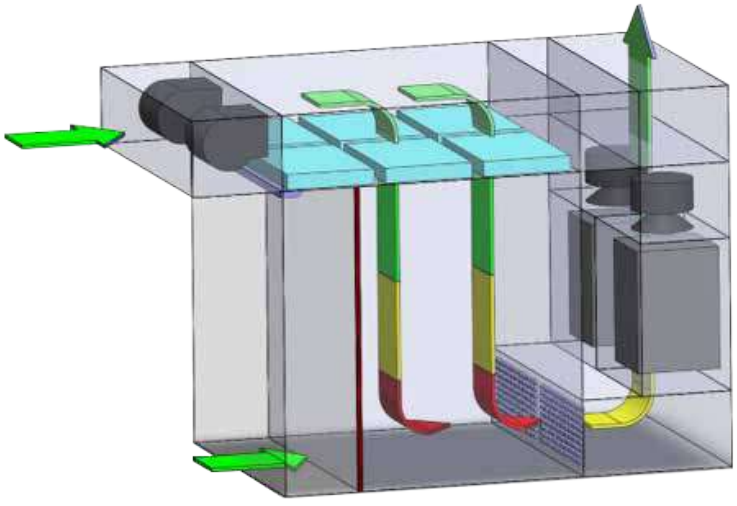


Configurations	Options	Model		
		0.3 m Back Stack	0.6 m Back Stack	1.0 m Back Stack
LOP Location	Option R - Right Panel	✓	✓	✓
	Option L - Left Panel	✓	✓	✓
	Option F - Front Panel	✓	✓	✓
Supply Voltage	Option A - 220V-240V 50 Hz 1Ph	✓	NA	NA
	Option B - 380V-400V 50 Hz 3 Ph	NA	✓	✓
	Option C - 208 V 60 Hz 3 Ph	NA	✓	NA
	Option D - 460V-480V 60 Hz 3 Ph	NA	✓	✓
	Option E - 110V-120V 60 Hz 1Ph	✓	NA	NA
MCP Location Panel	Option OR - Onboard Right Access	✓	✓	✓
	Option OL - Onboard Left Access	✓	✓	✓
	Option OF - Onboard Front Access	✓	NA	NA
	Option RM - Remote Mounted	✓	✓	✓
Control Type	PDI/ PB/ PDT/ PLC - Closed Loop Allen Bradley	NA	✓	✓
	PDI/ PB/ PDT/ PLC - Closed Loop Siemens	NA	✓	✓
	HMI/ PB/ PDT/ PLC - Closed Loop Allen Bradley	NA	✓	✓
	HMI/ PB/ PDT/ PLC - Closed Loop Siemens	NA	✓	✓
	Sentinel PDI/PDT - Open Loop	✓	NA	NA
Cooling Type	Option NIL - No Cooling	NA	✓	✓
	Option CC - Chilled Water	NA	✓	✓
	Option DX - Direct Expansion	NA	✓	✓
	Option GL - Glycol	NA	✓	✓

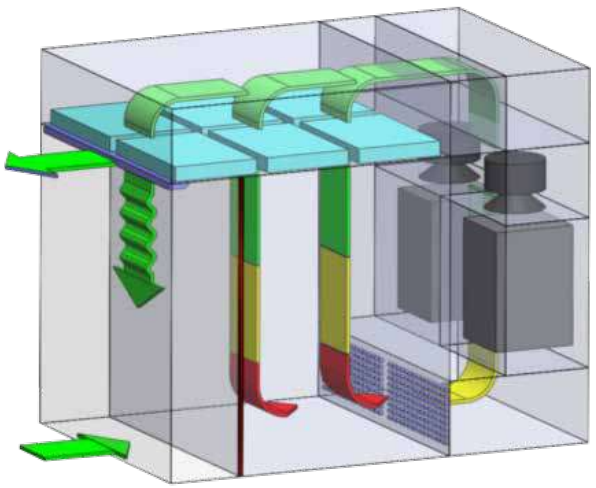
Mechanical	Many standard offering to fit our client's needs, reducing project start-up and fabrication time resulting in better lead time and deliveries.
	Modular design provides the option of increasing / decreasing booth size on-site without purchasing a new piece of equipment.
Controls	DFB control system is pre-programmed for all possible options making DFB easily adaptable to suit changing customer needs.
	Control system offerings (Siemens, AB, Sentinel Controller) provide options for international compliance and true closed loop control
Sales	Automated DFB G2 sales tool allows instant quoting and drawing generation to greatly reduce the time between Request for Quote (RFQ) and quote submittal.

Airflow Schematic

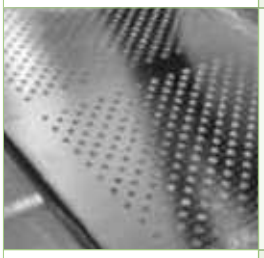
Single Pass



Recirculating



Clean Air Contaminated Air

Options			
	High Containment Screen (1 or 5D)		Material Handling
	Benches; SST or Granite Tables, W x D, Fixed to Booth or Stand Alone		Vision Panel
	Computer Monitor Mounting Screen		Sound Insulation
	Airlock		Ethernet & RS-232 Pass Through Connections
	UV Light Guards		Bumper Rails
	Two Additional Electrical Outlets		Temperature and RH Local Display
	Pass Through		Drum Tipper
	Side Wall Fire Sprinkler Penetration		

CLAF

Ceiling Laminar Airflow

Introduction

Ceiling Laminar Airflows are customizable units that are:

- Utilized as open restricted access barriers over filling and capping machines.
- Stand alone units mounted via eye bolts and drop rods over specific applications.
- Stand alone units mounted over mobile stands for mobile aseptic zones.

Basic Principles

- Room air is drawn pre-filtered via an EU6 prefilter before entering through the perforated diffuser into supply plenum.
- A special baffle system that channels the airflow through the gel-sealed HEPA filters as downflow supply creating an aseptic work zone with low noise.

Key Features

- Easy to clean
- HEPA/ULPA gel-sealed design better than the conventional gasket-sealed design.
- Sentinel™ silver micrprocessor control with audio/visual alarms for downflow velocity.
- Zoned magnehelic gauges for filter loading.
- Energy efficient teardrop lightings positioned away from downflow.
- Emergency stop

Optional Features

- Remote mounted main control panel
- Splashproof electrical outlets
- PVC Curtains

Guide to Models

CLAF-PC-1 _ _ _ -AC-H13

Product Code	Materials of Construction	Electrical Code	External Width	External Dimension	External Height	Fan	Filter Type
CLAF	**PC** - Powder coated EG Steel **S1** - Stainless Steel 304 **S2** - Stainless Steel 316 L	**1** - 220-240 VAC 50/60 Hz **2** - 110-130 VAC 50/60 Hz **3** - 100-110 VAC 50/60 Hz	TBD*	TBD*	TBD*	AC EC	H13 H14 U15 Others

** To be discussed according to customers' preference*

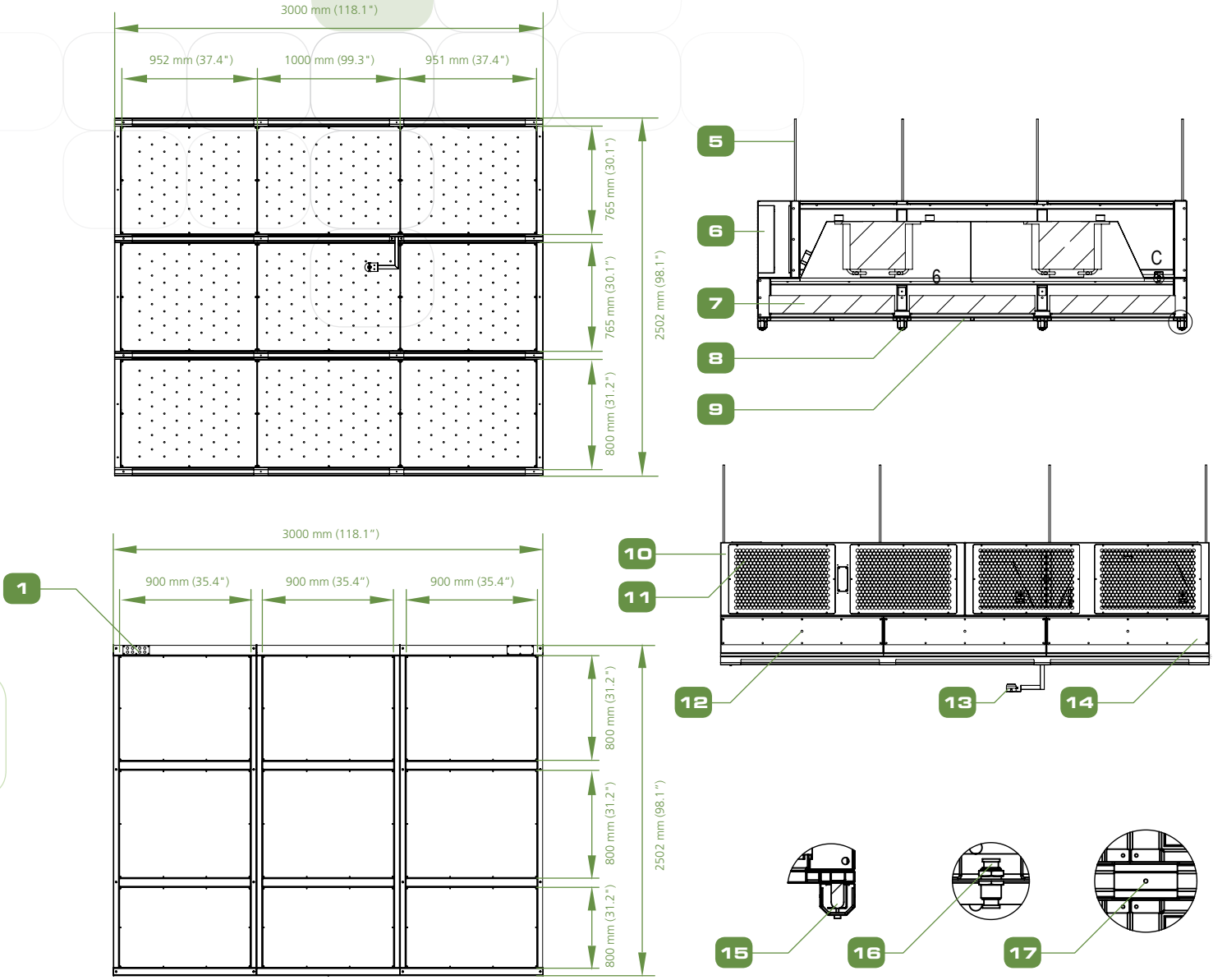
Electrical Supply Options

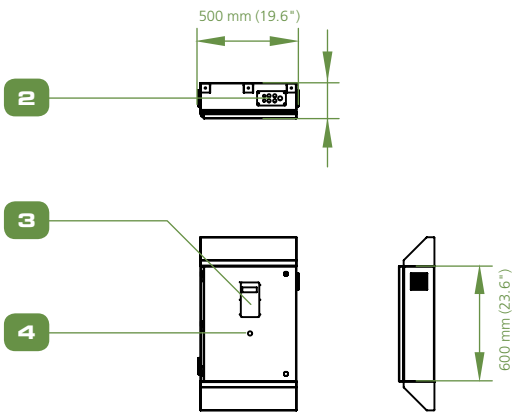
1 = 220-240 VAC 50 Hz

2 = 110-130 VAC 50 / 60 Hz

3 = 220-240 VAC 60 Hz

ENGINEERING DRAWING (MODEL CLAF)





1. *Plenum Tubing and Power Cable Inlet*
2. *Local Operationg Panel (LOP) Tubing and Cable Inlet*
3. *Esco Sentinel™ Silver Microprocessor Controller*
4. *Emergency Stop*
5. *Stainless Steel Threaded Rod*
6. *EC Blowers*
7. *H14 HEPA Filters*
8. *T5 LED Lights*
9. *Perforated Diffusers*
10. *Stainless Steel Plenum*
11. *Stainless Steel Exhaust Grille*
12. *PAO Sampling Port*
13. *Airflow Sensor*
14. *Stainless Steel Cover Filter Housing*
15. *Lamp Housing*
16. *Upstream Port*
17. *Downstream Port*

LFHT/LFVT

Laminar Flow Horizontal Trolley
Laminar Flow Vertical Trolley

Introduction

Laminar Flow Horizontal or Vertical Trolleys provide enhanced aseptic work zones by utilizing uni-directional airflow to purge the working environment from contaminants, allowing aseptic transfer of materials throughout lightings positioned away plant.

Laminar Trolleys are customizable units that can provide:

- Product aseptic zones with single pass or recirculatory airflow.
- Operator or environment protection (only available in recirculatory airflow) and in negative pressure with respect to ambient.
- Stand alone units mounted over mobile stands for mobile aseptic zones.

Applications

- Transfer of lyophilized vials to and from freeze dryers
- Transfer of process skids or feed hoppers
- Aseptic workzones

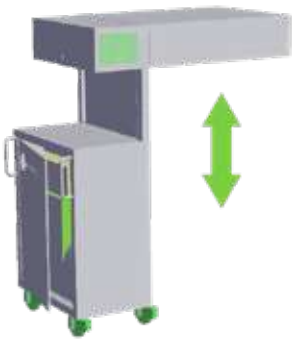
Basic Principles

- Room air is drawn via an EU6 prefilter before entering perforated diffuser into the supply plenum.
- Airflow passes through a baffle system prior to gel-sealed HEPA filtration, creating a low decibel aseptic work zone for operator comfort.

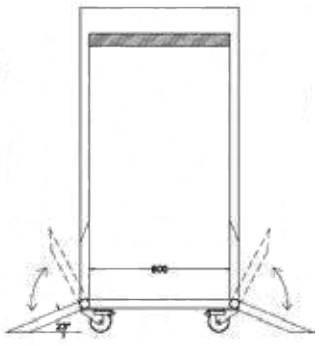
Standard Features

- Easy to clean design with single welded construction.
- Tempered glass doors
- Stainless steel hinges
- HEPA/ULPA knife edge gel-sealed design better than conventional gasket sealed.
- Sentinel™ Silver microprocessor control with audio/visual alarms for downflow velocity.
- Zoned magnehelic gauges for filter loading
- Polyurethane (PU) wheels
- Special food grade FDA approved air tight seal
- 10 mm glass windows with plastic latches
- Magnehelic Differential Pressure Gauges for monitoring filter lifespan.
- Battery for onboard power when not connected to main building supply.
- Emergency stop

Optional Configurations



Hydraulic height adjustable



Hydraulic Ramp

Options

- Hydraulic adjustable stands
- Electromagnetic interlocking doors
- Splashproof electrical outlets
- PVC Curtains
- Main body is electrogalvanized steel with Isocide™ antimicrobial coating

Airflow Patterns

- Single Pass
- Recirculatory

Guide to Models

LFVT - A-EG - __ __ - S-P-2

Product Code	MOC-	Internal Width	Internal Dimension	Internal Height	Airflow Pattern	Airflow Pressure	Battery Life (Hrs)
V- Vertical airflow	**A-EG** Steel Exterior/Interior with SS304 base.	TBD	TBD	TBD	**S**-Single Pass **R**-Recirculatory	**P**-Positive **N**-Negative	Two hours (standard)
H-Horizontal airlow	**B-SS** Full SS304 right angle corners.	TBD	TBD	TBD			

** TBD - To be discussed according to the customers' preference.*

Laminar Flow Straddle Units, Single and Double

Main Features

- Quiet, reliable, permanently lubricated direct drive centrifugal blowers.
- Long-life ULPA filter for supply airflow.
- Sterile work zone environment created for optimum product protection.
- Isocide™ antimicrobial coating on all painted surfaces minimizes contamination.
- Available in single, double, 1.2 and 1.8 meter (4′ and 6′) models.
- Multiple units may be connected for production line applications.
- Units are floor mounted with stainless steel work surfaces isolated from the main frame to reduce vibration.

Esco Experience

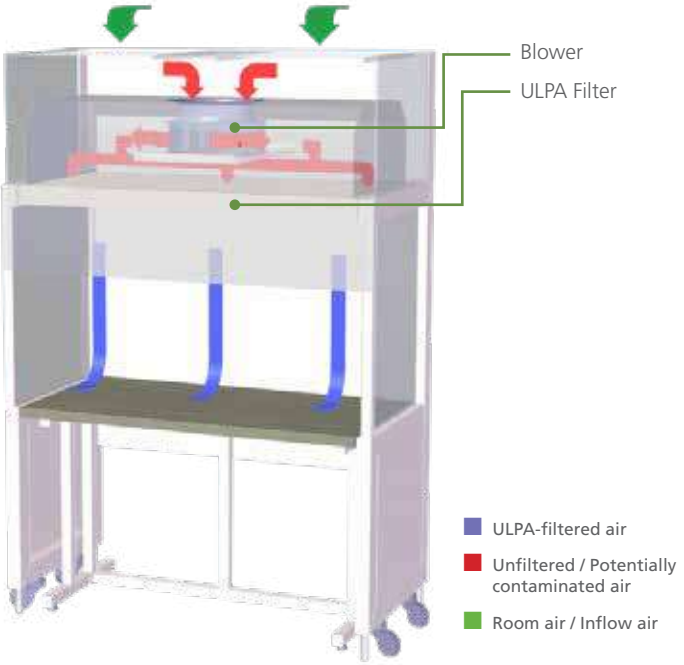
Esco is a leader in premium laminar flow clean benches for the global industrial and life sciences market. Since 1978, Esco has installed tens of thousands of laminar flow clean benches providing reliable protection for samples and work processes for a multitude of applications.

Esco laminar flow clean benches are the premium selection for the discerning purchaser, offering a combination of value, high quality construction, low operating noise levels, and a wide product range to suit all budgets.

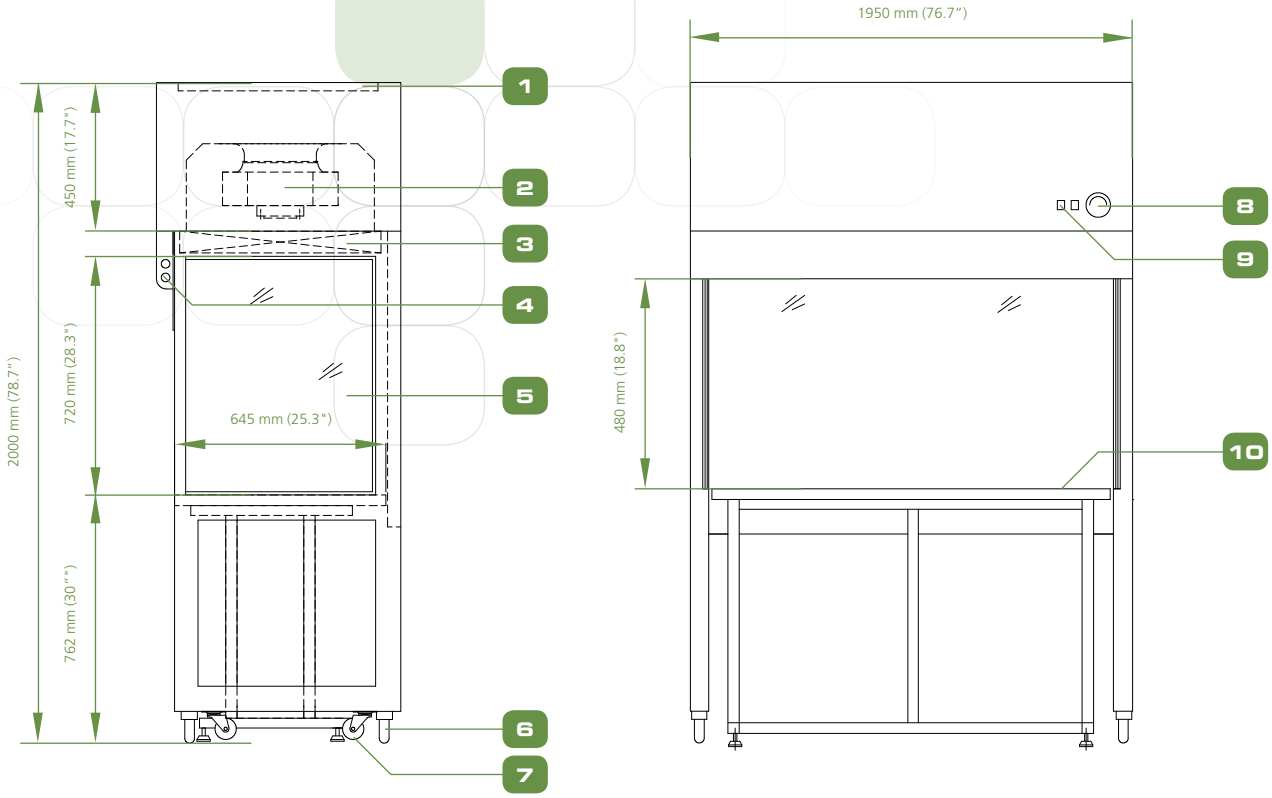
Esco Enterprise Laminar Flow Straddle Units are designed for larger-scale process protection in industrial applications typically requiring multiple units connected in an assembly line configuration. They may be placed within an ISO Class 8 cleanroom to provide an ultra-clean environment directly at the process level, without the initial and operating costs associated with a full-sized ISO Class 3 or 4 cleanroom.

Vertical Laminar Flow Straddle Unit Airflow Diagram

- *During operation, room air is drawn through the top of the straddle unit via a washable polyurethane prefilter with 20% arrestance, trapping larger particles and increasing the life of the main filter.*
- *The air is then forced evenly through the ULPA filter with > 99.999% efficiency, resulting in a unidirectional stream of clean air projected vertically over the internal work zone. All airborne contaminants are flushed and diluted, resulting in a particulate-free work environment.*
- *The purified air then leaves the storage area across the entire open front of the straddle unit.*
- *A nominal filter face velocity of 0.45 m/s (90 fpm) ensures that there is a sufficient number of air changes within the enclosed area of the straddle unit in order to maintain cleanliness.*



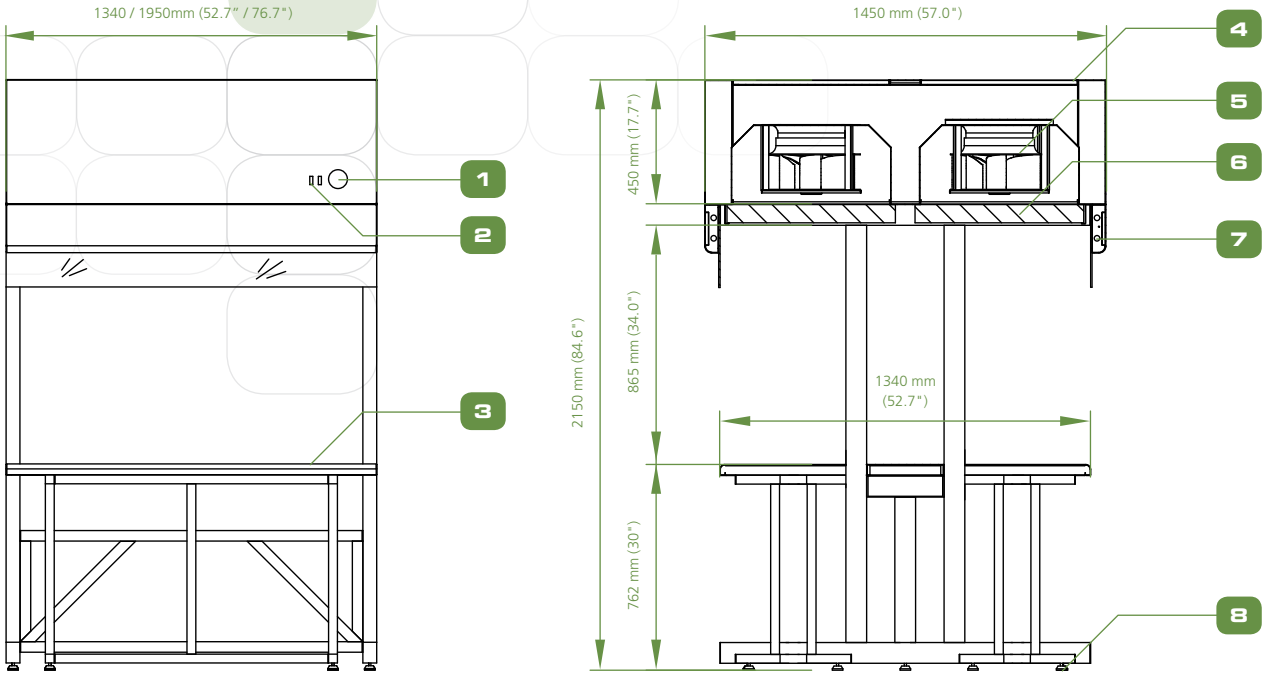
ENGINEERING DRAWING (MODEL: ESUS-4)



1. *Prefilter*
2. *ebm-papst® Blower*
3. *ULPA filter*
4. *Fluorescent Lamp*
5. *Acrylic Side Wall*
6. *Leveling Feet*
7. *Caster Wheel*
8. *Pressure Gauge*
9. *Operating Switch*
10. *Isolated Stainless Steel Worktop*

General Specifications, Enterprise Laminar Flow Single Straddle Unit			
Model		**EQU/04-ESUS**	**EQU/06-ESUS**
Nominal Size		1.2 meter (4')	1.8 meter (6')
External Dimensions (W x D x H)		1340 x 740 x 2000 mm (52.7" x 29.1" x 78.7")	1950 x 740 x 2000 mm (76.7" x 29.1" x 78.7")
Internal Work Area, Dimensions (W x D x H)		1220 x 645 x 720 mm (48" x 25.4" x 28.3")	1830 x 645 x 720 mm (72" x 25.4" x 28.3")
Usable Work Zone		1220 x 645 mm (48.0" x 25.4")	1830 x 645 (72.0"x 25.4")
Initial Airflow Velocity		Average of 0.45 m/s or 90 fpm (+/- 20%)	
Air Volume		1205 m^3/h	1810 m^3/h
Prefilter		Washable non-woven polyester fibers with 90% arrestance and 20% efficiency	
HEPA Filter Typical Efficiency		99.99% at partical size 0.3 µm	
Sound Emission Per IEST-RP-CC002.2		62 dBA	63.5 dBA
Fluorescent Lamp Intensity At Zero Ambient		≥ 1000 lux (≥ 93 foot-candles)	
Cabinet Construction	Main Body	1.5 mm (0.06") electro-galvanised steel with white oven-baked epoxy-polyester Isocide™ antimicrobial powder coated finish	
	Work Zone	1.2mm (0.05") 18 gauge stainless steel grade 304	
Net Weight		220 kg (484 lbs)	300 kg (660 lbs)
Shipping Weight		270 kg (594 lbs)	360 kg (792 lbs)
Shipping Dimensions, Maximum (W x D x H)		1500 x 900 x 2200 mm (59" x 35.4" x 86.6")	2100 x 900 x 2200 mm (82.6" x 35.4" x 86.6")
Electrical	220-240V, AC, 50Hz, 1ø	EQU/04-ESUS	EQU/06-ESUS
	Cabinet Full Load Amps (FLA)	1.8 A	4 A
	Cabinet Nominal Power	378 W	628 W
	Cabinet BTU	1290	2143

ENGINEERING DRAWING (MODEL: ESUD-4)



1. *Operating Switch*
2. *Pressure gauge*
3. *Isolated Stainless Steel Table*
4. *Prefilter*
5. *ebm-papst® Blower*
6. *ULPA Filter*
7. *Fluorescent Lamp*
8. *Leveling feet*

General Specifications, Enterprise Laminar Flow Double Straddle Unit			
Model		**EQU/04-ESUD**	**EQU/06-ESUD**
Nominal Size		1.2 meter (4')	1.8 meter (6')
External Dimensions (W x D x H)		1340 x 1450 x 2150 mm (52.7" x 57.1" x 84.6")	1950 x 1450 x 2150 mm (76.7" x 57.1" x 84.6")
Internal Work Area, Dimensions (W x D x H)		1340 x 1340 x 865 mm (52.8" x 52.8" x 34")	1950 x 1340 x 865 mm (76.8" x 52.8" x 34")
Usable Work Zone		1340 x 1340 mm (52.8" x 52.8")	1950 x 1340 mm (76.8" x 52.8")
Initial Airflow Velocity		Average of 0.45 m/s or 90 fpm (+/- 20%)	
Air Volume		2410 m^3/h	3620 m^3/h
Prefilter		Washable non-woven polyester fibers with 90% arrestance and 20% efficiency	
HEPA Filter Typical Efficiency		99.99% at partical size 0.3 µm	
Sound Emission Per IEST-RP-CC002.2		63.5 dBA	65 dBA
Fluorescent Lamp Intensity At Zero Ambient		≥ 1000 lux (≥ 93 foot-candles)	
Cabinet Construction	Main Body	1.5 mm (0.06") electro-galvanised steel with white oven-baked epoxy-polyester Isocide™ antimicrobial powder coated finish	
	Work Zone	1.2mm (0.05") 18 gauge stainless steel grade 304	
Net Weight		420 kg (924 lbs)	600 kg (1320 lbs)
Shipping Weight		500 kg (1102 lbs)	700 kg (1543 lbs)
Shipping Dimensions, Maximum (W x D x H)		1500 x 1600 x 2200 mm (59" x 63" x 86.6")	2100 x 1600 x 2200 mm (82.6" x 63" x 86.6")
Electrical	220-240V, AC, 50Hz, 1ø	EQU/04-ESUD	EQU/06-ESUD
	Cabinet Full Load Amps (FLA)	3.6 A	8 A
	Cabinet Nominal Power	756 W	1256 W
	Cabinet BTU	2580	4286

Cytoculture®

Cytotoxic Safety Cabinet

Introduction

The Esco Cytoculture® Cytotoxic Safety Cabinet is the premium solution for cytotoxic/antineoplastic drug processing, providing the highest level of patient, operator and environmental protection. This revolutionary product builds on Esco's experience of more than 20 years as a global leader in biological safety containment technology.

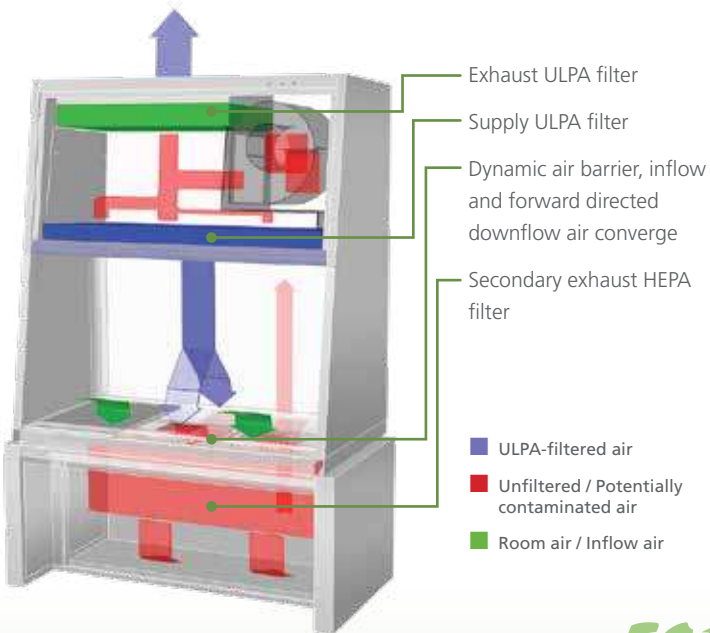
The unique demands of handling and preparing cytotoxic drugs for chemotherapy use require a specialized cabinet. As cytotoxic drugs cannot be inactivated by chemical decontamination, Class II biosafety cabinets should not be used.

Main Features

- Sentinel™ Silver Microprocessor controller supervises all functions.
- Meets the requirements of the European Std. EN 12469 for microbiological safety cabinets.
- Provides you with the highest level of operator safety to protect you and your personnel from the hazardous compounds used in cytotoxic drugs.
- Motorized sash helps simplify transfer of materials into the work zone.
- Highest level of protection within the work zone for patient safety and product cleanliness.
- Esco Isocide™ antimicrobial coating on all painted surfaces.
- Dual long-life ULPA filters for supply and exhaust airflow.
- Additional secondary HEPA exhaust filter.
- Spacious knee room maximizes operator comfort, 245mm (9.6") inward
- Available in 1.2 and 1.8 m models (4' and 6').

Cytoculture® Cytotoxic Safety Cabinet Airflow

- *Air enters the cabinet through perforations located along the front of the work zone before mixing with used downflow air in a common chamber below the work zone (this inflow air does not mix with the filtered downflow air in the cabinets main chamber). The mixed air then passes through the HEPA filter located beneath the work zone.*
- *The HEPA filtered air then passes through internal ducting in the back wall of the cabinet to a common air plenum where 35% is exhausted through the ULPA exhaust filter and 65% is forced evenly through the ULPA supply filter. This sterilized air then passes through the main chamber as downflow air, flushing all contaminates from the work zone.*
- *At the work surface the downflow airstream splits and enters the common air chamber beneath the work zone through perforations located at the front and back of the main chamber, from where the cycle is repeated.*



General Specifications, Cytoculture® Cytotoxic Safety Cabinets			
Model		CYT-4A_	CYT-6A_
Nominal Size		1.2 meter (4')	1.8 meter (6')
External Dimensions (W x D x H)		1420 x 780 x 2190 mm (55.9" x 30.7" x 86.2")	2030 x 780 x 2190 mm (79.9" x 30.7" x 86.2")
Internal Work Area, Dimensions (W x D x H)		1270 x 603 x 670 mm (50.0" x 23.7" x 26.4")	1870 x 603 x 670 mm (73.6" x 23.7" x 26.4")
Internal Work Area, Space		0.60 m^2 (6.4 sq.ft.)	0.90 m^2 (9.7 sq.ft.)
Average Airflow Velocity	Inflow	0.45 m/s (90 fpm)	
	Downflow	0.30 m/s (60 fpm)	
Exhaust Volume with Thimble Duct	CBV Exhaust Volume	611 m^3/h (360 cfm)	931 m^3/h (548 cfm)
	Static Pressure at CBV Exhaust Volume	39 Pa / 0.15 in H_2O	63 Pa / 0.25 in H_2O
ULPA Filter Typical Efficiency		99.9995% for particle size between 0.1 to 0.2 microns	
Sound Emission Per EN 12469*		61 dBA	63 dBA
Fluorescent Light Intensity At Zero Ambient		> 1300 lux (> 121 foot-candles)	> 1200 lux (> 111 foot-candles)
Cabinet Construction		1.5 mm (0.06") 16 gauge electrogalvanized steel with Isocide white oven-baked epoxy powder-coating	
Net Weight		383 kg (844 lbs)	500 kg (1102 lbs)
Shipping Weight		415 kg (915 lbs)	578 kg (1274 lbs)
Shipping Dimensions, Maximum (W x D x H)		1560 x 930 x 2230 mm (61.4" x 36.6" x 87.8")	2170 x 930 x 2230 mm (85.4" x 36.6" x 87.8")
Shipping Volume, Maximum		3.26 m^3 (115 ft^3)	4.49 m^3 (158.6 ft^3)
Electrical**		Model	Voltage
		CYT-4A1, CYT-6A1	220-240 VAC, 50Hz, 1 phase
		CYT-4A2, CYT-6A2	110-120 VAC, 60Hz, 1 phase
		CYT-4A3, CYT-6A3	220-240 VAC, 60Hz, 1 phase

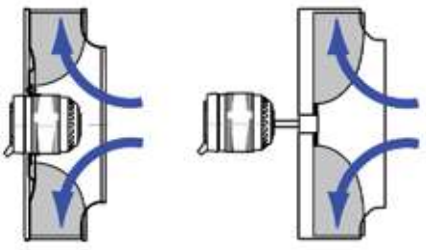
** Noise as measured in open field / anechoic chamber.*
*** Additional voltages may be available; contact Esco for ordering information.*

Customized to Meet Your Specific Needs

Esco CYT cabinets can be configured to meet unique needs including:

- Lead shielding for nuclear medicine applications.
- An optional carbon filter impregnated with KI (potassium iodide) in place of the additional HEPA filter (this configuration does not protect service technicians when changing contaminated filters).

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



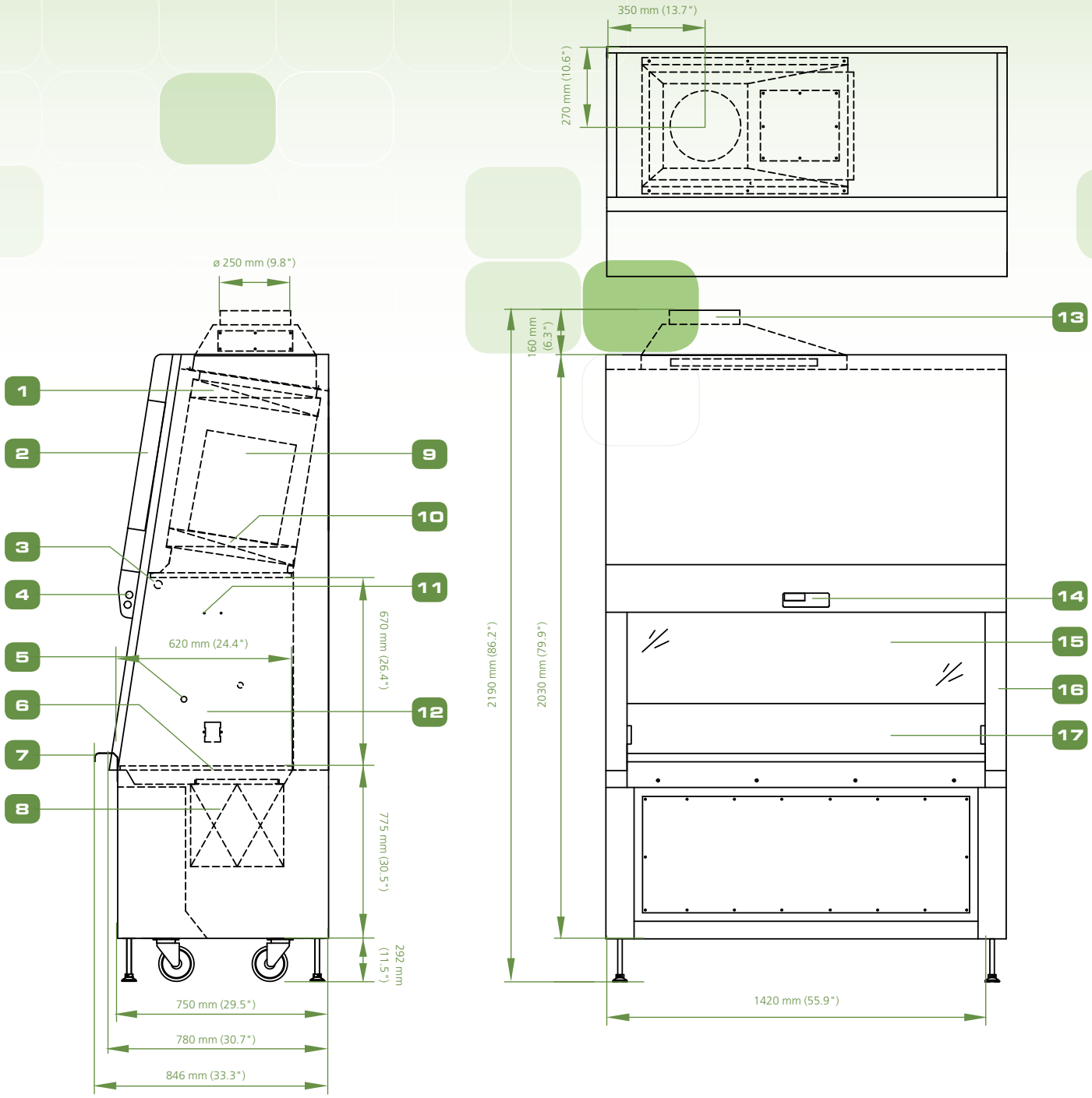
- *Esco cabinets use German made ebm-papst® permanently lubricated, centrifugal motor/blowers with external rotor designs.*
- *Integrated blades narrow the profile and eliminate need for a motor shaft.*
- *Motors are selected for energy efficiency, compact design, and flat profile. The completely integrated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

Comprehensive Performance Testing At Esco

Every Cytoculture™ model manufactured by Esco is individually tested, documented by serial number and validated with the following test methods.

- *Inflow / downflow velocity*
- *PAO aerosol challenge for filter integrity*
- *Airflow pattern visualization*
- *Electrical safety to IEC61010-1*
- *Additional KI-Discus containment and microbiological testing is performed on statistical sampling basis.*

ENGINEERING DRAWING (MODEL: CYT-4A)



1. *Exhaust ULPA filter*
2. *Electrical Panel*
3. *UV Lamp Retrofit Kit Provision*
4. *Fluorescent Lamp*
5. *Service Fixture Retrofit Kit provision*
6. *Stainless Steel Multi-piece Work Tray*
7. *Stainless Steel Arm Rest*
8. *Exhaust ULPA Filter*
9. *DC-ECM Blower*
10. *Downflow HEPA Filter*
11. *IV Bar Retorfit Kit Provision*
12. *Electrical Outlet Retrofit Kit Provision (two on each side)*
13. *Exhaust Collar (Optional)*
14. *Esco Sentinel™ Silver Microprocessor Controller*
15. *Motorized Sash Window*
16. *Removable Side Panel*
17. *Single-piece Stainless Steel Back Wall and Side Walls*

ACTI
Aseptic Containment Isolator

Introduction

Esco Aseptic Containment Isolator (ACTIs) work in conjunction with advanced material transfer techniques and bio-decontamination agents providing a 6 log reduction in viable contaminants.

Esco ACTIs provide standard configurable designs able to adapt to various batch sizes and process flows. Through a user-friendly operating system, this isolator can be setup to operate under recirculation or total exhaust airflow and operate in positive or negative pressure modes. This allows the system to be multi functional and caters all of the requirements for both toxic and non toxic aseptic materials. The system also incorporates safe change filters for toxic materials.

Basic principles

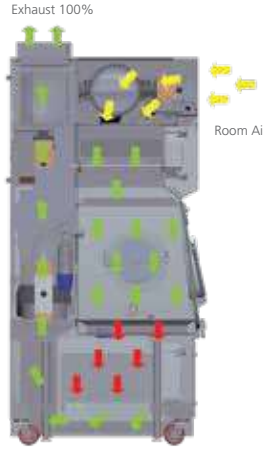
- Total unidirectional airflow provides superior aseptic work zones.
- Safety toughened laminated glass hinges upwards assisted with gas springs for batch loading.
- Airflow regime either runs in recirculatory or full exhaust airflow. Total exhaust airflow for fast purging of bio-decontamination agent during aeration period. Recirculation option for reduced airflow taken from the room, thus, less air is exhausted during normal operation and during conditioning and decontamination phases.
- U15 supply and exhaust filters suitable for either toxic or non-toxic aseptic materials. Exhaust filter directly below the isolator can be removed & a bypass tube fitted for non-potent material applications.

Airflow Schematic

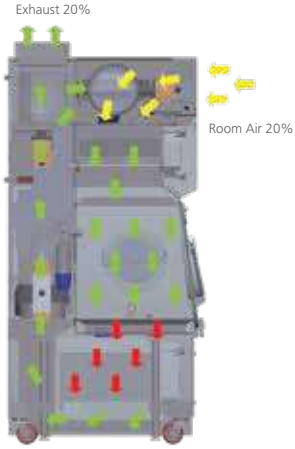
Room air Filtered air Contaminated air

Standard Features

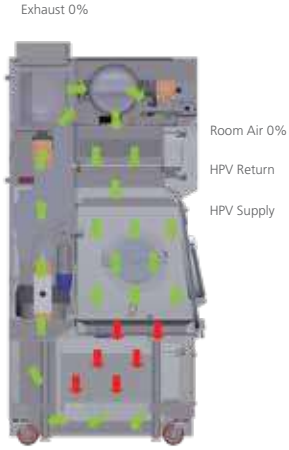
- Full unidirectional airflow provides superior aseptic work zones.
- Safety toughened laminated glass hinges upwards assisted with gas springs for batch loading



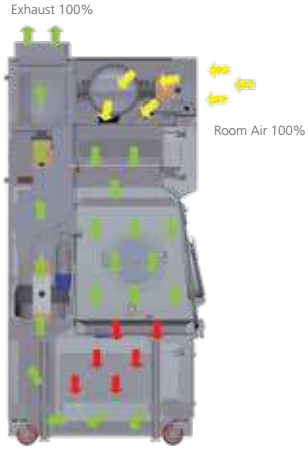
Normal Running
- Full Exhaust Airflow



Normal Running
- Recirculating Airflow



Decontamination
- Recirculating Airflow

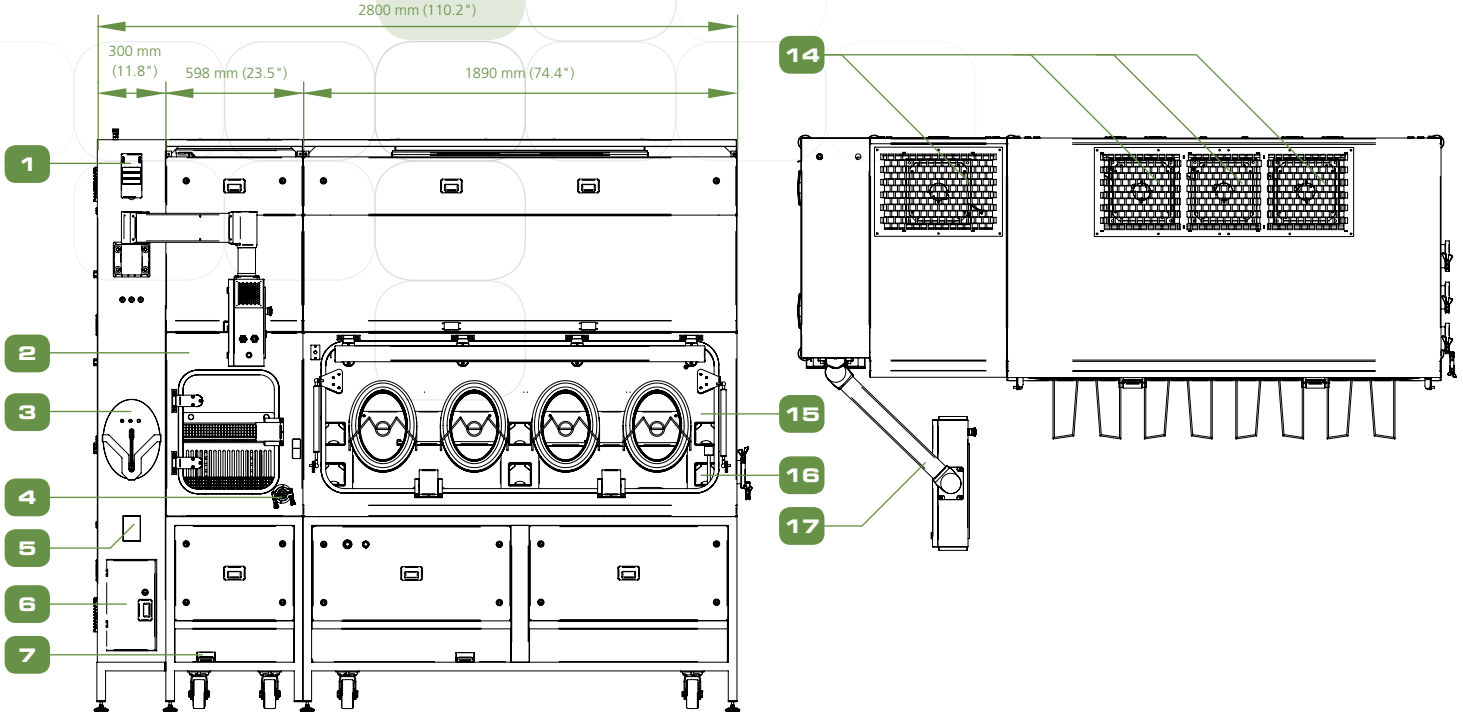


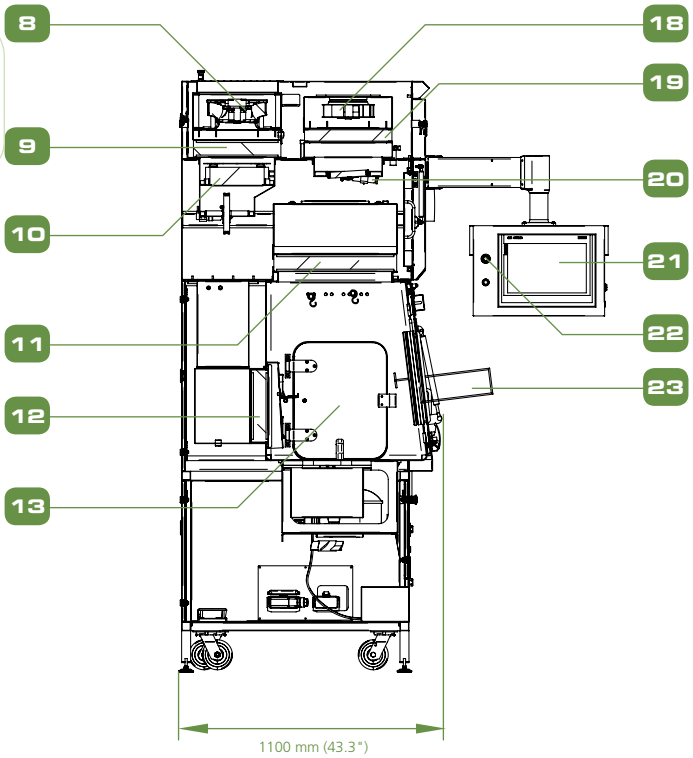
Aeration
- Full Exhaust Airflow

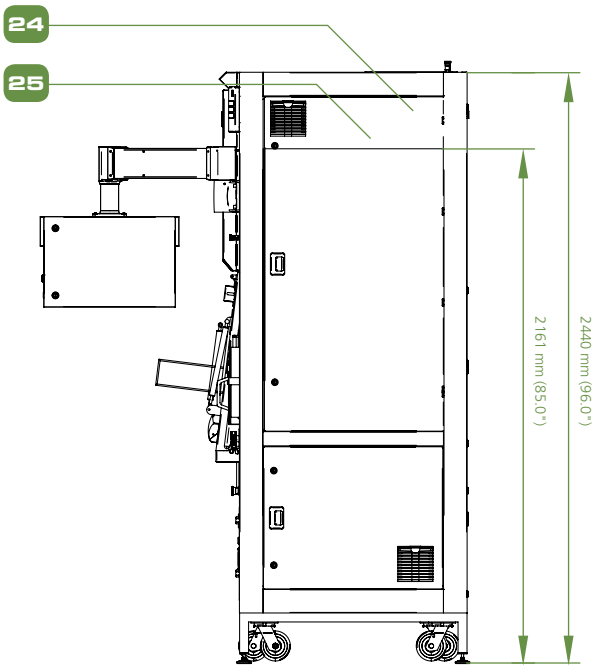
GENERAL SPECIFICATIONS
Aseptic Containment Isolator (ACTI)

		ACTI-2G_	ACTI-3G_	ACTI-4G_
Main Chamber Nominal Size		1200 mm (47.2")	1500 mm (59.1")	1900 mm (74.8")
Working Chamber Dimensions (W x D x H)		1200 x 670 x 796 mm (47.2" x 26.4" x 31.3")	1500 x 670 x 796 mm (59.1" x 26.4" x 31.3")	1900 x 670 x 796 mm (74.8" x 26.4" x 31.3")
External Dimensions (W x D x H)		2100 x 1007 x 2502 mm (82.7" x 39.6" x 98.5")	2400 x 1007 x 2502 mm (94.5" 39.6" x 98.5")	2800 x 1007 x 2502 mm (110.2" 39.6" x 98.5")
Chamber Environment		ISO Class 5 all Chambers (Grade A)		
Filter Type – Isolator Inlet		ULPA U15 with integral mesh guard and knife edge gel seal		
Filter Efficiency – Inlet		99.9995% at MPPS	99.9995% at MPPS	99.9995% at MPPS
Filter Type – Isolator Exhaust		HEPA H14 with knife edge gel seal		
Filter Efficiency – Exhaust		99.995% at MPPS	99.995% at MPPS	99.995% at MPPS
Lighting Level		≥ 600 lux (≥ 56 foot-candles)	≥ 600 lux (≥ 56 foot-candles)	≥ 600 lux (≥ 56 foot-candles)
Sound Level		≤ 68 dBA	≤ 68 dBA	≤ 68 dBA
Isolator Construction	Chamber	316L	316L	316L
	Service Housing	316L	316L	316L
	Support Frame	316L	316L	316L
Isolator Finish	Chamber Internal	≤0.4 Ra	≤0.4 Ra	≤0.4 Ra
	Chamber External	≤0.6 Ra	≤0.6 Ra	≤0.6 Ra
	Service Housing External	0.6 Ra	0.6 Ra	0.6 Ra
	Support Frame	1.0 Ra	1.0 Ra	1.0 Ra
Electrical Requirements	220-240V, AC, 50Hz, 1Ø	✓	✓	✓
	110-120V, AC, 60Hz, 1Ø	✓	✓	✓
	220-240V, AC, 60Hz, 1Ø	✓	✓	✓
Compressed Air requirements	6 Barg Pressure at 5ltr/sec	✓	✓	✓
Exhaust Duct Requirements		10" Duct from Isolator to Outside		
Options	Pass Chamber	✓	✓	✓
	Bio-decontamination – BioVap™	✓	✓	✓
	Non-Viable Air Sampler	✓	✓	✓
	Viable Air Sampler	✓	✓	✓
	Sterility Test Pump	✓	✓	✓
	Glove Tester	✓	✓	✓
	Waste Bag Grommet	✓	✓	✓
	Sterile Continuous Liner	✓	✓	✓
	Bag-Welder with Table	✓	✓	✓
	RTP Ø270 – Alpha	✓	✓	✓
	RTP Ø270 – Beta Canister	✓	✓	✓
	RTP Ø270 – Beta Liner	✓	✓	✓

ENGINEERING DRAWING (MODEL: ACTI-4G)







1. *Signal Light*
2. *Pass Chamber*
3. *Glove Leak Tester*
4. *H_2O_2 Sensor Port*
5. *Printer*
6. *Biovap™ Decon Port*
7. *Pass Chamber Inner Door Foot Switch*
8. *Inlet Fan*
9. *Prefilter*
10. *Catalytic Converter*
11. *H14 Supply Filter*
12. *H14 Exhaust Filter*
13. *Inner Glass Door*
14. *Exhaust*
15. *Inflatable Seal Window*
16. *Electrical Outlets*
17. *Swing Arm*
18. *G4 Prefilter*
19. *Exhaust Filter*
20. *Exhaust Damper*
21. *HMI Display*
22. *Emergency Stop*
23. *Glove Stretcher*
24. *UPS for 30 mins*
25. *Main Control Panel (MCP)*

CBI
Containment Barrier Isolator

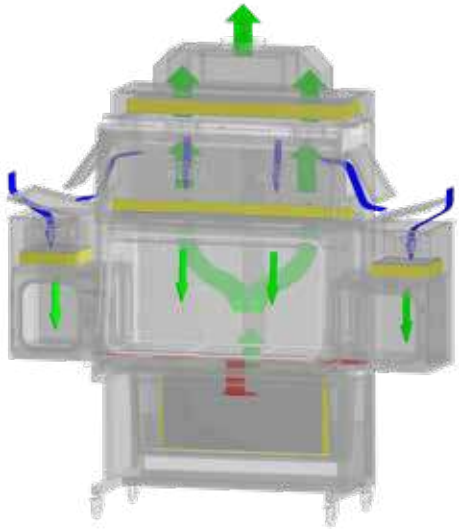
Introduction

The Esco Containment Barrier Isolator (CBI) facilitates the isolation of a product or process while providing the required conditions for a sterile/ aseptic environment. This equipment provides a comprehensive range of personnel, product, and environmental protection.

CBI is designed in complete compliance with PIC/s and international cGMP standards, with its 19 mm radius coved internal corners in a single piece chamber (no perforations or grilles for contaminants to be trapped in all four corners). Its rear return filter ensures that ducts are not contaminated.

Applications

- Pharmacy Compounding (Chemotherapy/TPN)
- Small-scale Potent Material Handling
- Aseptic Processing
- Research and Development
- Cell processing



Ambient Air Filtered Air Potentially Contaminated Air

Other Options and Accessories

- Electrical outlets
- UV lamp with Timer
- IV bars with hooks
- Exhaust Collar*
- Hard ducting with anti-blow back valve**
- Glove leak tester
- Sharps Disposal Container
- CCTV provision and/or integration
- Rear view screen adaptation
- Automated Pressure Hold Test
- BioVap™ bio-decontamination system
- Bag-In Bag-Out (BIBO) System
- Manual or Hydraulic Stand
- Removable Sliding Work Tray
- Foot Switch
- Bag welder for continuous liner system

** for CBI-U only*

*** for CBI-T and CBI-III only*

Containment Barrier Isolator Airflow Diagram

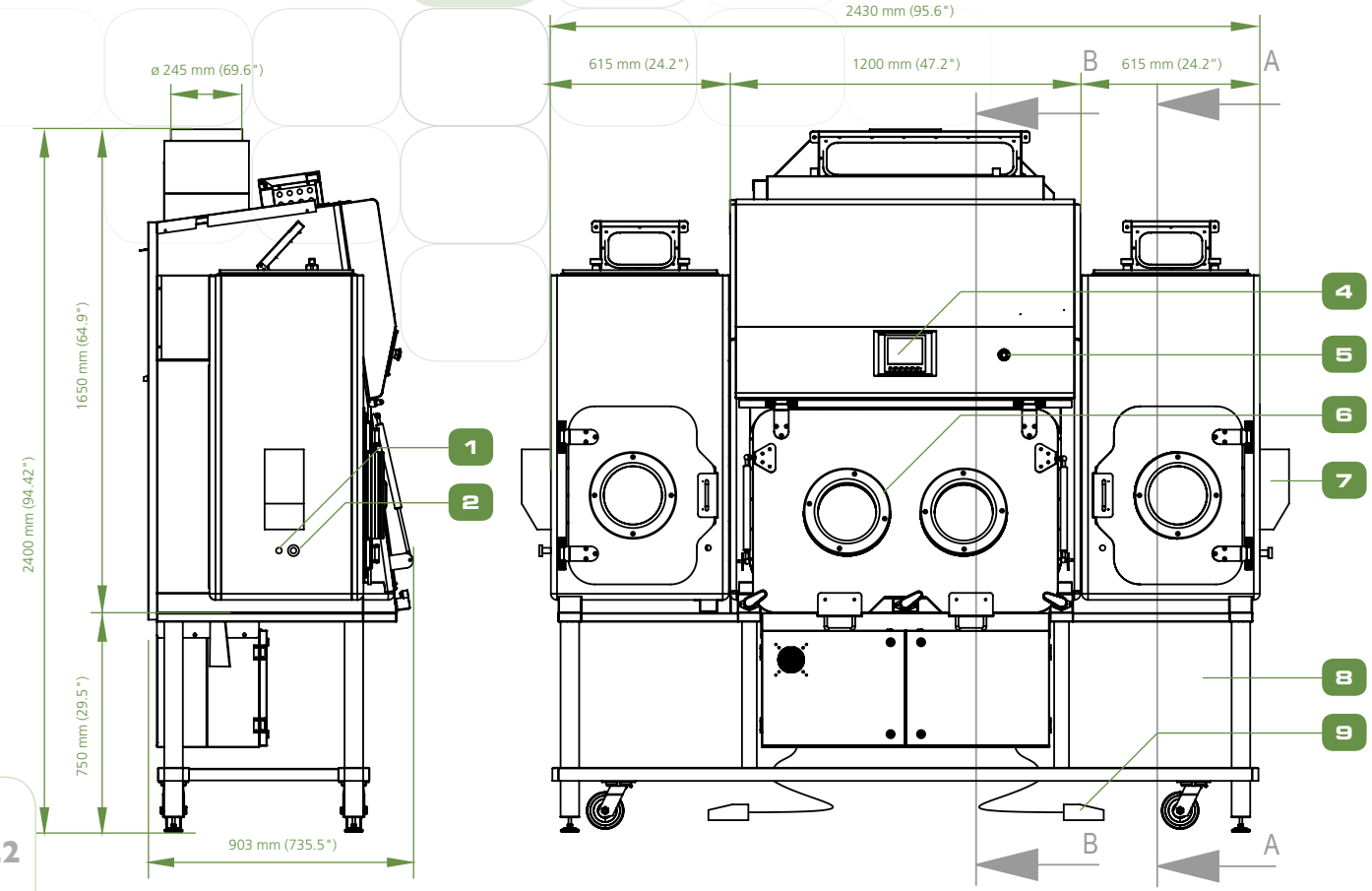
Ambient air is pulled through the inlet prefilter (80% efficiency for positive pressure model) located on top of the isolator. The prefilter traps large size particles to extend the life of the supply ULPA filter.

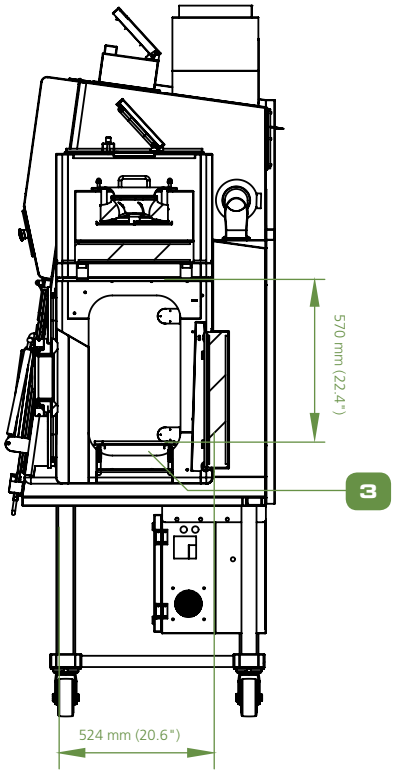
Air from the top inlet and from work zone is pulled by the fan which creates a positive pressure on the plenum that creates downflow. In positive pressure model, the proprietary plenum design forces more air into the work zone, increasing its pressure relative to the pass-thru. In negative pressure model, the work zone and pass-thru interchange are under negative pressure to the room, thereby preventing contaminants from leaving the work zone in case of a breach. The ULPA downflow filter creates a laminar and particle-free ISO Class 5 air cleanliness as per ISO 14644-1 (equivalent to Class 1 as per US Fed Std 209E) inside the isolator to protect the work material inside the main chamber and pass-thru.

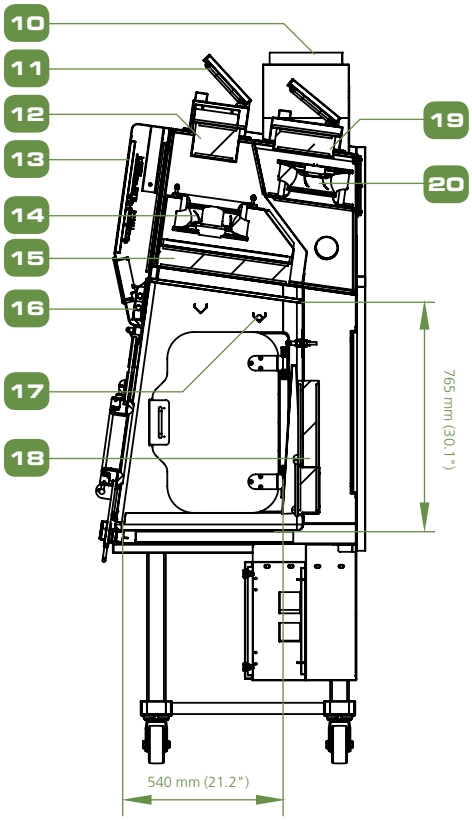
Air from the work zone and pass-thru is quickly purged out by the fan to keep the area clean. The fan pulls approximately 90% of the purged air back to the plenum and after passing through the ULPA downflow filter again, it is recirculated back to the work one and pass chamber. The high rate of airflow recirculation helps to prolong filter life and reduces the chances of ambient contaminants entering the work zone.

Approximately 10% of the purged air is exhausted through an ULPA-filter to prevent heat build-up inside the isolator that can be detrimental to drug compounding. This exhausted air is replenished by ambient air coming from the top inlet prefilter and a filter with 80% efficiency for positive pressure model.

ENGINEERING DRAWING (MODEL: CBI-U-2G)







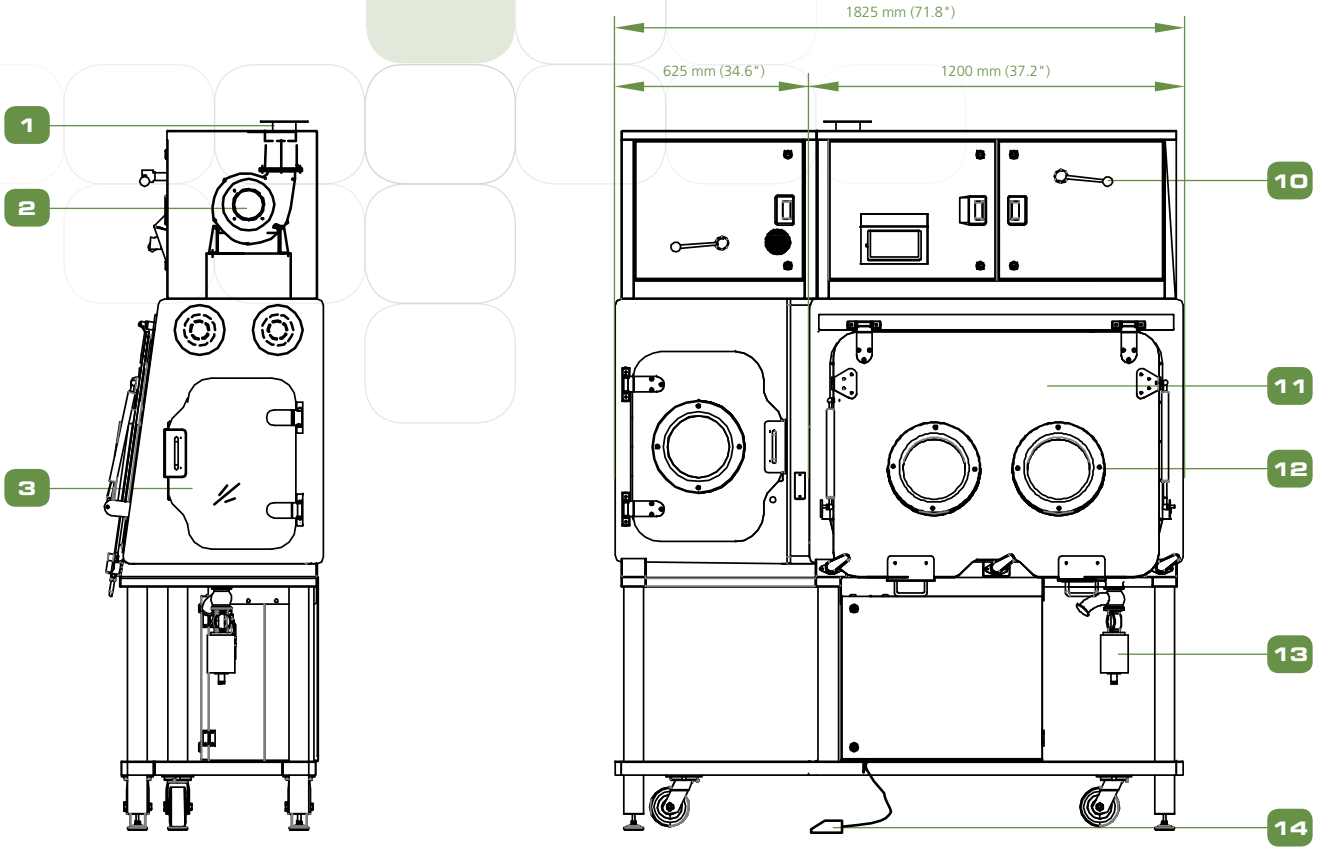
1. *PAO Reading Port*
2. *PAO Injection Port*
3. *Sliding Tray*
4. *HMI Display*
5. *Emergency Stop*
6. *Round Glove Ports*
7. *BioVap™ Nozzle Housing (optional)*
8. *Fixed Height Support Stand*
9. *Foot Switch*
10. *Exhaust Collar*
11. *Manual Damper*
12. *Inlet Prefilter*
13. *Electrical Control Panel*
14. *Supply Fan*
15. *Supply Filter*
16. *Fluorescent Lamps*
17. *IV Bar Provision*
18. *Exhaust H14 Filter*
19. *Second Exhaust H14 Filter*
20. *Exhaust Fan*

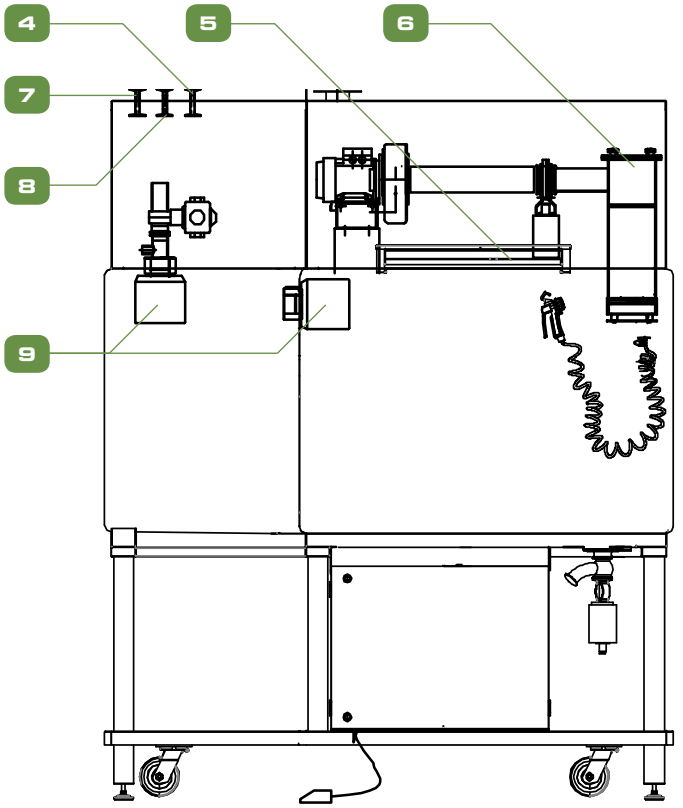
GENERAL SPECIFICATIONS

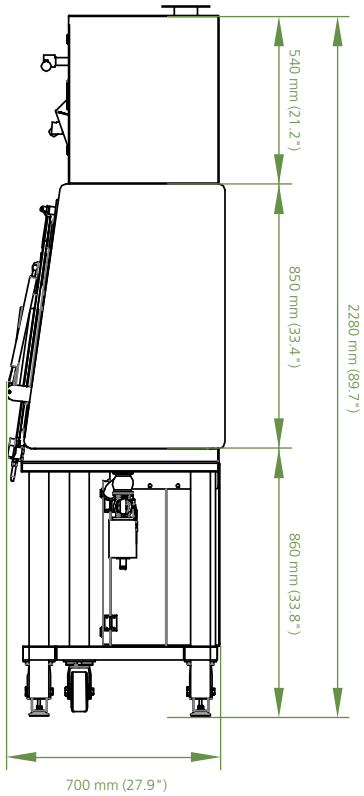
Containment Barrier Isolator - Unidirectional

		CBI-U-2G	CBI-U-3G	CBI-U-4G
Main Chamber Nominal Size (Width)		1200 mm (47.2")	1600 mm (62.9")	2000 mm (78.7")
Working Chamber Dimensions - Min (L x W x H)		1200 x 550 x 770 mm (47.2" x 21.6" x 30.3")	1600 x 550 x 770 mm (62.9" x 21.6" x 30.3")	2000 x 550 x 770 mm (78.7" x 21.6" x 30.3")
Working Chamber Dimensions - Max (L x W x H)		1200 x 630 x 840 mm (47.2" x 24.8" x 33")	1600 x 630 x 840 mm (62.9" x 24.8" x 33")	2000 x 630 x 840 mm (78.7" x 24.8" x 33")
External Dimension (with one Pass Chamber) (L x W x H)	With Adjustable Base Stand (Min)	1820 x 920 x 2260 mm (71.6" x 36.2" x 88.9")	2220 x 920 x 2260 mm (87.4" x 36.2" x 88.9")	2620 x 920 x 2260 mm (103.1" x 36.2" x 88.9")
	With Adjustable Base Stand (Max)	1820 x 920 x 2560 mm (71.6" x 36.2" x 100.7")	2220 x 920 x 2560 mm (87.4" x 36.2" x 100.7")	2620 x 920 x 2560 mm (103.1" x 36.2" x 100.7")
Glove Port Height (Min)		1000 mm (39.3")	1000 mm (39.3")	1000 mm (39.3")
Glove Port Height (Max)		1300 mm (51.1")	1300 mm (51.1")	1300 mm (51.1")
Chamber Environment		ISO Class 5 all Chambers (Grade A)		
Filter Type - Chamber Inlet		ULPA U15 with Integral Mesh Guard and Knife Edge Gel Seal		
Filter Efficiency - Chamber Inlet		99.9998%		
Filter Type - Chamber Exhaust		HEPA H14 with Integral Mesh Guard and Gasket Seal		
Filter Efficiency - Chamber Exhaust		99.995%		
Lighting Level		≥ 700 lux (≥ 65 foot-candles)		
Sound Level		< 63 dBA	< 67 dBA	< 71 dBA
Isolator Construction	Chamber	SS316L		
	Service Housing	SS304L		
	Support Frame	SS304L		
Isolator Finish	Chamber Internal	≤ 0.4 Ra		
	Chamber External	≤ 0.6 Ra		
	Service Housing External	≤ 0.6 Ra		
	Support Frame	≤ 1.0 Ra		
Electrical Requirements (by Client)	220-240 VAC, 50/60 Hz, 1Ø	✓	✓	✓
	110-120 VAC, 50/60 Hz, 1Ø	✓	✓	✓
Compressed Air Requirement (by Client) if no on-board compressor	2 Bar-g Pressure at 5 L/sec	✓	✓	✓
Exhaust Duct Requirements (by Client) unless Integral Catalytic Converter is Included		10" Duct from Isolator to Outside		
Options	Pass Chamber (Small, nongloved or Large, nongloved/gloved)	✓	✓	✓
	Bio-Decontamination BioVap™	✓	✓	✓
	Non-Viable Air Sampler	✓	✓	✓
	Viable Air Sampler	✓	✓	✓
	Sterility Test Pump	✓	✓	✓
	Glove Tester	✓	✓	✓
	Waste Bag Grommet	✓	✓	✓
	Sterile Continuous Liner	✓	✓	✓
	Bag Welder with Table	✓	✓	✓
	RTPØ105, 190, 270, 350, 460 - Alpha	✓	✓	✓
	RTPØ105, 190, 270, 350, 460 - Beta Canister	✓	✓	✓
	RTPØ105, 190, 270, 350, 460 - Beta Liner	✓	✓	✓
	Analytical Balance	✓	✓	✓
	Spray Gun	✓	✓	✓
	Temperature and Humidity Monitor	✓	✓	✓
	H_2O_2 Monitoring	✓	✓	✓
	Product Waste Entry / Exit Ports	✓	✓	✓
	Liquid Waste Entry / Exit Ports	✓	✓	✓
	4" Butterfly Valve	✓	✓	✓
	Drain	✓	✓	✓
	Liner System	✓	✓	✓
	On-board Air Compressor	✓	✓	✓
	UV Lamp	✓	✓	✓
	Carbon Filter	✓	✓	✓
	Adjustable Hydraulic Stand	✓	✓	✓
	CCTV Camera	✓	✓	✓
	TV Monitor	✓	✓	✓

ENGINEERING DRAWING (MODEL: CBI-T-2G)







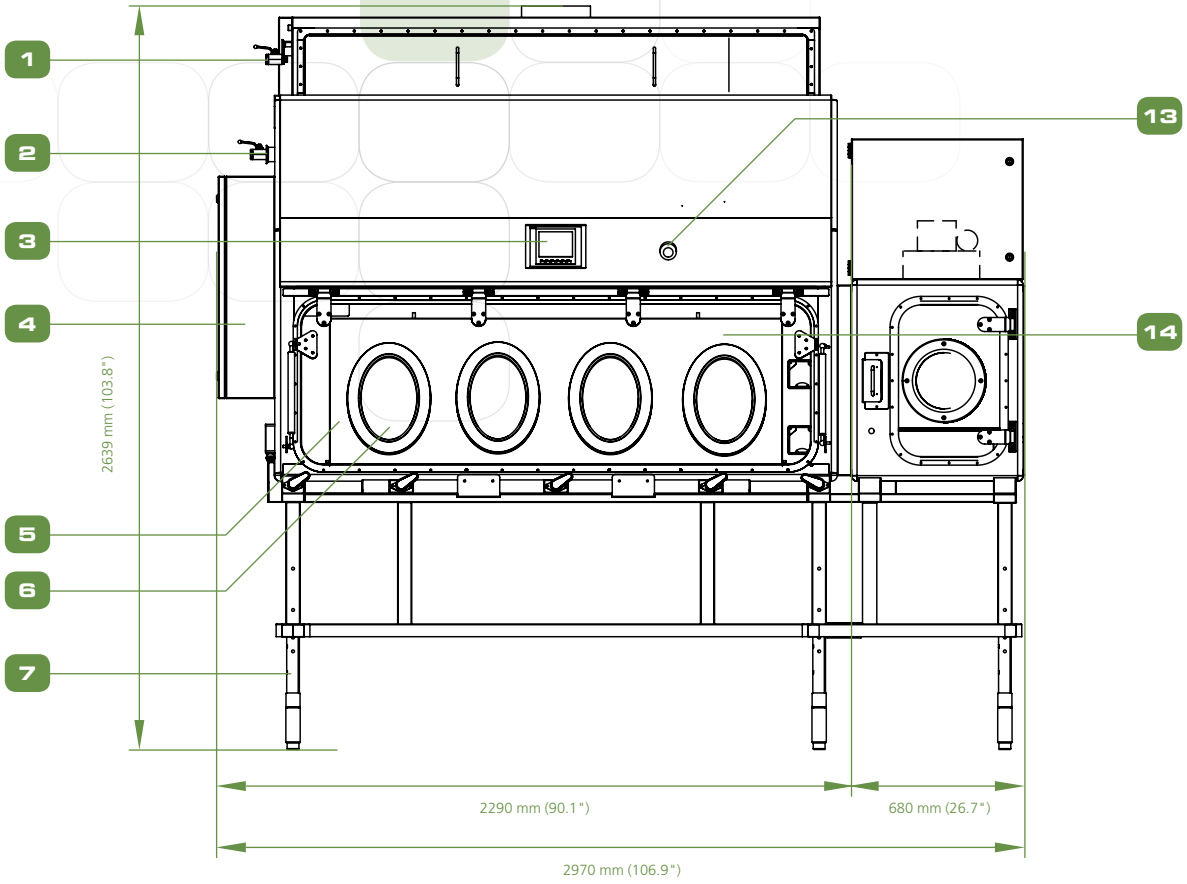
1. *Exhaust Duct*
2. *Exhaust Fan*
3. *Inflatable Pass Chamber*
4. *WIP Inlet*
5. *Lighting*
6. *Exhaust Filter*
7. *N_2 Purge (optional)*
8. *Compressed Air Inlet*
9. *H14 Canister*
10. *Manual Valve*
11. *Process Chamber*
12. *Glove Ports*
13. *Ball Drain Valve*
14. *Foot Switch*

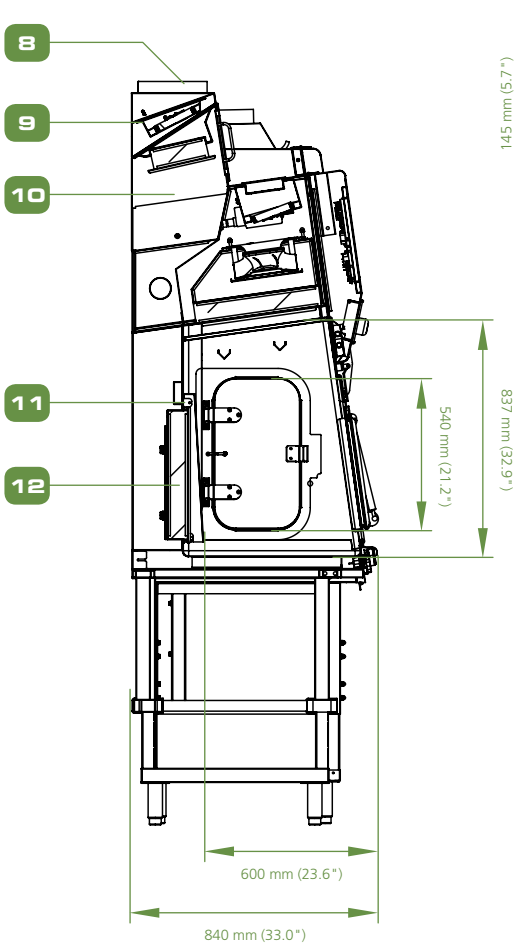
GENERAL SPECIFICATIONS

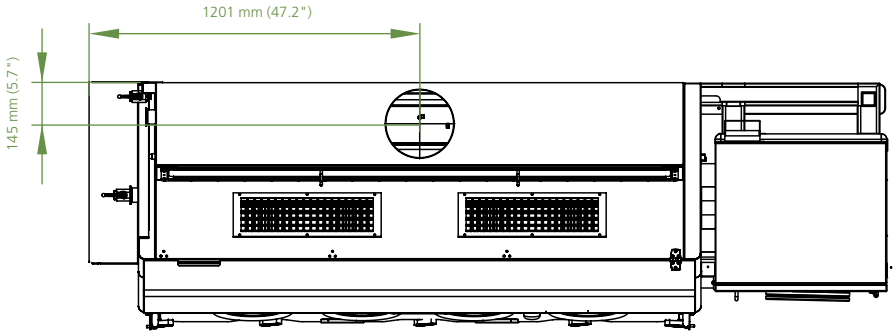
Containment Barrier Isolator - Turbulent

		CBI-T-2G	CBI-T-3G	CBI-T-4G
Main Chamber Nominal Size		1200 mm (47.2")	1600 (62.9")	2000 (78.7")
Process Chamber External Dimension (W x D x H)		1200 x 640 x 840 mm (47.2" x 25.1" x 33")	1600 x 640 x 840 mm (62.9" x 25.1" x 33")	2000 x 640 x 840 mm (78.7" x 25.1" x 33")
Pass-through Chamber External Dimension (W x D x H)		600 x 520 x 840 mm (23.6" x 20.4" x 33")		
External Dimensions (W x D x H)		1825 x 700 x 2280 mm (71.8" x 27.5" x 89.7")	2225 x 700 x 2280 mm (87.5" x 27.5" x 89.7")	2625 x 700 x 2280 mm (103.3' x 27.5" x 89.7")
Glove Port Diameter		200 x 300 mm (7.87" x 11.8")		
Glove Port Quantity		2	3	4
Chamber Environment		Negative Pressure		
Airflow Type		Turbulent Flow		
Chamber Environment		ISO Class 8 (Grade D)		
Filter Type - Inlet		H14 Cartridge Filter		
Filter Efficiency - Inlet		99.98%		
Filter Type - Exhaust		H14 Push Push Filter		
Filter Efficiency - Exhaust		99.98%		
Lighting Level		≥ 650 lux (≥ 60 foot-candles)		
Sound Level		< 68 dBA	< 68 dBA	< 68 dBA
Downflow Velocity (m/s)	Process Chamber	48	36	29
	Pass Chamber	61	61	61
Air Change Per Hour	Process Chamber	31	31	31
	Pass Chamber	16	16	16
Isolator Construction	Main Body	1.5 mm (0.06") 16 gauge stainless steel, type 316, with 4B finish		
	Internal Chambers	1.5 mm (0.06") 16 gauge stainless steel, type 316, with 4B finish		
Electrical Requirements (by Client)	230 VAC, 50/60 Hz, 1Ø	CBI-T-2G8	CBI-T-3G8	CBI-T-4G8
	110-120 VAC, 50/60 Hz, 1Ø	CBI-T-2G9	CBI-T-3G9	CBI-T-4G9
Compressed Air Requirement (by Client)	2 Bar-g Pressure at 5 L/sec	2 Bar		
Exhaust Duct requirements (by Client)		101.6 mm (4")		
General Options/Accessories	Pass Chamber Glove ports	✓	✓	✓
	WIP - Spray Gun with Manual Ball Valve	✓	✓	✓
	CIP - Spray Ball with Manual Ball Valve	✓	✓	✓
	N_2 Purge for Process Chamber	✓	✓	✓
	Weighing Scale Granite Slab	✓	✓	✓
	Automated Pressure Hold Test with Client Supplied Compressed Air	✓	✓	✓
	Automated Pressure Hold Test with On-board Pump	✓	✓	✓
	Glove Leak Tester	✓	✓	✓
	Temperature and Relative Humidity Monitoring	✓	✓	✓
	RTP Ø190 Alpha Port	✓	✓	✓
	RTP Ø270 Alpha Port	✓	✓	✓
	RTP Ø350 Alpha Port	✓	✓	✓
	Ø250 mm Product Waste Bag Out Ports	✓	✓	✓
	Electrical Outlet (IP66)	✓	✓	✓

ENGINEERING DRAWING (MODEL: CBI-III-4G)







1. *Decon Port (Out)*
2. *Decon Port (In)*
3. *HMI Display*
4. *Main Control Panel*
5. *Laminated Tempered Safety Glass*
6. *Glove Ports*
7. *Telescopic Support Stand*
8. *Exhaust Duct*
9. *Automated Damper with Inflatable Seal*
10. *Exhaust Blowers*
11. *UV Lamp*
12. *Exhaust Filter*
13. *Emergency Stop*
14. *Process Chamber*

GENERAL SPECIFICATIONS

Containment Barrier Isolator - CBI-III

		CBI-III-2G	CBI-III-3G	CBI-III-4G
Main Chamber Nominal Size (Width)		1200 mm (47.2")	1600 mm (62.9")	2000 mm (78.7")
Working Chamber Dimensions - Min (W x D x H)		1200 x 550 x 770 mm (47.2" x 21.6" x 30.3")	1600 x 550 x 770 mm (62.9" x 21.6" x 30.3")	2000 x 550 x 770 mm (78.7" x 21.6" x 30.3")
Working Chamber Dimensions - Max (W x D x H)		1200 x 630 x 840 mm (47.2" x 24.8" x 33")	1600 x 630 x 840 mm (62.9" x 24.8" x 33")	2000 x 630 x 840 mm (78.7" x 24.8" x 33")
External Dimension (with one Pass Chamber) (W x D x H)	With Adjustable Base Stand (Min)	1820 x 920 x 2260 mm (71.6" x 36.2" x 88.9")	2220 x 920 x 2260 mm (87.4" x 36.2" x 88.9")	2620 x 920 x 2260 mm (103.1" x 36.2" x 88.9")
	With Adjustable Base Stand (Max)	1820 x 920 x 2560 mm (71.6" x 36.2" x 100.7")	2220 x 920 x 2560 mm (87.4" x 36.2" x 100.7")	2620 x 920 x 2560 mm (103.1" x 36.2" x 100.7")
External Dimension - Small Pass-through Chamber (W x D x H)		620 x 450 x 580 mm (24.4" x 17.7" x 22.8")	620 x 450 x 580 mm (24.4" x 17.7" x 22.8")	620 x 450 x 580 mm (24.4" x 17.7" x 22.8")
Glove Port Height (Min)		1000 mm (39.4")	1000 mm (39.4")	1000 mm (39.4")
Glove Port Height (Max)		1300 mm (51.2")	1300 mm (51.2")	1300 mm (51.2")
Chamber Environment		ISO Class 5 all Chambers (Grade A)		
Prefilter	Process Chamber	F6 filter, glass fiber media		
	Pass-through Chamber	G4, polyester media		
Filter Type - Chamber Inlet		ULPA U15 with Integral Mesh Guard and Knife Edge Gel Seal		
Filter Efficiency - Chamber Inlet		99.9998%		
Filter Type - Chamber Return and Chamber Exhaust		HEPA H14 with Integral Mesh Guard and Gasket Seal		
Filter Efficiency - Chamber Return and Chamber Exhaust		99.995%		
Lighting Level		≥ 800 lux (≥ 74 foot-candles)		
Sound Level		< 63 dBA	< 67 dBA	< 71 dBA
Isolator Construction	Chamber	Stainless Steel 316L		
	Service Housing	Stainless Steel 304L		
	Support Frame	Stainless Steel 304L		
Isolator Finish	Chamber - Internal	≤ 0.4 Ra		
	Chamber - External	≤ 0.6 Ra		
	Service Housing - External	≤ 0.6 Ra		
	Support Frame	≤ 1.0 Ra		
Electrical Requirements (by Client)	220-240 VAC, 50/60 Hz, 1Ø	✓	✓	✓
	110-120 VAC, 50/60 Hz, 1Ø	✓	✓	✓
Compressed Air Requirement (by Client) if no on-board compressor	2 Bar-g Pressure at 5 L/sec	✓	✓	✓
Exhaust Duct Requirements (by Client) unless Integral Catalytic Converter is Included		10" Duct from Isolator to Outside		

OPTIONS

	CBI-2G	CBI-3G	CBI-4G		CBI-2G	CBI-3G	CBI-4G
Pass Chamber (Small, nongloved or Large, nongloved/gloved)	✓	✓	✓	Product Waste Entry / Exit Ports	✓	✓	✓
CCTV Integration	✓	✓	✓	Liquid Waste Entry / Exit Ports	✓	✓	✓
CCTV Integration + Provision	✓	✓	✓	4" Butterfly Valve	✓	✓	✓
Bio-Decontamination BioVap™	✓	✓	✓	Drain	✓	✓	✓
Glove Tester	✓	✓	✓	Liner System	✓	✓	✓
Waste Bag Grommet	✓	✓	✓	On-board Air Compressor	✓	✓	✓
Sterile Continuous Liner	✓	✓	✓	UV Lamp	✓	✓	✓
Bag Welder with Table	✓	✓	✓	Adjustable Hydraulic Stand	✓	✓	✓
RTPØ105, 190, 270, 350, 460 - Alpha	✓	✓	✓	TV Monitor	✓	✓	✓
RTPØ105, 190, 270, 350, 460 - Beta Canister	✓	✓	✓	Bio Dunk Tank	✓	✓	✓
RTPØ105, 190, 270, 350, 460 - Beta Liner	✓	✓	✓	BSC Integration	✓	✓	✓
Analytical Balance	✓	✓	✓	Autoclave Integration	✓	✓	✓
H_2O_2 Monitoring	✓	✓	✓	CO_2 incubator Integration	✓	✓	✓

GPPI
General Processing Platform Isolator

Intoduction

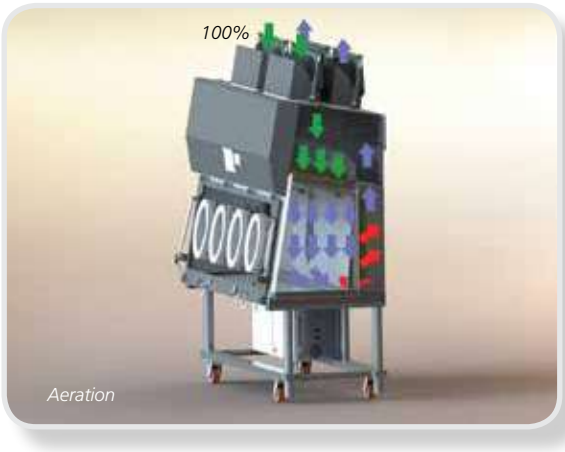
The Esco General Processing Platform Isolator (GPPI) is a highly adaptable, unidirectional laminar airflow isolator that can be used for sterility testing or other processes that require an ISO Class 5 (Grade A) aseptic environment. The GPPI's advanced control system allows the operator to select either positive or negative chamber pressure as well as single pass or recirculating airflow patterns. These features, along with the ability to perform safe change procedures on the supply and return ULPA filters, make the GPPI a highly versatile isolator that can be used for potent or non-potent aseptic materials.

In addition, the Esco GPPI's design offers over 20 standard options and configurations ensuring that Esco can provide a standard solution to fit your specific process and facility requirements. Should a standard option not fit your requirements Esco can offer customized solutions as well.

Basic Features

- Unidirectional laminar airflow
- User selectable positive or negative chamber pressure and single pass or recirculating airflow regimes.
- Multiple standard VHP bio-decontamination options providing 6 log reduction in viable contaminants.
- Low contamination filter change design allowing the handling of potent and non-potent aseptic products.

- ULPA-filtered air
- Unfiltered / Potentially contaminated air
- Room air / Inflow air

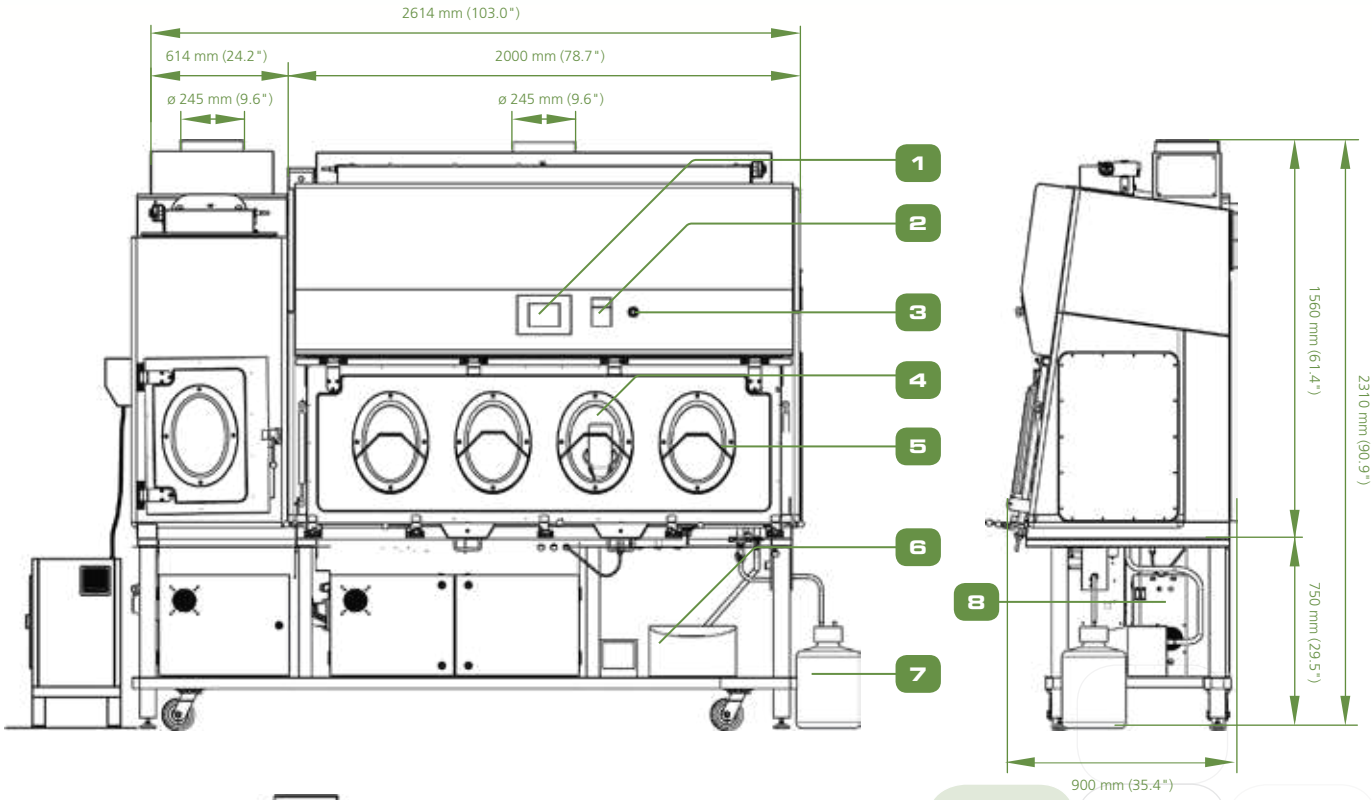


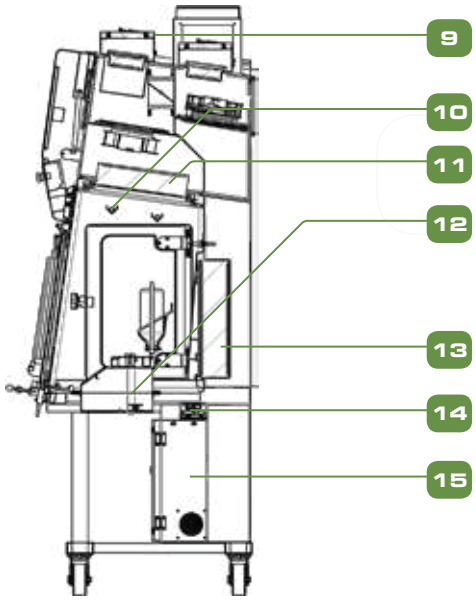
- ULPA-filtered air
- Unfiltered / Potentially contaminated air
- Room air / Inflow air

Standard Features

- Fully welded SS316L internal chambers with rounded coved corners.
- Product is designed with FDA-approved hydraulic stand that can be raised and lowered by the operator for optimum ergonomic comfort, thus, enabling ease of transport through a variety of doorway and ceiling heights.
- Self-contained design of control systems and electrics allowing simple plug-in installation.
- Integrated particle monitoring connections and optional inclusion of the viable and non-viable monitoring equipment.
- Automated pressure hold test
- Pre-programmed system to function with multiple H_2O_2 system options.
- Standard design incorporates cGMP compliant features with the inclusion of an optional chart recorder or printer. The GPPI also meets the data handling requirements for 21 CFR Part 11 requirements.
- Safe change glove system allows the changing of gloves while maintaining aseptic conditions inside the chambers.
- Optional on-board exhaust catalytic convertor allows exhaust into the surrounding room without modifications to the facility and fitted with an interlocked external H_2O_2 sensor for safety.
- Optional on-board air compressor eliminates the requirement for a site supplied compressed air connection, which allows the installation of a simple plug-in of electrical power.

ENGINEERING DRAWING (MODEL: GPPI-4G)





1. *Siemens Touch Screen Control*
2. *Printer*
3. *Emergency Stop*
4. *Glove Ports*
5. *Glove Retainer*
6. *Viable Particle Monitoring System (optional)*
7. *10L Carboy Container for Liquid Waster (optional)*
8. *Compress Air Inlet for Automated Chamber*
9. *F6 Inlet Filter*
10. *Stainless Steel 316L Hanging Rod*
11. *Gel Sealed U15 Supply Filter*
12. *Millipore Steritest System (optional)*
13. *Gasket Sealed U15 Exhaust Filter*
14. *TSI Non-viable Monitoring System (optional)*
15. *Electrical Control Box*

GENERAL SPECIFICATIONS

GENERAL PROCESSING PLATFORM ISOLATOR (GPPI)

		GPPI-2G	GPPI-3G	GPPI-4G
Nominal Size Main Chamber (Width)		1355 mm (53.3”)	1600 mm (62.9”)	2000 mm (78.7”)
Working Chamber Dimensions (L x W x H)	1200 x 610 x 720 mm (47.2” x 24” x 28.3”)	✓	✓	✓
	1200 x 720 x 720 mm (47.2” x 28.3” x 28.3”)	✓	✓	✓
External Dimensions (L x W x H)	With Adjustable Base Stand (Min)	1920 x 920 x 2200 mm (75.5” x 36.2” x 86.6”)	2320 x 920 x 2200 mm (91.3” x 36.2” x 86.6”)	2720 x 920 x 2200 mm (107” x 36.2” x 86.6”)
	With Adjustable Base Stand (Max)	1920 x 920 x 2500 mm (75.5” x 36.2” x 98.4”)	2320 x 920 x 2500 mm (91.3” x 36.2” x 98.4”)	2720 x 920 x 2500 mm (107” x 36.2” x 98.4”)
Glove Port Height Min		1055 mm (41.5”)	1055 mm (41.5”)	1055 mm (41.5”)
Glove Port Height Max		1355 mm (53.3”)	1355 mm (53.3”)	1355 mm (53.3”)
Chamber Environment		ISO Class 5 all Chambers (Grade A)		
Filter Type -Chamber Inlet		ULPA U15 with Integral Mesh Guard and Knife Edge Gel Seal		
Filter Efficiency - Chamber Inlet		99.9998%	99.9998%	99.9998%
Filter Type -Chamber Exhaust		ULPA U15 with Integral Mesh Guard and Knife Edge Gel Seal		
Filter Efficiency - Chamber Exhaust		99.9998%	99.9998%	99.9998%
Lighting Level		≥ 600 lux (≥ 56 foot-candles)		
Sound Level		68 dBA		
Isolator Construction	Chamber	SS316L		
	Service Housing	SS304L		
	Support Frame	SS304L		
Isolator Finish	Chamber Internal	≤ 0.4Ra		
	Chamber External	≤ 0.6Ra		
	Service Housing External	≤ 0.6Ra		
	Support Frame	≤ 1.0Ra		
Electrical Requirements (By Client)	220-240V, AC, 50Hz, 1Ø	✓	✓	✓
	110-120V, AC, 60Hz, 1Ø	✓	✓	✓
	220-240V, AC, 60Hz, 1Ø	✓	✓	✓
Compressed Air Requirement (By Client) (If no on-board compressor)	2 Bar-g Pressure at 5Ltr/sec	✓	✓	✓
Exhaust Duct Requirements (By Client) (Unless Integral Catalytic Convertor is Included)		10" Duct from Isolator to Outside		
Options	Pass Chamber	✓	✓	✓
	Bio-Decontamination Steris	✓	✓	✓
	Bio-Decontamination Bioquell	✓	✓	✓
	Non-Viable Air Sampler	✓	✓	✓
	Viable Air Sampler	✓	✓	✓
	Sterility Test Pump	✓	✓	✓
	Glove Tester	✓	✓	✓
	Waste Bag Grommet	✓	✓	✓
	Sterile Continuous Liner	✓	✓	✓
	Bag Welder with Table	✓	✓	✓
	RTPØ105, 190, 270, 350, 460 - Alpha	✓	✓	✓
	RTPØ105, 190, 270, 350, 460 - Beta Canister	✓	✓	✓
	RTPØ105, 190, 270, 350, 460 - Beta Liner	✓	✓	✓
	Weigh Scale	✓	✓	✓
	Spray Gun	✓	✓	✓
	Temperature and RH Monitoring	✓	✓	✓
	H_2O_2 Monitoring	✓	✓	✓
	Product Waste Entry / Exit Ports	✓	✓	✓
	Liquid Water Entry / Exit Ports	✓	✓	✓
	Integral Catalytic Convertor	✓	✓	✓
	On-board Air Compressor	✓	✓	✓

Isoclean®
Healthcare Platform Isolator (HPI-G3)

Introduction

The Isoclean® Healthcare Platform Isolator (HPI-G3) facilitates the isolation of a product or process while providing the required sterile/ aseptic environment. It is configured to operate at positive or negative pressure in single or recirculating airflow. This equipment provides a comprehensive range of personnel and product protection in addition to the surrounding work areas and the environment.

Application

- Pharmacy Compounding (Chemotherapy/TPN)
- Small-scale Potent Material Handling
- Aseptic Processing
- Research and Development
- Cell processing

Accessories and Options

HPI-G3 is available as a standard bench top unit. Additional accessories are available for further enhancement.

Support Stands

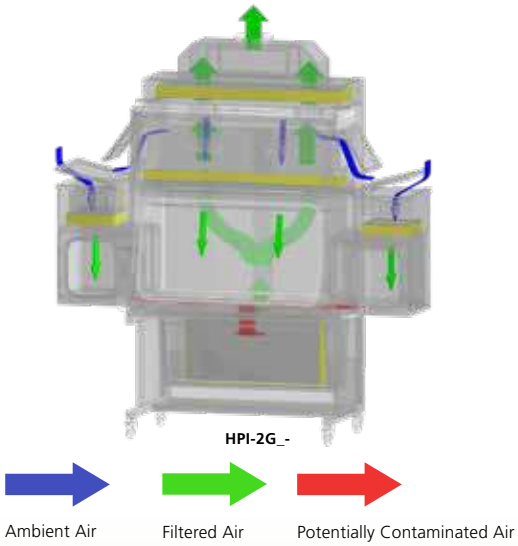
- Fixed height, available 711 mm (28") or 864 mm (34")
  - With leveling feet, ±38.1 mm (1.5") (SPL-_ _0)
  - With casters (SPC-_ _0)
- Telescoping height stand for leveling feet (STL-_ _0), nominal range 660 mm to 960 mm (26"to 37.8") - Adjustable in
- 25.4 mm (1") increments
- Adjustable hydraulic stand, with casters, elevates to accommodate user preference for sitting or standing work surface height (SHM-_-G3)

Other Options and Accessories

- Electrical outlets
- Portable UV Lamp
- IV bars with hooks
- Carbon VOC with filter housing*
- Exhaust collar+
- Hard ducting with anti-blow back valve*
- Glove leak tester
- CCTV and rear view adaptation
- Biovap™ bio-decontamination system
- Sharps container
- Continuous liner for Bag In or Bag Out
- Bag welder for continuous liner system

** for HPI-2G/HPI-3G/HPI-4G models only*

+ for negative isolator only



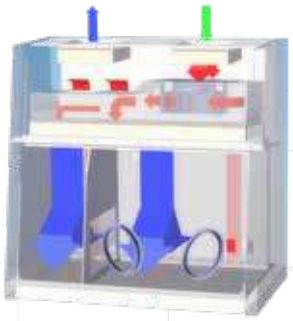
Isoclean® Healthcare Platform Isolator Airflow

Ambient air is pulled through the inlet prefilter (80% efficiency for positive pressure model) located on top of the isolator. The prefilter traps large size particles to extend the life of the supply ULPA filter.

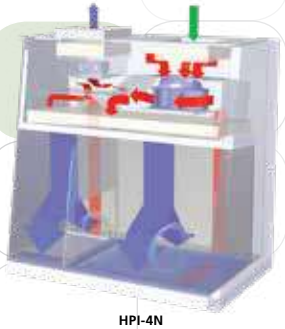
Air from the top inlet and from work zone is pulled by the fan which creates a positive pressure on the plenum that creates downflow. In positive pressure model, the proprietary plenum design forces more air into the work zone, increasing its pressure relative to the pass-thru. In negative pressure model, the work zone and pass-thru interchange are under negative pressure to the room, thereby preventing contaminants from leaving the work zone in case of a breach. The ULPA downflow filter creates a laminar and particle-free ISO Class 5 air cleanliness as per ISO 14644-1 (equivalent to Class 1 as per US Fed Std 209E) inside the isolator to protect the work material inside the main chamber and pass-thru.

Air from the work zone and pass-thru is quickly purged out by the fan to keep the area clean. The fan pulls approximately 90% of the purged air back to the plenum and after passing through the ULPA downflow filter again, it is recirculated back to the work one and pass chamber. The high rate of airflow recirculation helps to prolong filter life and reduces the chances of ambient contaminants entering the work zone.

Approximately 10% of the purged air is exhausted through an ULPA-filter to prevent heat build-up inside the isolator that can be detrimental to drug compounding. This exhausted air is replenished by ambient air coming from the top inlet prefilter and a filter with 80% efficiency for positive pressure model.



HPI-4P



HPI-4N

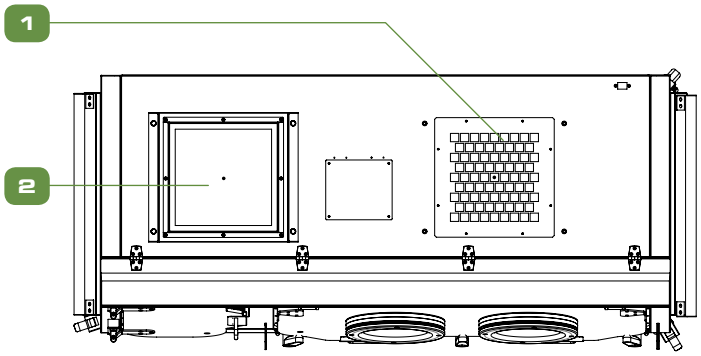
Ambient air is pulled through the inlet prefilter located on top of the isolator. The prefilter traps large size particles to extend the life of the supply HEPA filter.

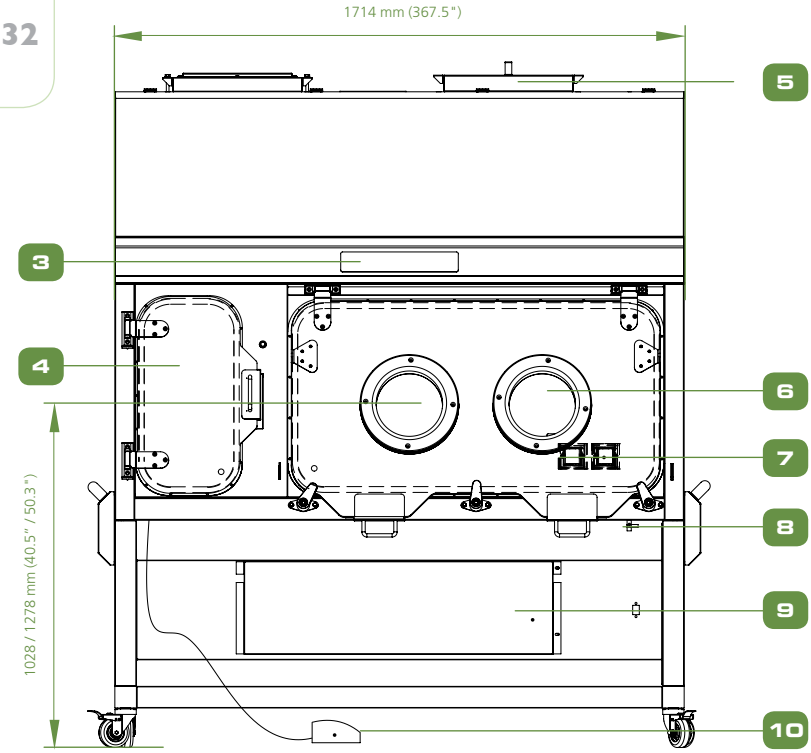
Air from the top inlet and from work zone is pulled by the main fan, which creates positive pressure on the plenum that creates downflow. Work zone pressure is always higher than the pass-through, to prevent contaminants from entering the work zone through the pass-through.

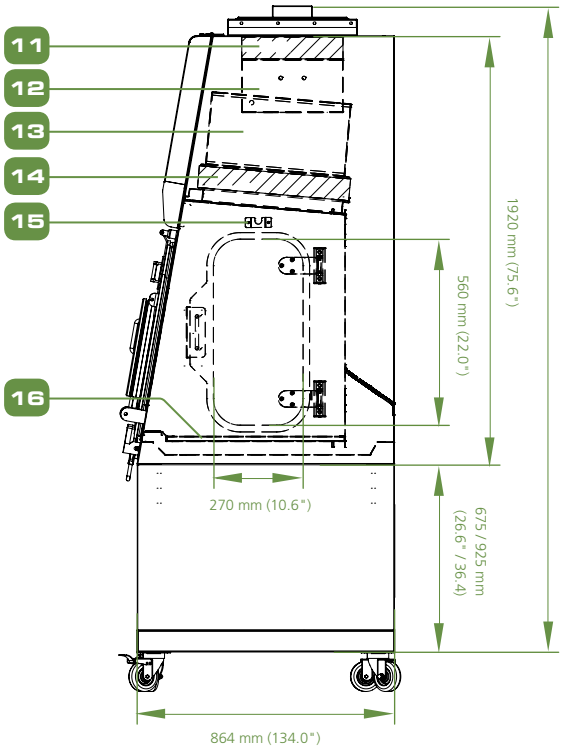
The downflow filter creates a full unidirectional airflow and particle-free ISO Class 5 environment inside the isolator to protect the work material inside the main chamber and pass-through. Air from the work zone and pass-through is quickly purged by the fans to keep the area clean.

Ambient Air Filtered Air Potentially Contaminated Air

ENGINEERING DRAWING (MODEL: HPI-4N_-G3-0)







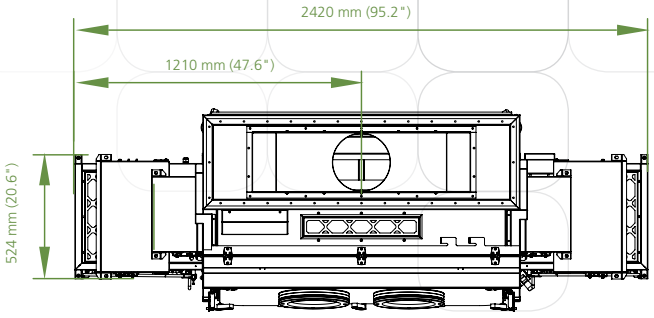
1. *Air Inlet HEPA Filter*
2. *Exhaust Carbon Filter*
3. *Esco Sentinel™ Gold Microprocessor Controller*
4. *Pass-thru Hinged Outer Door*
5. *Cover with clamps*
6. *Glove Ports*
7. *Electrical Outlet*
8. *Drain Valve*
9. *Hydraulic Height Adjustable Support Stand*
10. *Foot Switch for Inner Door*
11. *Exhaust HEPA Filter*
12. *Exhaust Fan*
13. *Supply Fan*
14. *Supply HEPA Filter*
15. *IV Bar Provision*
16. *Single-piece Stainless Steel Work Tray*

GENERAL SPECIFICATIONS

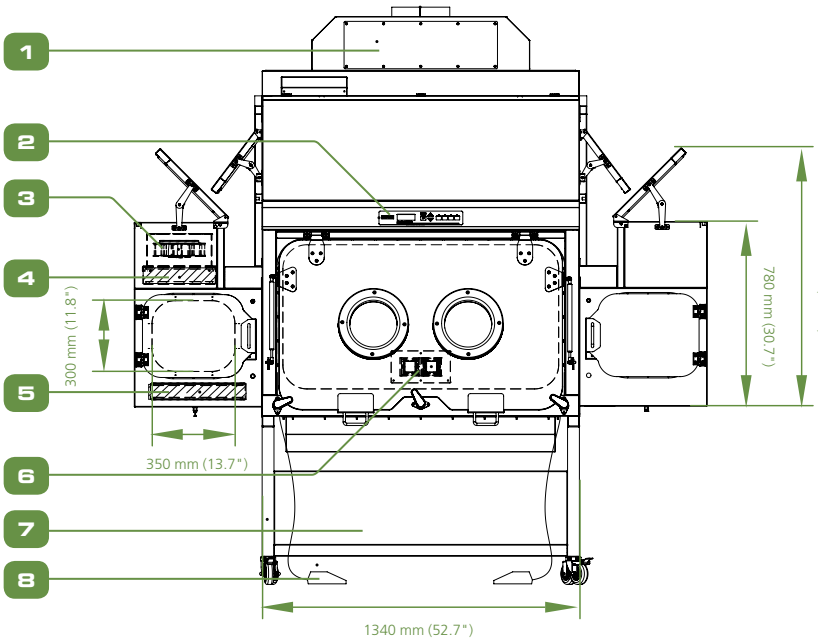
Isoclean® Healthcare Platform Isolator (HPI-G3) (without filter below)

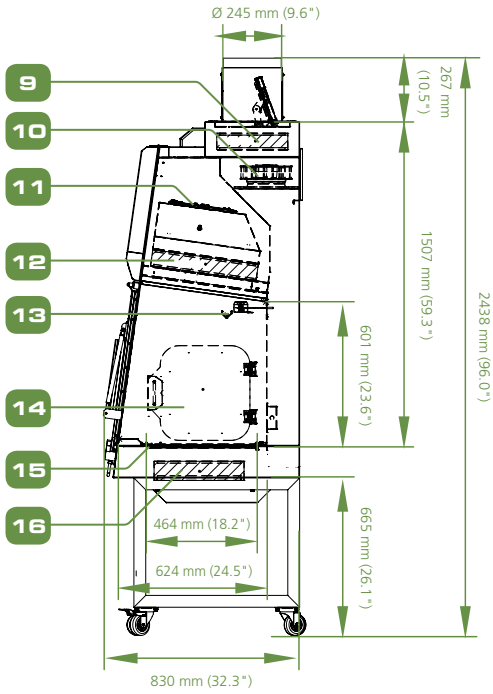
		HPI-4_ _-G3	HPI-6_ _-G3
Main Chamber Nominal Size (Width)		1130 mm (44.4”)	1360 mm (53.5”)
Process Chamber Internal Dimension - (W x D x H)		1130 x 570 x 670 mm (44.4” x 22.4” x 26.3”)	1360 x 570 x 670 mm (53.5” x 22.4” x 26.3”)
Pass Chamber Internal Dimension (W x D x H)		318 x 570 x 670 mm (12.5” x 22.4” x 26.3”)	318 x 570 x 670 mm (12.5” x 22.4” x 26.3”)
Pass Chamber Internal Dimension (W x D x H)	Inner Door	270 x 560 mm (10.6” x 22”)	
	Outer Door	270 x 560 (mm 10.6” x 22”)	
External Dimensions (W x D x H)	With Adjustable Stand (min)	1714 x 864 x 2200 (67.4” x 34” x 86.6”)	1950 x 864 x 2220 (76.7” x 34” x 86.6”)
	With Adjustable Stand (max)	1714 x 864 x 2450 (67.4” x 34” x 96.4”)	1950 x 864 x 2450 (76.7” x 34” x 96.4”)
Glove Port Diameter		200 mm (7.9”)	
Glove Port Quantity		2	3
Chamber Environment		Iso Class 5 all Chambers (Grade A)	
Inlet, Downflow, and Exhaust Filter Type		HEPA (H14) Filter with Integral Metal Guards and Filter Frame Gaskets; Fully Compliant With EN 1822 (H14) and IEST-RPCC001.3 Requirements	
Filter Efficiency		> 99.999% for particle size between 0.1 to 0.3 micron	
Lighting Level		> 800 lux (> 74 foot-candles)	
Sound Level		< 67 dBA	< 67 dBA
Isolator Construction	Main Body	1.2 mm (0.05”) 18 gauge electro-galvanized steel with white oven-baked epoxy-polyester Isocide™ antimicrobial powder-coated finish	
	Work Tray	1.5 mm (0.06”) 16 gauge stainless steel, with 4B finish	
	Side Walls	1.2 mm (0.05”) 18 gauge stainless steel, with 4B finish	
Electrical	220-240V, AC, 50 Hz, 1Ø	HPI-4_1-G3	HPI-6_1-G3
	110-120V,AC, 60 Hz, 1Ø	HPI-4_2-G3	HPI-6_2-G3
	220-240V, AC, 60 Hz, 1Ø	HPI-4_3-G3	HPI-6_3-G3
Compressed Air Requirement (by Client)	2 Bar-g Pressure at 5 L/sec	2 Bar	
Options/Accessories	Drain	✓	✓
	IV Bar with S hooks	✓	✓
	UV Lamp	✓	✓
	Carbon Filter	✓	✓
	Adjustable Hydraulic Stand	✓	✓
	CCTV	✓	✓
	TV Monitor	✓	✓
	Electrical Outlet	✓	✓
	Glove leak Tester	✓	✓
Work Surface Options	Single-piece Trays	✓	✓
	Multiple-piece Trays	✓	✓
Transfer Options	Sharps Disposal	✓	✓
	Continuous Liners for BIBO	✓	✓
	Bag Welder for Continuous Liner System	✓	✓
Net Weight		540 kg (1191 lbs)	900 kg (1984 lbs)
Shipping Weight		580 kg (1279 lbs)	950 kg (2094 lbs)
Shipping Dimensions, Maximum (W x D x H)		1950 x 950 x 2210 mm (76.7” x 37.4” x 87.0”)	3200 x 950 x 2210 mm (125.9” x 37.4” x 87.0”)
Shipping Volume, Maximum		4.09 m^3 (144.4 ft^3)	7.63 m^3 (269.4 ft^3)
		HPI-4_ _-G3	**HPI-6_ _-G3**
Building Exhaust Requirements		190 cmh at 80 Pa (80% recirculating, 20% exhaust)	286 cmh at 100 Pa (80% recirculating, 20% exhaust)

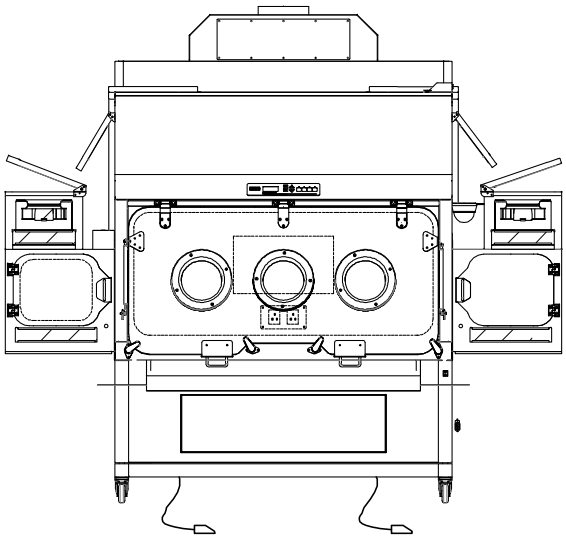
ENGINEERING DRAWING (MODEL: HPI-2G_-NS2-0)



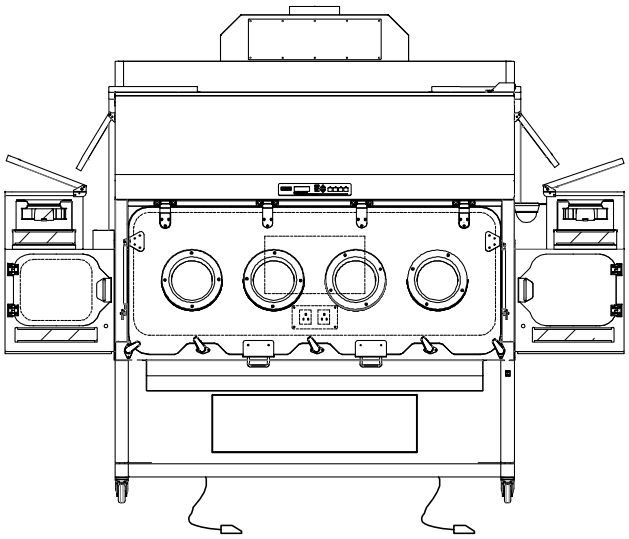
1. *Exhaust Collar*
2. *Esco Sentinel™ Gold Microprocessor Controller*
3. *Supply Fan*
4. *Supply H14 Filter*
5. *Exhaust H14 Filter*
6. *Electrical Outlet*
7. *Support Stand*
8. *Foot Switch for Inner Door*
9. *Second Exhaust H14 Filter*
10. *Exhaust Blower*
11. *Supply Fan*
12. *Supply H14 Filter*
13. *IV Bar Provision*
14. *Inner Door*
15. *Single-piece Sliding Tray*
16. *First Exhaust H14 Filter*







Model HPI-3G



Model HPI-4G

GENERAL SPECIFICATIONS

Isoclean® Healthcare Platform Isolator (HPI-G3) (with filter below)

		HPI-2G	HPI-3G	HPI-4G
Main Chamber Nominal Size (Width)		1.2 m (4')	1.5 m (5')	1.8 m (6')
External Dimension (with two Pass Chamber) (L x W x H)	Without Base Stand	1340 x 830 x 1462 mm (52.7" x 32.6" x 57.5")	2725 x 830 x 1462 mm (107.2" x 32.6" x 57.5")	3030 x 830 x 1462 mm (119.2" x 32.6" x 57.5")
	With Base Stand (Min)	2420 x 830 x 2430 mm (95.2" x 32.6" x 95.6")	2725 x 830 x 2430 mm (107.2" x 32.6" x 95.6")	3030 x 830 x 2430 mm (119.2" x 32.6" x 95.6")
	With Base Stand (Max)	2420 x 830 x 2680 mm (95.2" x 32.6" x 105.5")	2725 x 830 x 2680 (107.2" x 32.6" x 105.5")	3030 x 830 x 2680 mm (119.2" x 32.6" x 105.5")
Main Chamber Work Zone (W x D x H)		1215 x 624 x 616 mm (47.8" x 24.5" x 24.2")	1520 x 624 x 616 mm (59.8" x 24.5" x 24.2")	1825x 624 x 616 mm (71.8" x 24.5" x 24.2")
Pass Through (W x D x H)		577 x 427 x 320 mm (22.7" x 16.8" x 12.5")		
Work Zone and Interchange Chamber Performance		ISO Class 5 all Chamber (Grade A)		
Prefilter		G4, panel, polyester fiber media		
Inlet Filter Type		80% efficiency prefilter		
Downflow and Exhaust Filter Type		HEPA (H14) with Integral Mesh Guard and Gasket Seal, fully compliant with EN 1822		
Typical Filter Efficiency		> 99.999% for particle size between 0.1 to 0.3 micron		
Sound Level		< 67 dBA		
Fluorescent Lamp Intensity		> 800 lux (> 74 foot-candles)		
Isolator Construction	Main Body	1.5 mm (0.05") 18 gauge electro-galvanized steel with white oven-baked epoxy-polyester Isocide™ antimicrobial powder-coated finish		
	Work Tray	1.5 mm (0.06") 16 gauge stainless steel, type 316, with 4B finish		
	Side Walls	1.5 mm (0.06") 16 gauge stainless steel, type 316, with 4B finish		
Electrical	220-240V, AC, 50 Hz, 1Ø	**HPI-2G8-_ _ _ - _**	**HPI-3G8_-_ _ _ - _**	**HPI-4G8_-_ _ _ - _**
	Cabinet Full Load Amps (FLA)	15A	16A	17A
	Optional Outlets FLA	5A per outlet	5A per outlet	5A per outlet
	Cabinet Nominal Power	3.45 KW	3.68 KW	3.91 KW
	Cabinet BTU	11,772 BTU/hr	12,557 BTU/hr	13,341 BTU/hr
	110-120V,AC, 60 Hz, 1Ø	**HPI-2G9-_ _ _ - _**	**HPI-3G9_-_ _ _ - _**	**HPI-4G9_-_ _ _ - _**
	Cabinet Full Load Amps (FLA)	15A	16A	17A
	Optional Outlets FLA	5A per outlet	5A per outlet	5A per outlet
	Cabinet Nominal Power	1.725 A	1.84 A	1.95 KW
	Cabinet BTU	5,886 BTU/hr	6,278.34 BTU/hr	6,6670 BTU/hr
Compressed Air Requirement (by Client)	2 Bar-g Pressure at 5 L/sec	2 Bar		
General Options/ Accessories	UV Lamp	✓	✓	✓
	Carbon Filter	✓	✓	✓
	Adjustable Hydraulic Stand	✓	✓	✓
	CCTV	✓	✓	✓
	Rear View Screen Adaptation	✓	✓	✓
	IV Bars with hooks	✓	✓	✓
	Electrical Outlet	✓	✓	✓
	Glove Leak Tester	✓	✓	✓
	Carbon VOC Filter with Housing	✓	✓	✓
	Hard Ducting with Antiblowback	✓	✓	✓
Work Surface Options	Single Piece Trays	✓	✓	✓
	Multiple Piece Trays	✓	✓	✓
Transfer Options	Sharps Disposal	✓	✓	✓
	Continuous Liners for BIBO	✓	✓	✓
	Bag Welder for Continuous Liner System	✓	✓	✓
Net Weight		670 kg (1477 lbs)	750 kg (1653 lbs)	903 kg (1990 lbs)
Shipping Weight		745 kg (1642 lbs)	800 kg (1763 lbs)	953 kg (2101 lbs)
Shipping Dimensions, Maximum (W x D x H)		2600 x 1050 x 2620 mm (102.4" x 41.3" x 103.1")	2700 x 1050 x 2620 mm (106.2" x 41.3" x 103.1")	3200 x 1050 x 2620 mm (125.9" x 41.3" x 103.1")
Shipping Volume, Maximum		5.64 m^3 (199.1 ft^3)	6.32 m^3 (223.1 ft^3)	7.63 m^3 (269.4 ft^3)
Building Exhaust Requirements		**HPI-2G**	**HPI-3G**	**HPI-4G**
Recirculating	1 Pass-thru chamber	234 cmh at 30 Pa	270 cmh at 30 Pa	316 cmh at 30 Pa
	2 Pass-thru chamber	254 cmh at 50 Pa	290 cmh at 50 Pa	290 cmh at 50 Pa
Total Exhaust (Single Pass)	1 Pass-thru chamber	1170 cmh at 450 Pa	1350 cmh at 400 Pa	1580 cmh at 350 Pa
	2 Pass-thru chamber	1270 cmh at 500 Pa	1450 cmh at 450 Pa	1450 cmh at 400 Pa

Streamline®

Compounding Aseptic Isolator (Recirculating)

Main Features

- ULPA filters with a typical efficiency of > 99.999% at 0.1 to 0.3 microns provide superior ISO Class 5 air cleanliness, 100 times better than competing products.
- Sentinel™ Gold Microprocessor controller supervises all functions and monitors airflow and pressures in real-time.
- Work zone and pass-thru interchange are under negative pressure to the room in order to maintain operator protection in the event of a breach in the barrier isolation system.
- Robust dual-wall construction. The work zone is surrounded by negative pressure plenums at the sides and back. Unique Esco Dynamic Chamber™ plenum surrounds filter seals with negative pressure.
- Ergonomically angled front and oval gloveports improve reach and comfort.
- Safe-change cuff rings permit glove changes with zero risk of contaminating the work zone or pharmacy environment.
- One piece work zone liner with no crevices is easy to clean.
- Esco Isocide™ antimicrobial coating on all painted surfaces minimizes contamination.
- Optional sharps disposal system and hydraulic height-adjustable stand.

Airlock Pass-thru

The airlock pass-thru ensures work zone remains sterile during insertion and removal of items.

Optional Sharps Disposal System

Optional sharps disposal system enables smoother work flow and minimizes transfers in order to enhance patient protection and sterility. Sharps may be disposed through the work surface into disposal bins while minimizing contamination of the work zone.

Vertical Pass-thru Door

The vertical pass-thru door prevents ingress of contamination into the work zone during transfer procedures. The built-in electrical interlock prevents both doors from being opened at the same time.

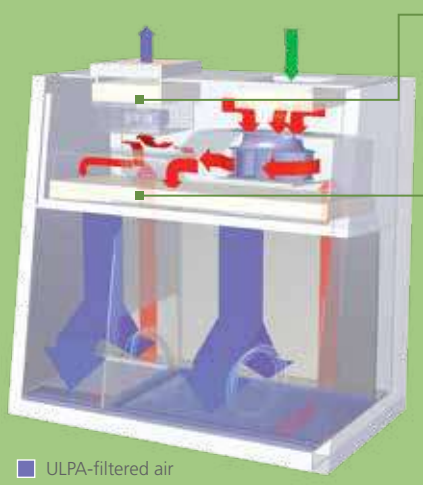
Horizontal Tray

The horizontal tray prevents operator fatigue during transfer procedures.

Other Options and Accessories

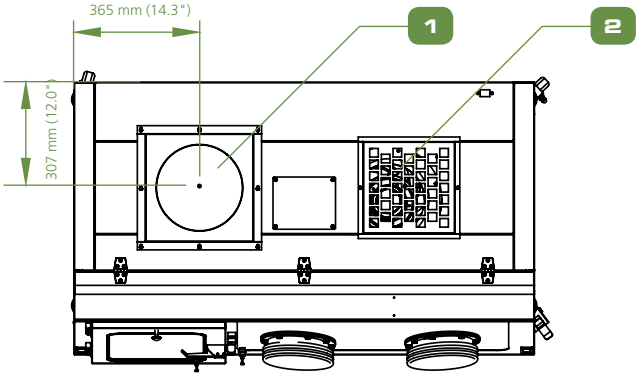
- Electrical outlets
- All stainless steel construction
- Portable UV Lamp
- IV bar, with hooks
- Sharps disposal system
- Cleaning accessories
- Alarm package
- Exhaust carbon filter
- Thimble exhaust collar
- Perforated shelf to increase work zone space

Compounding Aseptic Containment Isolator (Recirculating)

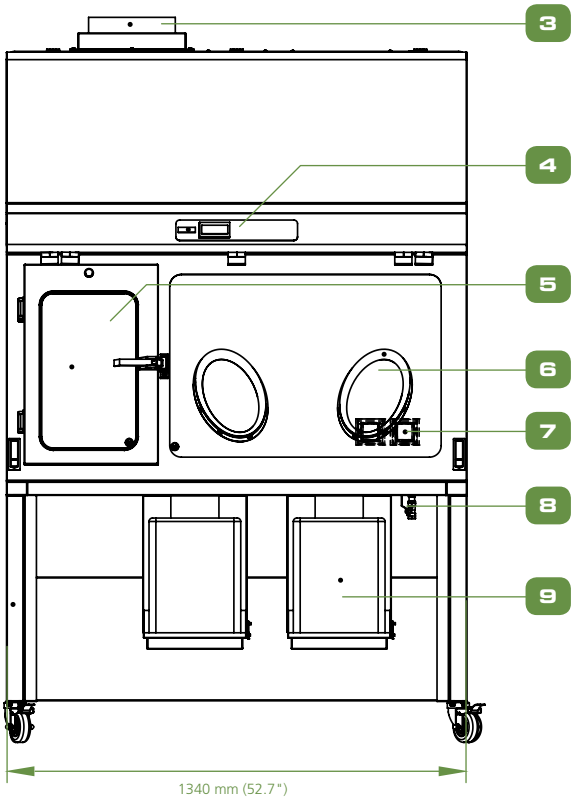


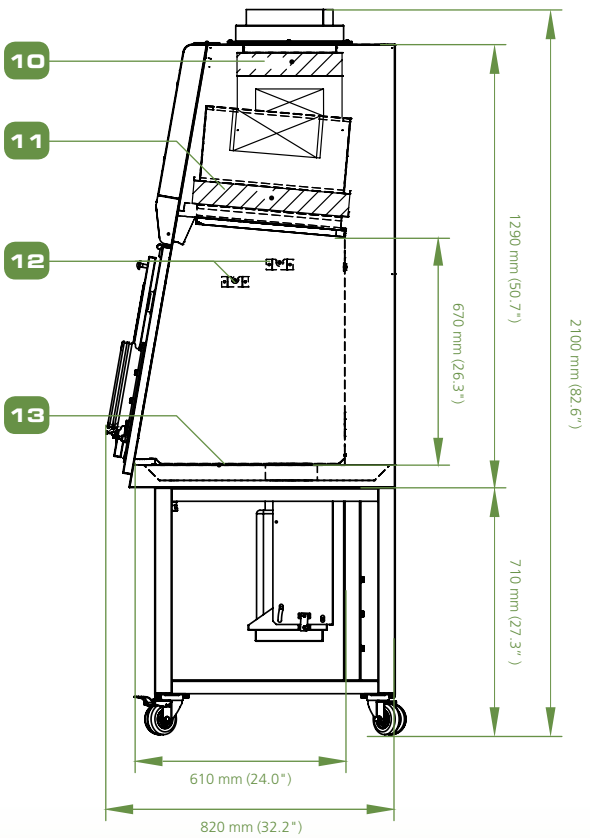
- *Ambient air is pulled through the inlet prefilter located on top of the Isolator. The prefilter traps larger particles and extends the life of the supply ULPA filter.*
- *Air from the top inlet and from work zone is pulled by the main fan, which creates positive pressure on the plenum that creates downflow.*
- *The work zone and pass-thru interchange are under negative pressure to the room.*
- *The ULPA downflow filter creates a laminar and particle-free ISO Class 5 environment inside the isolator to protect the work material inside the main chamber and pass-thru.*
- *Air from the work zone and pass-thru is quickly purged by the fans to keep the area clean. The main fan pulls approximately 90% of the purged air back to the plenum and after passing through the ULPA downflow filter again, it is recirculated back to the work zone and pass-thru. The high rate of airflow re-circulation helps to prolong filter life.*
- *Approximately 10% of the recirculated air is exhausted through an ULPA filter to prevent heat build-up inside the isolator.*

ENGINEERING DRAWING (MODEL: SCI-4N_-S)

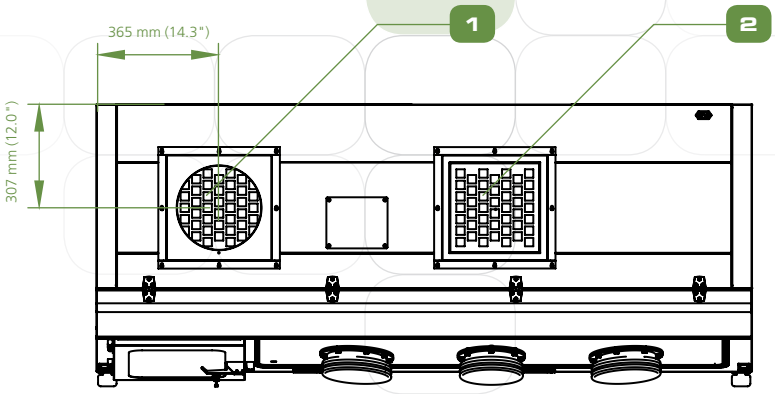


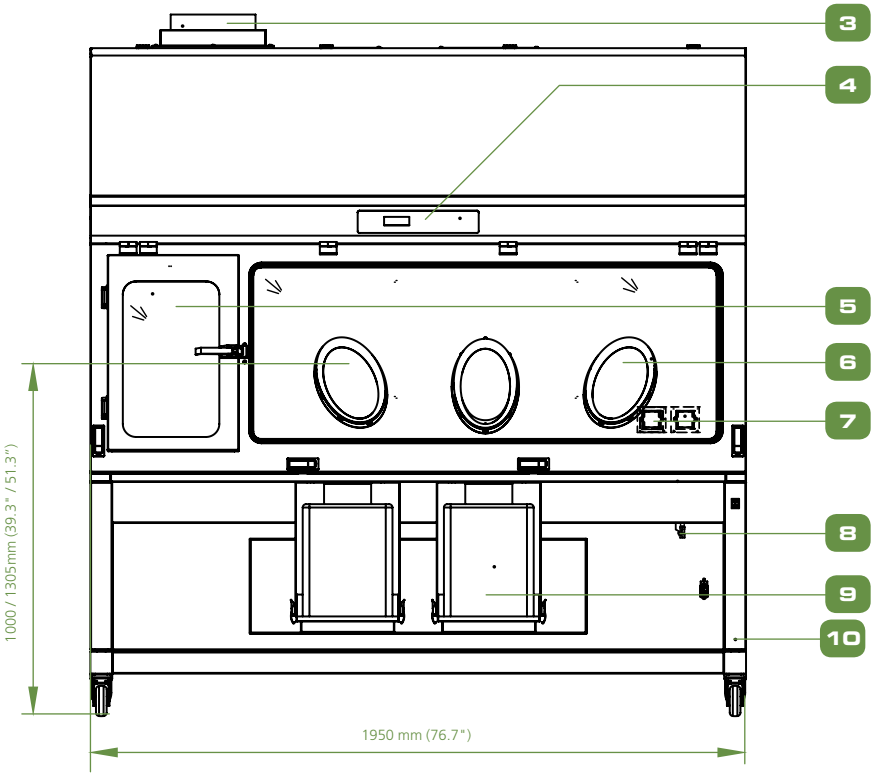
1. *Exhaust ULPA Filter*
2. *Air Intake ULPA Filter*
3. *Exhaust Collar*
4. *Esco Sentinel™ Gold Microprocessor Controller*
5. *Pass-thru Hinged Outer Door*
6. *Oval Glove Ports*
7. *Electrical Outlets*
8. *Drain Valve*
9. *Sharp Disposal Container*
10. *H14 Exhaust Filter*
11. *H14 Supply Filter*
12. *IV Bar Provision*
13. *Single-piece Stainless Steel Work Tray*

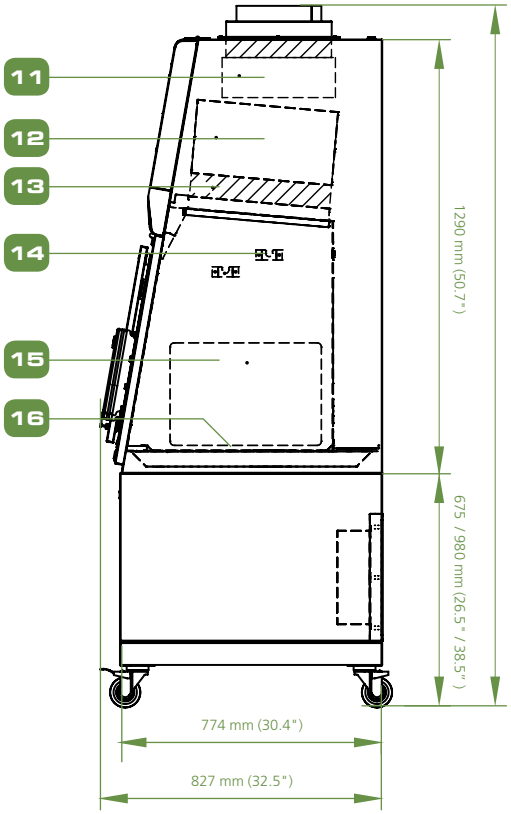




ENGINEERING DRAWING (MODEL: SCI-6N1-S)







1. *Exhaust ULPA Filter*
2. *Air Intake ULPA Filter*
3. *Exhaust Collar*
4. *Esco Sentinel™ Gold Microprocessor Controller*
5. *Pass-thru Hinged Outer Door*
6. *Oval Glove Ports*
7. *Electrical Outlets*
8. *Drain Valve*
9. *Sharp Disposal Container*
10. *Motorized Support Stand*
11. *Exhaust Fan*
12. *Supply fan*
13. *Supply ULPA Filter*
14. *IV Bar Provision*
15. *Pass-thru Inner Door*
16. *Single-piece Stainless Steel Tray*

Guide to Streamline® Compounding Aseptic Containment Isolator - Recirculating Models

SCI - 4 N 3 - S

Isolator	Code	Nominal Width	Code	Electrical Code	Code	Sharps Provisions	Code
Streamline® Compounding Isolator	SCI	4 ft (1.2 m)	4	220-240 V, AC, 50 Hz, 1Ø	1	No sharps provision	0
		6 ft (1.8 m)	6	110-120 V, AC, 50/60 Hz, 1Ø	2	With sharps provision	S
				220-240 V, AC, 60 Hz, 1Ø	3		

GENERAL SPECIFICATIONS

Compounding Aseptic Containment Isolator (Recirculating)

		SCI-4N_-_	SCI-6N_-_
Nominal Size		1.2 m (4')	1.8 m (6')
External Dimensions (W x D x H)	Without Base Stand	1340 x 820 x 1320 mm (52.8" x 32.3" x 51.9")	1950 x 820 x 1320 mm (76.8" x 32.3" x 51.9")
	With Base Stand (Min)	1522 x 820 x 1995 mm (59.9" x 32.3" x 78.5")	2132 x 820 x 1995 mm (83.9" x 32.3" x 78.5")
	With Base Stand (Max)	1522 x 820 x 2250 mm (59.9" x 32.3" x 88.6")	2132 x 820 x 2250 mm (83.9" x 32.3" x 88.6")
Main Chamber Work Zone (W x D x H)		840 x 610 x 670 mm (33.1" x 24.0" x 26.4")	1450 x 610 x 670 mm (57.1" x 24.0" x 26.4")
Pass Through (W x D x H)		355 x 610 x 670 mm (13.9" x 24.0" x 26.4")	355 x 610 x 670 mm (13.9" x 24.0" x 26.4")
Work Zone and Interchange Chamber Performance		ISO Class 5 all chambers (Grade A)	
Downflow and Exhaust Filter and Inlet Filter Type		ULPA filter with integral metal guards and filter frame gaskets; fully compliant with EN 1822 (H14) and IEST-RP-CC001.3 requirements (each cabinet has individual downflow, exhaust filters and inlet filters.)	
Typical Filter Efficiency		> 99.999% for particle size between 0.1 to 0.3 micron	
Airflow Volume	Required Exhaust With Optional Hard Ducting	190 m^3/h (112 cfm)	286 m^3/h (168 cfm)
	Static Pressure For Optional Hard Ducting	27 Pa / 0.10 in H_2O	30 Pa / 0.12 in H_2O
Fluorescent Lamp Intensity		> 950 lux (> 88 foot-candles)	
Isolator Construction	Main Body	1.2 mm (0.05") 18 gauge electro-galvanized steel with white oven-baked epoxy-polyester Isocide™ antimicrobial powder-coated finish	
	Work Tray	1.5 mm (0.06") 16 gauge stainless steel, type 304, with 4B finish	
	Side Walls	1.2 mm (0.05") 18 gauge stainless steel, type 304, with 4B finish	
Electrical	220-240V, AC, 50Hz, 1Ø	SCI-4N1-_	SCI-6N1-_
	Cabinet Full Load Amps (FLA)	2.1 A	2.5 A
	Optional Outlets FLA	5 A	5 A
	Cabinet Nominal Power	295 W	440 W
	Cabinet BTU	1007	1501
	110-120V, AC, 60Hz, 1Ø	SCI-4N2-_	SCI-6N2-_
	Cabinet Full Load Amps (FLA)	6 A	8.2 A
	Optional Outlets FLA	5 A	5 A
	Cabinet Nominal Power	410 W	600 W
	Cabinet BTU	1399	2047
	220-240V, AC, 60Hz, 1Ø	SCI-4N3-_	SCI-6N3-_
	Cabinet Full Load Amps (FLA)	2.1 A	2.5 A
	Optional Outlets FLA	5 A	5 A
	Cabinet Nominal Power	295 W	440 W
	Cabinet BTU	1007	1501
Net Weight		326 kg (718 lbs)	395 kg (870 lbs)
Shipping Weight		392 kg (864 lbs)	476 kg (1049 lbs)
Shipping Dimensions, Maximum (W x D x H)		1550 x 920 x 2210 mm (61.0" x 36.3" x 87.0")	2200 x 960 x 2210 mm (86.6" x 37.8" x 87.0")
Shipping Volume, Maximum		3.48 m^3 (122.9 ft^3)	4.51 m^3 (159.3 ft^3)

Streamline®

Compounding Aseptic Containment Isolator (Total Exhaust)

Streamline® Compounding Isolator (Total Exhaust) provides a sterile environment for handling hazardous drugs. Configured to operate at negative pressure to provide user, product, environment, and cross-contamination protection from exposure to hazards. The negative pressure, total exhaust isolator is suitable for work involving cytotoxic drugs and other hazardous drugs in the healthcare settings.

- H14 filters with a typical efficiency of > 99.995% at 0.3 microns provide superior ISO Class 5 air cleanliness.
- Robust construction and enhanced safety features qualify the Streamline® Compounding Aseptic Containment Isolator (Total Exhaust) for the most demanding laboratory applications. The isolator is fully assembled and ready to install and operate when shipped.
- Airlock Pass Chamber ensures work zone remains sterile during insertion and removal of items. Equipped with electromagnetic interlock doors facilitated by foot switch for the inner door.
- Esco Isodice™ antimicrobial coating on all painted surfaces minimizes contamination.
- Ergonomically styled sloped front reduces glare and allows for easier reach into the work area with highly rounded

Sentinel™ Gold Microprocessor Control System supervises all functions and monitors airflow and pressures in real-time.

Horizontal sliding tray prevents operator fatigue during transfer procedures

Foot switch provides hands-free access to opening and closing of the magnetic interlock minimizing operator fatigue during transfer procedures.

Safe-change cuff rings permit glove changes with zero risk of contaminating the work zone or pharmacy environment.

Exhaust Types

SCI Total Exhaust comes with 3 different exhaust configuration:

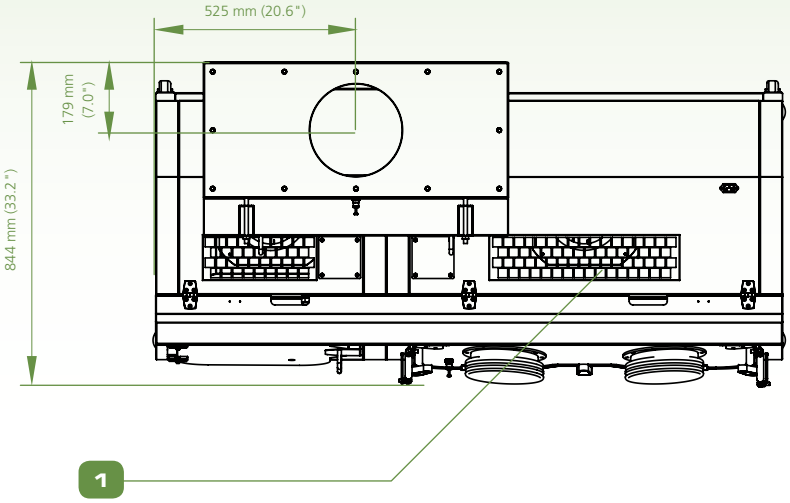
- *Double Exhaust (Top/Bottom)*
- *Single Exhaust –Top*
- *Single Exhaust -Bottom*

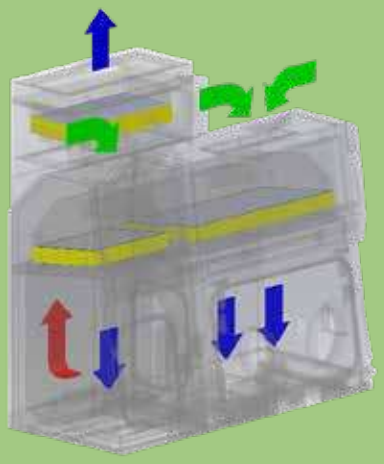
Bag-In Bag-Out (BIBO) Exhaust Filter at the top allows for safe and convenient filter change.

Filter below work zone filters the contaminated air immediately to minimize possibility of airborne contamination and allows low contamination change of filters.

Sharps disposal systems are available as options

ENGINEERING DRAWING (MODEL: SCI-2G_-NSL-2S)

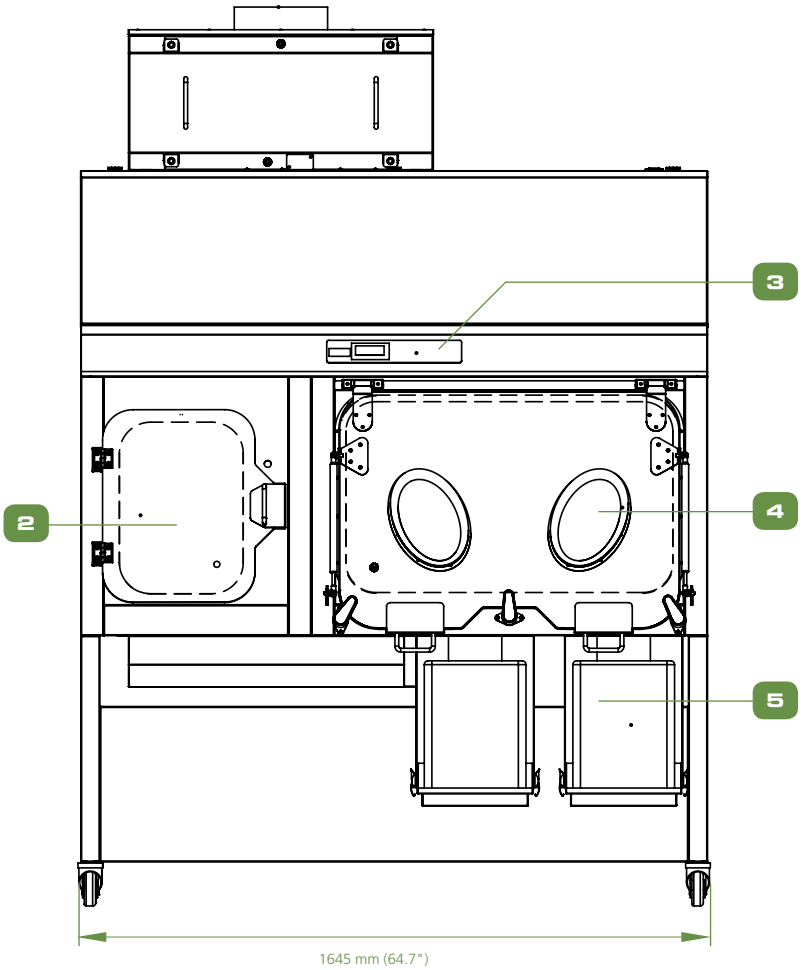


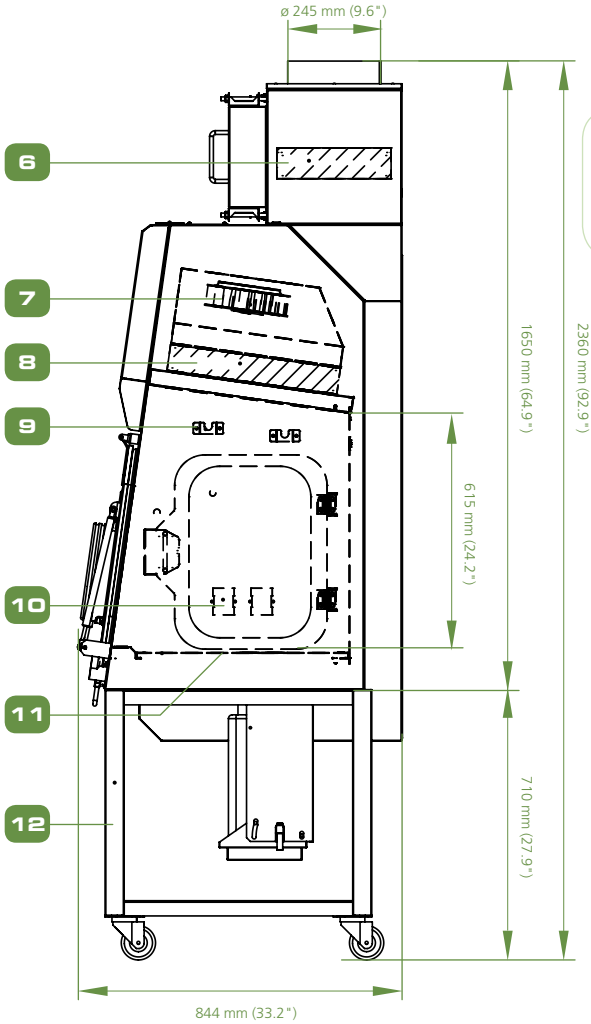


ULPA-filtered air
Unfiltered / Potentially contaminated air
Room air / Inflow air

Streamline® Compounding Isolator (Total Exhaust)

- *Ambient air is pulled through the inlet prefilter located on top of the isolator. The prefilter traps large size particles to extend the life of the supply HEPA filter.*
- *Air from the top inlet and from workzone is pulled by the main fan, which creates positive pressure on the plenum that creates downflow. Work zone pressure is always higher than the pass-through, to prevent contaminants from entering the workzone through the pass-through.*
- *The downflow filter creates a full unidirectional airflow and particle-free ISO Class 5 environment inside the isolator to protect the work material inside the main chamber and pass-through. Air from the work zone and pass-through is quickly purged by the fans to keep the area clean. The purge is completely exhausted through HEPA filter.*





1. *Air Inlet*
2. *Hinged Pass-thru Chamber*
3. *Esco Sentinel™ Microprocessor Controller*
4. *Oval Glove Ports*
5. *Sharps Disposal*
6. *Bag-In Bag-Out (BIBO) Second Exhaust Filter*
7. *Supply Fan*
8. *Supply H14 Filter*
9. *IV Bar Provision*
10. *Electrical Outlet*
11. *Single-piece Stainless Steel Work Tray*
12. *Support Stand*

Guide to Streamline® Compounding Aseptic Containment Isolator (Total Exhaust) Models

SCI - 2G 8 NS L - 1 0

Isolator	Code	Nominal Width	No. of Gloveports	Electrical Code	Code	Pass-through Chamber	Code	Exhaust Type	Code	Sharps Container*	Code
Streamline® Compounding Isolator	SCI	4 ft (1.2 m)	2G	220-240 V, AC, 50/60 Hz, 1Ø	8	Left	L	Double Exhaust (Top & Bottom)	1	No	0
		6 ft (1.8 m)	3G	110-120 V, AC, 50/60 Hz, 1Ø	9	Right	R	Single Exhaust (Top)	2	Yes	S
								Single Exhaust (Bottom)	3		

** Sharps container option is not available for Double Exhaust Filter Type*

GENERAL SPECIFICATIONS

Streamline® Compounding Aseptic Containment Isolator (Total Exhaust)

		SCI-2G_-NS	SCI-3G_-NS
External Dimensions (W x D x H)	With Adjustable Stand (Min)	1645 x 845 x 2360 mm (64.8" x 33.3" x 92.9")	1950 x 845 x 2360 mm (76.8" x 33.3" x 92.9")
	With Adjustabel Stand (Max)	1645 x 845 x 2600 mm (64.8" x 33.3" x 102.4")	1950 x 845 x 2600 mm (76.8" x 33.3" x 102.4")
Process Chamber Internal Dimension (W x D x H)		915 x 560 x 615 mm (36.0" x 22.0" x 24.2")	1220 x 560 x 615 mm (48.0" x 22.0" x 24.2")
Pass-through Chamber Internal Dimension (W x D x H)		480 x 560 x 615 mm (18.9" x 22.0" x 24.2")	480 x 560 x 615 mm (18.9" x 22.0" x 24.2")
Glove Port Quantity		2	3
Chamber Environment		ISO Class 5 all Chambers (Grade A)	
Prefilter		G4, panel, polyester fiber media	
Downflow and Exhaust Filter Type		HEPA H14 Filter with Integral Mesh Guards and Gaskets, fully compliant with EN 1822	
Bag-In Bag-Out (BIBO) Filter		HEPA H14 Filter with Integral Mesh Guards and Gaskets, fully compliant with EN 1822	
Filter Efficiency		> 99.995% for particle size between 0.1 to 0.3 microns	
Lighting Level		> 800 lux (>74 foot-candles)	
Sound Level		< 67 dBA	< 67 dBA
Downflow Velocity (m/s)	Process Chamber	0.3 ± 20%	0.4 ± 20%
	Pass Chamber	0.12 ± 20%	0.12 ± 20%
Air Change Per Hour	Process Chamber	1577	1577
	Pass Chamber	631	631
Air Volume (m^3/h)	Process Chamber	548	731
	Pass Chamber	115	115
Isolator Construction	Main Body	1.2 mm (0.05") 18 Gauge Electro-Galvanized Steel with White Oven-Baked Epoxy-Polyester Isocide™ Antimicrobial Powder Coated Finish	
	Work Tray	1.5 mm (0.06") 16 Gauge Stainless Steel, Type 316, with 4B Finish	
	Inner Side Wall	1.5 mm (0.06") 18 Gauge Stainless Steel, Type 316, with 4B Finish	
Building Exhaust Requirement	Double Exhaust (Top/Bottom)	450 Pa at 800 cmh	450 Pa at 850 cmh
	Single Exhaust Top	450 Pa at 670 cmh	300 Pa at 850 cmh
	Single Exhaust Bottom	450 Pa at 800 cmh	300 Pa at 850 cmh

WDCI
Weighing and Dispensing Isolator

Introduction

The Esco Weighing and Dispensing Containment Isolators (WDCI) are advanced containment systems providing controlled negative pressure environments to maximize personnel protection during weighing and dispensing of potent compounds.

Esco WDCIs' provide standard configurable designs that are able to adapt to various weighing and dispensing quantities and accuracies.

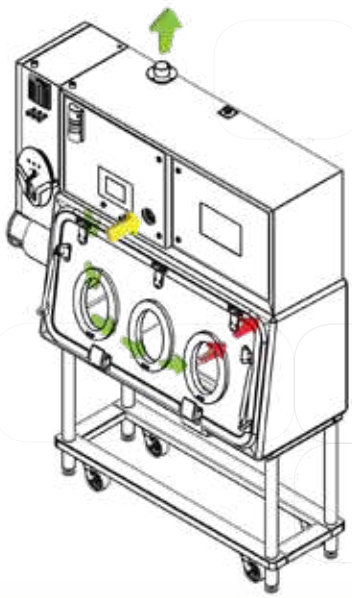
Basic principles

- Turbulent airflow allowing maximum containment with low airflow and therefore improved energy efficiency.
- Low negative pressure to reduce operator fatigue whilst providing maximum containment.
- Stable weighing accuracy as a result of low chamber pressure and flow in conjunction with anti-vibration platform.
- Contained Pass In / Pass Out systems to allow safe material transfer.

Standard Features

- Fully welded single-piece SS316L internal chambers with rounded coved corners.
- Pressure tested to ISO 14644-7.
- Inflatable antibacterial, USP Class VI compliant and food grade FDA approved gaskets providing both proactive and reactive sealing.
- Safe change glove system allowing change of gloves whilst maintaining a contained system.
- Integrated anti-vibration granite platform for analytical balance placement.
- Integrated automated pressure decay testing.
- Clean interior and exterior finishing.
- Safe change filters to allow in-process filter replacement.
- Lighting external to isolator chamber for ease of servicing and process chamber cleanliness.
- Integrated automated height adjustment providing 280mm of motion for ergonomic comfort.

Airflow Schematic

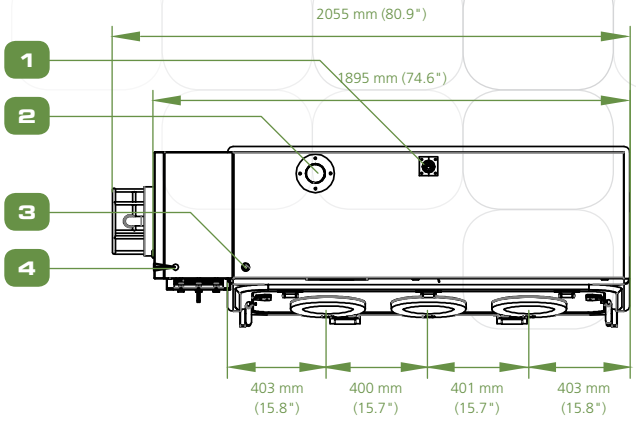


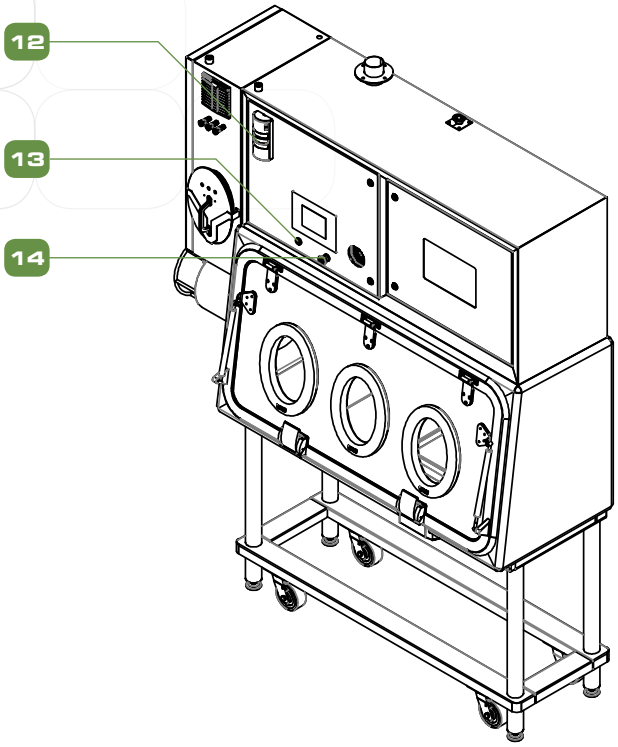
Room air Filtered air Contaminated air

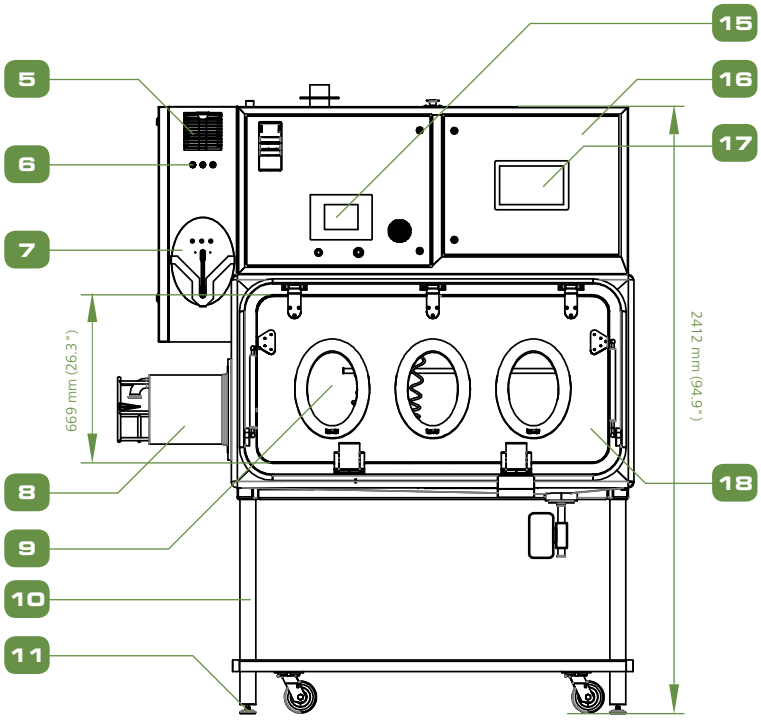
GENERAL SPECIFICATIONS

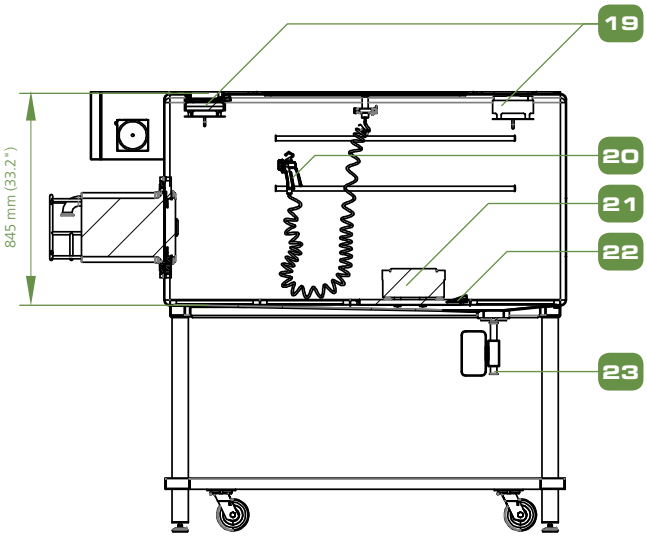
		WDCI - 2G	WDCI - 3G	WDCI - 4G	WDCI - 5G
Nominal Size Process Chamber		1190 mm (46.9”)	1590 mm (62.8”)	1990 mm (78.3”)	2390 mm (94.1”)
External Dimensions (W x D x H)	Without Base Stand	1200 x 800 x 1730 mm (47.2” x 31.4” x 68.1”)	1600 x 800 x 1730 mm (62.9” x 31.4” x 68.1”)	2000 x 800 x 1730 mm (78.7” x 31.4” x 68.1”)	2400 x 800 x 1730 mm (94.4” x 31.4” x 68.1”)
	With Adjustable Base Stand (Min)	1200 x 800 x 2080 mm (47.2” x 31.4” x 81.8”)	1600 x 800 x 2080 mm (62.9” x 31.4” x 81.8”)	2000 x 800 x 2080 mm (78.7” x 31.4” x 81.8”)	2400 x 800 x 2080 mm (94.4” x 31.4” x 81.8”)
	With Adjustable Base Stand (Max)	1200 x 800 x 2360 mm (47.2” x 31.4” x 92.9”)	1600 x 800 x 2360 mm (62.9” x 31.4” x 92.9”)	2000 x 800 x 2360 mm (78.7” x 31.4” x 92.9”)	2400 x 800 x 2360 mm (94.4” x 31.4” x 92.9”)
Internal Dimensions (W x D x H)		1190 x 633 x 842 mm (46.9” x 24.9” x 33.1”)	1590 x 633 x 842 mm (62.8” x 24.9” x 33.1”)	1990 x 633 x 842 mm (78.3” x 24.9” x 33.1”)	2390 x 633 x 842 mm (94.1” x 24.9” x 33.1”)
Glove Port Height Min		950 mm (37.4”)	950 mm (37.4”)	950 mm (37.4”)	950 mm (37.4”)
Glove Port Height Max		1300 mm (51.1”)	1300 mm (51.1”)	1300 mm (51.1”)	1300 mm (51.1”)
Chamber Pressure		Negative Pressure	Negative Pressure	Negative Pressure	Negative Pressure
Airflow Type		Turbulent Flow	Turbulent Flow	Turbulent Flow	Turbulent Flow
Airflow Volume - Maximum (Intake & Exhaust) - Normal Operation		21 m^3/h	21 m^3/h	21 m^3/h	21 m^3/h
Airflow Volume - Maximum (Intake & Exhaust) - Glove Breach Protection		75 m^3/h	75 m^3/h	75 m^3/h	75 m^3/h
Filter Type - Inlet		H14 Cartridge Filter with PVC Shroud	H14 Cartridge Filter with PVC Shroud	H14 Cartridge Filter with PVC Shroud	H14 Cartridge Filter with PVC Shroud
Filter Efficiency - Inlet - Safe Change		99.999%	99.999%	99.999%	99.999%
Filter Efficiency - Exhaust - Safe Change		H14 Push Push Filter with SS 316L Housing	H14 Push Push Filter with SS 316L Housing	H14 Push Push Filter with SS 316L Housing	H14 Push Push Filter with SS 316L Housing
Lighting Level		≥ 650 lux (≥ 60 foot-candles)	≥ 650 lux (≥ 603 foot-candles)	≥ 650 lux (≥ 60 foot-candles)	≥ 650 lux (≥ 60 foot-candles)
Sound Level		≤ 68 dBA	≤ 68 dBA	≤ 68 dBA	≤ 68 dBA
Isolator Construction	Chamber	SS 316L	SS 316L	SS 316L	SS 316L
	Service Housing	SS 304	SS 304	SS 304	SS 304
	Support Frame	SS 304	SS 304	SS 304	SS 304
Anti vibration weighing mount	Black Granite for Analytical Weigh Scale	✓	✓	✓	✓
Isolator Finish	Chamber Internal	≤ 0.4 Ra	≤ 0.4 Ra	≤ 0.4 Ra	≤ 0.4 Ra
	Chamber External	≤ 0.6 Ra	≤ 0.6 Ra	≤ 0.6 Ra	≤ 0.6 Ra
	Service Housing External	0.6 Ra	0.6 Ra	0.6 Ra	0.6 Ra
	Support Frame	1.0 Ra	1.0 Ra	1.0 Ra	1.0 Ra
Controls	Color 6” HMI - Siemens - CE Marked	✓	✓	✓	✓
	Operator Specific Login sets Isolator Working Height for Ergonomic Comfort (Selectable)	✓	✓	✓	✓
Electrical Requirements (By Client)	110-120 V, AC, 50 Hz/60 Hz, 1Ø	✓	✓	✓	✓
	220-240 V, AC, 50 Hz/60 Hz, 1Ø	✓	✓	✓	✓
	480 V, AC, 50 Hz/60 Hz, 3Ø	✓	✓	✓	✓
Compressed Air requirements (By Client)	6 Barg Pressure at 5ltr/sec	✓	✓	✓	✓
Exhaust Duct Requirements (By Client) - Thimble Connection Required		101.6 mm (4”)	101.6 mm (4”)	101.6 mm (4”)	101.6 mm (4”)

ENGINEERING DRAWING (MODEL: WDCI-3G)









1. *Spray Gun Inlet*
2. *3" Exhaust Connection*
3. *Compressed Air Connection*
4. *Inlet Power*
5. *Electrical Panel*
6. *Main Control Panel*
7. *Integrated Glove Leak Tester*
8. *Rapid Transfer Port*
9. *Glove Ports*
10. *Support Stand*
11. *Leveling Feet*
12. *Tower Lamp*
13. *Reset Button*
14. *Emergency Stop*
15. *Siemens HMI Controller*
16. *Technical Area Enclosure*
17. *Sartorius Scale Display*
18. *Main Chamber*
19. *Safe Change Filter*
20. *WIP Spray Gun*
21. *Sartorius Weighing Scale*
22. *Granite Worktop*
23. *Drain Valve*

TFAI
Turbulent Flow (Grade A) Aseptic Isolator

Introduction

The Esco Turbulent Flow Aseptic Isolator (TFAI) is a free-standing isolator complying with the most stringent regulatory requirements. The isolator has an automated airflow and pressure control to assure a safe, clean, and microbial-free environment in performing testing and other processes requiring the same environmental parameters. The TFAI's ability to meet turbulent grade A conditions provide a high degree of containment separation for product, operator, and environment.

Basic Principles

- The Esco Turbulent Flow Aseptic (Grade A) Isolator is a free-standing Isolator that has a very low leakage rate, complying with the most stringent leakage criteria as stated in ISO 14644-7.
- The isolator can be supplied with or without a pass-through chamber. It has an automated airflow and pressure control to assure a clean and microbial-free environment for sterility testing.
- The isolator's ability to meet Turbulent Grade A conditions and provide a high degree of containment separation for product, operator, and environment is unquestionable.

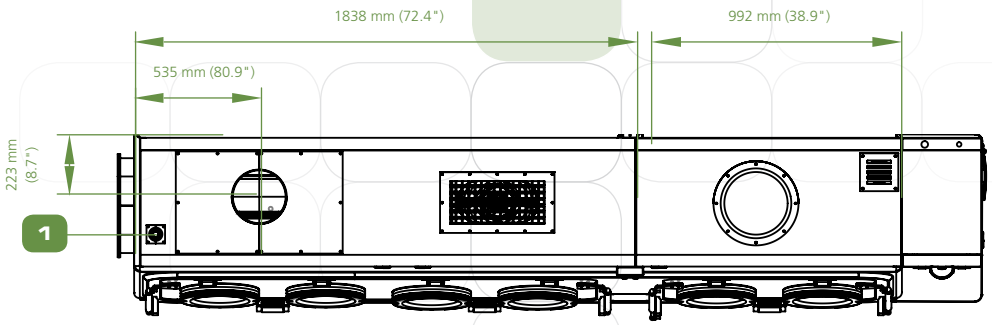
Key Features

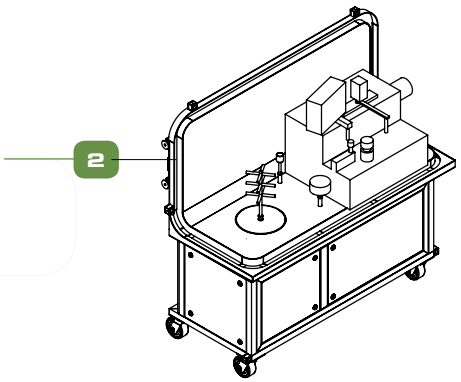
- An improved mini-pleat separation technique maximizes filter surface area, improves efficiency, and extends filter life over conventional separation.
- Utilizes a Bag-in, Bag-out Filter to safely remove the filter after bio-decontamination. It provides protection against exposure to hazardous materials for the maintenance personnel and the environment.
- The electromagnetic interlocking door mechanism with time-delayed ingress/egress control ensures work zone remains sterile during transfer of items.
- Optional chemical dunk tanks for BSL 3&4 applications and Sharps disposal system enables smoother workflow and minimizes transfers to enhance personnel protection and sterility.
- Improved safe-change cuff rings enable glove change with zero risk of contamination.
- Rapid Transfer Ports provide a safe and easy method for moving specimens, materials, supplies and waste without breaking containment.

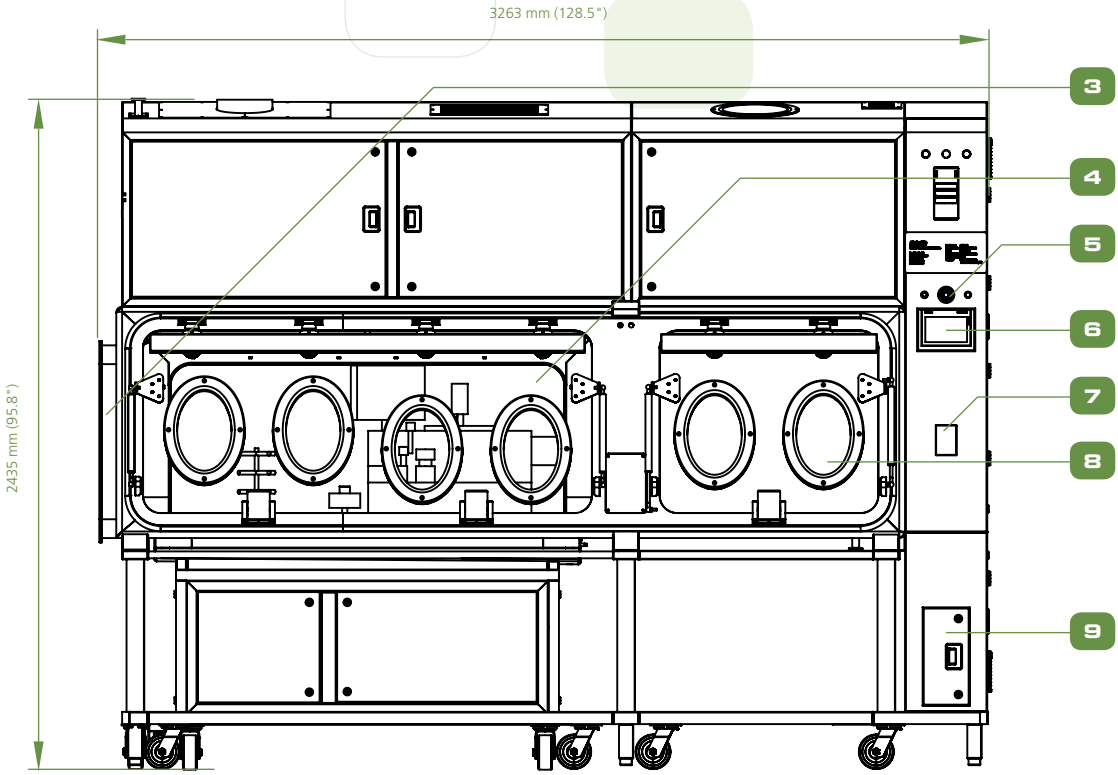
Ergonomic Enhancements

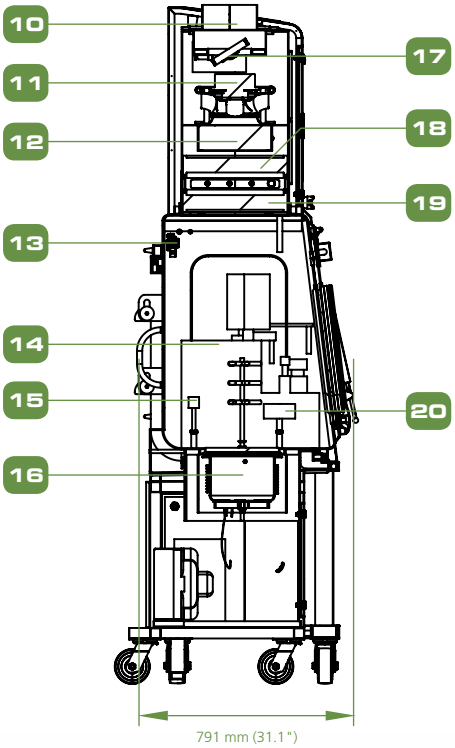
- Ergonomically styled sloped front and/or back reduces glare and allows for easier reach into the work area. Highly rounded edges to minimize crevices and maximize vision panel.
- Step-less floor between pass chamber and main chamber provide an easy manipulation of the mobile trolley from chamber to chamber.
- Oval-shaped glove ports to maximize arm movement and reach into the work zone, smooth surface, crevice free, and no exposed bolts and nuts at glove attachment to prevent bacterial growth.
- Hydraulic support frame legs allow the operator to adjust the work surface height to preference, for both sitting and standing operation.
- LED lamps provide superior illumination to the work zone.
- Optional Foot Switch for sterility test pump provides hands-free access minimizing movement and reduce operator fatigue.
- Suitable shelves and basket racks are provided internally within the isolator, purposely designed to accommodate operator's loading of materials used during sterility testing.

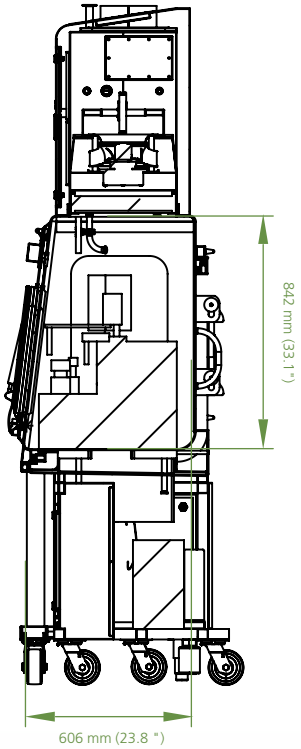
ENGINEERING DRAWING (MODEL: TFAI-4G)







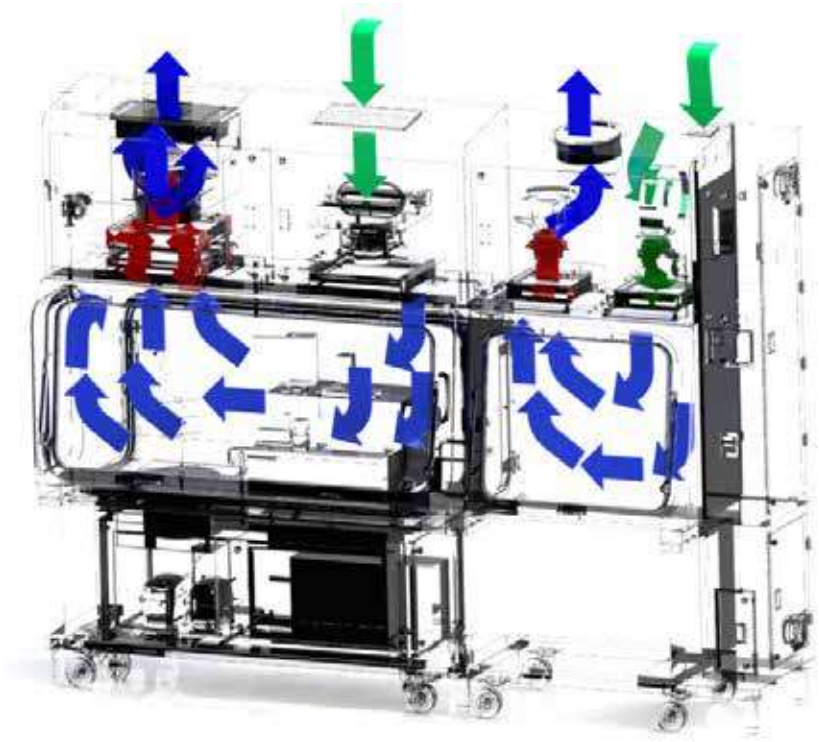




1. *Water Inlet Port*
2. *Esco Pod Flange (optional)*
3. *Chamber Extension Provisional Tunnel*
4. *Laminated Tempered Safety Glass Chamber*
5. *Emergency Stop*
6. *HMI Display*
7. *Thermal Printer*
8. *Oval Glove Ports*
9. *BioVap™ H_2O_2 Bottle Compartment*
10. *Exhaust Collar*
11. *ECM Blower*
12. *Catalytic Converter*
13. *BioVap™ Bio-decontamination Non-drip Nozzle*
14. *Benchtop Filling Machine (optional)*
15. *Non-viable Particle Counter probe*
16. *Esco Sublimate® Freezedryer (optional)*
17. *Exhaust Inflatable Seal Damper*
18. *Second Stage Exhaust ULPA Filter*
19. *First Stage Exhaust ULPA Filter*
20. *Viable Particle Counter Probe*

GENERAL SPECIFICATIONS

		TFAI-4G-1PTC
No. of Chambers		2 (1 Process Chamber and 1 Pass Chamber)
Overall External Dimensions (W x D x H)		2600 x 1078 x 2600 mm (102.4" x 42.2" x 102.4")
Internal Dimensions (W x D x H)	Process Chamber	1800 x 952 x 920 mm (70.9" x 37.5" x 36.2")
	Pass Chamber	633 x 952 x 920 mm (24.9" x 37.5" x 36.2")
Chamber Sheet Metal		Stainless Steel Type 316L (interior) Stainless Steel Type 304 (exterior)
Support Frame & Service Housing		Stainless Steel Type 304
Process Chamber	Performance	ISO Class 5 (Grade A equivalent)
	Operating Pressure	Negative 200 Pascal (+/-20%)
	Filter type	Gasket type U15
Pass Chamber	Performance	ISO Class 7 (Grade C equivalent)
	Operating Pressure	Negative 100 Pascal (+/-20%)
	Filter type	Push-push (H14 equivalent)
Airflow Type		Turbulent
Lighting Intensity		≥ 500 lux (≥ 47 foot-candles)
Noise Level		≤ 65 dBA
Electrical Requirement		AC 230V, 50 Hz, 1 Ph, 25A



- *Ambient air is pulled through the inlet prefilter located on top of the isolator. The prefilter traps large size particles to extend the life of the supply HEPA filter.*
- *Air from the top inlet and from workzone is pulled by the main fan, which creates positive pressure on the plenum that creates downflow. Work zone pressure is always higher than the pass-through, to prevent contaminants from entering the workzone through the pass-through.*
- *The downflow filter creates a turbulent airflow and particle-free ISO Class 5 (Grade A) environment inside the isolator to protect the work material inside the main chamber and pass-through. Air from the work zone and pass-through is quickly purged by the fans to keep the area clean. The purge is completely exhausted through HEPA filter.*

- ULPA-filtered air
- Unfiltered / Potentially contaminated air
- Room air / Inflow air

BioPass™
Pass Through

Introduction

Floor standing airtight transfer chamber with onboard ventilation and integrated hydrogen peroxide (H_2O_2) based bio-decontamination system designed for passing large equipment into a ISO Class 5 cleanroom in an aseptic manner.

BioPass™ provides a flush threshold enclosure to allow materials to be wheeled into the enclosure with minimum effort. Fully 316L stainless steel assembly in compliance with cGMP's design requirements.

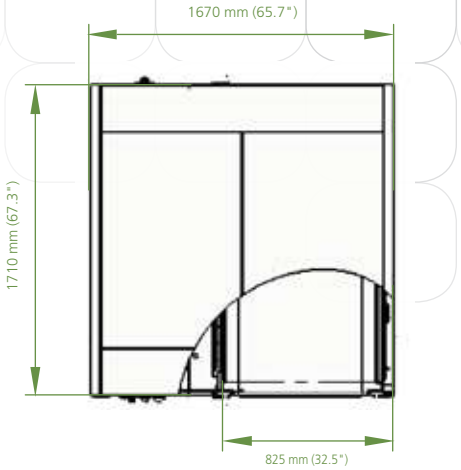
Industries Served

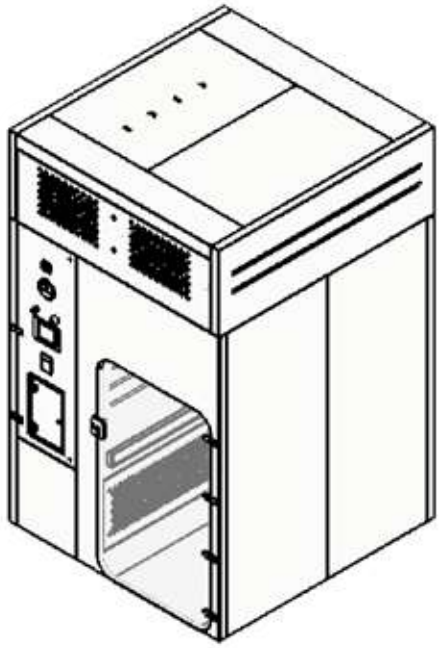
- Hospital
- Food, Beverages & Confectionary
- Manufacturing Facilities
- Veterinary Surgeries
- Dentist
- Primary Healthcare Facilities
- Pharmaceutical Industry

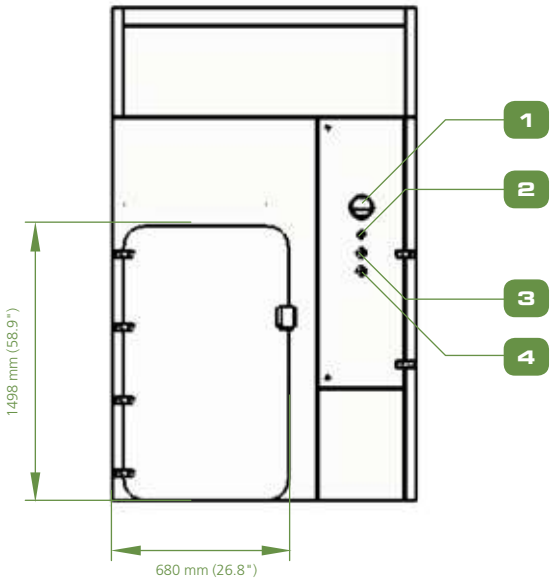
Features

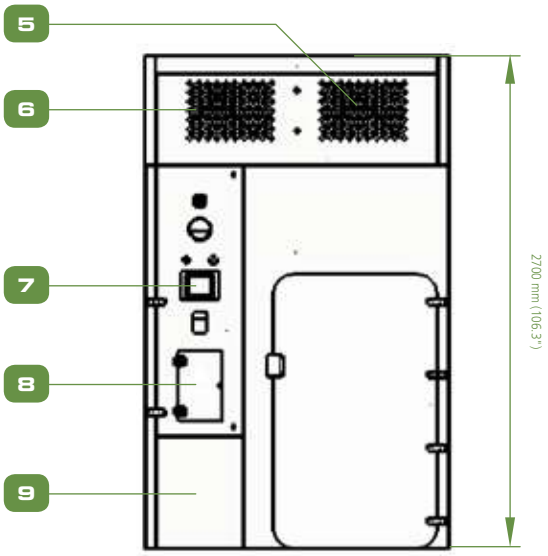
- The interior and cleanroom side face is made of 316 L stainless steel with a smooth interior and coved corners to ensure easy cleaning and bio-decontamination.The interior surface is polished to 0.6 Ra µm or better and external surfaces exposed to cleanrooms 1.2 Ra µm or better. The cleanroom wall interface allows a flush finish with the surface for cleanliness.
- Chamber doors are constructed from FDA compliant materials with integrated FDA approved silicone inflatable seal around the perimeter. Doors shall give > 90° opening for full access. The integrated inflatable seal secures the door during operation and removes the need for an external mechanical latch.
- Direct reading pressure gauges are provided to both sides of the pass through to give indication of the chamber pressure.
- Integrated with Esco BioVap™ bio-decontamination system with PLC control, HMI operator interface and ticket roll printer to give hard copy of the bio-decontamination cycle.
- Interlocking doors to prevent opening at the same time and also to prevent the sterile unloading doors from opening until after a bio-decontamination.
- Optional on-board catalytic converter to allow air to be taken from the room , then exhausting it back, with interlocked safety exhaust H_2O_2 sensor. This avoids costly HVAC ducting.

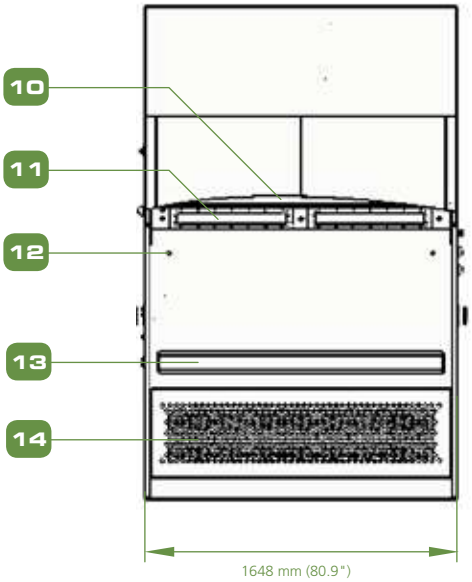
ENGINEERING DRAWING (MODEL: EPB-_90 165 150-_)











1. *Chamber Pressure Gauge*
2. *Emergency Stop*
3. *Door Button*
4. *Door Availability Indicator*
5. *Inlet Filter*
6. *Exhaust Filter*
7. *HMI Display*
8. *VHP Bottle Loader*
9. *Technical Housing*
10. *Supply HEPA Filter*
11. *Chamber Light Assembly*
12. *Safety Egress Button*
13. *Bumper Rails*
14. *Exhaust HEPA Filter*

STANDARD INTERNAL DIMENSIONS

W x D x H (mm)	1200 x 900 x 1200 mm	900 x 1600 x 1500 mm	1600 x 1600 x 2500 mm	2000 x 2000 x 2700 mm	2000 x 3000 x 2700 mm	3000 x 4000 x 2700 mm
W x D x H (in)	48" x 35" x 47"	35" x 66" x 59"	63" x 63" x 98"	79" x 79" x 107"	79" x 119" x 107"	119" x 158" x 107"
W x D x H (ft)	4' x 3' x 3' 11"	2'11" x 5'6" x 4'11"	5' 3" x 5' 3" x 8'11"	6'7" x 6'7" x 8'11"	6'7" x 9'10" x 8'11"	9'10" x 13'2" x 8'11"

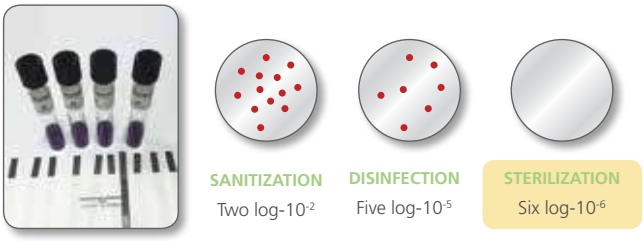
TECHNICAL SPECIFICATIONS

Air Classification	ISO Class 5 (Grade A)
Airflow Pattern	Single Pass uni-directional airflow (not laminar)
Operating Pressure	Chamber +50Pa with respect to the grey side area
Leak Tightness	The acceptable leakage rate of the chamber will be no greater than 0.5% vol/hr, equivalent to a class 3 Isolator
Lighting	Internal lighting shall be provided giving average 200 lux illumination over the whole area of the chamber when measured at 1 m above the floor level.
Noise Levels:	Less than 65 dBA
Temperature:	Uncontrolled
Humidity:	Uncontrolled
Inlet Filtration:	HEPA (H14) Filtration
Exhaust Filtration:	HEPA (H14) Filtration
Prefilter:	G4 Prefilters
Bio-decontamination:	A minimum of log 6 reduction in spore forming micro-organisms validated using a biological indicators

GENERAL SPECIFICATIONS	
Power Supply	240/110V, 50/60 Hz single phase
Air Supply	6 bar pressure 200 l/min flow (clean & dry air)
Sterilant	30% Hydrogen peroxide (200-1000 uL/sec)
Air Injection Pressure	4 bar ± 10%
Air Injection Flow Rate	32 lpm ± 10%
Injection Time	30 sec-20 mins
Dwell Time	15-45 mins
Aeration Time	20-90 mins
Total Decontamination	Time 30 mins-3 hrs
Sterilant Used in One Cycle	10-150 mL
PLC	Siemens S7-1200 series
HMI	Siemens TP170 komfort
Printer	Gebe ticket label printer
Spore Log Reduction	Up to Log 6

Integrated Bio-decontamination System

Esco Pharma has developed an effective hydrogen peroxide based bio-decontamination system capable of achieving a log 6 reduction in bio-burden. The spore log reduction has been validated by biological indicator challenge using biological indicator stainless steel ribbons populated with *Geobacillus stearothermophilus* spores.



SANITIZATION
Two log-10^{-2}

DISINFECTION
Five log-10^{-5}

STERILIZATION
Six log-10^{-6}

Optional Configurations

DESCRIPTION

H_2O_2 Monitoring System - (One per Biopass Needed)

H_2O_2 sensor 0-100ppm to ensure the concentration of hydrogen peroxide inside the chamber to confirm end of aeration.

Remote Catalytic Converter

Allows aeration of the system and operation without the need for site ducting. The system can be exhausted to the room following aeration.

Catalytic Converter

ESB
Esco Sputum Booth

Introduction

Esco Sputum Collection Booth (ESB) controls exposure risk to harmful aerosols / airborne diseases by providing containment using air flow to capture and exhaust out aerosols from sputum during expectoration, handling, or processing. We provide both operator / patient and environmental protection.

Key Features

- ISO Class 5 air cleanliness (Class 100 as per US Fed Std 209 E.)
- Negative pressure keeps aerosol contained in booth: Supplies 100% HEPA filtered / fresh air to the downflow plenum Typical airflow is 85% total volume as downflow, 15% inflow nd 100% exhausted.
- Fluorescent light fittings: T5 Lighting, 30W with diffuser for uniform lighting throughout the chamber.
- UV lamp operates on programmable timer embeded in the Sentinel™ Microprocessor System.

Construction

- Esco Sputum Collection Booth is made of either stainless steel 316 L grade or Electrogalvanized steel coated with Isocide™ antimicrobial coating finish sheet metal.
- Stainless steel 316 L or Electrogalvanized steel coated with Isocide™ antimicrobial coating finish sheetmetal perforated grilles.
- Heavy-duty, durable stainless steel 316 L or Electrogalvanized steel coated with Isocide™ antimicrobial coating finish sheet metal framed doors assembly with transparent glass windows.
- Reinforced stainless steel 316 L or SS304 finish sheetmetal floor
- Wall mounted stainless steel perporated work bench.
- Stainless steel leveling feet

Filtration System

- Room air is taken from the top of the booth through a washable pre-filter, air is forced evenly across the HEPA filter resulting in a clean downward airflow.
- Purified air travels downward within the interior in a vertical, downward stream with a velocity of 0.16 m/s and leaves the exhaust filter at 0.60m/sec into the room close to front side wall.
- Supply and exhaust fan / filter systems will be individually designed for each location.

Control System

- Programmable UV timer

Filtration Package

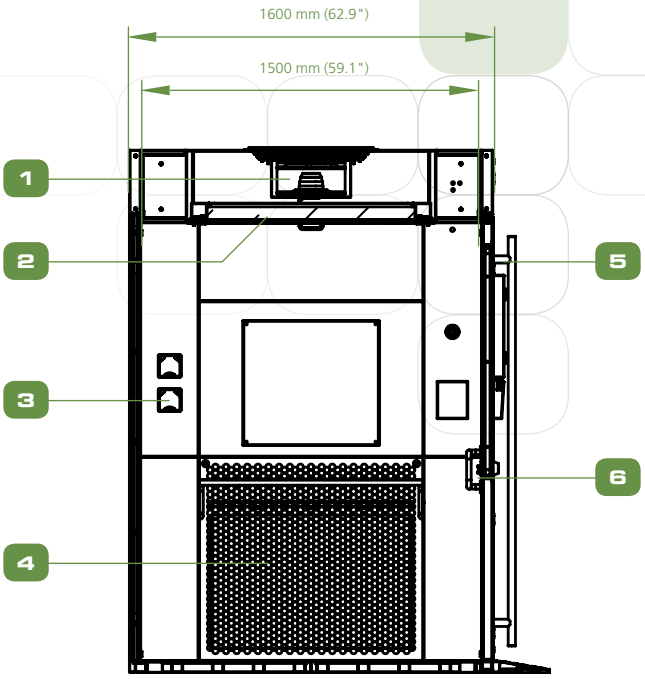
- Pre-Filter: A disposable G4 pre-filter with 85% arrestance and efficiency of 20% extends the life of the main filter.
- Downflow Filter: HEPA (H10)
- Main Supply Filter: HEPA (H10)
- Pre-exhaust Filter: HEPA (H14) filter on Esco Fan Filter Unit provides 99.995% at 0.3 microns at MPPS (Most Penetrating Particle Size).

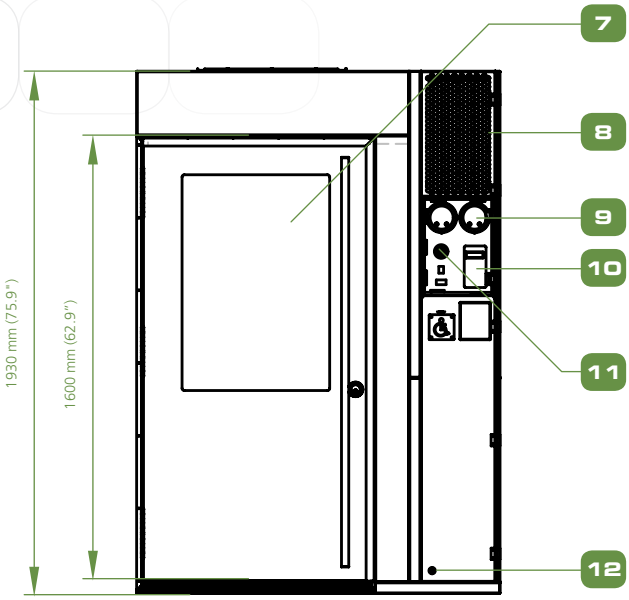
Warranty

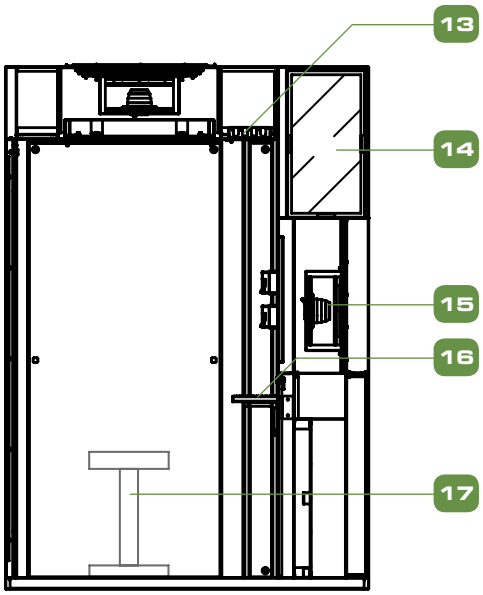
1 year warranty (excluding consumables). Consumables are ballast, fluorescent, and filters. The warranty will cover all other parts including the blower, speed controller, electrical main board, and microprocessor.

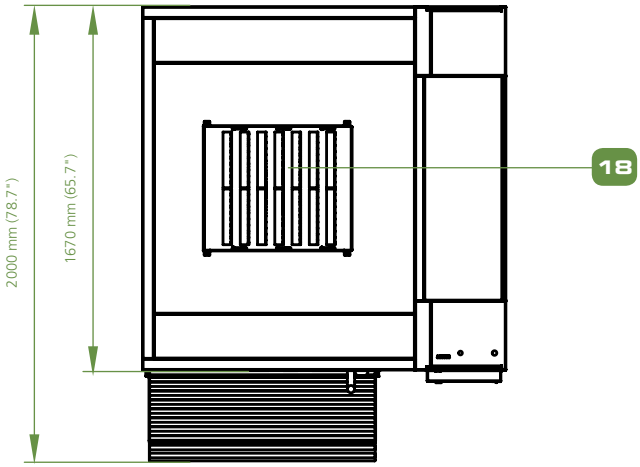
During the period of warranty, any repair, modification, testing and commissioning performed by any unathorized party other than Esco Service Team shall void the warranty of the unit.

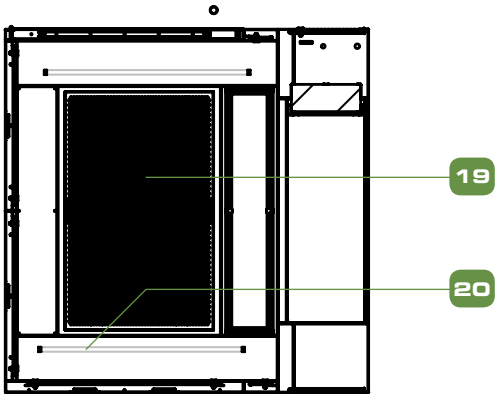
ENGINEERING DRAWING (MODEL: ESB-S115150193-_)











1. *ebm-papst® Blower*
2. *H10 Prefilter*
3. *13A-Gang Outlet*
4. *Return Grill*
5. *SS Outside Door Handle*
6. *SS Inside Door Handle*
7. *Tempered Glass View Panel*
8. *Exhaust Grill*
9. *Photohelic Gauge*
10. *Esco Sentinel™ Gold Microprocessor Controller*
11. *Emergency Stop*
12. *SS Cam Latch*
13. *LED Lamp*
14. *H14 Exhaust Filter*
15. *ebm-papst® Blower*
16. *Perforated Table*
17. *SS Chair*
18. *Prefilter*
19. *Downflow Diffuser*
20. *UV Lamp Provision (optional)*

GUIDE TO MODELS

ESB – S 115 150 193 – 1

Product Code	Material of Construction		Internal Width		Internal Dimension		Internal Height		Electrical Requirements	
Esco Sputum Booth	Stainless Steel 304	S	1150 mm	115	1500 mm	150	1930 mm	193	220-240 V, AC, 50 HZ, 1Ø	1
	Stainless Steel 316	B	Customization	X	Customization	X	Customization	X	110-120 V, AC, 50/60 HZ, 1Ø	2
	Electrogalvanized steel coated with Isocide™ antimicrobial coating	A							220-240 V, AC, 60 HZ, 1Ø	3

GENERAL SPECIFICATION

Model		Sputum Collection Booth
Nominal Size		1600 mm (62.9")
External Dimension (W x D x H)		1600 x 2000 x 2300 mm (62.9" x 78.7" x 91.0")
Internal Work Area Dimension (W x D x H)		1150 x 1500 x 1930 mm (45.3" x 45.3" x 75.9")
Cabinet Construction	Main Body	Stainless Steel Grade 316 L / Electrogalvanized steel coated with Isocode™ antimicrobial coating sheet metal
	Floor	Stainless Steel Grade 316 L / SS304
	Door	Stainless Steel Grade 316 L / Electrogalvanized steel coated with Isocode™ antimicrobial coating sheet metal
Power Consumption		350 W, FLA 7A
Cabinet Full Load Amps (FLA)		10 amp
Fluorescent Lamp Intensity		500 lux (47 foot-candles)
Net Weight		725 kg (159 lbs)
Shipping Weight		1000 kg (2205 lbs)
Shipping Dimension, Maximum (W x D x H)		2500 x 1250 x 2000 mm (98.4" x 48.2" x 78.7")

ADDITIONAL SPECIFICATION

Filter	G4 Pre-Filter, H10 Downflow HEPA Filter, H10 Return Grill Hepa Filter, H14 Exhaust HEPA Filter
Lights	UV & T5 Lighting
Work Bench	Detachable Stainless Steel
Leveling Feet	Concealed
Air Flow	100% Exhausted
ACH (Air Change per Hour):	105
CMH	350 m^3/hr

EPB-A504050 and EPB-A606060
(Standard Pass Box)

EPB-S616161 and EPB-S454645
(Pharmaceutical Grade Transfer Hatch)

Pass Boxes / Transfer Hatches

Controlling the ingress of particulate contamination into cleanrooms and other controlled environments is paramount in order to maintain the integrity of products and processess. Personnel traffic is the most important factor which must be controlled. Esco Pass Boxes and Transfer Hatches are cost effective solution as they allow materials to be transferred into controlled environments without actual personnel movement. They may also be used to protect the external environment from egress of contamination, for example, in biological safety laboratory applications.

Available Models				
Model	**Internal Dimensions**	**Construction**	**Interlock**	**Air Shower**
EPB-A504050	500 x 400 x 500 mm (19.7" x 15.7" x 19.7")	Powder coated steel, non coved corners (optional: stainless steel)	Mechanical	NA
EPB-A606060	600 x 600 x 600 mm (23.6" x 23.6" x 23.6")	Powder coated steel, non coved corners (optional: stainless steel)	Mechanical	NA
EPB-S616161	610 x 610 x 610 mm (24" x 24" x 24")	2 mm stainless steel, all coved corners	Mechanical	NA
EPB-S454645	450 x 460 x 450 mm (17.7" x 18.1" x 17.7")	2 mm stainless steel, all coved corners	Mechanical	NA
EQU/00-EAS-PB	800 x 500 x 600 mm (31.5" x 19.7" x 23.6")	Powder coated steel, non coved corners (optional: stainless steel)	Electrical	✓

Main Features

- Mechanical interlock is reliable, maintenance-free, fail-safe, and maintains cleanroom integrity by preventing both doors from being opened at the same time.
- All Esco products are manufactured for the most demanding controlled environment applications.
- All components are designed for maximum chemical resistance and enhanced durability for a long service life.
- The main body of the pass box is constructed of industrial-grade electrogalvanized steel.
- The pass box base surface is constructed of stainless steel, making the work zone easy to clean
- Acrylic doors provide a clear view of the internal chamber.
- Standard 1 year warranty.

Options and Accessories

- Flange for sealing the gap between the pass box and the cleanroom wall, when the cleanroom wall can support the weight of the pass box. *(Set of 2 flanges).*

  Catalog Numbers:

  EPB-A504050-FL for EPB-A504050

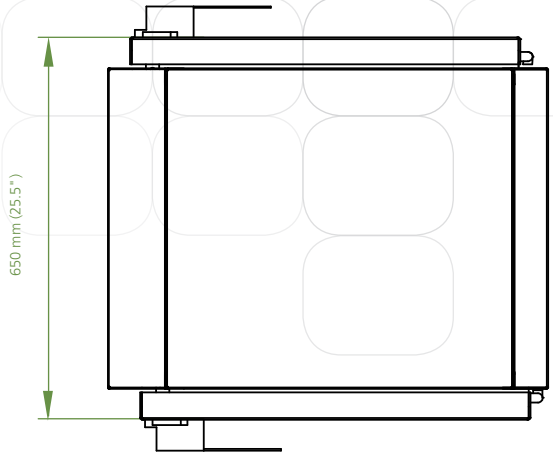
  EPB-A606060-FL for EPB-A606060
- Optional UV lamp, must be factory fitted, (only available for EPB-A606060) add "-U1" to the end of the model to order for 230VAC 50HZ models and add "-U2" to the end of the model for 115VAC 60HZ models *(example: EPB-A606060-U1).*
- Support stand (for cleanrooms with thin wall partitions, which cannot support the weight of the pass box) to mount the pass box to the floor. Specify mounting height when ordering.

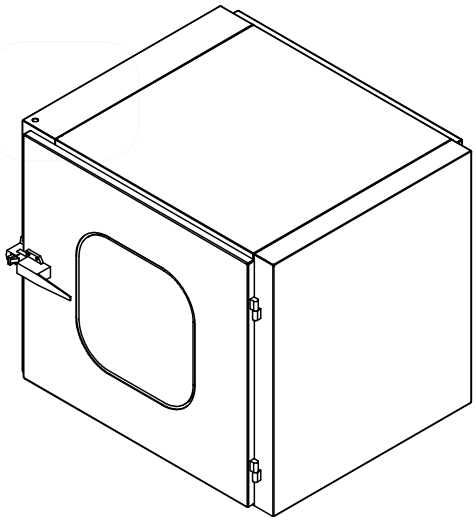
  Catalog Numbers:

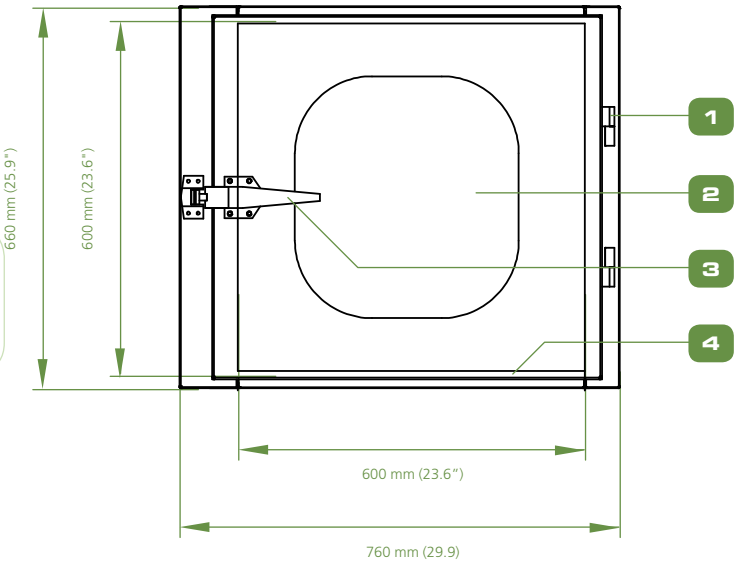
  EPB-A504050-SS for EPB-A504050

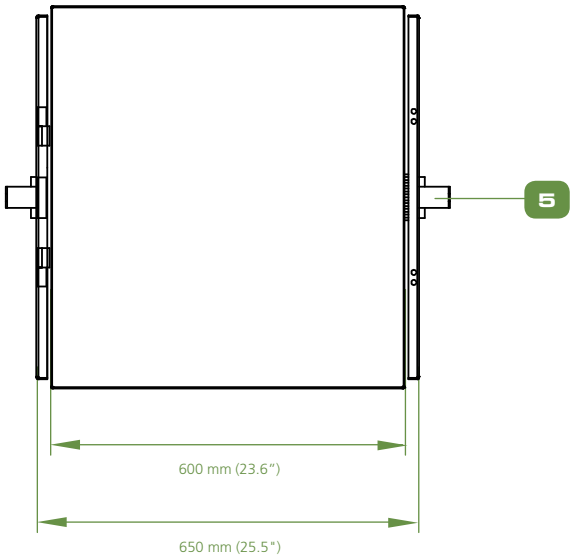
  EPB-A606060-SS for EPB-A606060
- All stainless steel construction (non-coved corners).

ENGINEERING DRAWING (MODEL: EPB-A504050)









1. *Door Hinges*
2. *Polycarbonate View Port*
3. *Door Handle*
4. *Stainless Steel Base*
5. *Mechanical Interlock*

GENERAL SPECIFICATIONS

Esco Pass Box		
Model	**EPB-A504050**	**EPB-A606060**
External Dimensions (W x D x H)	660 x 450 x 560 mm (26.0" x 17.7" x 22.0")	760 x 650 x 660 (30.0" x 25.6" x 26.0")
Internal Work Area, Dimensions (W x D x H)	500 x 400 x 500 mm (19.7" x 15.7" x 19.7")	600 x 600 x 600 mm (23.6" x 23.6" x 23.6")
Net Weight	43 kg (945 lbs)	56 kg (123 lbs)
Shipping Weight	62 kg (137 lbs)	80 kg (176 lbs)
Shipping Dimensions, Maximum (W x D x H)	850 x 750 x 800 mm (33.5" x 29.5" x 31.5")	850 x 820 x 900 mm (33.5" x 32.3" x 35.4")
Shipping Volume, Maximum	0.5 m^3 (17.6 ft^3)	0.6 m^3 (20.8 ft^3.)

Esco Air Shower Pass Box

EQU/00-EAS-PB
(Air Shower Pass Box)

Main Features

- Built-in air shower significantly reduces surface contamination on materials entering or exiting the controlled environment. Materials entering or exiting the controlled environment are "scrubbed" by high velocity ULPA-filtered air jets with velocities of 25 m/s (4921 fpm). Contaminated air is then drawn through the base within the unit, filtered and recirculated.
- An array of stainless steel nozzles direct high-velocity jets within the chamber.
- Air shower duration is adjustable. Standard factory pre-set is 12 seconds in both directions.

Air Shower Pass Box Construction

- Robust construction qualifies the air shower pass box for the most demanding controlled environment applications. The unit is fully assembled and ready to install and operate when shipped. All components are designed for maximum chemical resistance and enhanced durability for a long service life.
- Electrical interlock maintains cleanroom integrity by preventing both doors from being opened at the same time.
- The air shower is constructed of electrogalvanised steel sheets with an abrasion resistant oven-baked powder coated finish.
- The pass box base surface is constructed of perforated stainless steel, making the work zone easy to clean.
- Acrylic doors provide a clear view of the internal chamber.

Blower and Filtration Systems

- Esco Air Shower Pass Boxes use German made ebm-papst® permanently lubricated, centrifugal motor/blowers with external rotor designs. Selected for energy efficiency, compact design, and flat profile, the completely integrated blower assembly optimizes motor cooling, with unified rotating parts and overall component balance for smooth, quiet, vibration-free operation. Weight is equally distributed to all bearings to extend bearing life.
- ULPA filter(s) provide > 99.999% typical efficiency for particle sizes at 0.3 microns. Esco Air Shower filters meet the IEST-RP-CC001.3 recommended practice for HEPA performance (USA), and EN 1822 for H13 performance (EU).
- A disposable prefilter with 85% arrestance extends the life of the main filter.

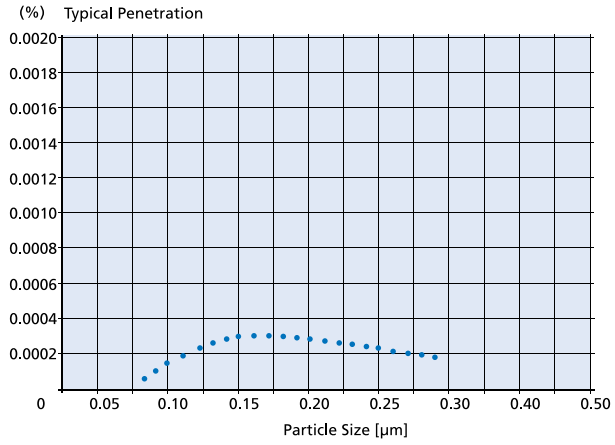
Warranty

- All Esco Air Shower Pass Boxes are covered by 1 year warranty. Contact your local Sales Representative for warranty details.

Options and Accessories

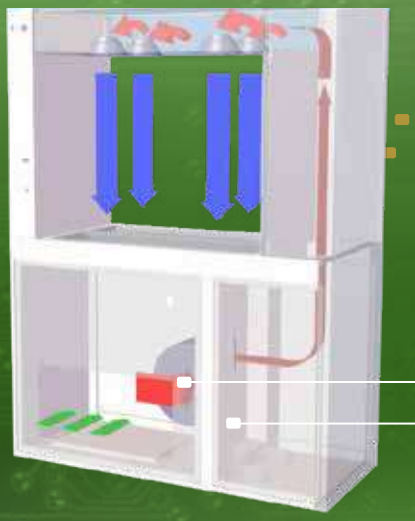
- Optional UV lamp (only available for EPB-S616161) must be factory fitted, add "-U1" to the end of the model to order for 230V, AC 50Hz models and add "-U2" to the end of the model for 115V, AC 60Hz models (example: EQU/00-EAS-PB-U1).

All stainless steel construction.



Esco ULPA Filter Efficiency

Esco cabinets use ULPA filters (per IEST-RP-CC001.3) instead of conventional HEPA filters commonly found in cleanroom product. 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.



Esco Air Shower Pass Box Airflow

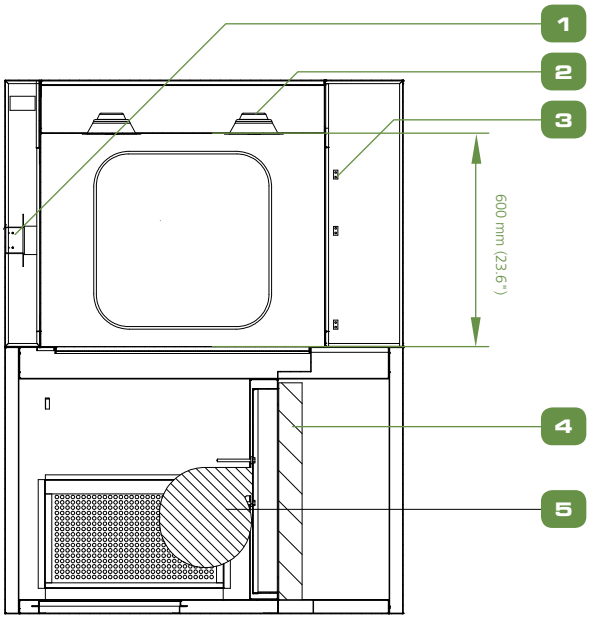
Blower

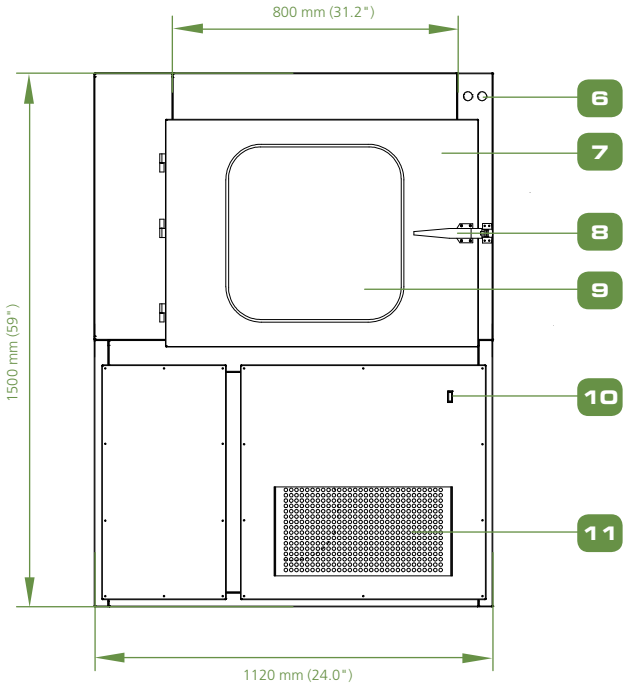
ULPA Filter

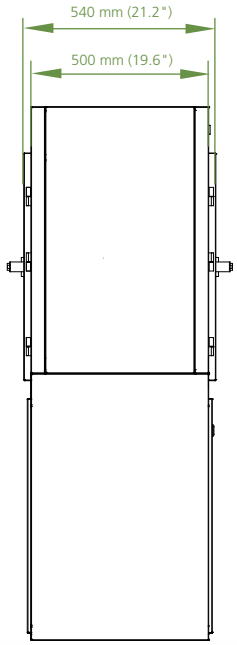
- ULPA-filtered air
- Unfiltered / Potentially contaminated air
- Room air / Inflow air

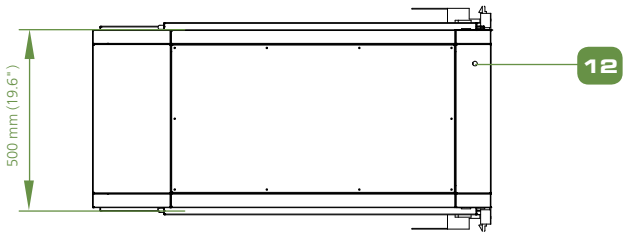
- *Air is forced by the blower(s) through ULPA filter(s) which are >99.999% efficient against particles of 0.3 microns.*
- *Filtered air is ejected through nozzles at high velocities into the chamber. These turbulent air streams disperse particulate matter on all surfaces.*
- *Dispersed particulate matter migrate with the air stream towards the lower areas in the air shower chamber.*
- *The air is continuously filtered and recirculated.*

ENGINEERING DRAWING (MODEL: EAS-PB)





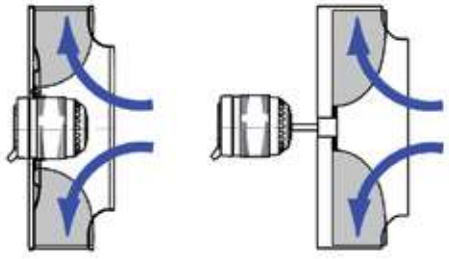




1. *Electromagnetic Door System*
2. *Nozzles*
3. *Door Hinges*
4. *ULPA Filter*
5. *ebm-papst® Blower*
6. *Light Indicator*
7. *Door*
8. *Door Handle*
9. *Polycarbonate Window*
10. *Blower Switch*
11. *Prefilter*
12. *Power Cord*

General Specifications, Esco Air Shower Pass Box		
Model		**EQU/00-EAS-PB**
External Dimensions (W x D x H)		1120 x 540 x 1500 mm (44.1" x 21.3" x 59.0")
Internal Work Area, Dimensions (W x D x H)		800 x 500 x 600 mm (31.5" x 19.7" x 23.6")
Air Change		1360 / hr
Air Velocity (m/s)		25 m/s (4921 fpm)
Number of Nozzles		4
Air Shower Duration (seconds)		Factory set at 12 seconds (adjustable up to 2 mins)
Prefilter		Washable non-woven polyester fibers with 85% arrestance and 20% efficiency
ULPA Filter Typical Efficiency		> 99.999% at particle size 0.3 µm
Main Body		1.5 mm electrogalvanised steel / White Oven-Baked Epoxy-Polyester Isocide™ Antimicrobial Powder Coated Finish
Electrical *	Voltage	220 - 240 V, AC, 50 Hz, 1ø
	Cabinet Full Load Amps (FLA)	1.75 A
	Cabinet Nominal Power	250 W
	Cabinet BTU	853
Net Weight		130 kg (286 lbs)
Shippping Weight		164 kg (362 lbs)
Shipping Dimensions, Maximum (W x D x H)		1120 x 570 x 1650 mm (44.1" x 22.4" x 65.0")
Shipping Volume, Maximum		1.05 m^3 (37 ft^3)

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



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.*

Cleanroom Air Showers

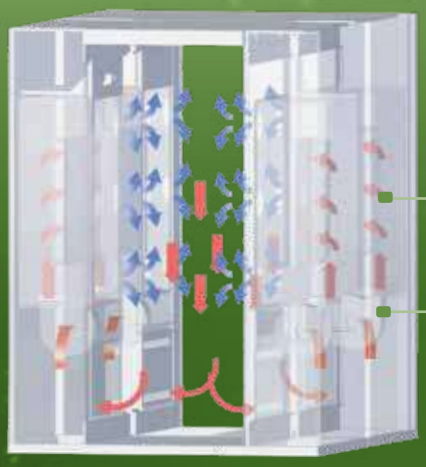
Air Showers are self contained chambers installed at entrances to cleanrooms and other controlled environments. They minimize particulate matter entering or exiting the clean space. Personnel and materials entering or exiting the controlled environment are "scrubbed" by high velocity HEPA-filtered air jets with velocities of 20-22m/s (4000-4300fpm). Contaminated air is then drawn through the base within the unit, filtered and recirculated.

Esco is the pioneering company for the construction of air showers with different applications on areas in the micro-electronics, semiconductors, pharmaceutical, spray painting, laboratory animal research and food markets.

Main Features

- High velocity shower jets in excess of 20 m/s to ensure efficient scrubbing action to remove particulate matter.
- Operating modes can be programmed in the field.
- Microprocessor controller supervises all functions.
- Mini-pleated HEPA filtration achieves > 99.999% typical efficiency at 0.3 micron particles.
- A disposable prefilter with 85% arrestance extends the life of the main filter.
- An emergency stop button is mounted on both sides of the shower.
- Indicator lights mounted on both sides of the exterior of the air shower to regulate traffic flow, in and out of the cleanroom.
- Permanently lubricated direct drive centrifugal blowers used in conjunction with stainless steel air nozzles.

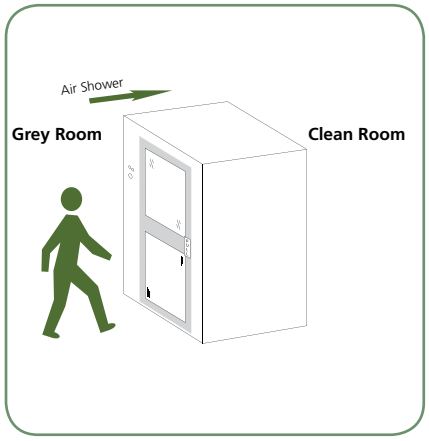
Cleanroom Air Shower Filtration System



- *Air is forced by the blower(s) through HEPA filter(s) which are 99.99% efficient against particles of 0.3 microns.*
- *Filtered air is ejected through nozzles at high velocities into the chamber. These turbulent air streams disperse particulate matter on all surfaces.*
- *Dispersed particulate matter migrate with the air stream towards the lower areas in the air shower chamber. Air enters the blower supply plenum through prefilter(s) installed at the base of the chamber.*
- *The air is continuously filtered and recirculated. The air shower is a self-contained device and does not exchange air with the environment it is placed in.*

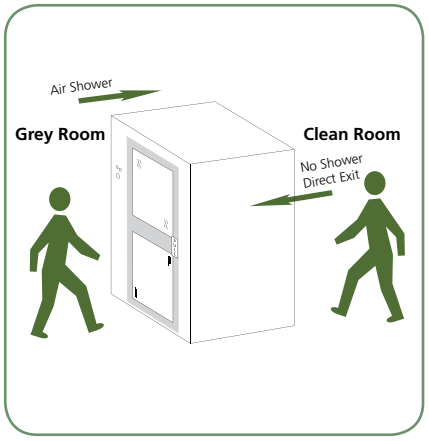
Air Shower Operating Sequences

Unlike conventional air showers which are delivered with a fixed operating sequence, the Esco Cleanroom Air Shower's operating sequence may be selected from three pre-programmed sequences:



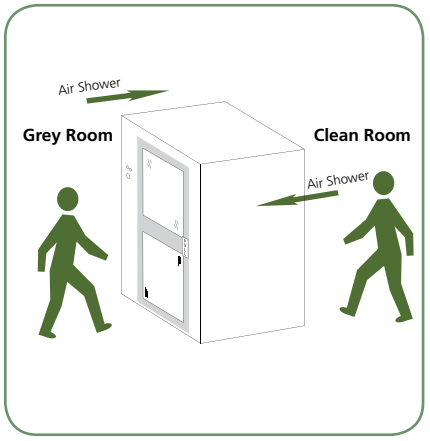
One-Way

Personnel may enter the controlled environment but not exit through the air shower. At the idle state, the clean side door is locked while the grey side is unlocked. This mode of operation is useful for controlling traffic patterns in and out of the controlled environment.



Two-Way One-Way

Personnel may enter or exit the controlled environment through the air shower. The air shower program is able to detect if the person is entering or exiting the controlled environment via door sensors and a time-sequenced control.



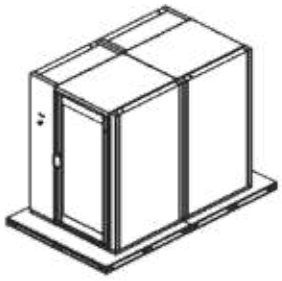
Two-Way

Personnel may enter or exit the controlled environment through the air shower. In both directions the air shower is activated. This mode of operation is useful in pharmaceutical and lab animal research applications to prevent the egress of hazardous substances and allergens from the controlled environment.

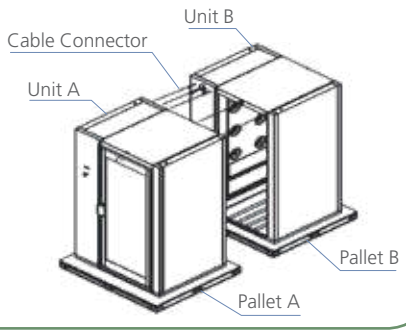
General Specifications, Cleanroom Air Shower, Model EAS (A-Series)					
Note to customer: Insert electrical voltage number into last model number digit _ when ordering.					
Model			**EAS-1A_**	**EAS-2A_**	**EAS-3A_**
External Dimensions (W x D x H)			1260 x 1000 x 2050 mm (49.7" x 39.4" x 80.7")	1260 x 2000 x 2050 mm (49.7" x 78.7" x 80.7")	1260 x 3000 x 2050 mm (49.7" x 118.1" x 80.7")
Internal Work Area, Dimensions (W x D x H)			790 x 920 x 1930 mm (31.1" x 36.2" x 76.0")	790 x 1920 x 1930 mm (31.1" x 75.6" x 76.0")	790 x 2920 x 1930 mm (31.1" x 115" x 76.0")
Air Change			371/hr	356/hr	351/hr
Initial Airflow Velocity			20-22 m/s (3,937-4,330 fpm)		
Number of Nozzles			6	12	18
Air Shower Duration			Factory set at 12 seconds (adjustable up to 3 mins)		
Persons Per Cycle			1	2-3	4-6
Personnel Flow (Persons / Min.)			4	8-12	15-23
			Above figures based on: Total Cycle Time of 16 seconds (12 seconds of Air Shower + 4 seconds for buffer time / personnel entrance and exit)		
Filtration Efficiency			Main Filter: > 99.99% at 0.3 µm Prefilter: Arrestance 85%, efficiency 20%		
Filtration Elements			Main Filter: HEPA filter Prefilter: Disposable and non-washable polyester fibers		
Fluorescent Lamp			17 W x 2	17 W x 4	17 W x 6
Air Shower Construction			1.5 mm / 0.06"/ 18 electro-galvanised steel / White oven-baked epoxy-polyester Isocide™ antimicrobial powder coated finish		
Max. Power Consumption Current, BTU/hr	During Operation		245 W, 1.2 A, 500 BTU/hr	490 W, 2.4 A, 1000 BTU/hr	735 W, 3.5 A, 1499 BTU/hr
	During Standby		113 W, 0.5 A, 231 BTU/hr	226 W, 1 A, 461 BTU/hr	339 W, 1.5 A, 692 BTU/hr
Electrical	220-240V, AC, 50Hz, 1Ø		EAS-1A1	EAS-2A1	EAS-3A1
	110-130V, AC, 60Hz, 1Ø		EAS-1A2	EAS-2A2	EAS-3A2
	220-240V, AC, 60Hz, 1Ø		EAS-1A3	EAS-2A3	EAS-3A3
	Note: Customer must provide isolator switch on site.				
Gross Weight			390 kg (858 lbs)	660 kg (1452 lbs)	980 kg (2156 lbs)
Shipping Dimensions, Maximum (W x D x H)	Assembled (W x D x H)		1450 x 1250 x 2152 mm (57.1" x 49.2" x 84.7")	1450 x 1250 x 2152 mm (57.1" x 49.2" x 84.7")	NA
	Module Form (W x D x H)	Pallet A	NA	1450 x 1250 x 2152 mm (57.1" x 49.2" x 84.7")	1450 x 1250 x 2152 mm (57.1" x 49.2" x 84.7")
		Pallet B	N/A	1450 x 1250 x 2152 mm (57.1" x 49.2" x 84.7")	1450 x 1250 x 2152 mm (57.1" x 49.2" x 84.7")
		Pallet C	N/A	NA	1450 x 1250 x 2152 mm (57.1" x 49.2" x 84.7")
	Unassembled (W x D x H)	Pallet A	2100 x 1300 x 778 mm 82.7" x 51.2" x 30.6"	2100 x 1300 x 924 mm 82.7" x 51.2" x 36.4"	2100 x 1300 x 1296 mm (82.7" x 51.2" x 51.0")
		Pallet B	NA	2100 x 1300 x 632 mm (82.7" x 51.2" x 24.9")	2100 x 1300 x 781 mm (82.7" x 51.2" x 30.7")
Shipping Volume, Maximum	Assembled		3.90 m^3 (138 ft^3)	7.80 m^3 (276 ft^3)	NA
	Module Form		NA	7.80 m^3 (276 ft^3)	11.70 m^3 (414 ft^3)
	Unassembled		2.12 m^3 (75 ft^3)	4.24 m^3 (150 ft^3)	5.66 m^3 (200 ft^3)

Esco Cleanroom Air Showers, Modes of Shipment, Model EAS-2A_

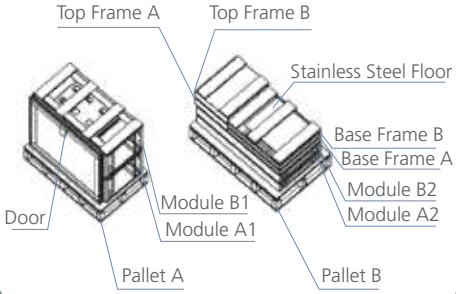
Assembled



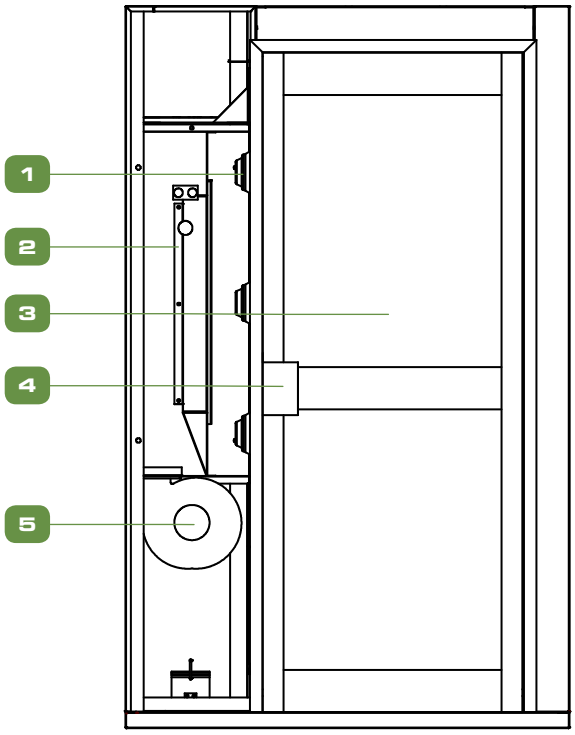
Module Form

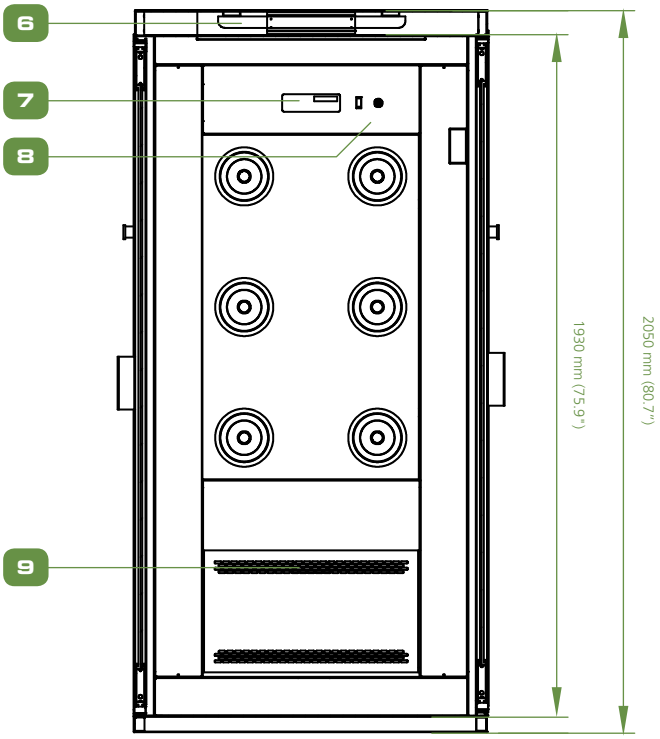


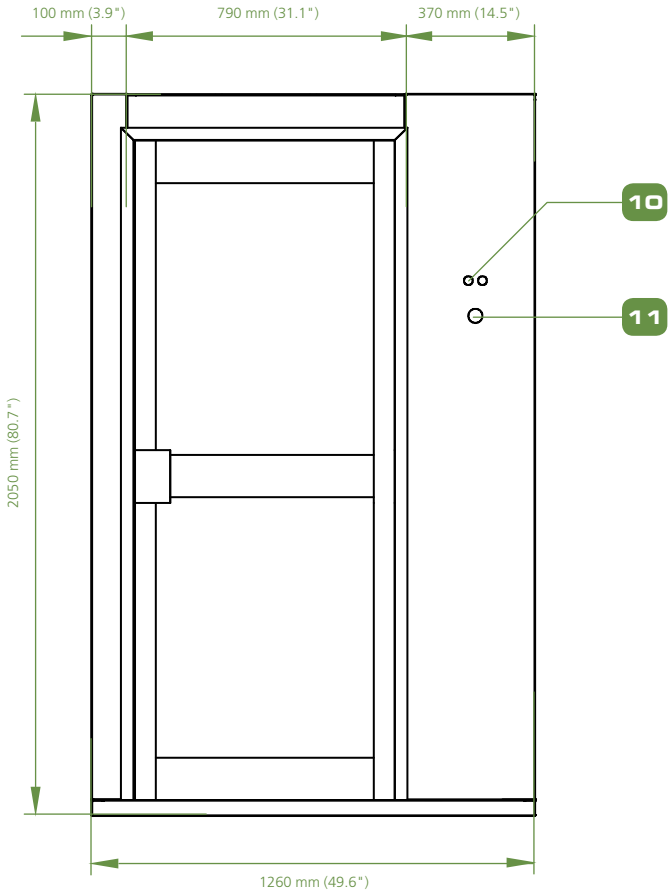
Unassembled

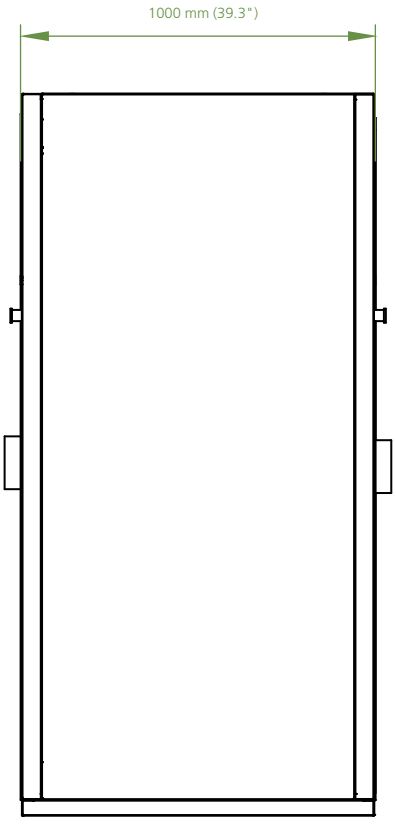


ENGINEERING DRAWING (MODEL: EAS-1A_)









1. *Nozzle*
2. *HEPA Filter*
3. *Tempered Glass Door*
4. *Door Handle*
5. *Blower*
6. *Fluorescent Lamp*
7. *Esco Sentinel™ Silver Microprocessor Controller*
8. *Electrical Panel*
9. *Prefilter*
10. *Indicator Light*
11. *Emergency Stop*

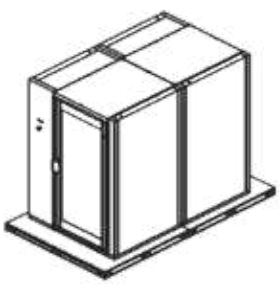
General Specifications, Cleanroom Air Shower, Model EAS (B-Series)

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

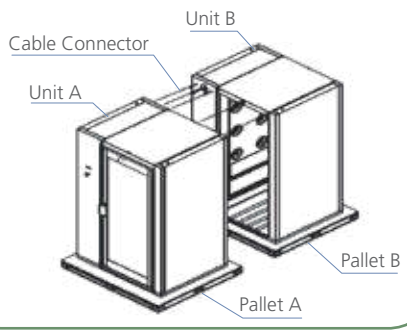
Model			EAS-1B_	EAS-2B_	EAS-3B_
External Dimensions (W x D x H)			1530 x 1000 x 2050 mm (60.2" x 39.4" x 80.7")	1530 x 2000 x 2050 mm (60.2" x 78.7" x 80.7")	1530 x 3000 x 2050 mm (60.2" x 118.1" x 80.7")
Internal Work Area, Dimensions (W x D x H)			790 x 920 x 1930 mm (31.1" x 36.2" x 76.0")	790 x 1920 x 1930 mm (31.1" x 75.6" x 76.0")	790 x 2920 x 1930 mm (1.1" x 115" x 76.0")
Air Change			743/hr	712/hr	702/hr
Initial Airflow Velocity			20-22 m/s (3,937-4,330 fpm)		
Number of Nozzles			12	24	36
Air Shower Duration			Factory set at 12 seconds (adjustable up to 3 mins)		
Persons Per Cycle			1	2-3	4-6
Personnel Flow (Persons / Min.)			4	8-12	15-23
			Above figures based on: Total Cycle Time of 16 seconds (12 seconds of Air Shower + 4 seconds for buffer time / personnel entrance and exit)		
Filtration Efficiency			Main Filter: > 99.99% at 0.3 µm Prefilter: Arrestance 85%, efficiency 20%		
Filtration Elements			Main Filter: HEPA filter Prefilter: Disposable and non-washable polyester fibers		
Fluorescent Lamp			17 W x 2	17 W x 4	17 W x 6
Air Shower Construction			1.5 mm/ 0.06"/18 electro-galvanised steel / White oven-baked epoxy-polyester Isocide™ antimicrobial powder coated finish		
Max. Power Consumption Current, BTU/hr	During Operation		500 W, 2.3 A, 1020 BTU/hr	1000 W, 4.6 A, 2040 BTU/hr	1500 W, 7 A, 3060 BTU/hr
	During Standby		162 W, 0.7 A, 330 BTU/hr	200 W, 1 A, 408 BTU/hr	250 W, 1.1 A, 510 BTU/hr
Electrical	220-240V, AC, 50Hz, 1Ø		EAS-1B1	EAS-2B1	EAS-3B1
	110-130V, AC, 60Hz, 1Ø		EAS-1B2	EAS-2B2	EAS-3B2
	220-240V, AC, 60Hz, 1Ø		EAS-1B3	EAS-2B3	EAS-3B3
	Note: Customer must provide isolator switch on site.				
Gross Weight			450 kg (990 lbs)	820 kg (1808 lbs)	1250 kg (2750 lbs)
Shipping Dimensions, Maximum (W x D x H)	Assembled (W x D x H)		1750 x 1250 x 2152 mm 68.9" x 49.2" x 84.7"	1750 x 2500 x 2152 mm 68.9" x 98.4" x 84.7"	NA
	Module Form (W x D x H)	Pallet A	NA	1750 x 1250 x 2152 mm (68.9" x 49.2" x 84.7")	1750 x 1250 x 2152 mm (8.9" x 49.2" x 84.7")
		Pallet B	NA	1750 x 1250 x 2152 mm (68.9" x 49.2" x 84.7")	1750 x 1250 x 2152 mm (68.9" x 49.2" x 84.7")
		Pallet C	NA	NA	1750 x 1250 x 2152 mm (68.9" x 49.2" x 84.7")
	Unassembled (W x D x H)	Pallet A	2100 x 1300 x 1048 mm (82.7" x 51.2" x 41.3")	2100 x 1300 x 1296 mm (82.7" x 51.2" x 51.0")	2100 x 1300 x 1668 mm (82.7" x 51.2" x 65.7")
		Pallet B	N/A	2100 x 1300 x 800 mm (82.7" x 51.2" x 31.5")	2100 x 1300 x 1219 mm (82.7" x 51.2" x 48.0")
Shipping Volume, Maximum	Assembled		4.70 m³ (166 ft³)	9.40 m³ (333 ft³)	NA
	Module Form		NA	9.40 m³ (333 ft³)	14.10 m³ (499 ft³)
	Unassembled		2.83 m³ (100 ft³)	5.71 m³ (202 ft³)	7.87 m³ (279 ft³)

Esco Cleanroom Air Showers, Modes of Shipment, Model EAS-2B_

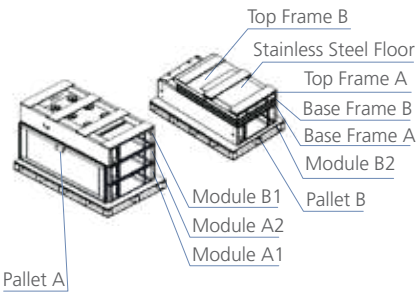
Assembled



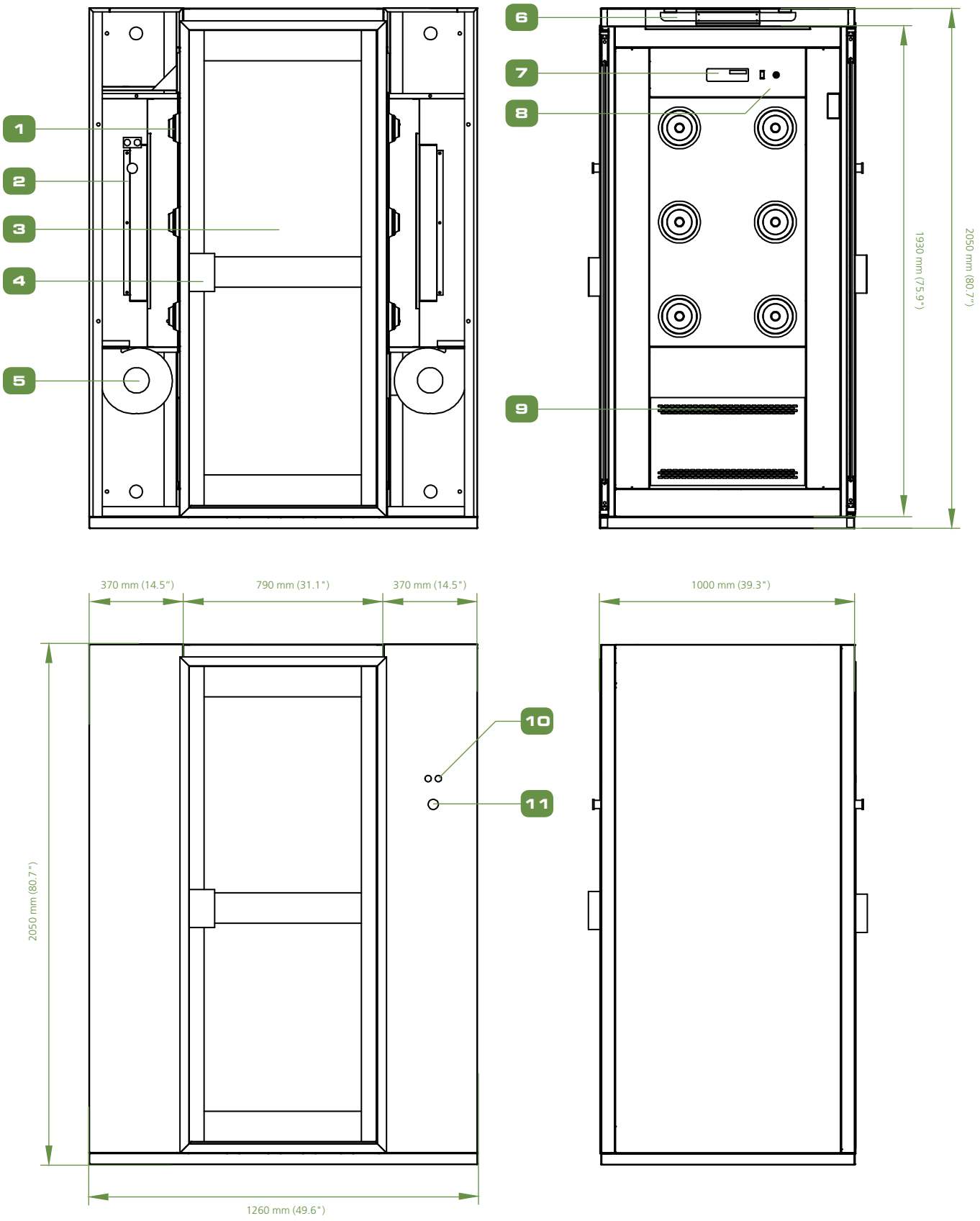
Module Form



Unassembled



ENGINEERING DRAWING (MODEL: EAS-1B_)



1. *Nozzle*
2. *HEPA Filter*
3. *Tempered Glass Door*
4. *Door Handle*
5. *Blower*
6. *Fluorescent Lamp*
7. *Esco Sentinel™ Silver Microprocessor Controller*
8. *Electrical Panel*
9. *Prefilter*
10. *Indicator Light*
11. *Emergency Stop*

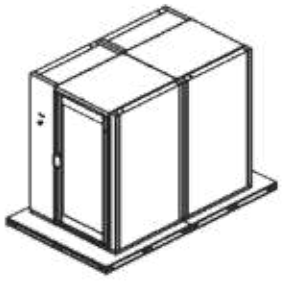
General Specifications, Cleanroom Air Shower, Model EAS (C-Series)

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

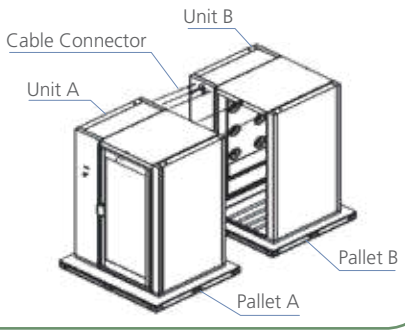
Model			EAS-2C_	EAS-3C_
External Dimensions (W x D x H)			2330 x 2000 x 2050 mm (91.7" x 78.7" x 80.7")	2330 x 3000 x 2050 mm (91.7" x 118.1" x 80.7")
Internal Work Area, Dimensions (W x D x H)			1590 x 1920 x 1930 mm (62.6" x 75.6" x 76.0")	1590 x 2920 x 1930 mm (62.6" x 115" x 76.0")
Air Change			354/ Hr	349/ Hr
Initial Airflow Velocity			20-22 m/s (3,937-4,330 fpm)	
Number of Nozzles			24	36
Air Shower Duration			Factory set at 12 seconds (adjustable up to 2 min)	
Persons Per Cycle			2-3	4-6
Personnel Flow (Persons / Min.)			8-12	15-23
			Above figures based on: Total Cycle Time of 16 seconds (12 seconds of Air Shower + 4 seconds for buffer time / personnel entrance and exit)	
Filtration Efficiency			Main Filter: > 99.99% at 0.3 µm Prefilter: Arrestance 85%, efficiency 20%	
Filtration Elements			Main Filter: HEPA filter Prefilter: Disposable and non-washable polyester fibers	
Fluorescent Lamp			17 W x 8	17 W x 12
Air Shower Construction			1.5 mm/ 0.06"/18 electro-galvanised steel / White oven-baked epoxy-polyester Isocide™ antimicrobial powder coated finish	
Max. Power Consumption Current, BTY/Hr	During Operation		1000 W, 2.3 A, 1020 BTU/hr	1500 W, 7 A, 3060 BTU/hr
	During Standby		162 W, 0.7 A, 330 BTU/hr	250 W, 1.1 A, 510 BTU/hr
Electrical	220-240V, AC, 50Hz, 1Ø		EAS-2C1	EAS-3C1
	110-130V, AC, 60Hz, 1Ø		EAS-2C2	EAS-3C2
	220-240V, AC, 60Hz, 1Ø		EAS-2C3	EAS-3C3
	Note: Customer must provide isolator switch on site.			
Gross Weight			910 kg (2006 lbs)	1660 kg (3660 lbs)
Shipping Dimensions, Maximum (W x D x H)	Assembled (W x D x H)		2500 x 2500 x 2232 mm (98.4" x 98.4" x 87.9")	NA
	Module Form (W x D x H)	Pallet A	2500 x 1250 x 2232 mm (98.4" x 49.2" x 87.9")	2500 x 1250 x 2232 mm (98.4" x 49.2" x 87.9")
		Pallet B	2500 x 1250 x 2232 mm (98.4" x 49.2" x 87.9")	2500 x 1250 x 2232 mm (98.4" x 49.2" x 87.9")
		Pallet C	NA	2500 x 1250 x 2232 mm (98.4" x 49.2" x 87.9")
	Unassembled (W x D x H)	Pallet A	2100 x 1300 x 1296 mm (82.7" x 51.2" x 51.0")	2100 x 1300 x 1668 mm (82.7" x 51.2" x 65.7")
		Pallet B	2100 x 1300 x 800 mm (82.7" x 51.2" x 31.5")	2100 x 1300 x 1219 mm (82.7" x 51.2" x 48.0")
Shipping Volume, Maximum	Assembled		13.94 m^3 (493 ft^3)	NA
	Module Form		13.94 m^3 (493 ft^3)	20.91 m^3 (740 ft^3)
	Unassembled		5.71 m^3 (202 ft^3)	7.87 m^3 (279 ft^3)

Esco Cleanroom Air Showers, Modes of Shipment, Model EAS-2C_

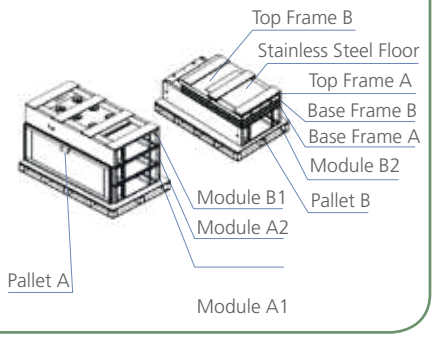
Assembled



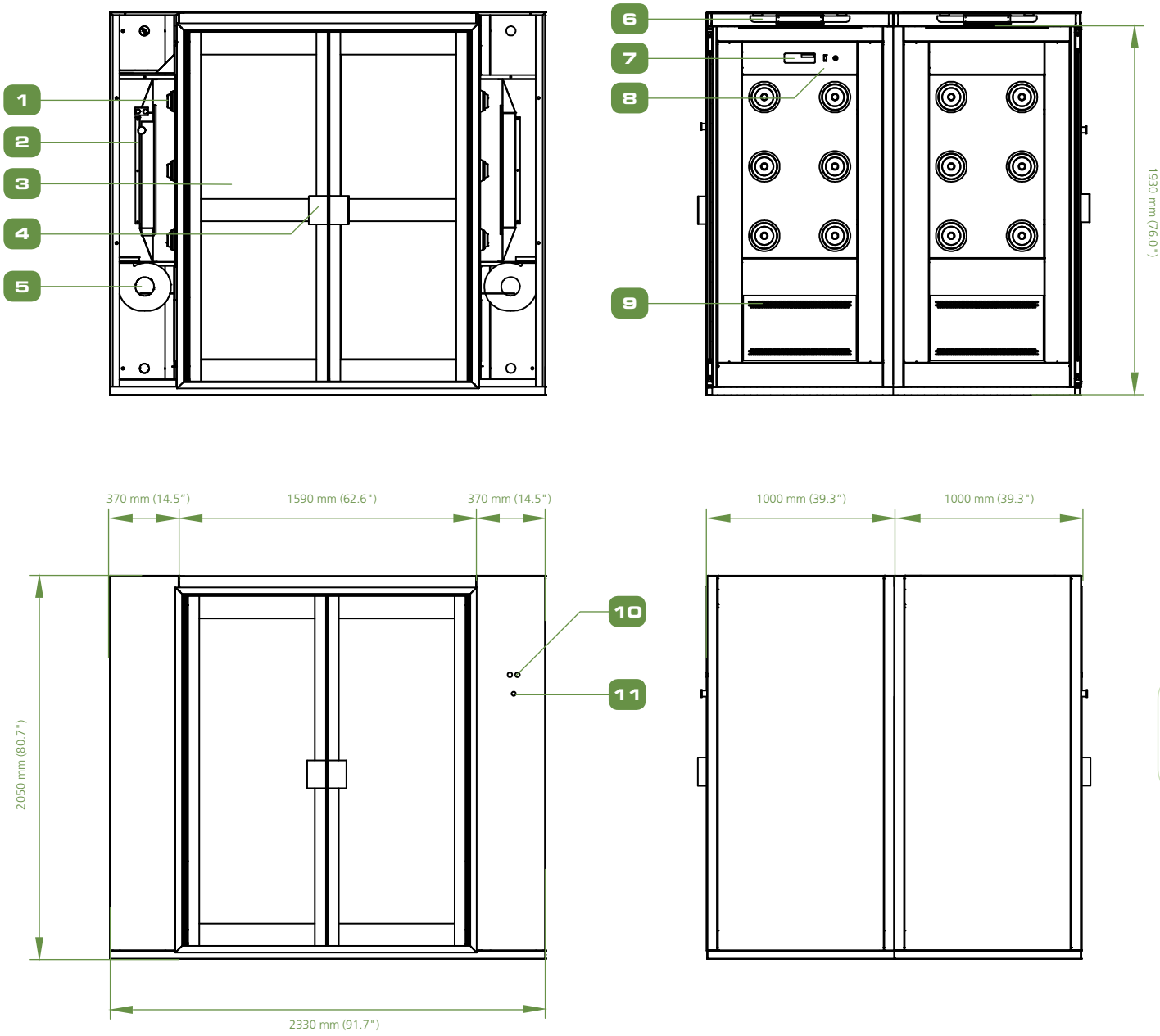
Module Form



Unassembled



ENGINEERING DRAWING (MODEL: EAS-2C_)



1. *Nozzle*
2. *HEPA Filter*
3. *Tempered Glass Door*
4. *Door Handle*
5. *Blower*
6. *Fluorescent Lamp*
7. *Esco Sentinel™ Silver Microprocessor Controller*
8. *Electrical Panel*
9. *Prefilter*
10. *Indicator Light*
11. *Emergency Stop*

Soft Capsule

Soft Wall Cleanroom

Esco Experience

As a pioneer in cleanroom technology, since 1978, Esco has been creating controlled environments for the electronics, semiconductors, pharmaceutical, food, biotechnology, nanotechnology and other high technology industries. Today, increasing quality and process demands in these and other industries require the control of particulate contamination to stringent standards.

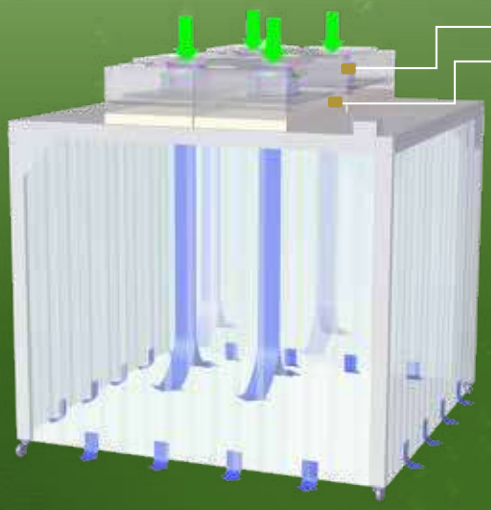
Esco Soft Capsule Soft Wall Cleanrooms are the ideal solution when clean air areas need to be created on a small to mid scale. Flexible and economical, they may be easily relocated when application requirements change. Esco offers a complete range of soft wall cleanrooms to meet various construction, dimensional and cleanliness class requirements.

Applications

Uses include applications where clean air is required for process and product protection.

- Pharmaceuticals, Grade A filling suites
- Medical devices, plastic injection moulding
- Electronics assembly
- Contact lens packaging
- Hospital pharmacy (USP 797)
- Biotechnology
- Nanotechnology
- Life sciences
- Aerospace
- Quality control
- Food industries

Soft Wall Cleanroom Filtration System

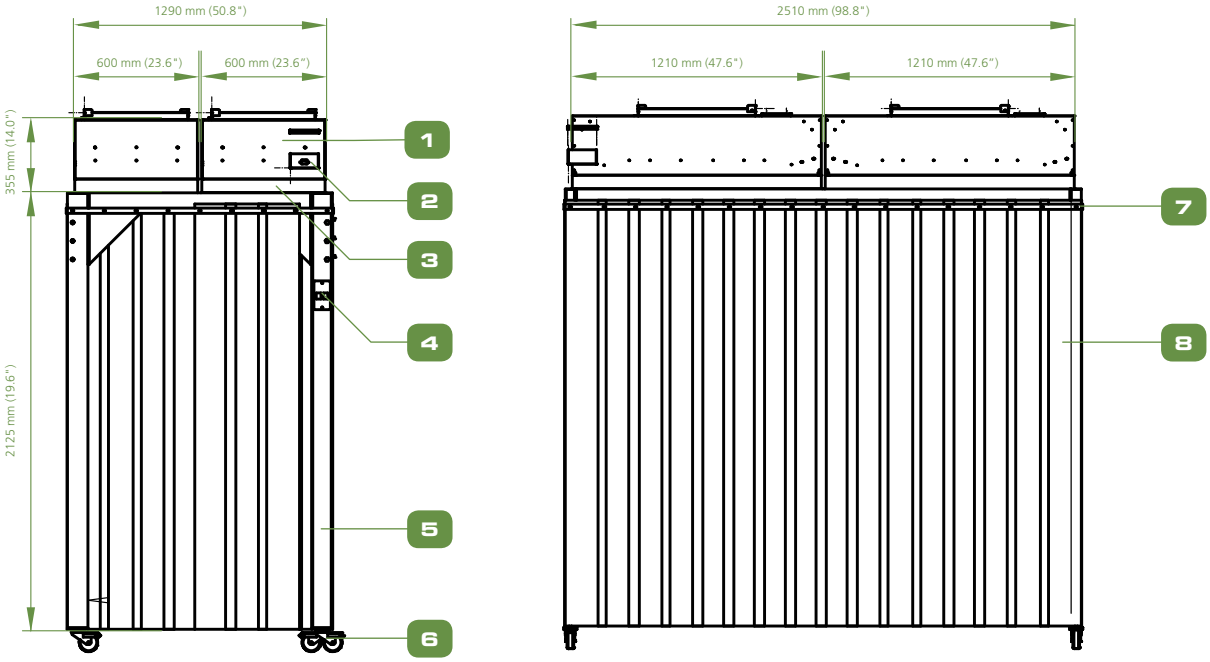


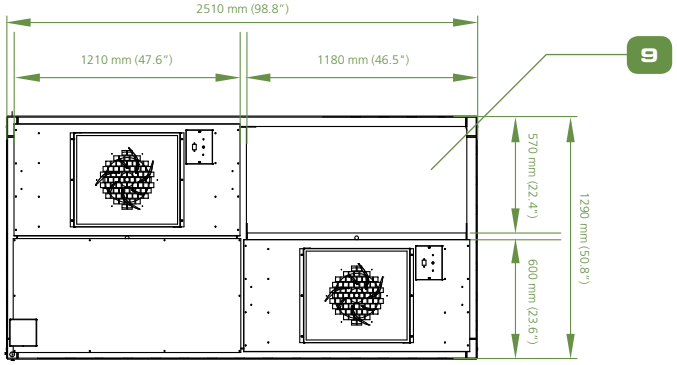
HEPA-filtered air

Room air / Inflow air

- *Room air is taken in from the top of the cleanroom through a disposable prefilter with 85% arrestance; this serves to trap larger particles and increase the life of the main filter.*
- *Air is forced evenly across the HEPA 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.*
- *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 cleanroom in order to maintain cleanliness.*
- *The purified air travels downward within the interior in a vertical, unidirectional stream, and leaves the cleanroom close to floor level at the perimeter.*
- *The cleanroom is positively pressurized to prevent ingress of airborne contaminants from the external environment.*

ENGINEERING DRAWING (MODEL: STL-SC-_)





1. *Fan Filter Unit*
2. *Control Box*
3. *HEPA Filter*
4. *Operation Switch*
5. *Vertical Bar*
6. *Caster Wheel*
7. *Curtain Holder*
8. *Curtain Strips*
9. *Ceiling Cover*

DPB/DFLH

Dynamic Passbox / Dynamic Floor Label Hatch

Introduction

The Esco Dynamic Passboxes and Dynamic Floor Label Hatches are aseptic architectural systems utilized to prevent contaminants from leaking into aseptic suits. They are utilized for aseptic transfer of materials into and out from the critical process environments.

Basic Principles

- Dynamic airflow provides an air barrier to prevent contaminant from entering into critical controlled environments during material transfers.
- Vertical purging to trace any contaminants that can enter during post material transfer.
- Airflow set at dual recirculatory on both sides.

The Highest Quality Cabinet Construction

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

- Easy to clean design.
- HEPA/ULPA gel sealed main filter design
- Sentinel™ microprocessor control with audio/visual alarms for downflow velocity and filter loading.
- Red/green indicators for all operational parameters.
- Emergency stop
- Food grade FDA approved, USP class 6 Compliant air tight seals.
- Toughened safety glass
- Air tight Pharma grade latches with electromagnetic interlocks
- Stainless steel hinges
- Fully rounded interior corners with enhanced perforated grille system for full downflow in critical corners.
- Port for particle counter probe
- Port for upstream PAO concentration
- Pressure tested as per ISO standards

Basic Principles

- UV Lighting
- Onboard lighting
- Splashproof electrical outlets
- Internal Shelves
- Flanges
- Support stands
- Lead shielding
- Atex rated
- Fire rated

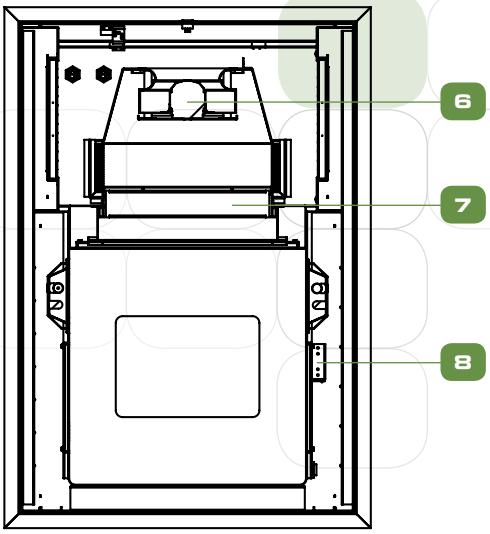
Product Code	-	MOC-	IW (cm)	ID (cm)	IH (cm)	-	Door Opening	Base	Onboard Lighting	UV Light	X	Electrical Code
DPB / DFLH		**A**-EG Steel Exterior/Interior with SS304 base.					**1**- Straight Through	**1** - With	**1** - With	**1** - With		**1** 220-240 VAC 50 Hz
		S1-Full SS304 with interior rounded corners					**2** - L shape	**2** - Without	**2** - Without	**2** - With-out		**2** 110-130 VAC 50/60 Hz
		S2-Full SS316L with interior rounded corners					**3** - 3 way					**3** 100-110 VAC 60 Hz
		CMB-Other Combinations										

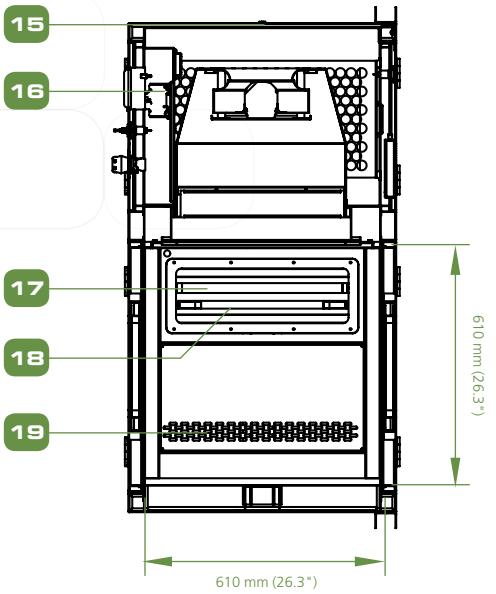
Standard sizes now available from Esco at standard factory leadtimes!

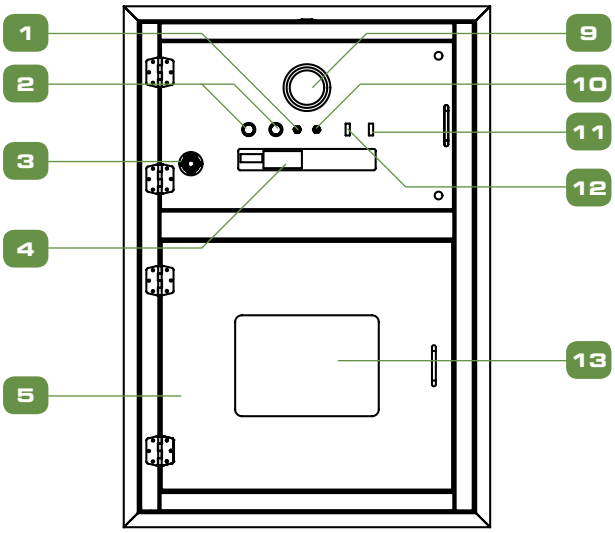
Standard Sizes	Internal WxDxH
DPB-606060-112X1	600 x 600 x 600 mm (23.6" x 23.6" x 23.6")
DPB-616161-312X1	610 x 610 x 610 mm (24" x 24" x 24")
DPB-454545-112X1	450 x 450 x 450 mm (17.7" x 17.7" x 17.7")
DPB-606060-212X1	600 x 600 x 600 (23.6" x 23.6" x 23.6")
DPB-616176-312X1	610 x 610 x 760 mm (24" x 24" x 29.9")
DPB-919191-112X1	915 x 915 x 915 mm (36" x 36" x 36")

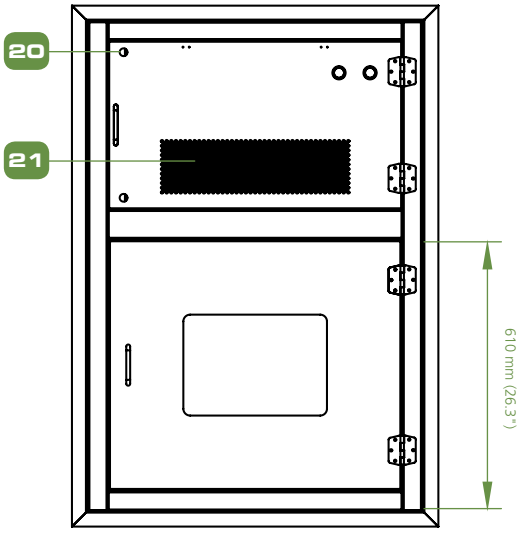
Standard Sizes	Internal WxDxH
DPB-616176-112X1	610 x 610 x 760 mm (24" x 24" x 29.9")
DPB-616191-312X1	610 x 610 x 915 mm (24" x 24" x 36")
DFLH-909090-112X1	900 x 900 x 900 mm (35.4" x 35.4" x 35.4")
DFLH-9090120-112X1	900 x 900 x 1200 mm (35.4" x 35.4" x 47.2")
DFLH-150150150-112X1	1500 x 1500 x 1500 mm (59" x 59" x 59")

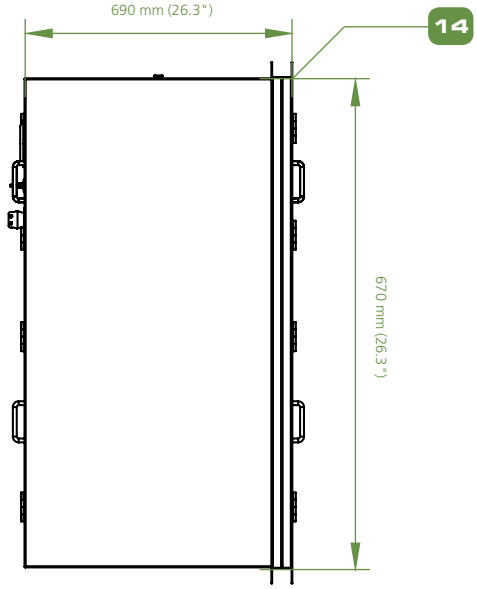
ENGINEERING DRAWING (MODEL: DPB-S616161-C)











1. *PAO Injection Port*
2. *Status Indicator Lights*
3. *Emergency Stop*
4. *Esco Sentinel™ Gold Microprocessor Controller*
5. *Door*
6. *ebm-papst® Blower*
7. *H14 Filter*
8. *Electromagnetic Interlock*
9. *Magnehelic Gauge*
10. *PAO Reading Port*
11. *By Pass Switch*
12. *Power Switch*
13. *Viewing Glass*
14. *Removable Flange*
15. *G4 Prefilter*
16. *Electrical Panel*
17. *UV Light*
18. *Fluorescent Lamp*
19. *Exhaust Grill*
20. *Cam Latch*
21. *G4 Prefilter*

EGSC
Esco Garment Storage Cabinet

Introduction

Esco laminar flow cabinets are the premium selection for the discerning user, offering a combination of value, high quality construction, low operating noise levels, and a wide product range to suit all budgets, from an industry leader.

Basic Principles

Esco garment storage cabinets make a positive contribution to maintaining the cleanliness of a cleanroom environment.

- ULPA-filtered airflow keeps garments clean during storage and handling.
- High quality ULPA filters utilizing an improved mini-pleated separation technique to maximize surface area improving efficiency and extending 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.
- Enables garments to be stored in a visible and organized manner.
- Esco laminar flow cabinets provide ISO Class 3 air cleanliness within the work zone as per ISO 14644.1, 100 times cleaner than the usual Class 5 classification.
- An additional disposable prefilter on all models traps large particles in the inflow air prior to reaching the main filter, protecting it against damage and prolonging its life.

Standard Features

- Reliable rocker switches control the fan and lights and a Minihelic™ pressure gauge monitors cabinet operation.
- 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.
- All components are designed for maximum chemical resistance and enhanced durability for a long service life.
- The main body of the cabinet is constructed with industrial-grade electrogalvanized steel.
- The cabinet can be designed as mobile with caster wheels or static via built-in leveling feet.
- All cabinet components are clean room compatible. Isocide™ eliminates 99.9% of surface bacteria within 24 hours of exposure.

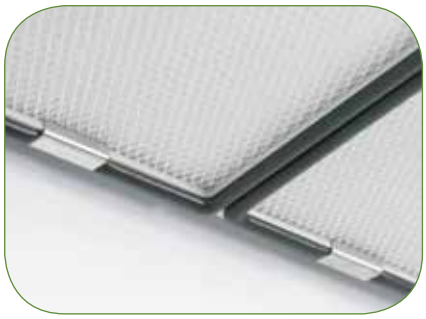
Enhanced Filtration System

- Esco laminar flow cabinets provide ISO Class 3 air cleanliness within the work zone as per ISO 14644.1, 100 times 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.

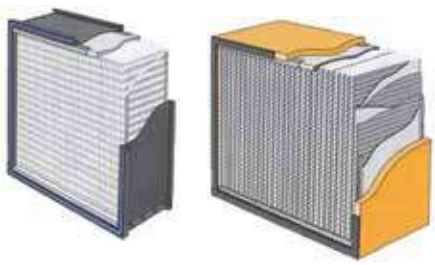
Esco Garment Storage Cabinet Filtration System

- During operation, room air is drawn through the top of the cabinet via a non-washable polyurethane prefilter with 85% arrestance, trapping larger particles and increasing the life of the main filter.
- The air is then forced evenly through the ULPA filter with > 99.999% efficiency, resulting in a unidirectional stream of clean air projected vertically over the internal work zone. All airborne contaminants are flushed and diluted, resulting in a particulate-free work environment.
- The purified air then leaves the storage area across the entire open front of the cabinet.
- A nominal filter face velocity of 0.45 m/s (90 fpm) ensures that there is a sufficient number of air changes with in the enclosed area of the cabinet in order to maintain cleanliness.
- Esco laminar flow storage cabinets incorporate permanently lubricated direct drive centrifugal blowers.
- The energy efficient external rotor motor design reduces operating costs, noise, and vibration levels.
- Built-in solid state variable speed controllers with integral RFI and noise filters offering flexible adjustment from zero to maximum setting.
- Each cabinet is individually factory tested for safety and performance in compliance with international standards.
- All electrical components are UL listed or UL recognized, ensuring superior electrical safety.
- All Esco laminar flow storage cabinets meet general safety requirements set by independent testing laboratories.

	Cabinet Performance	Air Quality	Filtration	Electrical Safety
Standard Compliance	EN 12469 IEST-RP-CC002.2, Worldwide	ISO 14644.1, Class 3, Worldwide AS 1386 Class 1.5, Australia JIS B9920 Class 3, Japan	EN-1822 (H14), Europe IEST-RP-CC001.3, Worldwide IEST-RP-CC007.1, Worldwide IEST-RP-CC034.1, Worldwide	IEC 61010-1, Worldwide EN 61010-1, Europe UL 61010-1, USA CAN/CSA-22.2, No.61010-1



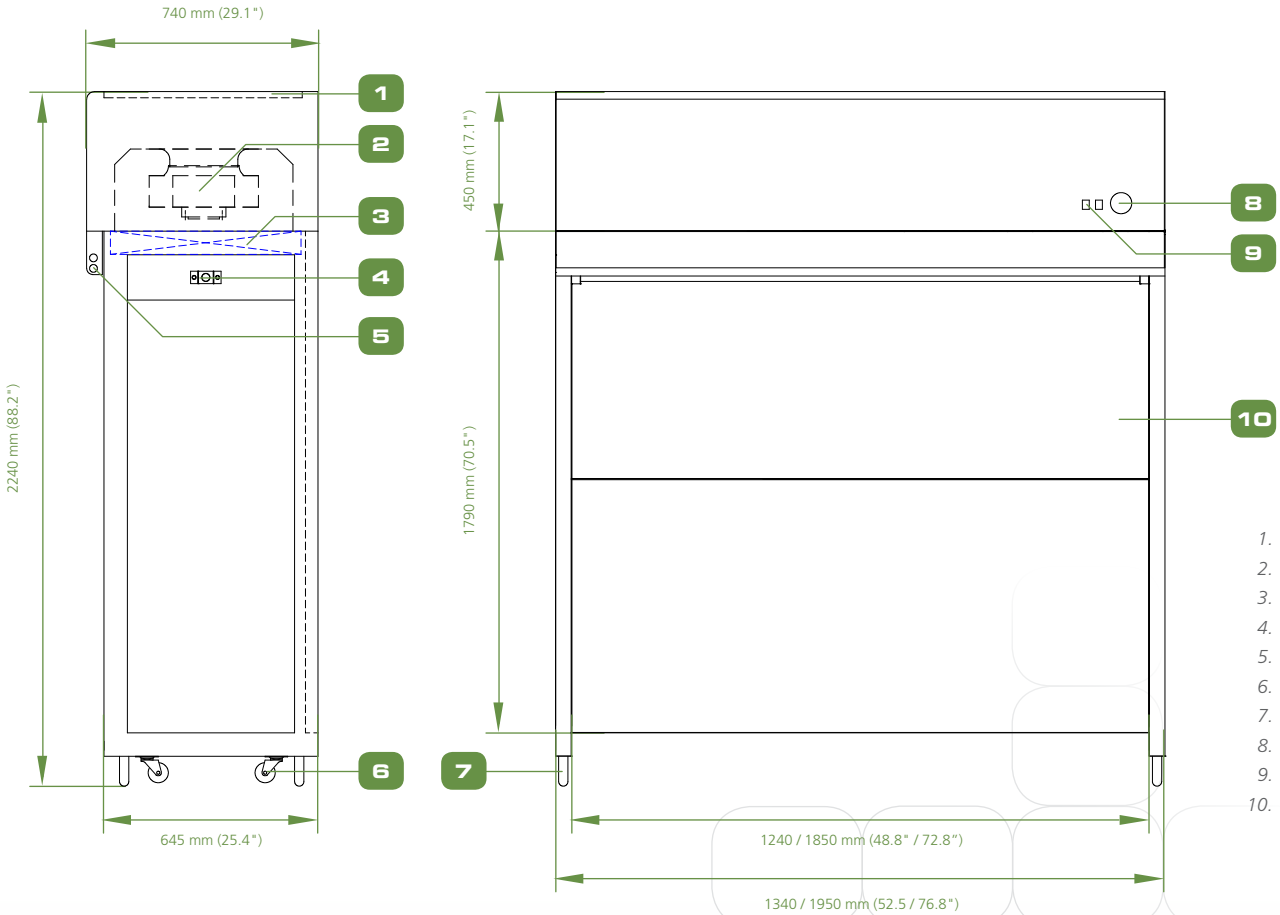
Mini-pleat Separatorless Filter (left) vs. Conventional Aluminum Separator Filter (right)



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.

General Specifications, Garment Storage Cabinet			
Model		**EQU/04-EGSC**	**EQU/06-EGSC**
Nominal Size		1.2 meters (4')	1.8 meters (6')
External Dimensions (W x D x H)		1340 x 740 x 2240 mm (52.8" x 29.1" x 88.2")	1950 X 740 X 2240 mm (76.8" x 29.1" x 88.2")
Internal Storage Area, Dimensions (W x D x H)		1240 x 645 x 1790 mm (48.8" x 25.4" x 70.5")	1850 x 645 x 1790 mm (72.8" x 25.4" x 70.5")
Storage Capacity		16 garments on hangers (4' model)	24 garments on hangers (6' model)
Average Airflow Velocity		0.45 m/s (90 fpm)	
Prefilter		Washable non-woven polyester fibers with 90% arrestance and 20% efficiency	
ULPA Filter Typical Efficiency		99.999% for particles size at 0.3 microns	
Sound Emission Per IEST-RP-CC002.2		61 dBA	63 dBA
Fluorescent Lamp Intensity At Zero Ambient		> 800 ux (> 74 foot-candles)	
Cabinet Construction	Main Body	1.2mm (0.05") 18 gauge electro-galvanised steel with White oven-baked epoxy-polyester Isocide™ antimicrobial powder coated finish	
Electrical	220-240V, AC, 50Hz, 1Ø	EQU/04-EGSC	EQU/06-EGSC
	Cabinet Nominal Power	378 W	628 W
	Cabinet Full Load Amps (FLA)	1.8 A	4 A
	Cabinet BTU	1290	2143
Net Weight		150 kg (331 lbs)	220 kg (484 lbs)
Gross Weight		230 kg (507 lbs)	312 kg (688 lbs)
Shipping Dimensions, Maximum (W x D x H)		1950 x 950 x 1320 mm (76.8" x 37.4" x 51.9")	2200 x 960 x 1310 mm (86.6"x 37.8 x 51.6")
Shipping Volume, Maximum		2.1 m³ (74.4 ft³)	2.6 m³ (90.7 ft³)

ENGINEERING DRAWING (MODEL: EGSC-_A)



1. *Prefilter*
2. *Blower*
3. *ULPA filter*
4. *Stainless steel rod*
5. *Fluorescent lamps*
6. *Caster Wheel*
7. *Leveling Feet*
8. *Pressure gauge*
9. *Operating Switches*
10. *Back panel*

VBE
Ventilated Balance Enclosure

Introduction

The Esco Ventilated Balance Enclosure (VBE) is designed specifically for stability and accuracy while maintaining a high level of operator protection by containing hazardous airborne powders. The aerodynamically designed the aerodynamically designed sash and the arm rest with a sectionalized baffle assures that the airborne powders are well contained inside the enclosure and exhausted through a HEPA filter or direct to the laboratory exhaust.

Construction

This equipment is also equipped with aerodynamic sash handle and arm rest to provide optimized airflow inside the enclosure.

The design of VBE is modular in terms of exhaust and filtration system. There are three basic modules: the Base Module, the Filter Module, and the Blower Module.

The cabinet construction is made up of electro-galvanized steel with white oven-baked epoxy polyester Isocide™, an antimicrobial powder coat finish. The unit can also be optionally be made in full stainless steel.

Key Features

- Negative pressure application provides high level of operator's protection from hazardous airborne particles.
- Disposal port is equipped with O-ring to provide a sealed trash bag for additional powder containment solution.
- VBE is equipped with a filter and a blower module for better airflow control.

Filtration Package

- Single Bag-In Bag-Out (BIBO) Filter
  - Efficiency: 99.995% at 0.3 micron
  - Classification: H14 filters
  - Media: Glass Fiber
  - Sealing Method: Gasket

Control System Package

- RH/Temperature sensor
- Fan speed control

Comfortable Ergonomic Design

- The 5° angled front frame improves viewing on the workspace.
- Lightweight sash with position hinge to provide easy access on the equipment inside.
- Instant start-up fluorescent lamp
- The arm rest is raised above the work zone to improve comfort and to ensure the user's arm is not blocking the airflow.
- Optimized side panels providing a more conducive light when working.

Electrical Safety and Certification

All components meet or exceed applicable safety requirements.

Each cabinet is individually tested at the factory for safety testing.

- Documentation specific to each cabinet serial number is maintained on file.

Warranty

One year warranty excluding consumables such as but not limited to ballast, fluorescent, and filters is given with this unit.

Consequently, all other parts including the blower, fan switch, and electrical main boards are covered in the warranty. During the period of warranty, any repair, modification, testing, and commissioning performed by any authorized party other than the Esco Service Team, shall void the warranty of the unit.

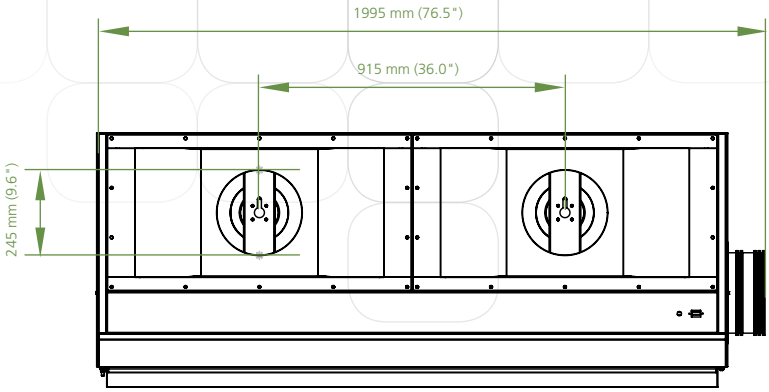
ORDERING INFORMATION

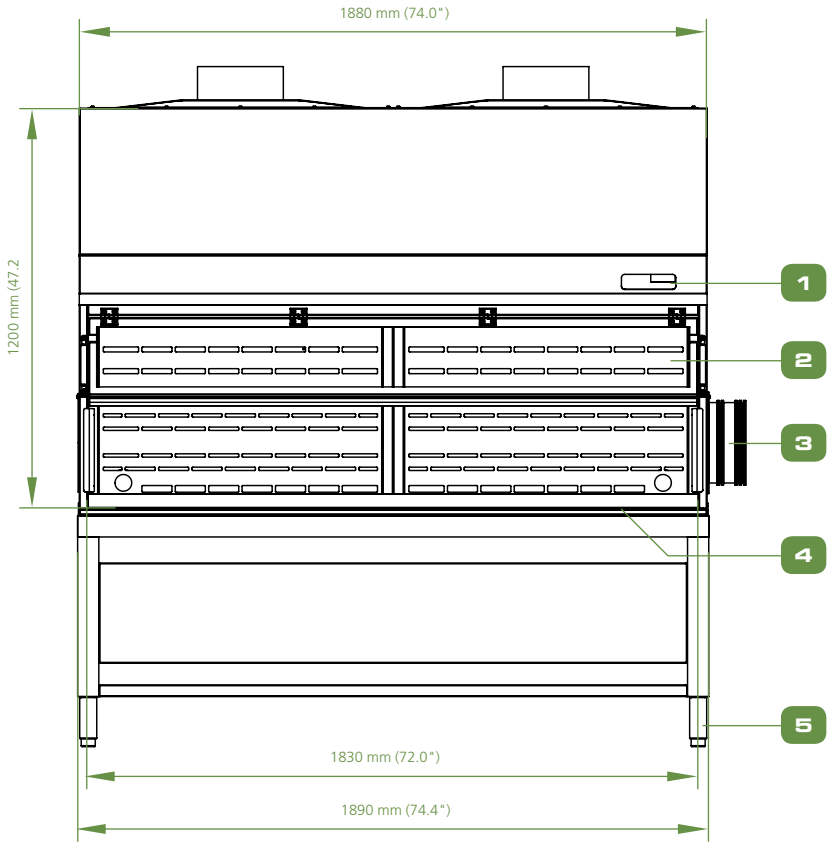
Guide to Ventilated Balance Enclosure (VBE) Models

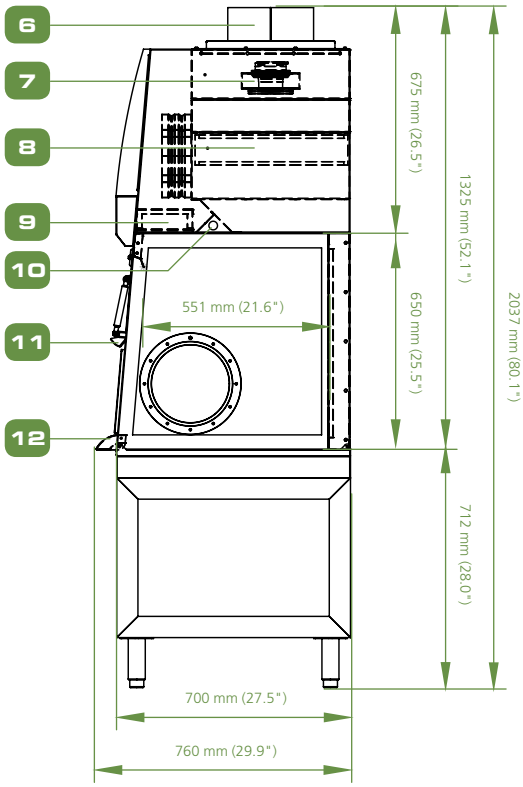
VBE-2 A 8-03 SA

Model	Internal Width (mm)	Size	Configuration	Electrical Code	Enclosure Module	Filter Module	Exhaust Type
VBE	610	**2**	**A** - Standard **B** - Tall **C** - Tall and Deep	**7** - 100V 50/60Hz **8** - 230V 50/60Hz **9** - 115V 50/60Hz	**01** - without filter and blower **02** - with filter **03** - with filter and blower	**S** - Single Filtration **D** - Double Filtration	**A** - Ducted **B** - Ductless **C** - Portable Duct
	915	**3**					
	1220	**4**					
	1525	**5**					
	1830	**6**					
	2135	**7**					
	2440	**8**					

ENGINEERING DRAWING (MODEL: VBE-6A_-03SA)







1. *Esco Sentinel™ Silver Microprocessor Controller*
2. *Polycarbonate Sash Window*
3. *Disposal Port*
4. *Stainless Steel Work Top*
5. *Leveling Feet*
6. *Exhaust Ducting*
7. *ebm-papst® Blower*
8. *Bag-In / Bag-Out (BIBO) Filter*
9. *Electrical Panel*
10. *Fluorescent Lamp*
11. *Sash Handle*
12. *Arm Rest*

ACCESSORIES AND OPTIONS

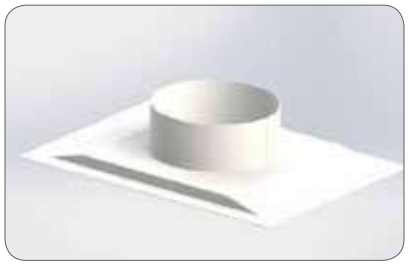
Filter Module

- Filter module can be configured as Single or Dual filtration, additional H14 filters may be ordered.
- Additional carbon filter may be supplied for odor control.

Carbon Filter	Carbon Type	Size	Dimensions
CF	**A** - Organic	**2V**	457 x 457 x 90 mm (17.9" x 17.9" x 3.5") (2 for 5' cabinets)
	B - Acid	**3V**	
	C - Mercury		457 x 762 x 90 mm (17.9" x 30" x 3.5") (2 for 6' and 7' cabinets)
	D - Sulphur		
	E - Halogen		
	F - Aldehyde		
	G - Ammonia/Amine		
	H - Chloroform /Ethers		

Exhaust Module

VBE has two options for Exhausting Filtered Air such as **DUCTED** type (standard configuration) and **DUCTLESS** type (customizable configuration).



Filter Module

Filter Module can be configured as **DOUBLE FILTRATION** (customizable configuration) or **SINGLE FILTRATION** (standard configuration). Each module section quantity may vary from 1 to 3, depending on the width of the enclosure. Additional carbon filter may be supplied for odor control.

Enclosure Module

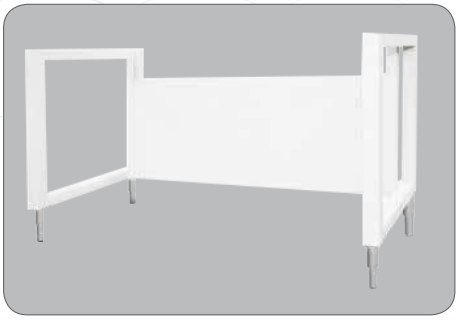
VBE Enclosures covers a wide range of weighing and powder handling options and requirements. **SMALL** (standard configuration), **MEDIUM** (customizable configuration) or **LARGE** (customizable configuration) models are available. Small models are perfect for small spaces, hence, adding portable filter options will save ceiling space. Medium models are suitable for high-capacity equipment when weighing powders, consequently, large models are for large scale powder handling, and is recommended to be combined with the worktop or drum access options.

Worktop Option

There are four types of worktop available:

- Solid Epoxy
- SS304
- SS316
- GRANITE

For the base, support stand, cabinet, support stand with drum access are available. in addition to this, castor wheel or leveling feet can be selected for footing options.



AFTER SALES SERVICES

Parts Availability

Whenever service is needed and parts are required, minimizing downtime is a critical objective. Statistical usage analysis helps Esco to predict parts life, permitting Esco to manage logistics and stage proper inventories around the world. The combination of predictive maintenance, historical data and geospecific proximity assures our customers that parts and labor are available whenever service is scheduled through the local sales organization.

Registration, Documentation and Instruction

Quality control at Esco extends from research and development through engineering, manufacturing, shipment, delivery and customer feedback. Esco maintains an aggressive program to encourage warranty card registration by mail, email or online submission so that we know where Esco products are located and how they are being used. Rest assured that all information disclosed from warranty registrations will be kept confidential. All Esco products include unique serial numbers for identification. Documentation for all performance tests is archived and maintained for customer reference.

Online Technical Information

Site preparation instructions are useful before product arrival and installation. Installation and start-up manuals, operation manuals and quick reference guides are available anytime from the Esco resources online. An interactive online LiveSupport™ concierge center accessible through the Esco website offers extended hours of operation. LiveSupport™ permits users to dialogue directly with Esco personnel.

Services Coordination

A Service Coordinator on hand assists and coordinates any technical queries and schedule site visits for customers. As a service team, we are customer service driven, and aims to do all we can to provide the best possible service from start to finish.

NSF International Accreditations and NEBB Certification

The National Sanitation Foundation (NSF) International is an independent, non-profit organization that provides standards development, product certification, auditing, education and risk management for public health and the environment. The NSF mark is your assurance that the product complies with all the standard requirements, tested by one of the most respected independent certification organizations in existence today. NSF conducts periodic unannounced inspections and product testing to verify that the product continues to comply with the standard. It is valued by consumers, manufacturers, retailers and regulatory agencies worldwide.

National Environmental Balancing Bureau (NEBB) is an international association certifying firms and qualifying supervisors and technicians in different disciplines, like cleanroom purposes. Each discipline is anchored by a NEBB Procedural Standard that provides guidelines for work to be performed and NEBB certification examinations that validate the individual's knowledge.

Esco has passed stringent requirements during testing and inspection, also confirming product conformance to NSF, NEBB, ISO, and EN Standards.

In line with Esco's commitment in providing world class services worldwide, Esco has ensures a large contingent of NSF accredited certifiers along with the NEBB certified service engineer. These accreditations make Esco not only an **E**xcellent **S**tandards **CO**mpany but also an **E**xcellent **S**ervice **CO**mpany, which exemplifies Esco's collective quest of being an **E**ternally **S**uccessful **CO**mpany.

References and Links

For more information, you can visit Esco at **www.escopharma.com**

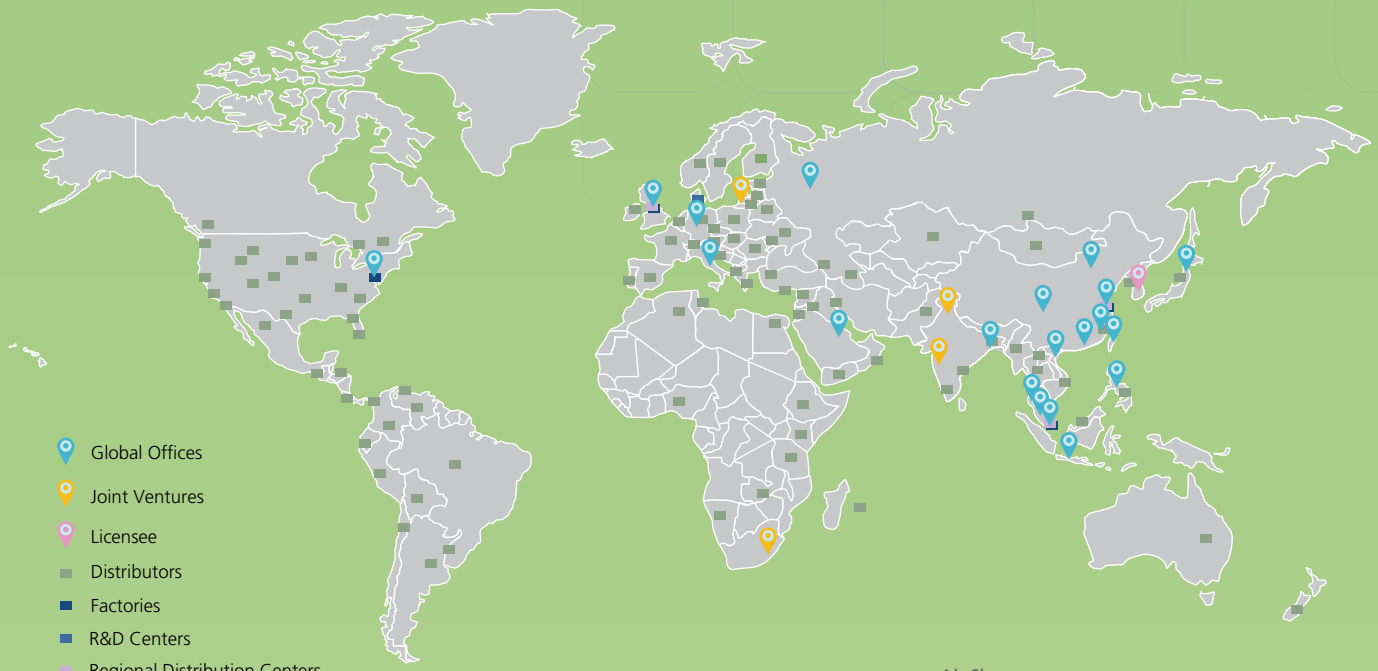
escoglobal.com LIVE SUPPORT

SAFETY

DOESN'T HAVE TO BE WORN

Esco Pharma provides specialist services, equipment packages and process solutions leading to improved protection of operators, reduction of cross-contamination, and more efficient processing, thereby advancing occupational health and human healthcare.

ESCO GLOBAL NETWORK



Air Shower
Aseptic Containment Isolator (ACTI)
Ceiling Laminar Airflow Units
Cleanroom Transfer Hatch
Containment Barrier Isolator (CBI)
Downflow Booth (DFB)
Dynamic Floor Label Hatch
Dynamic Pass Box
Evidence Drying Cabinet
Garment Storage Cabinet
General Processing Platform Isolator (GPPI)
Laminar Flow Horizontal Trolley
Laminar Flow Straddle Units, Single and Double
Laminar Flow Vertical Trolley
Pass Box
Soft Wall Cleanroom
Sputum Booth
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. www.escoglobal.com.

ESCO® PHARMA

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