

Operator protecting Equipment from Powder



ESCO



Your **B**est
Laboratory

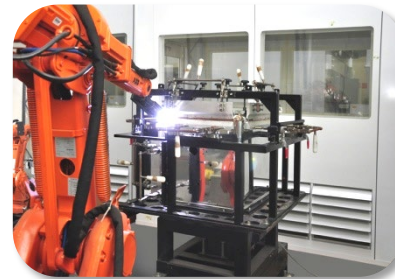
YB Co Kr
황용배 팀장

PRODUCTION PROCESS

Incoming materials inspection & warehousing



Automated sheet metal fabrication



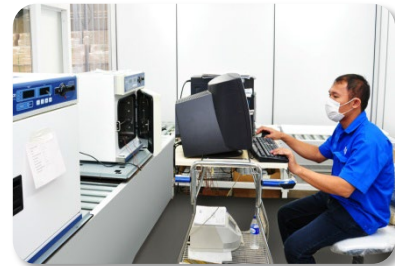
Robotic welding process



Environmentally friendly powder coating



Electrical/ electronics sub-assembly



Electromechanical final product assembly



Multi-step performance testing ; independent QC at each step



Packaging



In-House Integration of Multiple Manufacturing Technologies (Sheet Metal, Electronics, Sensors) for the Best Quality

ASSESSING CONTAINMENT Performance of EQUIPMENT

- ISPE GUIDELINES
 - APCPPE
 - Assessing Particulate Containment Performance of Pharmaceutical Equipment
 - SMEPAC
 - Standardized Measurement of Equipment Particulate Airborne Concentration
- Surrogate Testing
 - Lactose, Naproxen Sodium, Riboflavin, Sucrose, Acetaminophen, etc

ASSESSING CONTAINMENT Performance of EQUIPMENT

- SAMPLING
 - Static Sampler Locations
 - Breathing zone
 - General area air
 - Surface wipe or swab
- Equipment
 - Powder enclosure, DFB, Isolator, etc

ESCO

- Powdermax

- <https://www.escolifesciences.com/pdf/PW1-Surrogate-Mar2021.pdf>
- API(naproxen sodium), at an OEL of 26.3 nanogram/m³

- Down Flow Booth

- 원문: on request
- Lactose. OEL <100 µg/m³

ESCO Pharmacon Downflow Booth Setup



Powdermax® Balance Enclosure

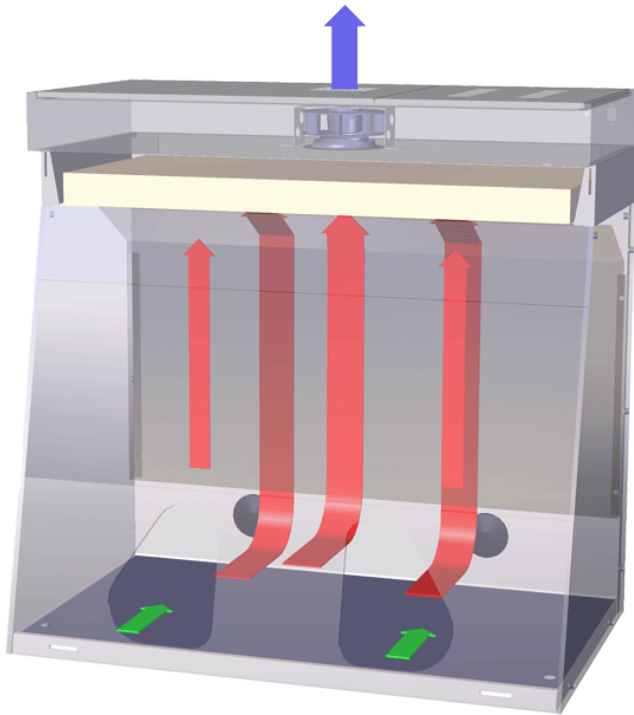


Features and Benefits

- Prevents exposure to hazardous powders during weighing, mixing and dispensing procedures
- Balance stability to 4 decimal places
- **HEPA filter**, rated at >99.99% efficiency for 0.3 micron sized particles
- Size: 3 or 4 feet
- Enclosure containment meets ASHRAE-110 requirements
- Microprocessor control and alarm system for maximum safety
- **13-degree sloped front** allows easy access to the work zone

Powdermax® Balance Enclosure

Airflow



- Room air is drawn in across the front of the cabinet with an average velocity of 0.5 m/s
- Air is drawn up through the cabinets work zone and forced through the HEPA filter
- The HEPA filtered air then returns to the laboratory removed of airborne contaminants or is vented using the optional exhaust collar for enhanced safety

Powdermax® Balance Enclosure

General Specifications, Powder Weighing Balance Enclosure			
Model	220-240 VAC, 50/60 Hz	PW-3A1 2160001	PW-4A1 2160010
	110-120 VAC, 60 Hz	PW-3A2 2160003	PW-4A2 2160006
	220-240 VAC, 60 Hz	PW-3A3 2160004	PW-4A3 2160007
Nominal Size		0.9 meter (3 ft)	1.2 meter (4 feet)
External Dimensions (W x D x H)*		840 x 700 x 1125 mm (33.1" x 27.6" x 44.3")	1140 x 700 x 1125 mm (44.9" x 27.6" x 44.3")
Internal Work Area, Dimensions (W x D x H)		820 x 650 x 829 mm (32.3" x 25.6" x 32.6")	1120 x 650 x 848 mm (44.1" x 25.6" x 33.4")
Standard Filtration Elements	Main Filter	HEPA filter, typical efficiency of >99.99% at 0.3 microns, removes particles and aerosols	
Control System		Sentinel™ Silver Microprocessor Controller	
Inflow Air Velocity		Initial setpoint: average of 0.5 m/s (100 fpm)	
Sound Emission		<55 dBA at initial blower speed setting measured at typical operator work position	
Cabinet Construction	Main Body	1.2 mm (0.05") 18 gauge electrogalvanized steel with white oven-baked epoxy-polyester Isocide™ antimicrobial powder coated finish	
	Back Wall		
	Front Window	6 mm (0.2") Acrylic	
	Side Walls		
	Work Top	Phenolic Resin	
Fluorescent Lamp Intensity at Zero Ambient		>560 lux (>52 foot-candles)	>550 lux (>51 foot-candles)
Sash Specification	Sloped Front	13°	
	Sash type	Hinged	
Net Weight		110 kg (242.5 lbs)	160 kg (352.7 lbs)
Shipping Weight		120 kg (264.6)	170 kg (374.8)
Shipping Dimensions, Maximum (W x D x H)		1050 x 1100 x 720 mm (2314.9" x 2425.1" x 1587.33")	1300 x 1100 x 720 mm (2866.0" x 2425.1" x 1587.33")
Shipping Volume, Maximum		0.83 m³ (29.3 cu.ft.)	1.0 m³ (35.3 cu.ft.)

Powdermax® Balance Enclosure

- Microbalance: Weighing accuracy



$l=0.50\text{m/s}(100\text{fpm})$	Weight (g)	
Measurement #	20	5
1	20.000010	5.000011
2	20.000016	5.000025
3	20.000019	5.000013
4	20.000013	5.000014
5	20.000021	5.000013
Average	20.000016	5.000015
Standard Deviation	0.000004	0.000006
% RSD	0.000022	0.000112

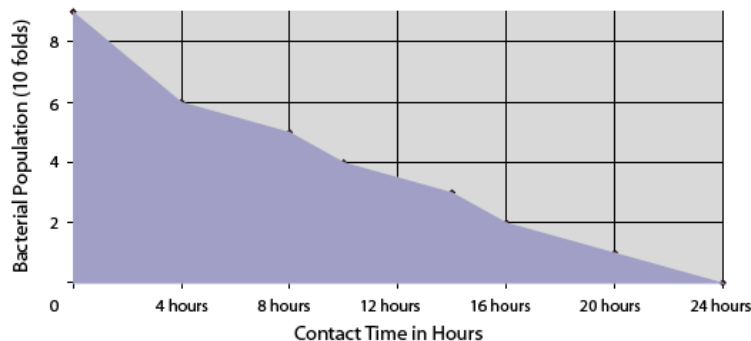
$l=0\text{ m/s}(0\text{ fpm})$	Weight (g)	
Measurement #	20	5
1	20.000019	5.000016
2	20.000019	5.000008
3	20.000019	5.000011
4	20.000016	5.000008
5	20.000015	5.000008
Average	20.000018	5.000010
Standard Deviation	0.000002	0.000003
% RSD	0.000010	0.000070

Powdermax® Balance Enclosure

Enclosure Construction

- The enclosure's head unit is constructed of electrogalvanized steel with abrasion-resistant powder-coated finish
- External surfaces are coated with Esco Isocide™ antimicrobial coating to protect against surface contamination and inhibit bacterial growth
- The enclosure is supplied with a chemical and abrasion resistant phenolic resin removable work surface

ISOCIDE™ Antimicrobial Powder-Coating



VENTILATED BALANCE ENCLOSURE

- designed specifically for stability and accuracy while maintaining a high level of operator protection by containing hazardous airborne powder



Powder
Weighing

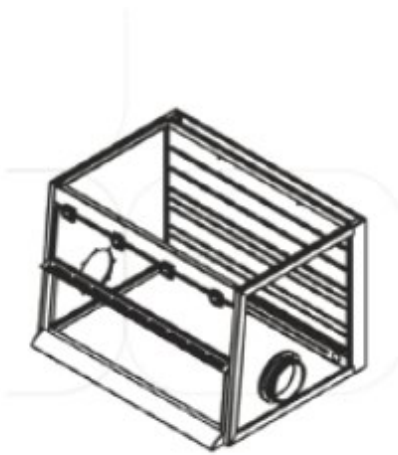


Non-hazardous
Compounding



VENTILATED BALANCE ENCLOSURE

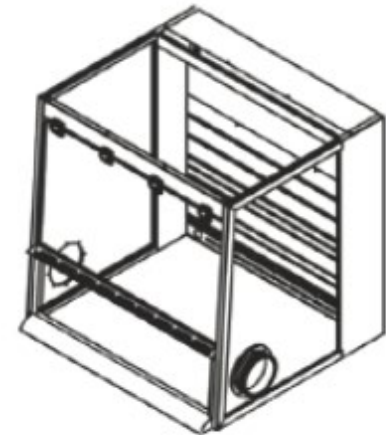
- Body
 - Size: 2 ~ 8 feet
 - Small, Medium, Large



Small Model is perfect for small spaces. Portable filter options can be added to save much of the ceiling space.



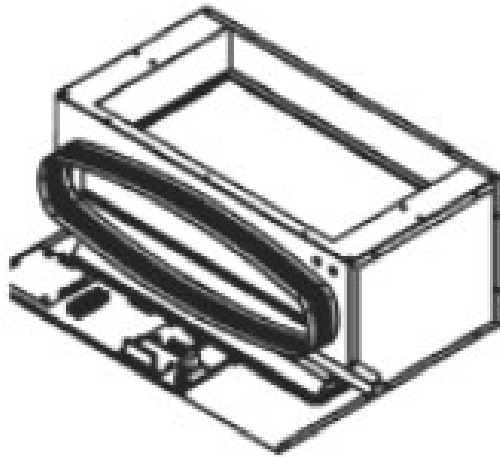
Medium Model is perfect for using high equipment for powder weighing.



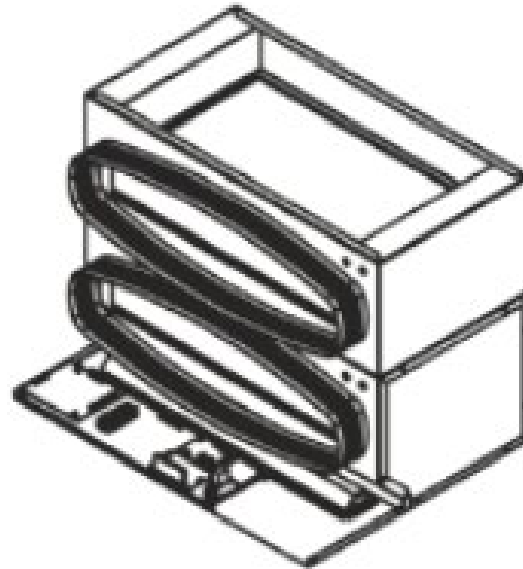
Large Model is perfect for large-scale powder handling. It can be combined with work top with drum access.

VENTILATED BALANCE ENCLOSURE

- Filter
 - Single or Double. Bag-In Bag-Out(BIBO)
 - Carbon
 - Organic, Acid, Mercury, Sulphur, Halogen, Aldehyde, Ammonia, Chloroform



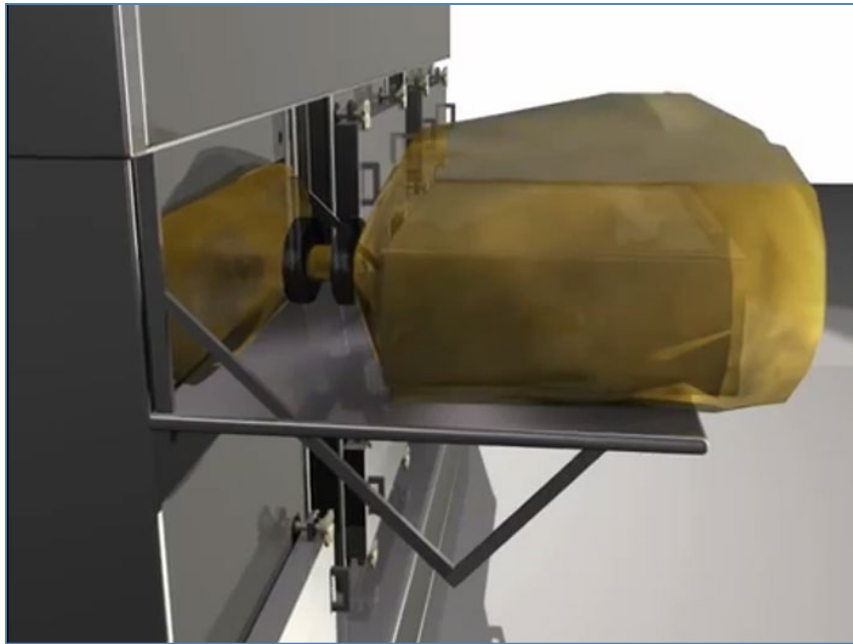
Single Filtration Module



Dual Filtration Module

VENTILATED BALANCE ENCLOSURE

- BIBO
 - <https://www.youtube.com/watch?v=JzbTGXyyjhA>



VENTILATED BALANCE ENCLOSURE

- Exhaust and Stand



Ducted



Ductless



For Ducted or Portable



Cabinet Type



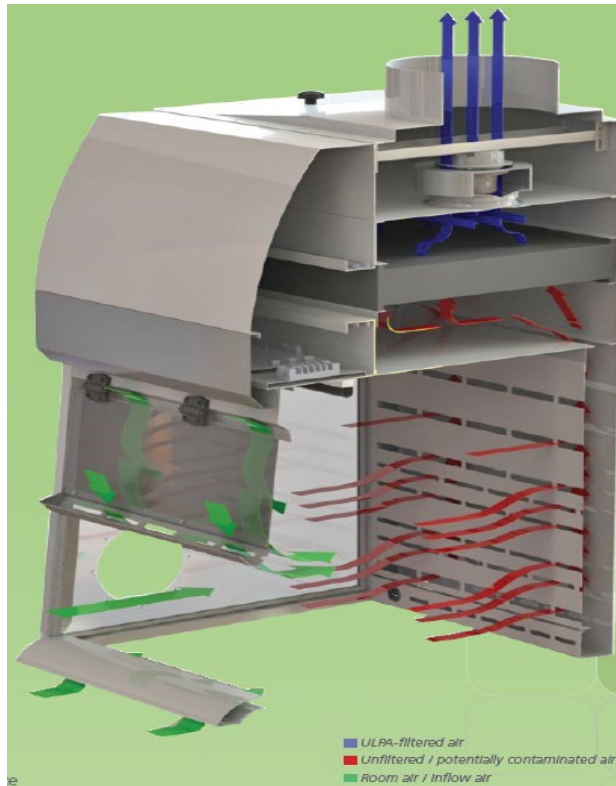
Standard Support Stand



Support Stand with Drum Access

VENTILATED BALANCE ENCLOSURE

- Aerodynamic Baffle and sash
- Disposal Port
- Sentinel™ Microprocessor
- Isocide™ antimicrobial coating



Material of Worktop

Type	SS304	SS316	Trespa TopLab ^{Plus} Phenolic Resin	Epoxy	u-PVC	PP	Ceramic
Chemical Resistance	Good	Better	Better	Better	Best except for some solvents	Best	Best
Temperature Resistance	Better (300°C)	Better (300°C)	Good (110°C)	Good (165°C)	Good	Good	Best (1200°C)
Cost	Low Price	Mid Price	Md Price	Mid Price	Mid-Price	Mid-Price	Premium



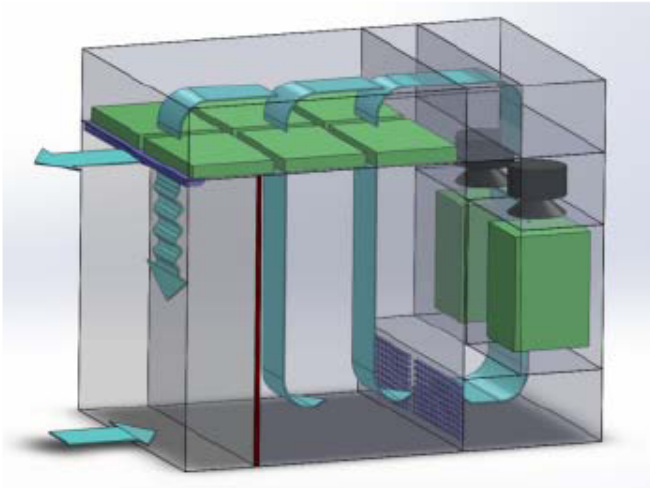
Down Flow Booth

- provide containment by utilizing high velocity air to capture airborne dust particles.
- Operator Exposure Levels (OEL's) $\leq 100 \mu\text{g}/\text{m}^3$



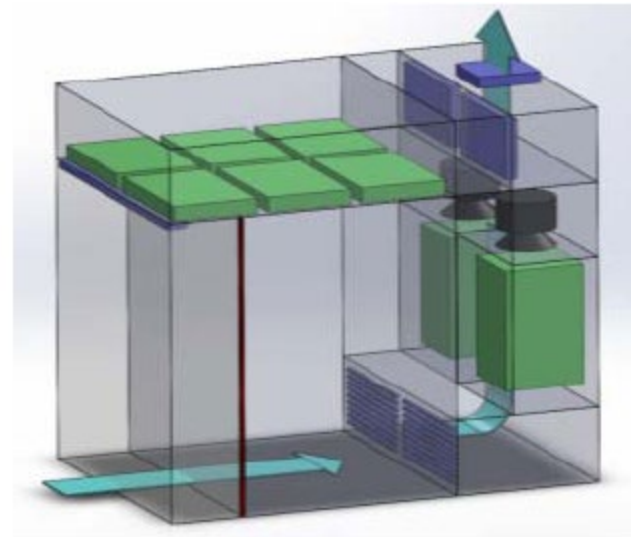
Down Flow Booth

- Airflow pattern



Recirculating Airflow - Powders

- Laminar airflow velocity of $0.45\text{m/s} \pm 20\%$ (90fpm) measured 150mm (6") from terminal HEPA filter or diffusor face
- ISO 5 environment at rest conditions measured at working height
- Cross contamination control through negative and positive pressure environment options

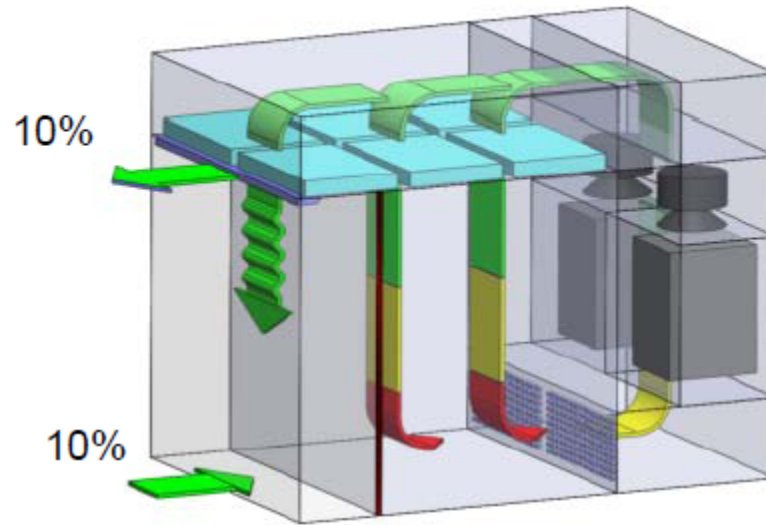


Single Pass Airflow - Vapors

- Captures and exhausts harmful vapors while in single pass mode
- No Laminar Airflow
- 100% of the airflow is directed through the bleed connection to the client's exhaust system

Down Flow Booth

- Bleed air



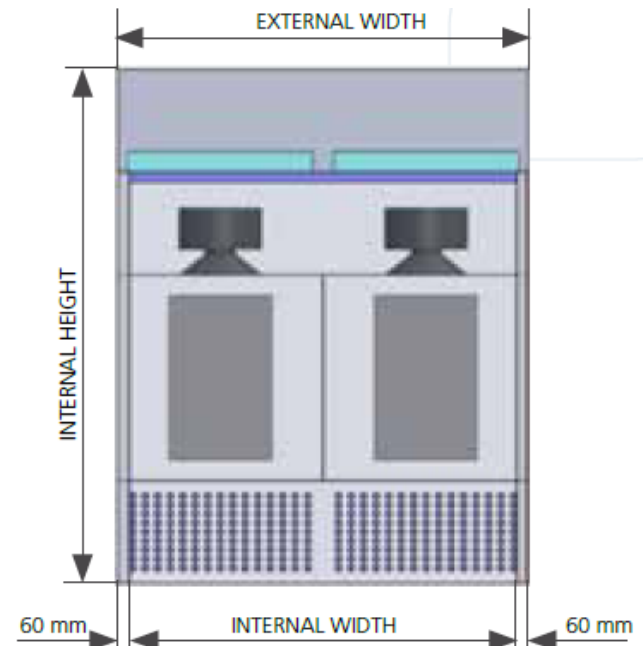
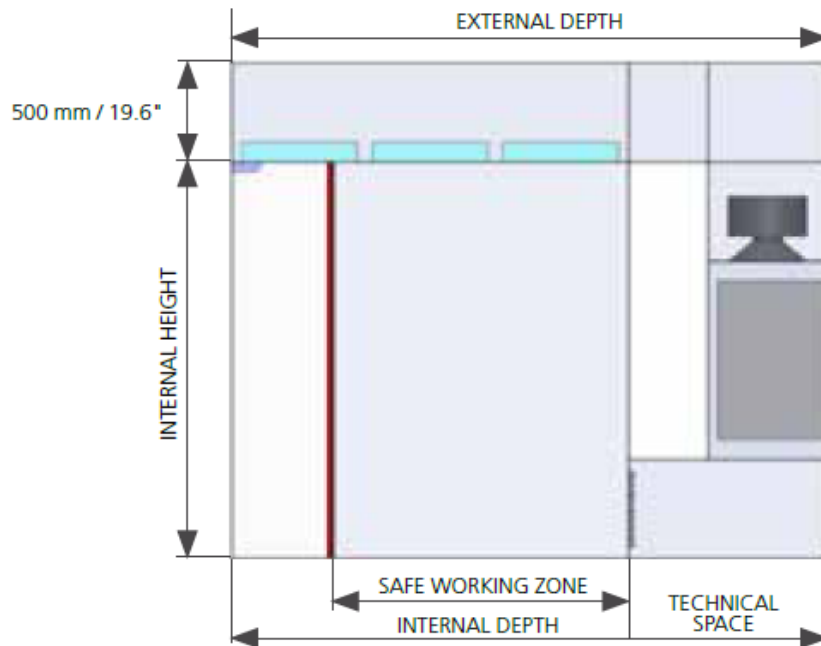
The airflow bleed performs the following functions:-

- Creates an intake of air at a low level from the front of the booth, creating a slight negative pressure within the booth to avoid cross contamination.
- Avoids stagnant air through fresh air make-up
- Counteracts the heat gain (Note: the bleed will not eliminate heat gain alone, only lesson the effect)

Down Flow Booth






- Dimensions

	0.3m Back Stack	0.6m Back Stack	1.0m Back Stack
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, 3.0, 3.2, 3.4, 3.6, 3.8, 4.0, 4.2, 4.4, 4.6, 4.8, 5.0	1.6, 1.8, 2.0, 2.4, 2.6, 2.8, 3.0, 3.2, 3.4, 3.6, 3.8, 4.0, 4.2, 4.4, 4.6, 4.8, 5.0	1.6, 1.8, 2.0, 2.4, 2.6, 2.8, 3.0, 3.2, 3.4, 3.6, 3.8, 4.0, 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



Down Flow Booth

- Filters

	Description	Illustration	Included in Filter Groups:	Available in Back Stack Version
G4 Coarse Pre-Filter	High Flow Pleated Panel Filter - 20-30% Eff.		A,B,C,D & F	All
Combined G4 Coarse Pre-Filter and Carbon Filter	High Flow Pleated Panel Filter with Broad Spectrum Carbon- 20-30% Eff.		E	0.3m
F8 Fine Dust Pre-Filter	High Flow V-Bank Pre-Filter with Gasket Seal - 90-95% Eff.		A,B,C & D	0.6m & 1.0m
H13 Primary HEPA Filter	High Flow V-Bank HEPA with Gel Seal Frame - 99.95% Eff.		A,B & C	
H14 Terminal HEPA Filter	Panel HEPA with Gel Seal Frame - 99.995% Eff.		A,B,C,D,E & F	All

Down Flow Booth

- Options
 - Controller: Siemens, Allen Bradley, Touch pad
 - Cooling systems





Item	Illustration
Front doors with optional sash window	
High Containment Screen 5D	
Benches	
Airlocks	
Drum Handling	

Item	Illustration
Pass Through	
Conveyors	
Windows	
Ethernet & RS-232 Ports	
UV Light	

Reference

- Global
 - Pfizer, Novartis, GSK, Baxter, etc
- Local
 - GC, DA, DK, KORUS, etc

Summary

사진				
품명	Powder weighing	Ventilated Balance Enclosure	DownFlowBooth	자가동력개인보호구(PPE)
모델명	PowderMax	VBE	Pharmacon	PAPR
제조사 (제조국)	ESCO(싱가폴)	ESCO(싱가폴)	ESCO(싱가폴)	
주요 용도	분진 비산방지된 저울 작업 가능(small scale)	항암제 등 Cytotoxic 물질의 handling(medium scale)	분말 작업시 작업자 보호 Filtering 하여 배출(large scale)	과산화수소 등 chemical, 분진 등으로 부터 보호
종류	가로 Size: 3, 4 feet	가로: 2~8 feet. Tall, deep Ducted, ductless	Width: 1.6 ~ 5.0 m Depth: 0.8 ~ 2.4 m Height: 2.1 / 2.5 m	HEPA, Combi filter
특징 및 Spec.	외장: Isocide coating 내장: SUS 304 Laminar flow type HEPA system Control: Microprocessor Type: laminar flow Air flow: Unidirectional Inflow: 0.5 m/s stand 제공	Bag-in Bag-out(BIBO) HEPA filter system(H14) Carbon filter option Duct or ductless Control: Microprocessor Air flow: 0.3 m/s Stand : standard, drum access	외장 : EG steel with coat 내장 : Stainless steel 304/316 Filter : HEPA Controller: Simens touch OEL <= 100ug/m3 Power: 480V, 60Hz, 3Ph Downflow: 0.45m/s BIBO(Bag In Bag Out) 적용 Recirculation / Single pass airflow	Battery powered Battery 잔량 확인 가능 4시간 연속 사용가능(완충 시) 필터를 통과하여 호흡기 쪽으 로 constant air 를 공급함 Chemical, particle 등을 제거

Contact



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- <https://www.escolifesciences.com>

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Laboratory**

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