

# *Technocratics Cleanroom air showers*



*Technocratics*

## Introduction

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 ULPA-filtered air jets with velocities of 18-30 m/s (3,543 - 5,906 fpm). Contaminated air is then drawn through the base within the unit, filtered and recirculated.

TS 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.

**Cleanroom Applications:** The greatest source of particulate contamination in a cleanroom is the operator. Air showers are installed between change areas and the cleanroom. The air shower augments the cleanroom operating protocol by reminding the operators that they are entering a controlled environment.

**Pharmaceutical and Lab Animal Research Applications:** Air showers maintain the cleanliness of the pharmaceutical production and laboratory animal breeding areas. It can also minimize egress of hazardous substances and allergens exiting the controlled environment.

## Main Features

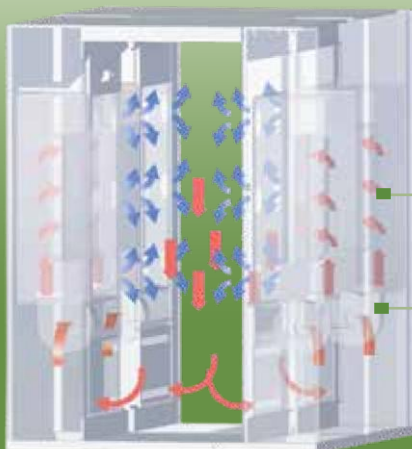
- High velocity shower jets running at 18-30 m/s to ensure efficient scrubbing action to remove particulate matter.
- Operating modes can be programmed in the field.
- Microprocessor controller supervises all functions.
- Mini-pleated ULPA filtration achieves > 99.9999% typical efficiency at 0.3 micron particles.
- A disposable pre-filter 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.

TS, Cleanroom Air Shower Series Comparison Chart

Model	Airflow	Door
TS (A-Series)	Single Sided	Single leaf
TS (B-Series)	Double Sided	Single leaf
TS (C-Series)	Double Sided	Double leaf

See the Specification Chart for more details.

## Air Shower Filtration System



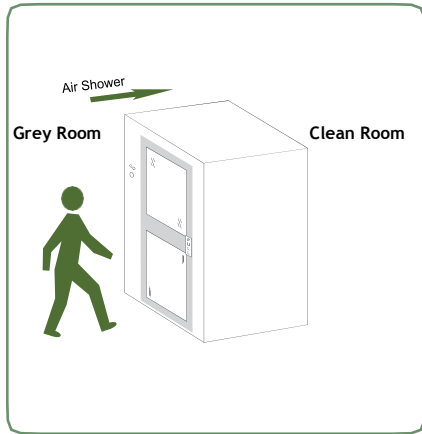
Blower  
ULPA Filter

■ ULPA-filtered air  
■ Unfiltered/potentially contaminated air

- ④ Air is forced by the blower(s) through ULPA filter(s) which are 99.9999% efficient against particles of 0.3 microns.
- ④ Filtered air is ejected through nozzles at high velocities into the chamber. These turbulent air streams disperse particulate matter on all surfaces.
- ④ Dispersed particulate matter migrate with the air stream towards the lower areas in the air shower chamber. Air enters the blower supply plenum through pre-filter(s) installed at the base of the chamber.
- ④ 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.

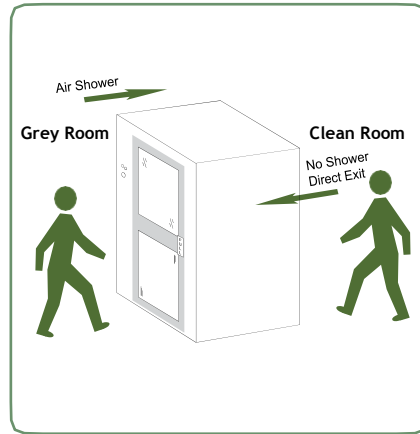
## Air Shower Operating Sequences

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



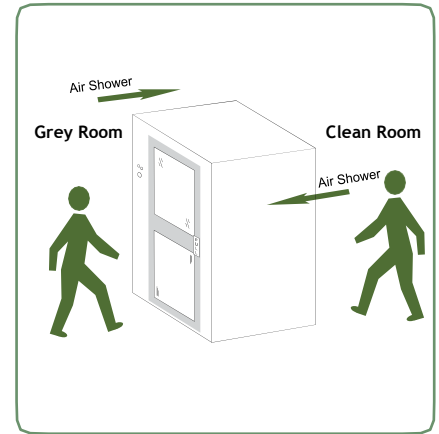
### One-Way

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.



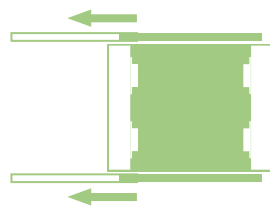
### Two-Way

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.

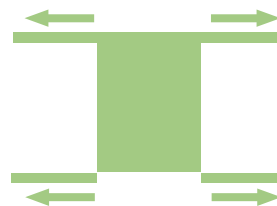
## Optional Shutter Doors



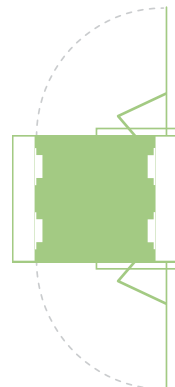
Vertical Shutter Door



Single



Double

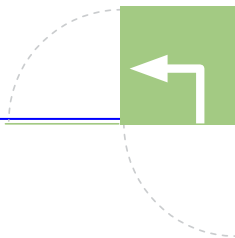


Auto-swing Door

## Optional Exit Directions



Straight-through



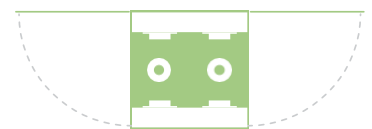
L-Shaped

\*Turn Left or Turn Right as per client's specifications

## Blowing Type



Single Side Blowing (TS-A series)



Optional Three Side Blowing  
\*With Top Blowing



Double Side Blowing (TS-B and C series)

# Cleanroom Air Showers

## High Performance Blower System

German made ebm-paps® permanently lubricated centrifugal motor/blowers with external rotor designs. Motors selected for energy efficiency compact design and flat profile. Completely integrated assembly optimizes motor cooling. All rotating parts balanced for smooth, quiet, vibration-free operation.

## ULPA Filtration System

ULPA filter(s) provide 99.9999% typical efficiency for particle sizes of 0.1 to 0.3 microns.

## Light Indicator and Emergency Switch

Indicator lamps indicate if doors are locked or unlocked, thereby regulating the flow of personnel in and out of the air shower.

Emergency buttons mounted on both external faces of the shower unlock all doors instantly.

## Door

Heavy-duty, durable aluminum framed door assemblies are constructed with glass windows permitting visibility.



## Key Features

TS Air Shower filters meet the ~~EST~~ RP-CC001.3 recommended practice for HEPA performance (USA), and EN 1822 for H14 performance (EU).

The automatic reset feature unlocks the ~~door~~ preventing accidental lock-outs in cases when an operator opens the air shower without actually entering.

In case of a power failure, all doors ~~are~~ unlocked automatically, and the settings are retained.

A disposable pre-filter with 85% ~~arrestance~~ extends the life of the main filter.

The air shower is constructed of ~~electro-gal-~~vanised steel sheets with an abrasion-resistant oven-baked powder coated finish.

Each air shower is individually factory ~~test~~ed for safety and performance in accordance with international standards.

Robust construction qualifies the air shower for the most demanding applications. The air shower is carefully assembled and readily installed and operated when shipped.

Each unit is shipped with a ~~documentation~~ outlining the tests undertaken and its individual results.

All electrical components are UL listed / recognised.

The Air Shower is warranted for one ~~year~~ excluding consumable parts and accessories.

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## Sentinel Microprocessor Control System, Programmable

The microprocessor control detects improper operation and displays corresponding error messages should the integrity of the cleanroom be violated. The LCD displays shower duration and countdown, and reports cycle progress and operational status. A 24-hour clock displays local time.



### Light Diffuser

Diffusers ensure and uniform lighting throughout the chamber.

### Stainless Steel Nozzles

An array of stainless steel nozzles direct high-velocity jets within the chamber.

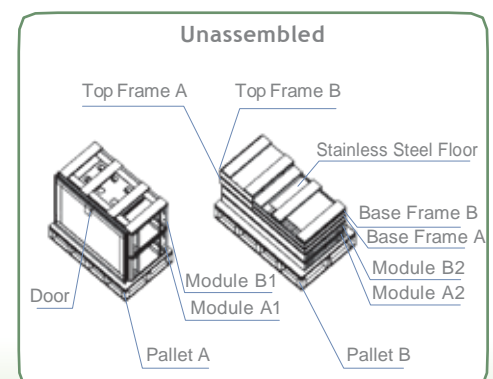
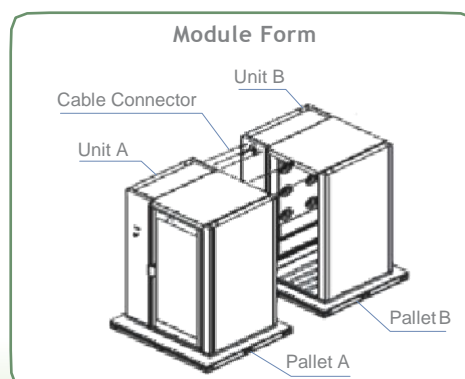
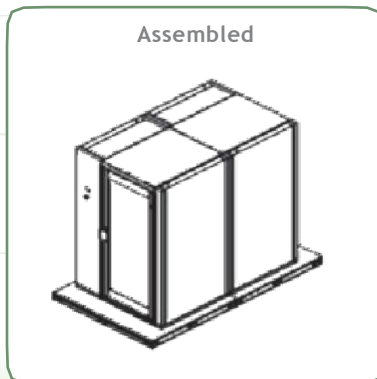
## General Specifications, Cleanroom Air Shower, Model TS (A-Series)

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

Model	TS-1A_	TS-2A_	TS-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"		
Clear Door Opening (WxH)	715 x 1835 mm				
Air Change (18-30 m/s)	137-227/Hr	131-218/Hr	129-215/Hr		
Initial Airflow Velocity	18-30 m/s (3,543 - 5,906 fpm)				
Number of Nozzles	6	12	18		
Air Shower Duration	Factory set at 12 seconds (adjustable)				
Persons Per Cycle	1	2-3			
Personnel Flow (Persons / Min. )	4	8-12			
	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: >99.9999% at 0.3 µm Pre-Filter: Arrestance 85%, efficiency 20%				
Filtration Elements	Main Filter: ULPA filter Pre-Filter: 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 powder-coated finish				
Max. Power Consumption Current, BTY/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	
	<i>Note: Customer must provide isolator switch on site.</i>				
Gross Weight	390 kg (858 lbs)	660 kg (1,452 lbs)	980 kg (2,156 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"	N/A	
	Module Form (W x D x H)	Pallet A	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 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	N/A	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		N/A	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 m3 (138 cu.ft.)	7.80 m3 (276 cu.ft.)	N/A	
	Module Form	N/A	7.80 m3 (276 cu.ft.)	11.70 m3 (414 cu.ft.)	
	Unassembled	2.12 m3 (75 cu.ft.)	4.24 m3 (150 cu.ft.)	5.66 m3 (200 cu.ft.)	

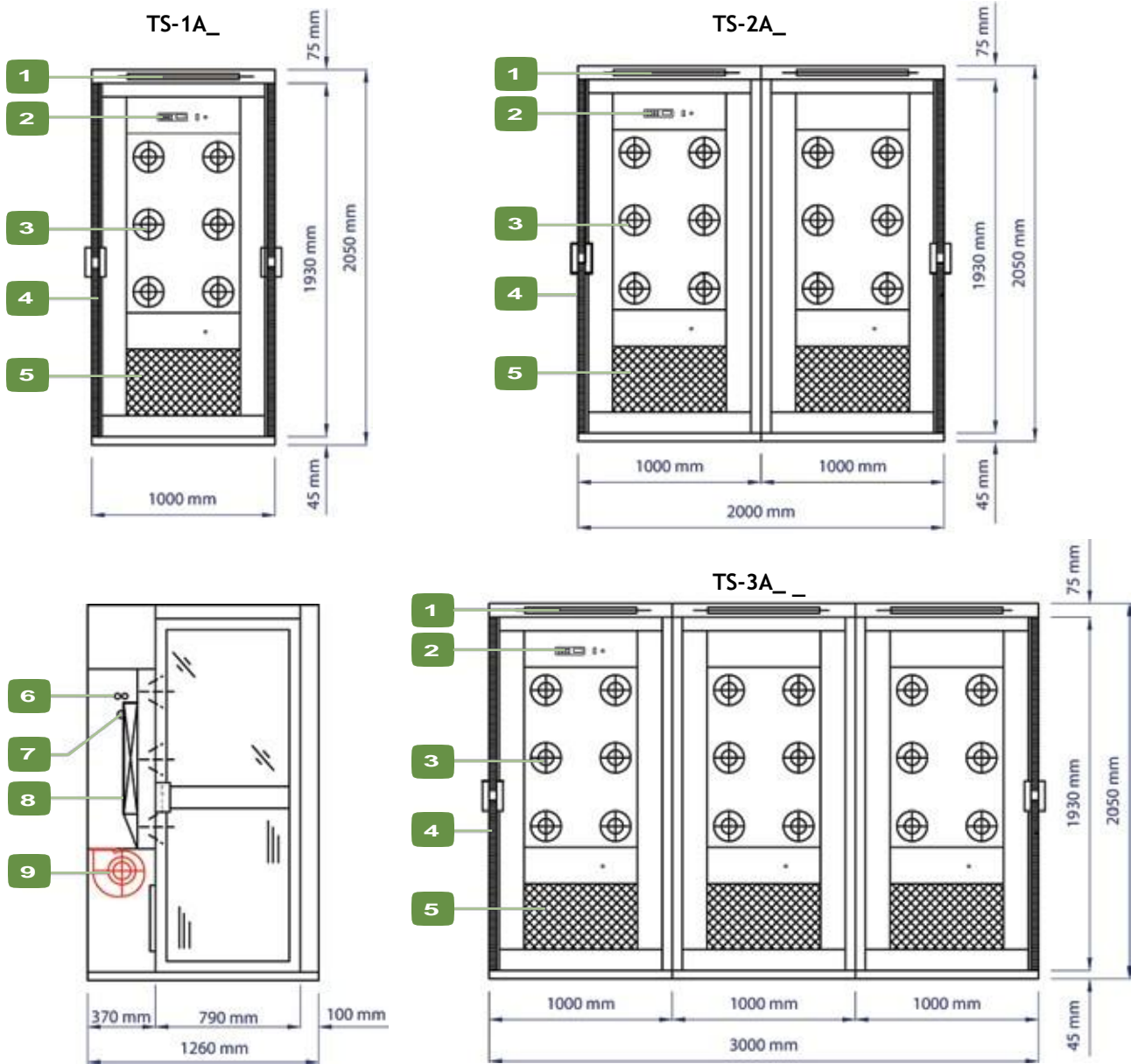
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### Technocratic Cleanroom Air Showers, Modes of Shipment, Model TS-2A\_





# Model TS (A-Series) Cleanroom Air Shower Technical Specifications



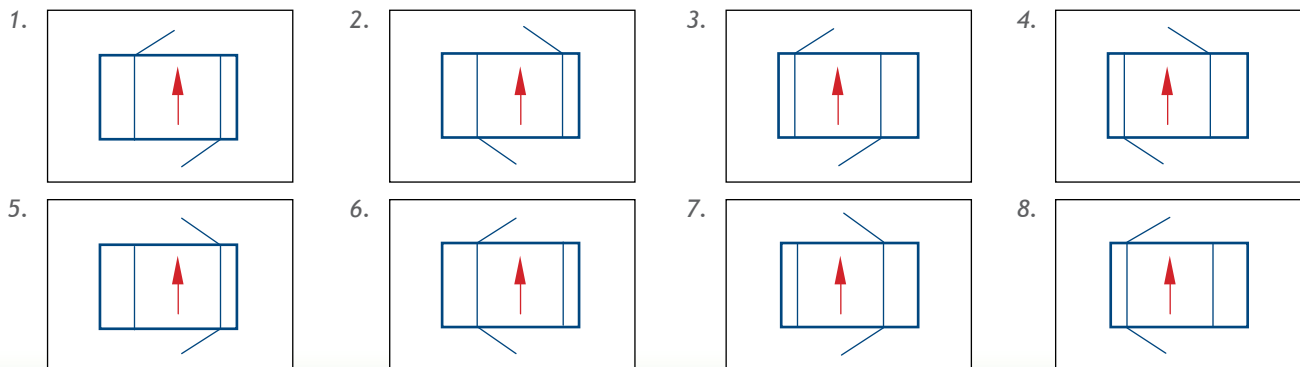
- 1. Fluorescent lamp
- 2. Technocratic microprocessor system
- 3. Nozzles

- 4. Door
- 5. Pre-filters
- 6. Indicator light

- 7. Emergency switch
- 8. ULPA filter
- 9. Blower

## Model TS (A-Series), Door Direction

(Factory Configured. Choose One When Ordering.)



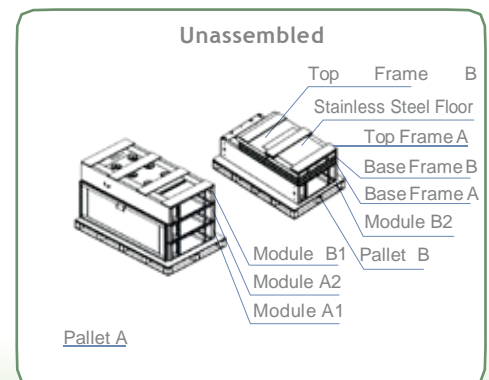
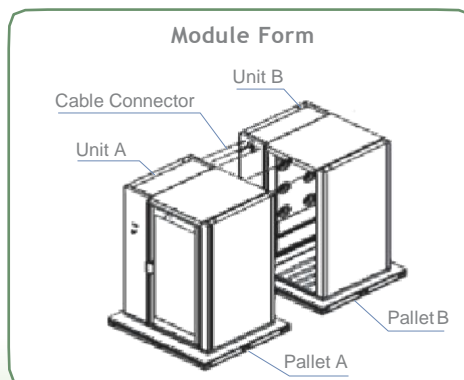
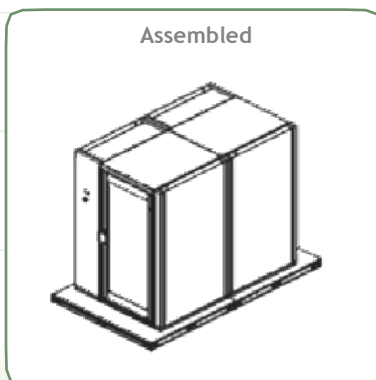
## General Specifications, Cleanroom Air Shower, Model TS (B-Series)\*

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

Model		TS-1B_	TS-2B_	TS-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 31.1" x 115" x 76.0"	
Clear Door Opening (WxH)		715 x 1835 mm			
Air Change (18-30 m/s)		273-454/Hr	261-435/Hr	258-429/Hr	
Initial Airflow Velocity		18-30 m/s (3,543 - 5,906 fpm)			
Number of Nozzles		12	24	36	
Air Shower Duration		Factory set at 12 seconds (adjustable)			
Persons Per Cycle		1	2-3		
Personnel Flow (Persons / Min. )		4	8-12		
		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: >99.9999% at 0.3 µm Pre-Filter: Arrestance 85%, efficiency 20%			
Filtration Elements		Main Filter: ULPA filter Pre-Filter: 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 powder-coated finish			
Max. Power Consumption Current, BTY/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	
		<i>Note: Customer must provide isolator switch on site.</i>			
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"	N/A	
	Module Form (W x D x H)	Pallet A	N/A	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 B	N/A	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	N/A	N/A	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 m <sup>3</sup> (166 cu.ft.)	9.40 m <sup>3</sup> (333 cu.ft.)	N/A	
	Module Form	N/A	9.40 m <sup>3</sup> (333 cu.ft.)	14.10 m <sup>3</sup> (499 cu.ft.)	
	Unassembled	2.83 m <sup>3</sup> (100 cu.ft.)	5.71 m <sup>3</sup> (202 cu.ft.)	7.87 m <sup>3</sup> (279 cu.ft.)	

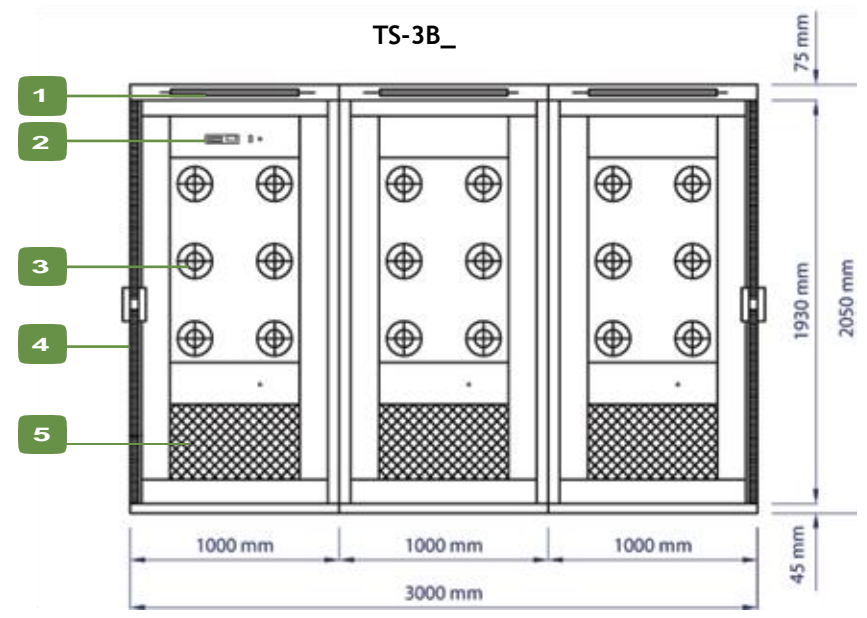
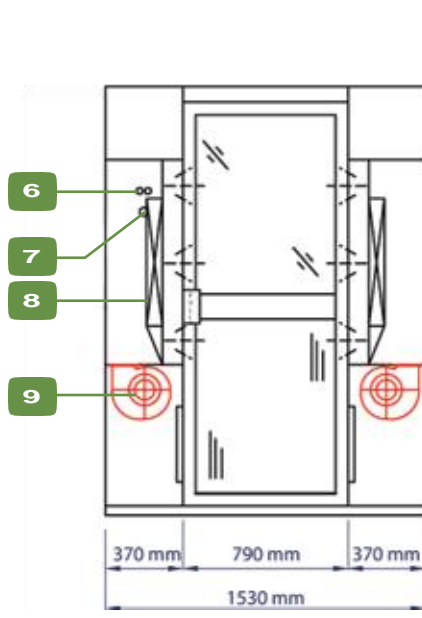
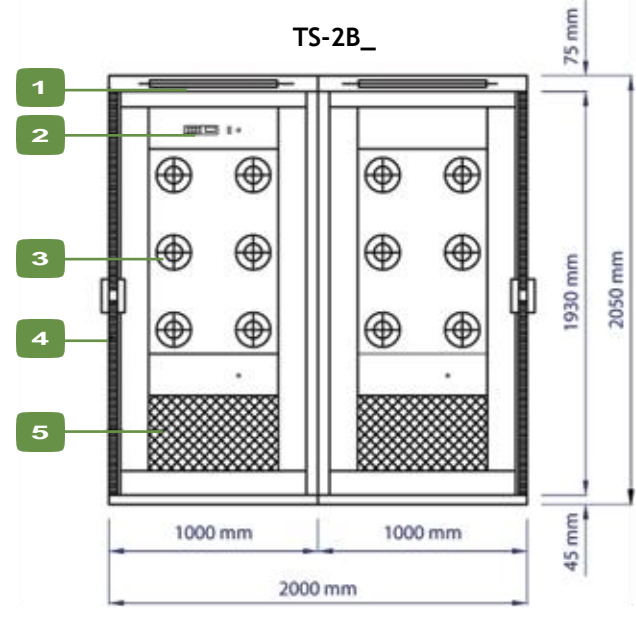
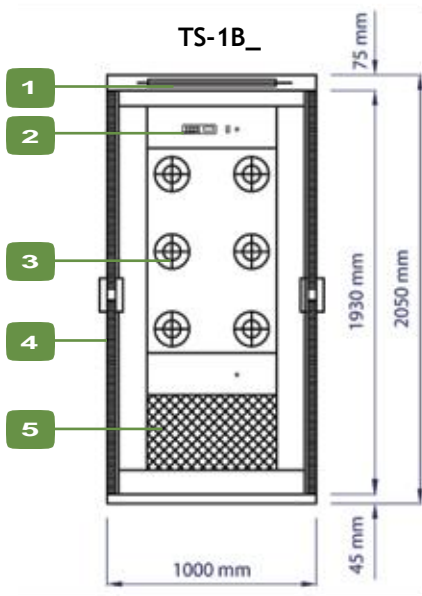
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### Technocratic Cleanroom Air Showers, Modes of Shipment, Model TS-2B\_





# Model TS (B-Series) Cleanroom Air Shower Technical Specifications

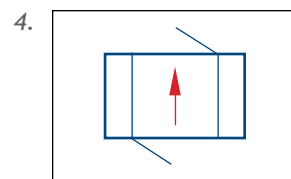
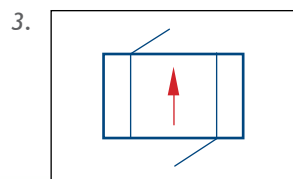
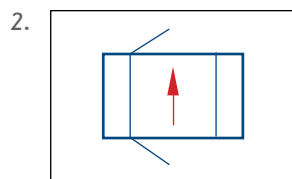
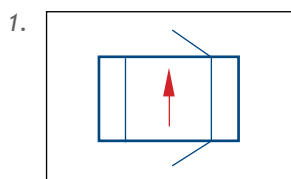


- 1. Fluorescent lamp
- 2. TS microprocessor system
- 3. Nozzles

- 4. Door
- 5. Pre-filters
- 6. Indicator light

- 7. Emergency switch
- 8. ULPA filter
- 9. Blower

## Model TS (B-Series), Door Direction (Factory Configured. Choose One When Ordering.)



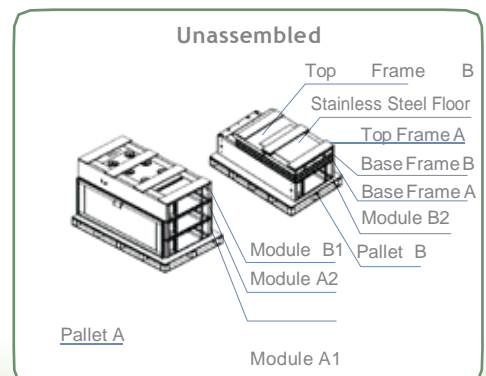
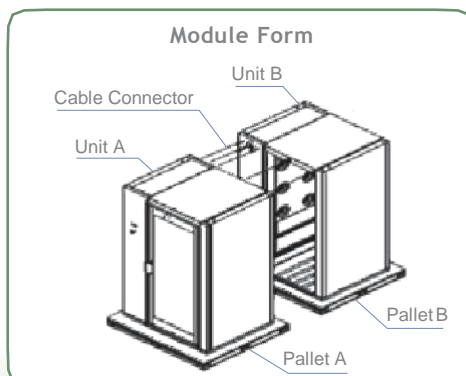
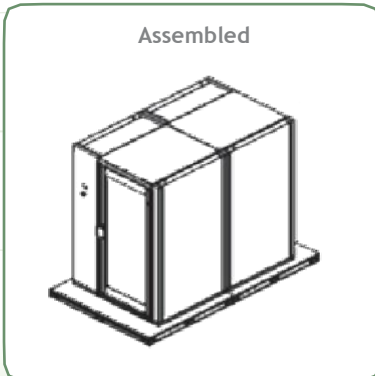
**General Specifications, Cleanroom Air Shower, Model TS (C-Series)\***

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

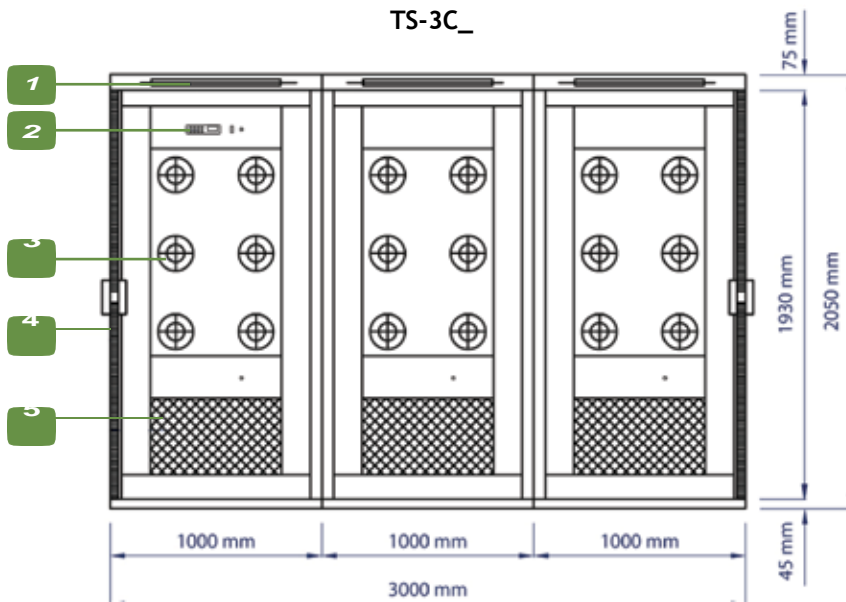
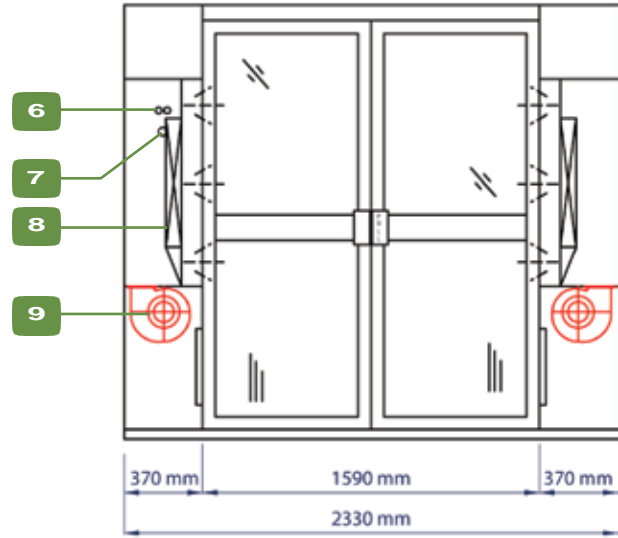
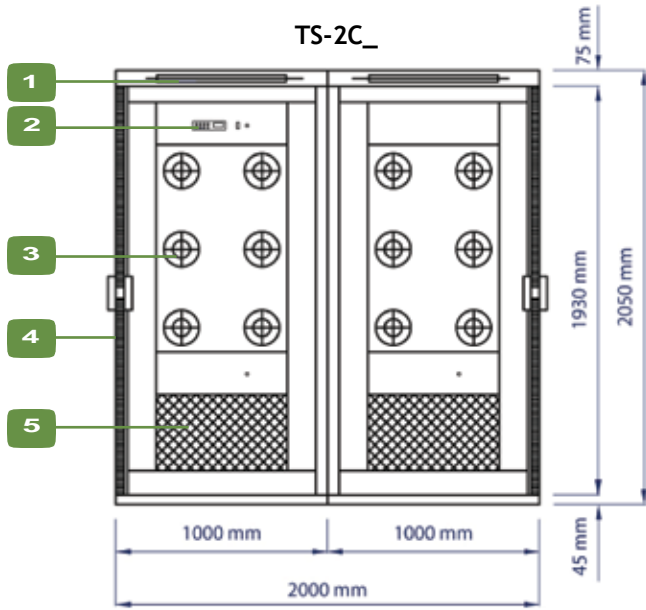
Model		TS-2C_	TS-3C_	
External Dimensions (W x D x H)		2330 x 2000 x 2050 mm 91.7" x 78.7" x 80.7"	2330 x 3000 x 2050 mm 91.7" x 118.1" x 80.7"	
Internal Work Area, Dimensions (W x D x H)		1590 x 1920 x 1930 mm 62.6" x 75.6" x 76.0"	1590 x 2920 x 1930 mm 62.6" x 115" x 76.0"	
Clear Door Opening (WxH)		1515 x 1835 mm		
Air Change (18-30 m/s)		130-216/Hr	128-214/Hr	
Initial Airflow Velocity		18-30 m/s (3,543 - 5,906 fpm)		
Number of Nozzles		24	36	
Air Shower Duration		Factory set at 12 seconds (adjustable)		
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: >99.9999% at 0.3 µm Pre-Filter: Arrestance 85%, efficiency 20%		
Filtration Elements		Main Filter: ULPA filter Pre-Filter: 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 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	
		<i>Note: Customer must provide isolator switch on site.</i>		
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"	N/A	
	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	N/A	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 <sup>3</sup> (493 cu.ft.)	N/A	
	Module Form	13.94 m <sup>3</sup> (493 cu.ft.)	20.91 m <sup>3</sup> (740 cu.ft.)	
	Unassembled	5.71 m <sup>3</sup> (202 cu.ft.)	7.87 m <sup>3</sup> (279 cu.ft.)	

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**Technocratic Cleanroom Air Showers, Modes of Shipment, Model TS-2C\_**

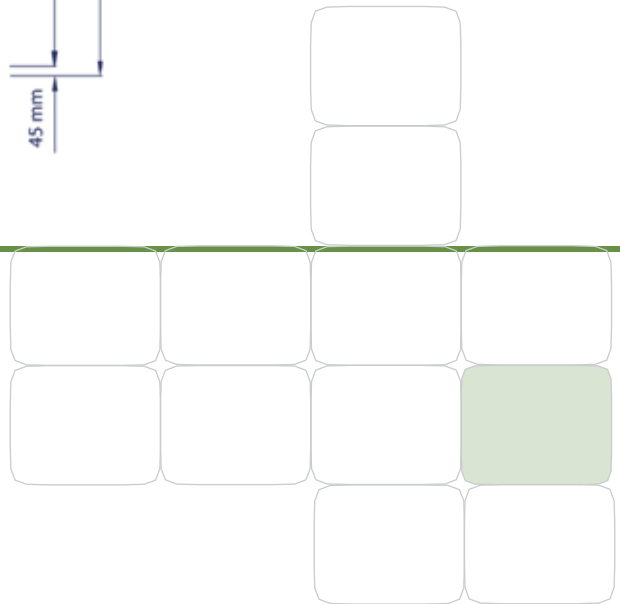
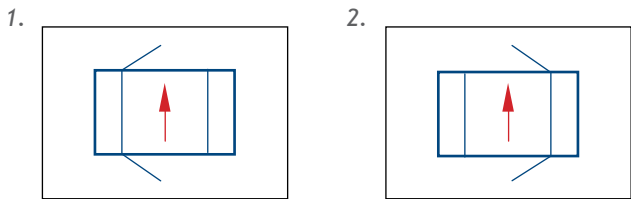


# Model Technocratic (C-Series) Cleanroom Air Shower Technical Specifications



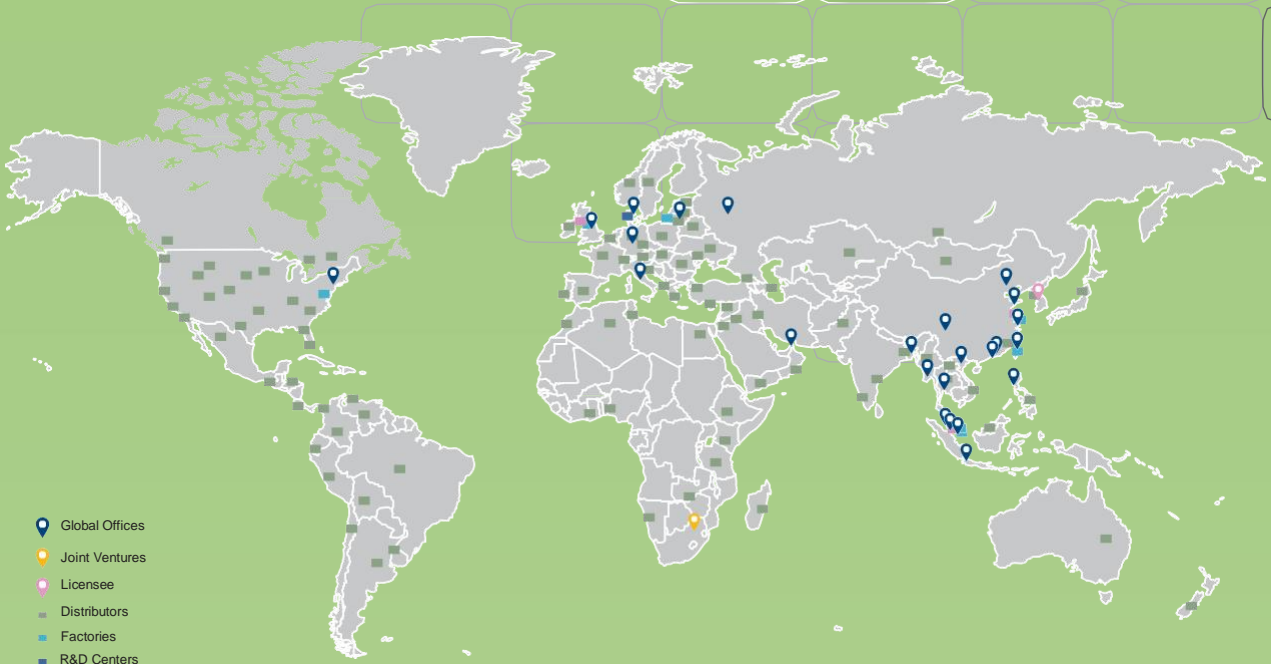
- 1. Fluorescent lamp
- 2. Technocratic microprocessor system
- 3. Nozzles
- 4. Door
- 5. Pre-filters
- 6. Indicator light
- 7. Emergency switch
- 8. ULPA filter
- 9. Blower

## Model TS (C-Series), Door Direction (Factory Configured. Choose One When Ordering.)



# Technocratic GLOBAL NETWORK

Multiple Locations In Pakistan All Over The Pakistan



- Global Offices
- Joint Ventures
- Licensee
- Distributors
- Factories
- R&D Centers
- Regional Distribution Centers



- 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 2000, Technocratic has emerged as a leader in the development of controlled environment, laboratory and pharmaceutical equipment solutions. Products sold all across Pakistan 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, Technocratic has passed more tests, in more languages, for more certifications, throughout more countries than any biosafety cabinet manufacturer in the world. Technocratic remains dedicated to delivering innovative solutions for the clinical, life science, research and industrial laboratory community. [www.escoglobal.com](http://www.escoglobal.com).

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## Technocratics Lahore

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