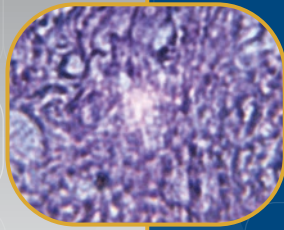


NordicSafe®




EN12469
Model: NC2-4L8
with optional support stand.

Low Noise, Class II Microbiological Safety Cabinets
The Industry's Most Comfortable, Energy Efficient Cabinet



ESCO
SCIENTIFIC



Main Features

- **NEW** Extremely low energy consumption (190 Watt) for environmentally-friendly and cost effective operation.
- **NEW** Latest generation, energy-efficient ECM blower from EBM-Papst Germany maintains constant airflow, despite building voltage fluctuations.
- **NEW** Quietest cabinet in the industry (51 dBA), emulates soft noise of distant waterfalls, for a serene working environment that helps to reduce fatigue and improve concentration.
- **NEW** Half Speed Mode reduces energy consumption to 80 Watt while still maintaining personnel and product protection when the cabinet is not being used.
- **NEW** Zero Volt Relay Contact, to synchronize turning ON/OFF internal blower fan with remote exhaust fan.
- **NEW** Esco Sentinel™ Gold microprocessor with integrated temperature-compensated airflow monitoring system.
- **NEW** Quickstart mode, to turn the blower and lights on/off, by moving the sash window to correct position.
- **NEW** RS 232 data output port enables remote monitoring of cabinet operating parameters.
- Unique Esco Dynamic Chamber™ plenum design delivers quiet, uniform airflow.
- Negative pressure plenum surrounds contaminated positive pressure plenum; no fabric bags are used.
- Dual, long-life ULPA filters (per IEST-RP-CC001.3), for supply and exhaust airflow.
- Ergonomically angled front improves reach and comfort. Frameless, shatterproof motorized sash is easier to clean, offers larger, unobstructed viewing area.
- Multi-piece tray components which lift and remove to provide easy access encourage surface decontamination and are autoclavable.
- The front sash is motorized for convenient one touch operation.
- Raised airflow grille maintains safety by preventing blockage.
- Transparent side windows, angled front, and reduced noise levels combine to create the most comfortable, well-lit cabinet in Esco's range.
- Esco **ISOCIDE™** antimicrobial coating on all painted surfaces minimizes contamination.



EN12469

NordiSafe® Class II Microbiological Safety Cabinet features glass sides to enhance visibility inside the work area. Model NC2-4L8, with optional support stand.

* Ultra low noise level achieved on 1.2 meter (4') model per EN12469 at open field condition.

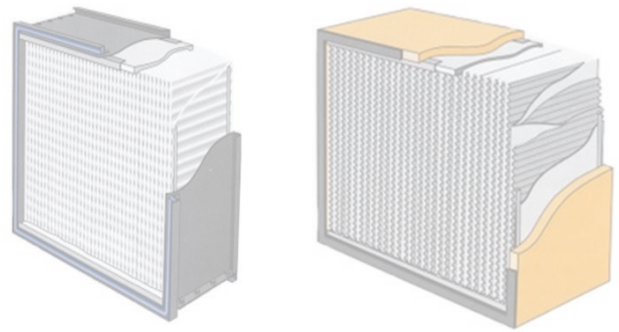


NordiSafe®

Biological Safety Cabinets • Class II Microbiological Safety Cabinets



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.

Operator, Product and Environmental Protection

Esco NordicSafe® Class II Microbiological Safety Cabinets offer a premium level of operator, product and environmental protection with advanced technology at an economical price. NordicSafe Microbiological Safety Cabinets provide protection against Biosafety Levels 1, 2 and 3, and can be used for handling Biosafety Level 4, provided that the operator wears a positive pressure suit.

Containment and Protection

- A combination of a supply ULPA filter and an exhaust ULPA filter creates a fully integrated performance envelope for product, operator and environmental protection.
- Inflow of room air enters the front air grille to establish operator protection; room air does not enter the work zone, preventing product contamination.
- Raised armrest prevents the likelihood of inflow grille blocking by operator's arms.
- The inflow velocity, downflow velocity, air flow path and intake geometry are precision tuned and tested to create an optimum air curtain on the front aperture. This curtain maintains operator and product protection even in the unlikely event of a severe inflow or downflow imbalance that would compromise protection in a conventional cabinet.

Integrated Filtration System

Independent supply and exhaust filters provide 99.999% typical efficiency for particle sizes of 0.1 to 0.3 microns. NordicSafe filters meet the IEST-RP-CC001.3 recommended practice for ULPA performance (USA), and EN 1822 for H14 performance (EU).

- ULPA filters (per IEST-RP-CC001.3), are tested to a typical efficiency of >99.999% for 0.1 to 0.3 micron particles; these provide better filtration capability than conventional H13 HEPA filters that have a typical efficiency of >99.99% for 0.3 micron particles.
- Modern separatorless mini-pleat filter construction maximizes the filter surface area to extend filter life and eliminate possible filter media damage by thin and sharp aluminum separators used in conventional HEPA filter construction.

- The filter assembly is constructed in accordance with EN1822 requirements for performance and fire retardant properties.
- The supply filter provides ISO Class 3 (per ISO14644.1) clean air to the work surface in a gentle vertical laminar flow for product protection.
- The exhaust filter traps biohazard particles acquired from the work surface before air is exhausted to the room, offering operator and environmental protection.
- The exhaust filter media is protected from mechanical damage by an integrated metal screen guard, which is absent from conventional HEPA filters.

Sentinel™ Microprocessor Control, Alarm, Monitoring System

The Esco Sentinel™ microprocessor-based control system supervises the operation of all cabinet functions.

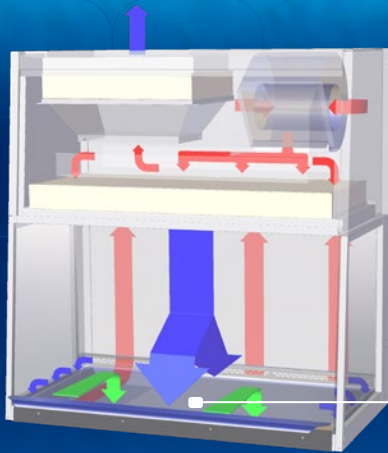
- The control panel is located at the front center of the cabinet and is angled down for easy access by the seated operator.
- Continuous monitoring of cabinet airflow is displayed on a bright, easy-to-read LCD panel. The large display monitors all operational parameters.
- True temperature-compensated airflow velocity sensors provide independent measurement of inflow and downflow velocities despite any room temperature fluctuations.
- All electronic parts are contained inside a plug-and-play module that permits easy exchange if required.
- Microprocessor software updates are available from Esco for download via the Internet.

Consult your Esco Operating Manual or contact Esco or your Sales Representative for information on user-preference programming capabilities built into the Sentinel microprocessor platform.

Energy-Efficient DC ECM Motor

- The most energy-efficient Class II Biosafety Cabinet in the world.
- 70% Energy savings compared to AC motor.
- Stable airflow, despite building voltage fluctuations & filter loading.
- Standby mode to further reduce power consumption by 60%.





Cabinet Filtration System

Dynamic air barrier, inflow and forward-directed downflow air converge

- Ambient air is pulled through the perforations located towards the work zone front to prevent contamination of the work surface and work product. The inflow air does not mix with the clean air within the cabinet work zone. Inflow air travels through a return path toward the common air plenum (blower plenum) at the top of the cabinet.
- The uniform, non-turbulent air stream protects against cross contamination within and throughout the work area.
- Near the work surface, the downflow air stream splits with a portion moving toward the front air grille, and the remainder moving to the rear air grille. A small portion of the HEPA filtered downflow enters the intake perforations at the side capture zones at a higher velocity (small blue arrows).
- A combination of inflow and downflow air streams form an air barrier that prevents contaminated room air from entering the work zone, and prevents work surface emissions from escaping the work zone.
- Air returns to the common air plenum where the 33% exhaust and 67% recirculation process is continued.

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

Cabinet Construction

Robust construction and enhanced safety features qualify the cabinet for the most demanding laboratory applications. The cabinet is fully assembled and ready to install and operate when shipped.

- The cabinet work zone has no welded joints to collect contaminants or rust.
- All stainless steel work surfaces are accessible for cleaning.
- Work zone back wall is manufactured from powder coated steel, which eliminates glare associated with stainless steel.
- Multi-piece tray components lift and remove to provide easy access and to encourage surface decontamination.
- A recessed central area and drain pan channels spills and contains liquids.
- There are no screws on the front or sides to trap contaminants or complicate cleaning.
- External and internal surfaces are coated with Esco Isocide™ antimicrobial coating to protect against surface contamination and inhibit bacterial growth. Isocide eliminates 99.9% of surface bacteria within 24 hours of exposure.

Service Fitting Access

The cabinet is prepared for easy installation of optional gas and vacuum fittings; see Accessories.

- Optional service fittings openings are offset for easier access.

Comfortable Ergonomic Design

The cabinet is engineered for comfort, utility value and safety.

- The angled viewing window and narrow profile front grille improve reach into the work area and ensure a good working position.
- The instant-start 5000k fluorescent lamp operates on an

electronic ballast to reduce heat, improve comfort and conserve energy.

- The lamp delivers uniform lighting to the work surface for greater comfort, reduced glare and improved productivity.
- The front armrest is raised above the work zone to improve comfort and to minimize blockage of forward airflow perforations.
- The optional adjustable support stand provides work surface height control.
- The frameless sash gives a clear unobstructed view of the working area.
- The motorized window can be fully opened to insert and remove larger instrumentation and equipment.

Electrical Safety and Certification

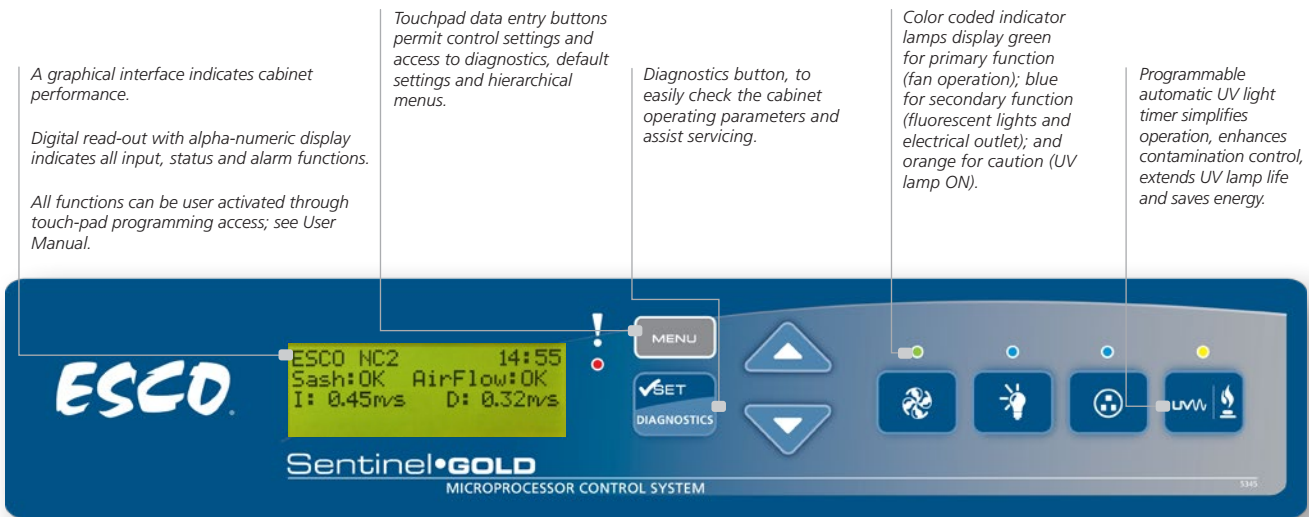
All components meet or exceed applicable safety requirements.

- Each cabinet is individually factory tested for electrical safety.
- Documentation specific to each cabinet serial number is maintained on file.
- Tested to major world standards for microbiological safety cabinets, including EN 12469.
- Contact Esco or your Sales Representative for site preparation information; see Electrical Specifications.

Warranty

NordicSafe NC2-L Series cabinets are warranted for 4 years excluding consumable parts and accessories.

- Each cabinet is shipped with a comprehensive User's Manual complete with a report documenting all test procedures.
- Additional IQ/OQ documentation is available upon request.
- Contact your local Sales Representative for specific warranty details or documentation requests.



A graphical interface indicates cabinet performance.

Digital read-out with alpha-numeric display indicates all input, status and alarm functions.

All functions can be user activated through touch-pad programming access; see User Manual.

Touchpad data entry buttons permit control settings and access to diagnostics, default settings and hierarchical menus.

Diagnostics button, to easily check the cabinet operating parameters and assist servicing.

Color coded indicator lamps display green for primary function (fan operation); blue for secondary function (fluorescent lights and electrical outlet); and orange for caution (UV lamp ON).

Programmable automatic UV light timer simplifies operation, enhances contamination control, extends UV lamp life and saves energy.

Sentinel™ Gold Microprocessor Control System, Programmable

- When programmed ON
 - the start-up sequence confirms status with Air Safe and local time display.
 - the Personal Identification Number (PIN) access restricts unauthorized adjustments.
 - an airflow alarm warns of deviations from normal velocities.

Accessories and Options

Esco offers a variety of options and accessories to meet local applications. Contact Esco or your local Sales Representative for ordering information.

Support Stands

- Fixed height with casters (SPC)
 - Available 711 mm (28") or 860 mm (34")
- Fixed height with leveling feet (SAL)
 - Available 735 mm (29") or 885 mm (34.8"), ±25 mm (1")
- Hydraulic motorized adjustable height with casters (SPM)
 - Nominal range 725 mm (28.5") to 1025 mm (40.4")
- Telescoping height with casters (STC)
 - Nominal range 660 mm (26") to 880 mm (34.6")
 - Adjustable in 25.4 mm (1") increments

- Telescoping height with leveling feet (STL)
 - Nominal range 660 mm (26") to 960 mm (37.8")

Electrical Outlets and Utility Fixtures

- Electrical outlet, Ground Fault Circuit Interrupter, North America
- Electrical outlet, Europe / Worldwide
- Petcock (air, gas, vacuum)
 - North America (American) style
 - Europe / Worldwide style DIN 12898, DIN 12919, DIN 3537

5



Robust Cabinet Construction and Enhanced Safety Features

Service fixtures are offset for easier reach. Standard cabinets include two fixture provisions on each sidewall (one provision on each sidewall for 0.9 meter/3 ft. cabinet).

- Helpful for certifiers, the hinged maintenance assembly opens to a fixed position on integrated, stainless steel struts providing front service access.

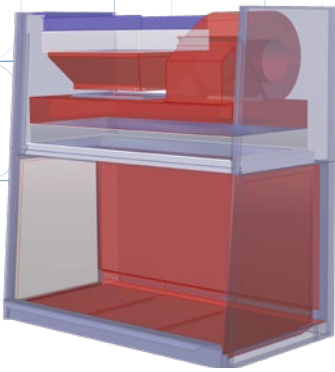
All key components, with the exception of the fan/motor assembly, are mounted outside the air stream and away from contaminated air to permit service without decontamination. These include fluorescent lamps, electrical harnesses, electronic boards and microprocessor control.

- Panels enclosing microbiologically or electrically hazardous areas are color-coded red to warn service technicians.
- The telescoping Dynamic Chamber™ plenum minimizes physical lifting and accelerates filter change when required.
- Work area containment is maintained even when removable components are lifted out for cleaning.

The multi-piece stainless steel work tray edges are radiused and easy to clean without crevices or joints.

- The lower drain trough is a single-piece fabrication with wide open angles and a channel to direct spills to the drain.
- The closed sidewall contains no perforations, air return slots or other hidden areas where contaminants can accumulate.

Dynamic Chamber™ Plenum Design



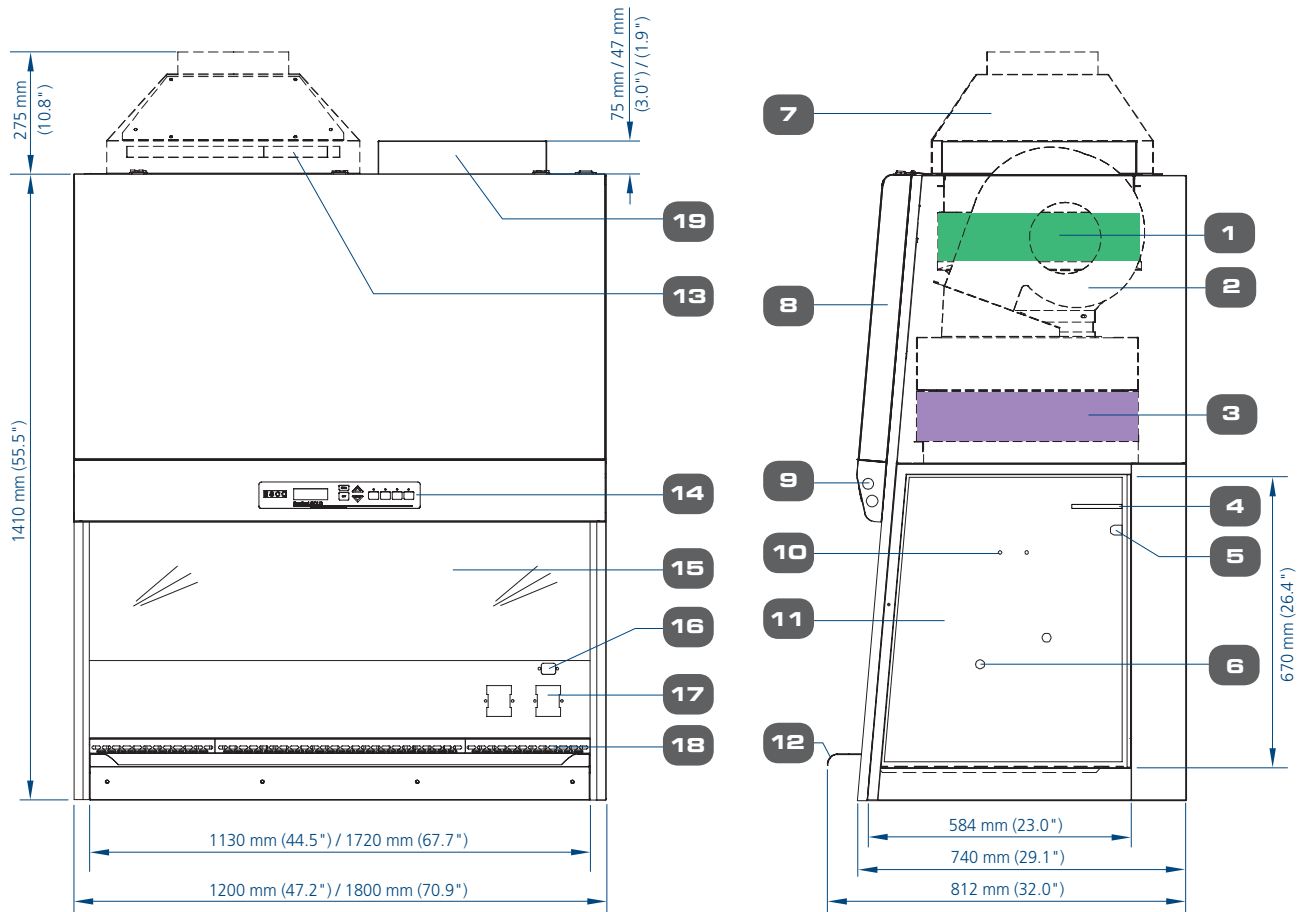
■ Negative pressure ■ Positive pressure

The Esco double-wall design creates a Dynamic Chamber plenum which surrounds contaminated areas with negative pressure, preventing the possibility of contamination from leaks in filter seal, gasket or cabinet structure.

Cabinet Accessories

- Germicidal UV lamp
 - Controlled by automatic UV lamp timer through Sentinel™ microprocessor control panel
 - Emission of 253.7 nanometers for most efficient decontamination
- PVC armrest
 - Chemically treated, improves operator comfort, easy to clean.
- Ergonomic lab chair
 - Laboratory grade construction, meets Class 100 cleanliness; alcohol resistant PVC materials
 - Adjustable height 395-490 mm (15.6" - 19.3")
- Ergonomic foot rest
 - Angled, helps maintain proper posture
 - Adjustable height
 - Anti-skid coating, chemical resistant finish
- IV bar, with hooks
 - Stainless steel construction
 - Available for all standard Esco cabinets
- Microscope viewing device
 - Mounting and viewing pouch integrated into sash. Factory installed; specify when ordering.

NordicSafe® NC2, Class II Microbiological Safety Cabinet Technical Specifications



- | | | |
|---|---|---|
| 1. Exhaust ULPA filter | 8. Electrical / Electronics panel | 14. Esco Sentinel™ Gold microprocessor control system |
| 2. Blower | 9. Fluorescent lamps | 15. Safety glass motorized sash window |
| 3. Downflow ULPA filter | 10. Standard UV light Retrofit Kit™ provision | 16. Female IEC inlet for UV provision |
| 4. Downflow sensor | 11. Tempered side glass | 17. Standard electrical outlet Retrofit Kit provision |
| 5. Standard UV light Retrofit Kit provision | 12. Stainless steel arm rest | 18. Stainless steel multi-piece work tray |
| 6. Plugged service fixtures provisions (2 on each side) | 13. Exhaust sensor | 19. hump |
| 7. Exhaust Collar (Optional) | | |

General Specifications, NordicSafe® Class II, Microbiological Safety Cabinets

Model		NC2-3L8	NC2-4L8	NC2-6L8
Nominal Size		0.9 meters (3')	1.2 meters (4')	1.8 meters (6')
External Dimensions (W x D x H)	Without Base Stand	900 x 812 x 1410 mm (main body)* 35.4" x 32.0" x 55.5"	1200 x 812 x 1410 mm (main body)* 47.2" x 32.0" x 55.5"	1800 x 812 x 1410 mm (main body)* 70.9" x 32.0" x 55.5"
	With Optional Base Stand, 711 mm (28") type	900 x 812 x 2120 mm 35.4" x 32.0" x 83.5"	1200 x 812 x 2121 mm (main body)* 47.2" x 32.0" x 83.5"	1800 x 812 x 2121 mm (main body)* 70.9" x 32.0" x 83.5"
Internal Work Area, Dimensions (W x D x H)		830 x 584 x 670 mm 32.7" x 23" x 26.4"	1130 x 584 x 670 mm 44.5" x 23.0" x 26.4"	1720 x 584 x 670 mm 67.7" x 23.0" x 26.4"
Internal Work Area		0.38 m ² (4.1 sq.ft)	0.44 m ² (4.7 sq.ft)	0.81 m ² (8.7 sq.ft)
Tested Opening		173 mm (6.8")	173 mm (6.8")	173 mm (6.8")
Working Opening		200 mm (7.9")	200 mm (7.9")	200 mm (7.9")
Average Airflow Velocity	Inflow	0.45 m/s (90 fpm) at initial setpoint		
	Downflow	0.32 m/s (65 fpm) at initial setpoint with uniformity of better than +/- 20%		
Airflow Volume	Inflow	235 m ³ /h (138 cfm)	317 m ³ /h (187 cfm)	485 m ³ /h (286 cfm)
	Downflow	556 m ³ /h (327 cfm)	703 m ³ /h (414 cfm)	1165 m ³ /h (686 cfm)
	Exhaust	235 m ³ /h (138 cfm)	317 m ³ /h (187 cfm)	485 m ³ /h (286 cfm)
	Required Exhaust With Optional Thimble Exhaust Collar	314 m ³ /h (185 cfm)	479 m ³ /h (282 cfm)	757 m ³ /h (446 cfm)
	Static Pressure For Optional Thimble Exhaust Collar	25 Pa / 0.11 in H ₂ O	28 Pa / 0.11 in H ₂ O	43 Pa / 0.17 in H ₂ O
ULPA Filter Typical Efficiency	Downflow	>99.999% at 0.1 to 0.3 microns and MPPS as per IEST-RP-CC001.3 USA with H14 rating as per EN 1822, Europe		
	Exhaust			
Typical Sound Emission per EN 12469**		58 dBA	60 dBA	64 dBA
Fluorescent Light Intensity At Zero Ambient		1000 lux (92 foot candles)	1200 Lux (111 foot candles)	1600 Lux (149 foot candles)
Cabinet Construction	Main Body	1.2 mm (0.05") 18 gauge electrogalvanized steel with white oven-baked epoxy-polyester Isocide™ antimicrobial powder coated finish		
	Work Surface	1.5 mm (0.06") 16 gauge stainless steel, type 304, with BA finish		
	Side Walls	UV absorbing tempered glass, 5 mm (0.2"), colorless and transparent		
Electrical 220-240V, AC, 50Hz, 1Ø	Cabinet Full Load Amps (FLA)	8 A	3 A	3.5 A
	Optional Outlets FLA	5 A	5 A	5 A
	Cabinet Nominal Power	132 W	187 W	272 W
	Cabinet BTU/Hr	450	638	928
Net Weight***		160 kg (352 lbs)	208 kg (459 lbs)	287 kg (633 lbs)
Shipping Weight***		185 kg (407 lbs)	247 kg (545 lbs)	339 kg (747 lbs)
Shipping Dimensions, Maximum (W x D x H)***		1060 x 820 x 1580 mm 41.7" x 32.2" x 62.2"	1350 x 850 x 1760 mm 53.1" x 33.5" x 69.3"	2050 x 850 x 1760 mm 80.7" x 33.5" x 69.3"
Shipping Volume, Maximum***		1.37 m ³ (45 cu.ft.)	2.02 m ³ (71 cu.ft.)	3.07 m ³ (108 cu.ft.)

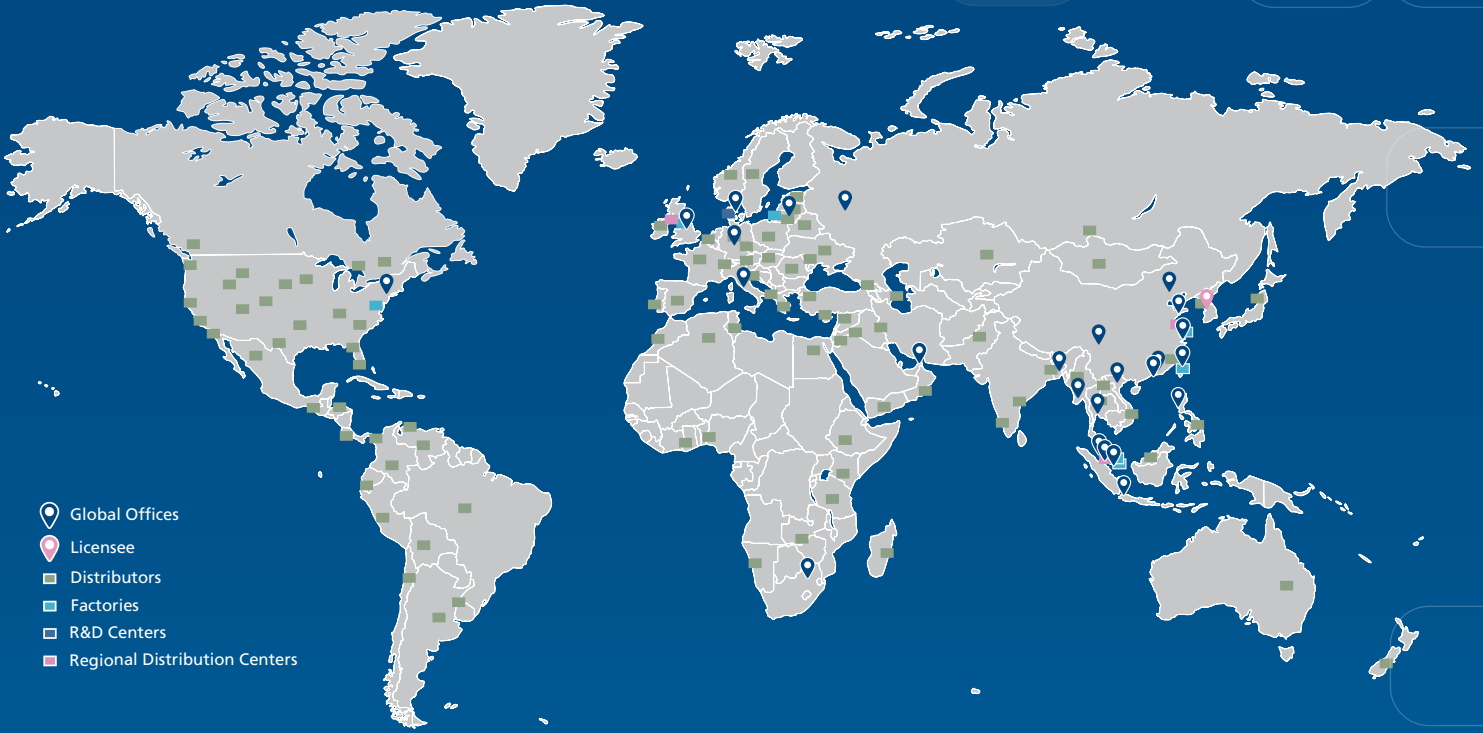
* Excluding hump. Please refer to engineering drawing on page 6 for details.

** Noise reading in open field condition / anechoic chamber.

*** Cabinet only; excludes optional stand

Standards Compliance	For Microbiological Safety Cabinets	For Air Quality	For Filtration	For Electrical Safety
	EN 12469, Europe	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

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