Infinity®

Class II Microbiological Safety Cabinet
The Industry’s Premier Biological Safety Solution from Esco

Esco Infinity tested to EN 12469 for safety and performance. Model FC2-4A_ with optional support stand.
Each cabinet is KI-Discus tested for performance integrity.
Available in 0.9, 1.2, 1.5 and 1.8 meter models (3’, 4’, 5’ and 6’).
Shown with optional telescoping stand.

Main Features

Unique Dynamic Chamber™ plenum with angled filter delivers superb airflow uniformity with deviation no greater than 5% to 6% of average downflow, exceeding European Standard EN 12469 by more than three times.

- Negative pressure plenum surrounds contaminated positive pressure plenum; no fabric bags are used.
- Dual fan design for guaranteed safety. If one fan fails, minimal protection is still maintained with only one fan running.
- Esco next-generation Sentinel™ microprocessor supervises all cabinet functions.
- A large easy-to-read digital display and ergonomically sized touchpad controls improve user interface.
- Fully closable, motorized sash provides an airtight seal for better safety when cabinet is inoperative overnight.
- Frameless, shatterproof sash is easier to clean, offers larger, unobstructed viewing area.
- Ergonomically angled front improves reach and comfort.
- Multi-piece work surface removal simplifies cleaning.
- Single-piece work surface with sump that contains spillage is also available as an option.
- Raised armrest maintains safety by preventing blockage.
- Esco ISOCTIDE™ antimicrobial coating on all painted surfaces minimizes contamination.

Tested to EN 12469 for safety and performance.
- Downflow air sensor mounted in interior.
- Accuflow™ microprocessor speed controller maintains safe cabinet airflow despite supply voltage fluctuations.
- Integrated RFI and electrical noise filters eliminate interference with and from adjacent equipment.
- Low noise level <58 dBA (1.2 meter (4') cabinet) is significantly quieter than conventional cabinets.
- Dual, long-life ULPA (per IEST-RP-CC001.3) filters for supply and exhaust airflow.

- Enhanced side-capture zones optimize containment.
- Independent exhaust sensor mounted exterior to work area.
- Single piece side and back wall construction.
- Improved lighting is brighter, more uniform and reduces glare.
- Optional UV lamp operates on programmable timer.
- HPV-compliant and approved for safe decontamination using BIOQUELL technology.

The front sash is motorized for convenient one-hand operation. The sash control is mounted on the front control panel.

- Integrated sash proximity contacts sense proper sash position, serve as an interlock for the UV lamp, and activate an alarm if the sash is improperly positioned.

- When fully lowered the sash seals automatically against a closed-cell peripheral gasket to isolate the interior and prevent escape of contaminants during decontamination.

Motorized Front Sash Assembly and Sash Seal

- The magnetic switch eliminates the chance of mechanical wear and tear typical of a mechanical switch.
- The laminated glass maintains containment if the sash is accidentally broken during cabinet operation.
- The back of the sash can be easily cleaned by removing the sash track cover to swing up the sash glass.
Advanced Engineering

The Esco Infinity® microbiological safety cabinet includes a number of design and performance features not found on our popular Labculture® series cabinets. These include:

- An aerosol tight window for additional safety while the cabinet is inoperative.
- Double fan design guarantees safety in the event of the failure of one fan.
- Motorized front sash for one-hand operation.
- Larger LCD display for easy monitoring of operational parameters.
- Reduced height permits cabinet installation for seated operation in standard 2.4 meter (nominal, <8') laboratory ceiling height. Cabinet shown on optional mounting stand with casters and optional adjustable footrest.

Containment and Protection

The Esco Infinity Class II Microbiological safety cabinet (FC2) provides operator, product and environmental protection against Biosafety Levels 1, 2 and 3. This cabinet can be used for handling Biosafety Level 4, provided that the operator wears positive pressure suit.

- The airflow ratio of 65% recirculation to 35% exhaust increases operator protection beyond the 70% / 30% ratio of conventional microbiological safety cabinets.
- 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.
- Auto-purge slots located at the front side walls eliminate eddy currents and dead air pockets in the critical area behind the sash window.
- The downflow (supply) filter is tilted proportionally to the cabinet front angle to direct more air forward to the front air grille.
- The inflow velocity, downflow velocity, airflow path and intake geometry are precision tuned and tested to create an optimum air curtain on the front aperture; this curtain maintains personal 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. Infinity Series 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.
Filter assembly is constructed in accordance with EN1822 requirements.

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.

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 exhaust filter traps biohazard particles acquired from the work surface before air is exhausted to the room, offering personal 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 operation of all cabinet functions.

- Continuous monitoring of cabinet airflow is displayed on a bright, easy-to-read LCD panel. The large display monitors operational parameters.
- The control panel is located on the center of the cabinet, and angled down for easy access by the operator.
- A back-up battery maintains alarm function for airflow, power and pressure alarm in the event of a power failure.
- Two integrated, temperature-compensated true airflow velocity sensors provide independent measurement of inflow and downflow velocities despite room temperature fluctuation.

- A pressure sensor monitors pressure drop across the filter plenum and computes estimated remaining filter life.
- A one-touch half-speed setting can be activated at the end of the work day to reduce energy consumption, prolong filter life and maintain interior work zone cleanliness for the next day’s work.
- 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.
- Sentinel functions are factory set to default (ON or OFF), depending on worldwide destination and local preferences. Default settings can be user activated through the touchpad data entry access.

**Esco Accuflow Microprocessor Speed Controller**

The Esco Accuflow™ microprocessor speed controller maintains steady motor/blower speed despite building voltage fluctuations, thereby assuring constant face velocity and downflow for optimum safety, containment and protection.
Automatic start-up sequence will prepare the cabinet for normal operation and advise when safe conditions are established.

An administrator controlled PIN (Personal Identification Number) can be set to restrict access to main menu.

The airflow alarm can be activated or deactivated depending on user preference and nature of the work. 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.

Redundant Blower System
The Infinity blower system is designed for high performance operation, redundancy, maximum energy efficiency and minimal maintenance.

Dual permanently lubricated direct-drive external rotor motor/blowers safety in the event of a motor failure.

The external rotor motor design allows for optimum cooling of the motor during extended operations and extends the motor bearing life.

The inflow and downflow balance is precisely established by two independent Accuflow fan speed controls.

The Accuflow microprocessor based speed controller maintains constant, stable airflow despite building supply voltage fluctuations.

Speed can be adjusted electronically without mechanical adjustment.

Built-in RFI and electrical noise filters eliminate interference with adjacent instrumentation.

An integral blower hour meter tracks operating life and aids in predictive maintenance planning.

To prevent fan damage, a paper-catch grille traps papers or towels that may drop down on the drain pan, preventing them from being pulled into the column by fan suction.

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 interior sides and back wall are formed from a single piece of stainless-steel with large radius corners to simplify interior cleaning.

The cabinet work zone has no welded joints to collect contaminants or rust.

All stainless steel work surfaces are accessible for cleaning.

Multi-piece tray components are easily lifted and removed to encourage surface decontamination.

A recessed central area and stainless steel drain pan channels spills and prevent liquids from entering the lower filtration and blower systems.

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 ULPA 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 forms 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 35% exhaust and 65% recirculation process is continued.

Cabinet Filtration System

- 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 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.
- Approximately 35% of the air in the common plenum is exhausted through the ULPA filter to the room. The remaining 65% of the air is passed through the downflow ULPA filter and into the work area as a vertical laminar flow air stream bathing the work surface in clean air.
- The uniform, non-turbulent air stream protects against cross contamination within and throughout the work area.

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

Esco Infinity cabinets use a combination of high performance scroll blowers (supply) and German made ebm-papst® permanently lubricated, centrifugal motor/blowers with external rotor designs (exhaust). Selected for energy efficiency, compact design, and flat profile, the completely integrated exhaust 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, transfer heat and maximize speed control.

Room air / Inflow air

ULPA-filtered air

Unfiltered / potentially contaminated air
Double Blower System

Provides the maximum possible level of safety by enabling safe cabinet shut down in the event of a single blower failure.

1A: Under normal operation with both blowers operating (1a) the supply blower creates a negative pressure surrounding the contaminated positive pressure plenum and pushes air across the supply and exhaust filters. The exhaust blower boosts the air pressure through the exhaust filter to create better inflow and operator protection. Supply and exhaust blowers automatically operating at reduced speeds extend blower life.

1B: If the supply blower fails (1b), downflow to the work area is suspended. The exhaust blower ramps up to maximum power to provide inflow to the cabinet to help maintain containment. The control panel warns of downflow failure. With the supply blower offline, the cabinet still provides protection by maintaining inflow above 0.40 m/s as required by EN 12469.

1C: If the exhaust blower fails (1c), the supply blower continues to provide inflow to the cabinet and downflow to the work area. The control panel warns of inflow failure. With the exhaust blower offline, the cabinet maintains protection by maintaining inflow above 0.40 m/s as required by EN 12469.

Dynamic Chamber™ Plenum Design

The Esco triple-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. The third wall conceals utilities.

- External 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.
- There are no screws in the front or sides to trap contaminants or complicate cleaning.

Service Fitting Access

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

- The Service fitting openings are offset for easier access.
- The External plumbing is concealed behind trim panels to preserve cabinet aesthetics.
- A normally closed gas solenoid valve automatically shuts off gas flow in the event of a cabinet alarm or unsafe condition.

Comfortable Ergonomic Design

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

- The angled viewing window and narrow profile front grille improves reach into the work area.
- 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; see Specifications.
- 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 eliminates blockage of operator’s line of sight.
- A generous sash opening allows for easier access into the work zone, provides ample room for transferring of small equipment; see Specifications.
- The sliding 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 EN 12469, the renowned world standard for microbiological safety cabinets.
- Contact Esco or your Sales Representative for site preparation information; see Electrical Specifications.

Warranty

The Infinity is warranted for 3 years excluding consumable parts and accessories.

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

ESCO
WORLD CLASS. WORLDWIDE.
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.

**Single Piece Work Tray**
Available for applications where a sumped work surface is desired to contain spillage. Must be specified when ordering.

**Electrical Outlets and Utility Fittings**
- Electrical outlet, ground fault, North America
- Electrical outlet, Euro/Worldwide
- Petcock (air, gas, vacuum)
  - North America (American) style
  - Euro/Worldwide style DIN 12898, DIN 12919, DIN 3537

**Support Stands**
- Fixed height, available 737 mm (29") or 838 mm (33")
- Adjustable height, hydraulic range from 737 mm (29") to 838 mm (33")
- Manual or electrical lift
- With casters
- Telescoping height, nominal range from 737 mm (29") to 838 mm (33")
  - Adjustable in 25.4 mm (1") increments
- Infinitely adjustable cradle stand, with casters
- Elevates to seating or standing work surface height
- When lowered, permits movement through standard doorway
  - With casters
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  - Manual or electrical lift
  - With casters
  - Telescoping height, nominal range from 737 mm (29") to 838 mm (33")
    - Adjustable in 25.4 mm (1") increments
  - Infinitely adjustable cradle stand, with casters
  - Elevates to seating or standing work surface height
  - When lowered, permits movement through standard doorway
    - With casters
- PVC armrest
  - Chemically treated, improves operator comfort, easy-to-clean, 712 mm (28") standard size
- Ergonomic lab chair
  - Laboratory grade construction, meets Class 100 cleanliness; alcohol resistant PVC materials
  - Adjustable 395-490 mm (15.6"-19.3")
- Germicidal UV lamp
  - Controlled by automatic UV lamp timer through Sentinel microprocessor control panel
  - Emission of 253.7 nanometers for most efficient decontamination
  - Lamp is positioned away from operator’s line-of-sight for safety and proper exposure to interior surfaces
  - Note: UV lamp intensity reduces over time and its effectiveness is subject to factors such as relative humidity in the cabinet, ambient air temperature and microbial species in the work zone.
- 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 cabinets
- Microscope viewing device
  - Mounting and viewing pouch integrated into sash
  - Factory installed; specify when ordering

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**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 .9 meter/3' cabinet). Electrical outlets are mounted below service fixtures to minimize obstructions.

**Service features**
- Helpful for certifiers, the hinged maintenance assembly opens to a fixed position on integrated, gas spring struts providing front service access.
- All key components with the exception of the motor/blower assembly are mounted outside the air stream and away from contaminated air to permit service without decontamination. These include fluorescent lamps, UV lamps, electrical harnesses, electronic boards and microprocessor control.
- Panels enclosing potentially hazardous areas or components such as microbiological contamination or electrical shock 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 lower drain trough is a single-piece fabrication with wide open angles and a channel to direct spills to the drain.
Model FC2 Biological Safety Cabinet Technical Specifications

1. Exhaust filter
2. Blower
3. Downflow filter
4. Standard UV light Retrofit Kit™ provision
5. Standard IV-Bar Retrofit Kit provision
6. Universal electrical outlet (0.9 meter / 3’ model - one single outlet in work zone)
   (1.2, 1.5 and 1.8 meter / 4’, 5’ & 6’ models - two single outlets in work zone)
7. Exhaust fan
8. Electrical / Electronics panel
9. Fluorescent light
10. Gas service fixture with solenoid valve
11. Vacuum service fixture
12. Stainless steel single-piece work tray
13. Stainless steel armrest
14. Key switch
15. Esco Sentinel microprocessor control system
16. Motorized sliding sash (aerosol tight)
17. Single piece stainless steel back wall and side wall
18. Side removable panel for plumbing access
19. Thimble exhaust collar (optional)

Optional Exhaust Collar Positions for Thimble-Ducting for FC2 Models

*Access Opening Height | All Model Sizes
---|---
Testing Opening Height | 200 mm (7.9”)
Working Area Height | 210 mm (8.3”)

*The combination of the Esco raised armrest and recessed work surface creates additional space within the working area than typically specified.
## General Specifications

<table>
<thead>
<tr>
<th></th>
<th>FC2-4A_</th>
<th>FC2-6A_</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nominal Size</strong></td>
<td>1.2 meters (4’)</td>
<td>1.8 meters (6’)</td>
</tr>
<tr>
<td><strong>External Dimensions</strong></td>
<td>1420 x 805 x 1535 mm</td>
<td>2030 x 805 x 1535 mm</td>
</tr>
<tr>
<td>(W x D x H)</td>
<td>56.0” x 31.7” x 60.4”</td>
<td>80.0” x 31.7” x 60.4”</td>
</tr>
<tr>
<td><strong>Internal Work Area Dimensions</strong></td>
<td>1260 x 610 x 670 mm</td>
<td>1870 x 610 x 670 mm</td>
</tr>
<tr>
<td>(W x D x H)</td>
<td>49.6” x 24.0” x 26.4”</td>
<td>73.6” x 24.0” x 26.4”</td>
</tr>
<tr>
<td><strong>Internal Work Space Area</strong></td>
<td>0.62 m² (6.67 sq.ft.)</td>
<td>0.92 m² (9.90 sq.ft.)</td>
</tr>
<tr>
<td><strong>Tested Opening</strong></td>
<td>200 mm (7.9&quot;)</td>
<td>200 mm (7.9&quot;)</td>
</tr>
<tr>
<td><strong>Working Opening</strong></td>
<td>210 mm (8.3&quot;)</td>
<td>210 mm (8.3&quot;)</td>
</tr>
<tr>
<td><strong>Power Rating</strong></td>
<td>Code 1</td>
<td>Code 2</td>
</tr>
<tr>
<td><strong>Average Airflow Velocity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflow</td>
<td>0.48 m³/s (95 fpm) at initial setpoint</td>
<td>0.53 m³/s (105 fpm) at initial setpoint</td>
</tr>
<tr>
<td>Downflow</td>
<td>0.35 m³/s (70 fpm) at initial setpoint</td>
<td></td>
</tr>
<tr>
<td><strong>Airflow Volume</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflow</td>
<td>437 m³/h (257 cfm)</td>
<td>646 m³/h (380 cfm)</td>
</tr>
<tr>
<td>Downflow</td>
<td>929 m³/h (544 cfm)</td>
<td>1367 m³/h (804 cfm)</td>
</tr>
<tr>
<td>Exhaust</td>
<td>437 m³/h (257 cfm)</td>
<td>646 m³/h (380 cfm)</td>
</tr>
<tr>
<td><strong>Sound Emission</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Typical)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSF 49</td>
<td>&lt;61 dBA</td>
<td>&lt;64 dBA</td>
</tr>
<tr>
<td>EN 12469</td>
<td>&lt;58 dBA</td>
<td>&lt;61 dBA</td>
</tr>
<tr>
<td><strong>ULPA Filter</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical Efficiency</td>
<td>&gt;99.999% at 0.1 to 0.3 microns as per IEST-RP-CC001.3 USA</td>
<td>&gt;99.995% at MPPS as per EN 1822 (H-14) EU</td>
</tr>
<tr>
<td><strong>Fluorescent Lamp Intensity</strong></td>
<td>&gt; 1200 Lux (111 foot-candles)</td>
<td></td>
</tr>
<tr>
<td><strong>Cabinet Construction</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Body</td>
<td>1.2 mm (0.06&quot;) 16 gauge electrogalvanized steel with white oven-baked epoxy Isocide antimicrobial powder coated finish</td>
<td>Stainless steel grade 304, Work tray: 1.2 mm (0.04”), Walls and drain pan: 0.9 mm (0.03&quot;)</td>
</tr>
<tr>
<td>Work Zone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Side Walls</td>
<td></td>
<td>Stainless steel grade 304</td>
</tr>
<tr>
<td><strong>Electrical</strong></td>
<td>Code 1</td>
<td>Code 2</td>
</tr>
<tr>
<td>(Current &amp; Power Consumption)</td>
<td>220-240V, AC, 50Hz, 1ø</td>
<td>220-240V, AC, 50Hz, 1ø</td>
</tr>
<tr>
<td>A1</td>
<td>FC2-4A1, 810 W, 9.5 A</td>
<td>FC2-4A3</td>
</tr>
<tr>
<td>A2</td>
<td>FC2-4A2</td>
<td>FC2-6A2</td>
</tr>
<tr>
<td>A3</td>
<td>FC2-6A3</td>
<td></td>
</tr>
<tr>
<td><strong>Net Weight</strong></td>
<td>298 kg / 657 lbs</td>
<td>447 kg / 985 lbs</td>
</tr>
<tr>
<td><strong>Shipping Weight</strong></td>
<td>354 kg / 780 lbs</td>
<td>522 kg / 1150 lbs</td>
</tr>
<tr>
<td><strong>Shipping Dimensions, Maximum (W x D x H)</strong></td>
<td>1530 x 900 x 1870 mm</td>
<td>2150 x 900 x 1870 mm</td>
</tr>
<tr>
<td><strong>Shipping Volume, Maximum</strong></td>
<td>2.58 m³ (91 cu.ft.)</td>
<td>3.62 m³ (128 cu.ft.)</td>
</tr>
</tbody>
</table>

* Additional voltages may be available; contact Esco for ordering information.
** Cabinet only, excludes optional stand.
1 AC power specifications are to be specified in the last digit of the model number when ordering: 1, 220-240V, 50Hz; 2, 110-130V 60Hz; 3, 220-240V, 60Hz.
Note: Power rating code 2 models meet or exceed NSF 49 standards for safety and performance. For information contact Esco or your Sales Representative.
Microbiological Testing
Esco performs testing in accordance with more than 10 of the world’s most recognized standards for local, regional and international criteria. Testing in our micro-biology laboratory is conducted according to NSF49, EN12469, and JIS K3800. An NSF-accredited biohazard cabinet field certifier is available in-house full-time to supervise all testing work, using harmless Bacillus atrophaeus (formerly Bacillus Subtilis) bacteria that is used to challenge the cabinet, then incubated for 48 hours and the Colony Forming Units (CFU) are counted to determine the testing results. Increased microbiological challenge tests with objects inside the cabinet work zone from environmental contaminants.

The test objective is to determine cabinet protection to the product/samples inside the cabinet for the personnel operating on potentially hazardous samples in the cabinet. Personnel Protection Test
The test objective is to evaluate the safety of the cabinet for the personnel operating inside the cabinet. Both the front opening sash and Bunsen burner, external airflow disturbance, and Human-As-Mannequin test adapted from Fume Hood development were performed to simulate real-world conditions.

Product Protection Test
The test objective is to determine cabinet protection to the product/samples inside the cabinet work zone from environmental contaminants.

HPV Test Compliant:
Safer Hydrogen Peroxide Decontamination Compatibility
Esco biological safety cabinets are Hydrogen Peroxide Vapor (HPV) compliant and decontaminable cabinets approved by BIOQUELL for this patented process. HPV is a safer and more efficient alternative to conventional decontamination using formaldehyde (CH₂O):
• HPV is non-carcinogenic and odorless, while formaldehyde is carcinogenic, toxic and has pungent smell.
• If there is a gap on the cabinet sealing, escaping HPV to the lab will decompose to become oxygen and water. Escaping formaldehyde, however, is harmful to people in the lab. Therefore HPV decontamination can be performed while people are working inside the lab, while formaldehyde decontamination must be performed with no one present in the lab. The HPV method improves safety, productivity, and reduces the time to seal the cabinet.
• HPV biological efficacy is independent of environmental variables, whereas formaldehyde efficacy is dependent on such variables. HPV has a better penetration capacity, resulting in a full decontamination of the cabinet. The formaldehyde method is known to result in incomplete decontamination.
• HPV is more effective and rapid against biological organisms compared to formaldehyde.

Cross Contamination Test
The test objective is to evaluate cabinet protection from cross contamination of samples placed simultaneously inside the work zone.
• A nebulizer containing 55 mL of 5 to 8 x 10⁴ spores/mL B. atrophaeus spores is placed against one of the work zone sidewalls.
• Target agar plates are placed 360 mm (14”) away from the same side wall.
• Acceptance: The number of Bacillus atrophaeus CFU recovered on agar plates shall not exceed 2 CFU per test.

Kl-Discus Containment Test
According to EN 12469:2000 (Operator Protection)
Esco is currently one of the few companies in the world equipped to perform the Kl-Discus test for our customers. The Kl-Discus test is defined in the European Standard for microbiological safety cabinets, EN12469:2000, as a test method for validating the operator/personnel protection capabilities of the cabinet.
• The Kl-Discus test shows excellent correlation with the microbiological test method for operator protection, and is useful for validating the actual containment performance of the cabinet on-site.
• The Kl-Discus takes only 45 minutes as opposed to 2 days for microbiological testing.
• Thus, each Esco Infinity FC2 model is factory tested using the Kl-Discus method for operator safety.

Comprehensive Performance Testing At Esco

Every Infinity 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
- Light, noise and vibration
- Airflow pattern visualization
- Electrical safety to IEC61010-1
- Kl-Discus containment
- Additional microbiological testing is performed on statistical sampling basis.
Since 1978, Esco has emerged as a leader in the development of controlled environment, laboratory and cleanroom 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.