Low Noise, Class II Microbiological Safety Cabinets

The Industry's Most Comfortable, Energy Efficient Cabinet
**Main Features**

- Extremely low energy consumption (190 Watt) for environmentally-friendly operation.
- Latest generation, energy-efficient ECM blower from EBM-Papst Germany maintains constant airflow, despite building voltage fluctuations.
- 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.
- Half Speed Mode reduces energy consumption to 80 Watt while still maintaining personnel and product protection when the cabinet is not being used.
- Zero Volt Relay Contact, to synchronize turning ON/OFF internal blower fan with remote exhaust fan.
- Esco Sentinel™ Gold microprocessor with integrated temperature-compensated airflow monitoring system.
- Quickstart mode, to turn the blower and lights on/off, by moving the sash window to correct position.
- 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.

* Ultra low noise level achieved on 1.2 meter (4') model per EN12469 at open field condition.
• The inflow velocity, downflow velocity,
• Raised armrest prevents the likelihood
• Inflow of room air enters the front air
for H14 performance (EU).
• ULPA performance (USA), and EN 1822
RP-CC001.3 recommended practice for
NordicSafe filters meet the IEST-
particle sizes of 0.1 to 0.3 microns.
provide 99.999% typical efficiency for
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).
• 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.

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.

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.

Fan System
The NC2-L fan system is designed for high performance operation, maximum energy efficiency and minimal maintenance.
• Latest generation, energy efficient ECM fan from EBM-Papst Germany maintains constant airflow with a low energy consumption of only 190 Watts.
• Quietest cabinet in industry (51 dBA), offers a more comfortable working atmosphere with less fatigue thereby increasing concentration.
• An integral fan hour meter tracks operating life and aids in predictive maintenance planning.
• The external rotor motor design allows for optimum cooling of the motor during extended operations and extends the motor bearing life.
• To prevent fan damage, a paper-catch grille is positioned under the work surface in the return air plenum and prevents any papers, paper towels etc. from being drawn into the fan during normal operation.

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

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.

Save Energy, Money and the Planet!

Latest generation EBM-Papst Germany ECM fan technology replaces conventional fans. Improved energy efficiency dramatically lowers operating costs. Lower heat output further improves building energy efficiency.
Energy savings of up to US$600 per cabinet per year, based on average 600W savings on a 1.2m/4’ cabinet, continuous operation, and electricity cost of US$0.10/kWH, plus additional savings from reduced building cooling load.
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 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.

Stable Airflow provided by EBM-Papst EC Motor

The Esco NordicSafe uses latest generation EBM-Papst EC Motor (ECM) to maintain stable airflow despite building voltage fluctuations, thereby assuring constant face velocity and downflow for optimum safety, containment and protection.

**Comforatble 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.

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 737 mm (29") or 838 mm (33"), ±38.1 mm (1.5")
• Hydraulic motorized adjustable height with casters (SPM)
  - Nominal range 711 mm (28") to 864 mm (34")
• Telescoping height with casters (STC)
  - 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

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.
**NordicSafe NC2, Class II Microbiological Safety Cabinet Technical Specifications**

- **Exhaust ULPA filter**
- **Blower**
- **Downflow ULPA filter**
- **Downflow sensor**
- **Standard UV light Retrofit Kit provision**
- **Plugged service fixtures provisions (2 on each side)**
- **Exhaust Collar (Optional)**

**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.

**Dynamic Chamber™ Plenum Design**

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.

- Negative pressure
- Positive pressure

**NordicSafe, Biological Safety Cabinets • Class II Microbiological Safety Cabinets**
# General Specifications, NordicSafe Class II, Microbiological Safety Cabinets

<table>
<thead>
<tr>
<th>Model</th>
<th>NC2-4L8</th>
<th>NC2-6L8</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 (W x D x H)</strong></td>
<td>1200 x 812 x 1410 mm (main body)<em>&lt;br&gt;47.2&quot; x 32.0&quot; x 55.5&quot;&lt;br&gt;1800 x 812 x 1410 mm (main body)</em>&lt;br&gt;70.9&quot; x 32.0&quot; x 55.5&quot;</td>
<td>1200 x 812 x 2121 mm (main body)<em>&lt;br&gt;47.2&quot; x 32.0&quot; x 83.5&quot;&lt;br&gt;1800 x 812 x 2121 mm (main body)</em>&lt;br&gt;70.9&quot; x 32.0&quot; x 83.5&quot;</td>
</tr>
<tr>
<td><strong>Internal Work Area, Dimensions (W x D x H)</strong></td>
<td>1130 x 584 x 670 mm&lt;br&gt;44.5&quot; x 23.0&quot; x 26.4&quot;</td>
<td>1720 x 584 x 670 mm&lt;br&gt;67.7&quot; x 23.0&quot; x 26.4&quot;</td>
</tr>
<tr>
<td><strong>Internal Work Area</strong></td>
<td>0.44 m² (4.7 sq.ft)</td>
<td>0.81 m² (8.7 sq.ft)</td>
</tr>
<tr>
<td><strong>Tested Opening</strong></td>
<td>173 mm (6.8&quot;)</td>
<td>173 mm (6.8&quot;)</td>
</tr>
<tr>
<td><strong>Working Opening</strong></td>
<td>200 mm (7.9&quot;)</td>
<td>200 mm (7.9&quot;)</td>
</tr>
</tbody>
</table>

## 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
- **Required Exhaust With Optional Thimble Exhaust Collar**
  - **Inflow**: 317 m³/h (187 cfm)
  - **Downflow**: 703 m³/h (414 cfm)
  - **Exhaust**: 317 m³/h (187 cfm)
  - **Static Pressure For Optional Thimble Exhaust Collar**: 28 Pa / 0.11 in H₂O
- **Required Exhaust With Optional Thimble Exhaust Collar**
  - **Inflow**: 485 m³/h (286 cfm)
  - **Downflow**: 1165 m³/h (686 cfm)
  - **Exhaust**: 485 m³/h (286 cfm)
  - **Static Pressure For Optional Thimble Exhaust Collar**: 757 m³/h (446 cfm)

## 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

## Typical Sound Emission per EN 12469**
- **Inflow**: 52 dBA
- **Downflow**: 54 dBA

## Fluorescent Light Intensity At Zero Ambient
- **Main Body**: 1200 Lux (111 foot candles)
- **Work Surface**: 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 220-240 V, AC, 50 Hz, 1Ø
- **Cabinet Full Load Amps (FLA)**
  - **Inflow**: 3 A
  - **Downflow**: 3.5 A
  - **Optional Outlets FLA**: 5 A
  - **Required Exhaust With Optional Thimble Exhaust Collar**: 5 A
- **Cabinet Nominal Power**: 187 W
- **Cabinet BTU**: 638

## Net Weight****
- **Cabinet Only**: 208 kg (459 lbs)
- **Exhaust**: 287 kg (633 lbs)
- **Cabinet plus Exhaust**: 247 kg (545 lbs)
- **Shipping Weight****
  - **Cabinet Only**: 339 kg (747 lbs)

## Shipping Dimensions, Maximum (W x D x H)***
- **Main Body**: 1350 x 850 x 1760 mm<br>53.1" x 33.5" x 69.3"<br>2050 x 850 x 1760 mm<br>80.7" x 33.5" x 69.3"
- **Exhaust**: 2.02 m³ (71 cu.ft.)
- **Shipping Volume, Maximum***
  - **Cabinet Only**: 3.07 m³ (108 cu.ft.)

## Standards Compliance
### For Microbiological Safety Cabinets
- **EN 12469**, Europe
- **ISO 14644.1 Class 3**, Worldwide
- **AS 1386 Class 1.5**, Australia
- **JIS B9920 Class 3**, Japan

### For Air Quality
- **EN-1822 (H14)**, Europe
- **IEST-RP-CC001.3**, Worldwide
- **IEST-RP-CC007.1**, Worldwide
- **IEST-RP-CC034.1**, Worldwide

### For Filtration
- **IEC 61010-1**, Worldwide
- **UL 61010-1**, USA

### For Electrical Safety
- **CAN/CSA-22.2, No.61010-1**
The Esco Group of Companies is a global life sciences tools provider with sales in over 100 countries. The group is active in lab equipment, pharma equipment and medical devices. Manufacturing facilities are located in Asia and Europe. R&D is conducted worldwide spanning the US, Europe and Asia. Sales, service and marketing subsidiaries are located in 12 major markets including the US, UK, Singapore, Japan, China and India. Regional distribution centers are located in the US, UK, and Singapore.

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