ESCO
WORLD CLASS. WORLDWIDE.

Ascent™ Max Ductless Fume Hood, Model ADC-4B_. Shown with WF-PP (water faucet & PP drip-cup) on SPC-4A0 (support stand with caster wheels).

Ascent™ Opti Ductless Fume Hood, Model SPD-3A_. Shown with MBC-3A0 (mobile cart).

Ductless Fume Hoods

CERTIFIED TO MAJOR EUROPEAN AND AMERICAN STANDARDS

- **Energy Saving:**
  Recirculating design requires no external ducting and exhaust fan.
- **Environmentally Friendly:**
  All toxic fumes are carbon-filtered and no gases are discharged directly to the environment.
- **Microprocessor-based control / alarm system:**
  With US patent pending sensing technology.
- **Comfortable:**
  Ergonomic sloped front with transparent glass front and sides.
- **Safe Chemical Adsorption:**
  Advanced Nanocarb™ activated carbon filter design
  ensures high performance filtration in compliance with BS 7989 requirements.
- **Global Customer References:**
  Esco technology now in use throughout North America, Europe and Asia.

Ductless fume cabinets provide protection to the laboratory personnel and the environment from toxic fumes and are quickly becoming a viable alternative to conventional fume hoods. Unlike conventional fume hoods, these cabinets filter out chemical fumes and recycle air directly back to the laboratory.

Personnel protection is provided in a manner similar to conventional fume hoods by drawing air at a controlled rate across a front opening into the hood. Ductless fume cabinets have many advantages over conventional fume hoods:

- Energy savings since air which is costly to air-condition or heat is not removed from the laboratory. For example, in the USA the typical fume hood costs around USD 5,000 to operate in annual energy costs alone. Considering that there is an estimated number of 600,000 fume hoods in operation across America, every year approximately USD 3 billion is spent to operate them!
- They protect the environment since toxic fumes are not released to the environment unlike in conventional fume hoods.
- Fully installed systems ready to operate are available at a lower cost than bulky conventional fume hoods.
- An expensive ducting and external blower system that is often difficult to maintain is not required.
- Mobile and can be relocated easily; perfect for schools and education institutes.

No manufacturer in the world possesses as wide a range of international certifications encompassing the local requirements of all major nations!

Performance Testing At Esco

At Esco's factory, every ductless fume cabinet produced is rigorously tested to the requirements of two major international standards: Filter efficiency tests according to BS 7989:2001 and Containment tests according to ASHRAE 110-1995.

ANSI / ASHRAE 110-1995 Containment Tests

1. **Flow Visualization**
   Local Smoke Visualization
   Gross Smoke Visualization
2. **Face Velocity Measurement**
   Cross Draft Velocity
3. **Tracer Gas Test**
   Static Tracer Gas Test
   Surface Scan Test
   Sash Movement Effect

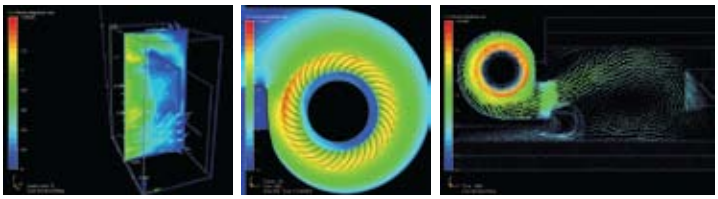
BS 7989:2001 Filter Efficiency and Capacity Test
Gaseous phase filter test for capacity and efficiency using propan-2-ol according to British Standard 7989:2001.The purpose of this test is to ensure that a recirculating filtration fume cupboard is capable of meeting the filter capacity requirements specified in 8.5.2 of the BS 7989:2001 Standard.

Filter efficiency testing according to BS 7989

Acceptance criteria:
The filter, when challenged continuously at 800ppm (+/-50ppm) of propan-2-ol, shall maintain the concentration of propan-2-ol in the exhaust stream at below 40ppm throughout the period of evaporation of 1 litre of propan-2-ol and below 400ppm throughout the period of evaporation from 1 litre to 2 litres of propan-2-ol.

Computational Fluid Dynamics (CFD)

Leading-edge computational fluid dynamics software is used to visualize and analyse the airflow pattern in the ductless fume hood, leading to an aerodynamic cabinet design that ensures optimum personnel protection.



Nanocarb™ Activated Carbon Filtration

Esco's ductless fume hoods incorporate a state-of-the-art vapour phase Nanocarb™ activated carbon filter system, which is the primary filtration component in removing all chemical fumes from within the hood before air is recirculated back to the laboratory.

Activated carbon is a porous material manufactured from carbon-based raw materials. These include coal, peat, coconut and wood. The activation process develops pores of nanometer sizes within the carbon particle. These give the carbon an extremely high internal porosity and surface area. Typically, activated carbons contain surface areas in the range of 500-2000 m^2/g.

The basic mechanism through which activated carbon removes impurities from contaminated air saturated with chemical fumes is referred to as physical adsorption.

Physical adsorption is a phenomenon resulting from intermolecular forces of attraction (London dispersion forces) between the impurities and the internal surfaces of the activated carbon. Activated carbon has the strongest physical adsorption forces or the highest volume of adsorbing porosity of any material known to mankind.

Before passing through the activated carbon filter, contaminated air in the ductless fume hood is passed through a pre-filter, which removes dust particles (but not chemical contaminants), therefore prolonging the life and effectiveness of the activated carbon filter.

Factors Affecting Filtration Efficiency

The amount of vapours being generated in the fume hood either through general evaporation or as a direct result of experimental procedures. (the lower the concentration / amount of the chemical released in the hood in vapour form, the lower the safety risk to personnel.)

The nature of the chemical(s) used in the fume hood. For example, larger molecules are adsorbed more easily by activated carbon. In addition, less soluble compounds are adsorbed more easily than more soluble compounds.

Environmental factors may also affect the adsorptive efficiency of the fume Hood. The ambient temperature of the laboratory and the gas must be kept to a minimum. Relative humidity must also be kept to a minimum since an especially high relative humidity can cause the activated carbon filter to adsorb water molecules in the place of chemical vapours.

The construction of the filter affects the adsorption efficiency of the Hood. A filter with a thicker media bed will have a longer contact time in which a larger amount of chemical vapours will be deposited in the filter bed by physical adsorption. In order to maximize the contact time, the air volume passing through the hood and the filter must be kept to a minimum. However, this must be balanced with the necessity of maintaining an inflow velocity (through the front opening in the hood) at a rate sufficient in order to ensure proper containment in the cabinet.

In order to increase adsorptive efficiency speciality carbon filters impregnated with other compounds may also be used. This is commonly known as chemisorption.

Safety Issue: Filter Saturation

Activated carbon filtration provides a safe alternative to conventional fume hoods in many applications. However ductless fume hoods are not recommended when very high concentrations and / or amounts of acids or solvents are used. They are also not recommended when highly toxic substances are used or when unknown reactions and/ or procedures are carried out. In such cases users are advised to utilise conventional ducted fume hoods for safety reasons. The life of the filter cannot be predicted with absolute accuracy (due to the large number of factors involved that determine adsorption efficiency). It is necessary to establish a regular routine for filter-monitoring by sampling the exhaust air. When this is not possible Esco recommends that the activated carbon filters be changed at least once a year as a standard safety procedure. *(Refer to page 4 for information on Esco's FiltraCheck™ chemical advisory service, free chemical assessment service for users of Esco ductless fume hoods.)*

Esco Nanocarb™ Filters

Esco's Nanocarb™ activated carbon filters are constructed in order to ensure maximum filter efficiency, retention capacity and operator protection. Esco's research scientists and engineers, working in consultation with world-leading authorities on adsorption science, have developed the following set of unique technologies:

- Optimized retention capacity (i.e. the total weight of chemicals the filter can retain, usually as a percentage of its own weight) considering that activated carbon may have an increased adsorption capacity by weight, yet poorer overall filtration performance for the actual application. By considering the Isotherms of various activated carbon materials, Esco scientists have selected the optimum grade(s) of raw materials in order to achieve the best balance of all performance factors.
- Continuous incoming quality control tests on all activated carbon raw material procured.
- Generously sized filters with more activated carbon by weight retain more chemicals and last longer.
- Proprietary computer modelling software to predict application suitability, filter saturation capacity, and efficiency for single and multiple compounds.
- Rigid, sheet metal construction coupled with a flat-packed bed to minimize dusting and ensure even air-flow through the filter.
- Quick-changeout filter clamping mechanism allows filter replacements to be carried out with minimal tools; even filter clamping (perimeter, not point force) prevents leaks from occurring.
- US patent pending diffusion technology to ensure even filter loading.
- Optional sensing technology (US patent pending) is available as an aid to predict filter breakthrough and warn the user to change the filters.
- Filters are individually installed onto each cabinet and certified at the factory before shipment.

Chemical Guide

Esco Ascent Ductless Fume Cabinets provide protection to both laboratory personnel and the environment from toxic fumes and are quickly becoming a viable alternative to conventional fume hoods.

Unlike conventional fume hoods, these cabinets filter out chemical fumes and recycle air directly back to the laboratory, in turn providing energy savings, personnel and environmental protection, convenience as you do not have to deal with complicated ducting systems and mobility as ductless cabinets are free-standing systems which do not require connection to the ductwork.

You might have concerns over which filters to choose for specific chemicals, as there are hundreds of different types of activated carbon in the world, each made for different specific applications. Esco has therefore come up with a Chemical Guide, which is a list of most commonly used laboratory chemicals and reagents, arranged in alphabetical order. Each chemical has been thoroughly studied by Esco's R & D team, and its suitable Esco Nanocarb™ activated carbon filter indicated in this guide.

Note: Every Esco Ascent Ductless Fume Hood purchased will come with an in-house test report, user manual and a chemical guide.

This chemical guide, combined with our Filtracheck™ Online Survey Form (more information on Page 14 & 15), will ensure that you are using the right filter for your application.

Nanocarb™ Filter Options

CODE	NAME	SUITABLE APPLICATIONS
A	Standard Filter	All common laboratory chemicals, especially with organics. When no specific requirements are present, or when more than one type of chemical is used.
B	Acid Filter	Applications involving sulphur dioxide, hydroflouric acid fumes. Removes inorganic / organic acid vapours and fumes
C	Mercury Compounds Filter	Highly effective for removal of mercury vapour and compounds. (Stable, non-volatile mercuric sulphide filter media).
D	Sulphur Compounds Filter	Removal of sulphur compounds.
E	Halogen Compounds Filter	Removal of halogen compounds like Chlorine, Flourine, Iodine, Bromine, Astatine etc.
F	Aldehyde Filter	Formaldehyde applications or when aldehydes are present. Hospital pathology and endoscopy applications.
G	Ammonia / Amines Filter	High performance removal of ammonia/amines by chemisorption.
Optional HEPA Filter		Custom models available with HEPA filter as a substitute to carbon filter OR in addition to carbon filter. Typical filtration efficiency of 99.99% at 0.3 microns/ Designed for trapping biohazardous aerosols.
Optional Secondary Backup Filter		When installed, cabinet complies with the requirements of ANSI/AIHA Z9.5-2003

Ascent™ Max Ductless Fume Cabinet, Model ADC-4B_. Shown with WF-PP (water faucet & PP drip-cup) on SPC-4A0 (support stand with caster wheels).

The Esco Ascent™ Max Ductless Fume Hood is the second generation of our original and most popular ductless fume cabinet product, offering a sensible balance of quality, performance features and cost-effectiveness. Developed at Esco's Invent-UK accredited research and development laboratory, these hood feature many key innovations that make our products the optimum solutions to your equipment needs.

Certified containment which means that chemical vapours are contained within the enclosure and will not leak through the frontal opening.

Certified filtration efficiency to ensure that the filter is effective against the compounds used in the enclosure at the specified concentration levels. Superior filtration through generously-sized Nanocarb™ main filters with higher chemical retention capacities and over-sized high air volume blower systems. Unique motorised impellers ensure better airflow uniformity, while external rotor motors ensure low energy consumption.

High-quality, extremely durable, all-metal carcass which creates an air-tight outer shell for the best possible toxic fume containment possible (as opposed to a non airtight plastic frame). This innovative design is also supplemented by the frameless glass sliding sash front window which is more air-tight than conventional plastic systems.

Attention is paid to ergonomics: Sloped front design of the cabinet ensures better visibility into the work zone and comfort for the operator. Glass side walls and front sash of our cabinet provide better visibility into the work zone and are ideal for classroom demonstration sessions.

Compliant to International Standards: Esco Ascent™ Max Ductless Hoods have been independently tested and certified to meet all major international standards by the following test agencies:

Invent, UK

- US Standard ANSI/ASHRAE 110-1995
- British Standard BS 7989 - 2001
- British Standard BS 7258
- French Standard AFNOR NF X 15-211
- French Standard AFNOR NF X 15-203
- European Standard EN14175.3

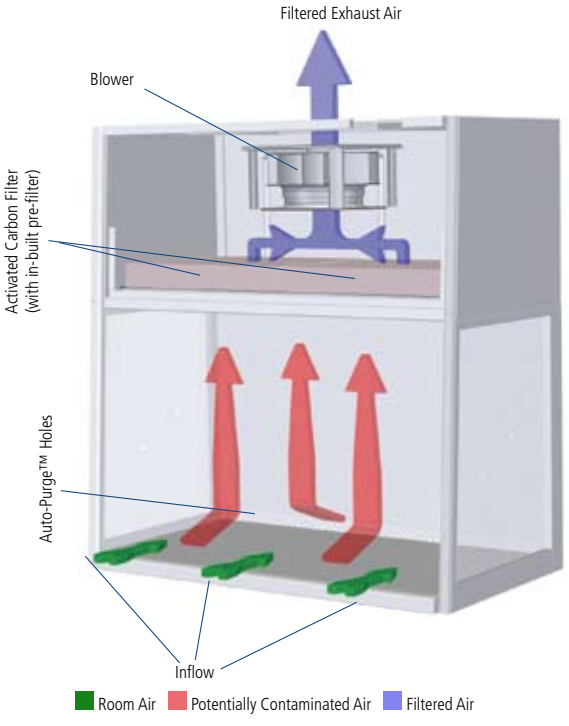
Exposure Control Technologies, USA

- US Standard ANSI/ASHRAE 110-1995

Airflow Pattern In Esco Ductless Fume Hoods

Ductless fume hoods provide operator and environment protection from toxic vapours, gases and fumes.

- The inflow moves from the ambient environment into the work zone through the cabinet front opening, with an average velocity of 0.5 m/s or 100 fpm. Additional inflow air taken through the AutoPurge™ perforations at the back of the work zone prevents fume accumulation for better operator protection. Negative pressure is created in the cabinet's work zone, with no outflow created to compromise operator safety.
- The inflow flushes the entire work zone of the cabinet; within the main chamber of the cabinet, negative pressure (relative to the ambient environment) is maintained so that no chemical fumes or vapours escape the work zone.
- Air is taken through a pre-filter and an activated carbon filter mounted in the interior. The pre-filter is in-built with the activated carbon filter, prolonging carbon filter life by removing large particulates before the they enter the carbon filter. The carbon filter removes all fumes from the exhaust air stream; filtered clean air is exhausted directly back to the room from the top of the cabinet.
- The ductless fume cabinet can be remotely exhausted to the external atmosphere via a non-airtight thimble ducting system (optional), providing additional protection for the operator from volatile toxic chemicals used in high amounts, which normally would not be completely removed by the exhaust filter.



User / Ergonomic Features

- Extremely low noise (less than 56dBA) and vibration levels due to proprietary construction and mounting technology.
- Sloped front design minimizes glare in the viewscreen and improves user comfort during extended operations.
- Service fixture provisions are offset and staggered for easier reach and access to service fixtures. Standard Esco cabinet comes with two factory-prepared service fixture provisions on each side wall of the cabinet.
- Esco Retrofit Kit™ system allows for convenient on-site installation of electrical outlets and service fixtures. These provisions are pre-fitted at our factory on standard models.
- Large, spacious work zone and high internal work ceiling (765mm / 30.1") accommodate many laboratory procedures and instruments.
- Tempered transparent glass sides are suitable for demonstrations and benchtop operations in the classroom. (Optional transparent glass back wall is available for maximum visibility of the work zone during demonstrations).

Safety And Maintenance Features

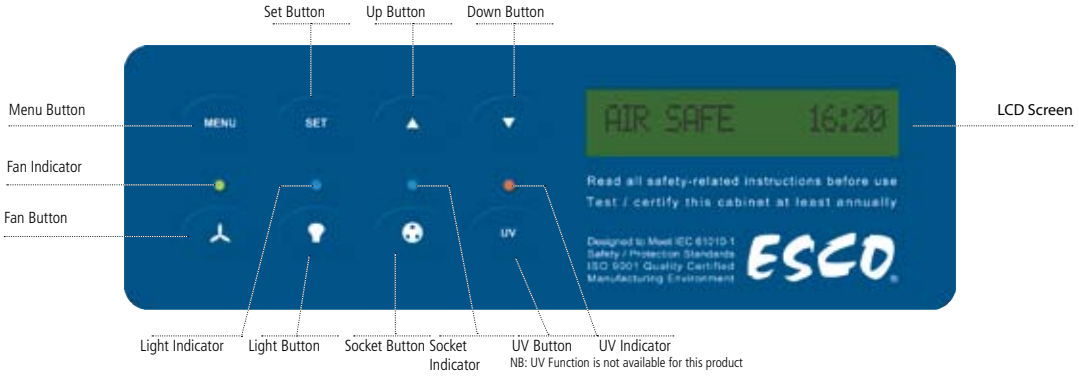
- Auto-Purge™ slots at the back of the work zone improves containment and operator protection by preventing the accumulation of fumes in the work zone.
- All cabinet service and filter replacement can be carried out from the front, allowing the cabinet to be placed against walls in the laboratory to save space.
- Small Filter ID window behind the front panel allows the user to easily identify the type of filter they are using.

- Front service panel opens up easily for immediate access for all maintenance functions.
- Designed to meet the general safety requirements of the IEC 61010-1 / EN 61010-1 / UL 61010A-1 / CSA C22.2 No. 1010.1-92.
- Cabinet is shipped fully-assembled; simply plug the unit into a power source for operation - no local installation is required; 10 international plug types are available.

Construction Features

- Industrial-grade main body and dress panels constructed from electro-galvanised steel is durable.
- All-metal frame is reinforced, welded and expertly gasketed, thus ensuring an airtight carcass for better safety to the operator and the environment.
- The unique electrolytic zinc coating on the steel provides an additional barrier of protection against corrosion and rust as compared to conventional uncoated cold-rolled steels, therefore maximising the service life of the cabinet.
- All parts are finished in a specially selected, abrasion-resistant thermoset powder coating process that is both environmentally friendly (compared to conventional paints) as well as resistant to common disinfecting chemicals.
- Permanently lubricated direct drive centrifugal blower(s); energy efficient external rotor type design reduces operating costs; industry exclusive backward-curve motorised impeller design guarantees better airflow uniformity, lower noise and lower overall energy consumption.
- Built-in solid state variable speed controller(s) (infinitely adjustable from zero to maximum setting) with built-in RFI and noise filters is superior to conventional "step" controllers.
- Chemical and abrasion-resistant stainless steel work surface will never chip. Lip at front edge of the work surface contains spills in the work zone. Curved front edge minimizes airflow turbulence and improves user comfort.

Control Features of Ascent™ Max



Esco's Sentinel™ microprocessor-based cabinet control system is designed to optimise the usage of our ductless fume cabinets. Combining user-friendly features with the most advanced technology, the embedded control provides you with the best product performance and safety.

Operational Features

- True airflow velocity (for inflow velocity) sensing technology, with temperature compensation for improved sensor accuracy. (Air-velocity can be displayed in either fpm or m/s).
- Continuous digital display of inflow velocity on the front LCD for constant monitoring.
- Configurable post-purge cycle ensures all residue contaminants are purged out of the cabinet work zone before the cabinet is deactivated.
- Intelligent diagnostics of hardware problems with error message reports.
- All cabinet operating parameters can be customized and configured based on the requirements of the user.
- Built-in 24hr clock and experiment timer display for monitoring the duration of experiments and processes.
- Ambient temperature display in both Celsius and Fahrenheit.
- Mute function on alarm is standard update in microprocessor control for operator convenience; once muted, operation is permanent unless it is turned off again.

Security Features

- Fail-safe control system equipped with a watchdog timer ensures that cabinet safety is not compromised even if the electronics hardware fails. In case of failure, the control will automatically reset the system and restore the cabinet to safe settings.
- An Admin PIN can be set by the laboratory supervisor to restrict access to all menu functions.
- A Fan PIN feature allows the supervisor to restrict access to fan control, thereby preventing usage of the cabinet by unauthorized personnel.

Ergonomic Features

- Control panel is sloped downwards to provide the operator (in a sitting position) a better view of and an easier access to the controls.
- Easy-to-clean touch controls equipped with a tactile mechanism.
- Large, generously-sized backlit LCD.

Safety Features

- Audible and visual alarms for low and /or high airflow, unsafe sash positions.
- High temperature alarm for monitoring emergency conditions like fire in the cabinet, due to chemical reactions.
- Sash alarm is activated and the light is automatically cut off when the sash is lower or higher than standard operating height, in order to restrict the user's operation, thus enhancing safety.

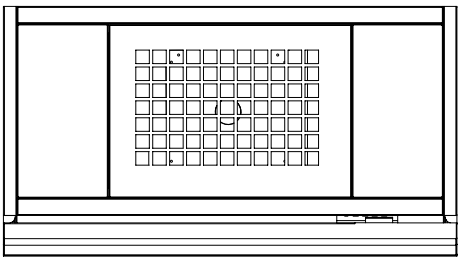
Maintenance Features

- Blower Hour Meter to help the user monitor total cabinet usage, and thus gauge the life span of the carbon filter / pre-filter. Every 60 hours, the control system reminds the user to test the exhaust concentration with gas detection tube to see whether the filter is saturated.
- Airflow calibration can be done easily using the microprocessor control on the front panel of the cabinet.
- The special Maintenance mode for servicing purposes, allows for by-pass of the cabinet presets and complete control over the cabinet's functions. All system interlocks are disabled, and all raw inputs and outputs can be viewed for troubleshooting purposes. (For authorized service personnel only. Consult manual before activation).

Optional Enhancements

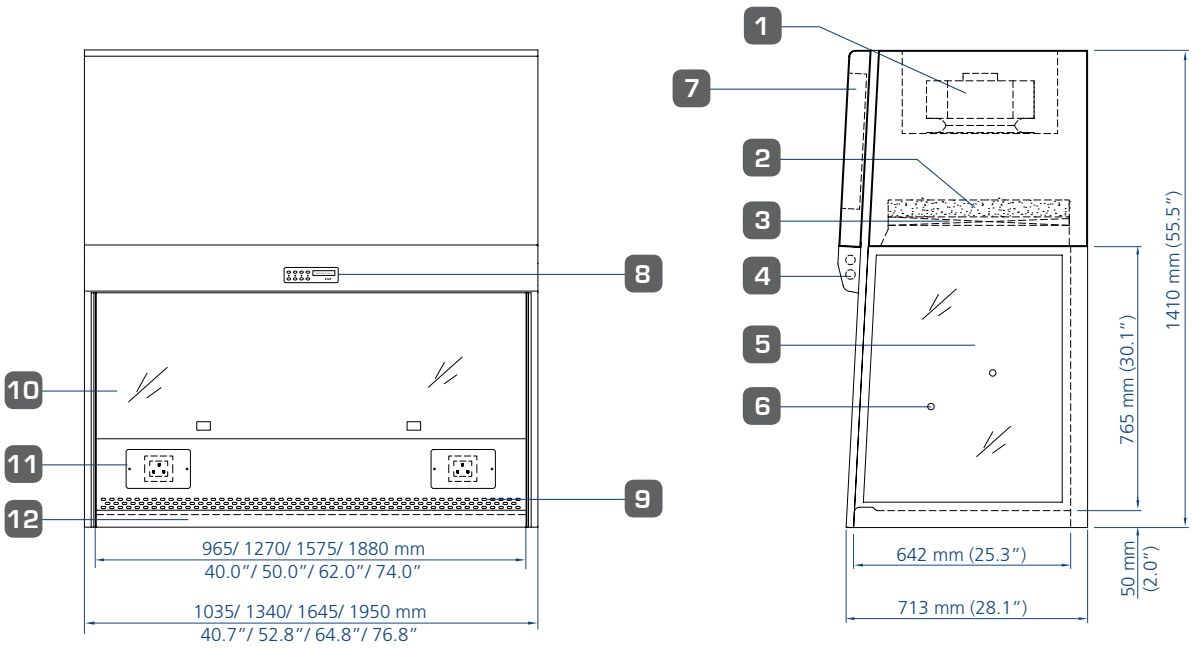
- Innovative filter saturation detection system for increased accuracy.
- While all functions can be accessed on the control panel, an RS232 interface to PC program for diagnostics, software updates and parameter settings is also available. Your investment is protected: The Sentinel™ control software may be updated by downloading update patches from the Esco Biotech web site.
- Motorized front sliding sash is available upon request. The movement of the sash will be controlled from the microprocessor control panel.
- Microprocessor control software can be customized upon request to fit the user's requirements.

Model ADC, Ascent Max Ductless Fume Hood Technical Specification

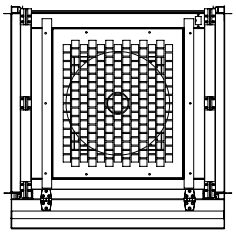


Top View

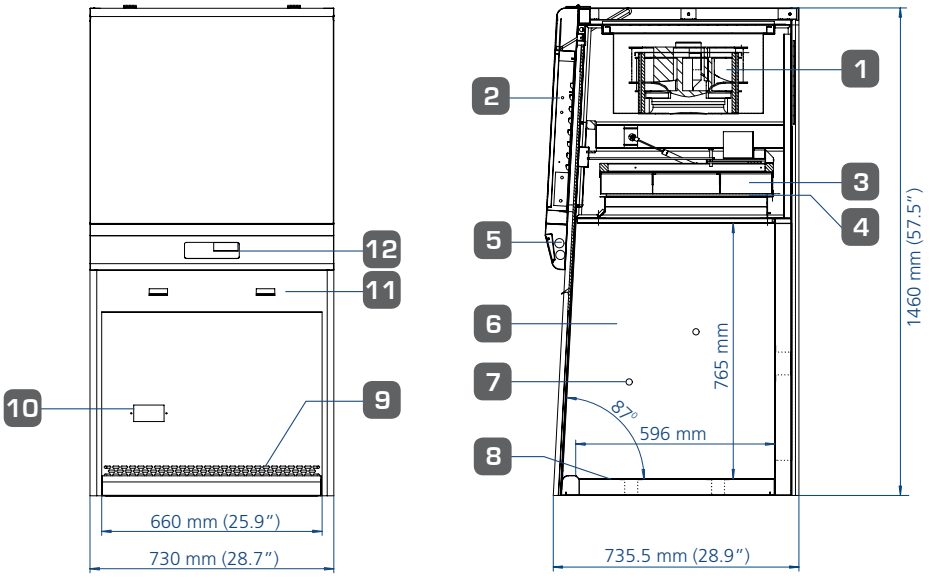
1. *Blower*
2. *Nanocarb™ activated carbon filter (2 no's)*
3. *Pre-filter*
4. *Fluorescent lamp*
5. *Tempered side glass window*
6. *Service fixture Retrofit Kit™ provisions (2 on each side wall)*
7. *Electrical / electronics panel*
8. *Esco Sentinel™ microprocessor control system*
9. *AutoPurge™ holes*
10. *Tempered glass sliding sash window*
11. *Electrical outlet Retrofit Kit™ provision (2 on internal back wall)*
12. *Stainless steel work surface*



Model ADC-2B_, Ascent Max Ductless Fume Hood Technical Specification



Top View



1. *Blower*
2. *Electrical / electronics panel*
3. *Main carbon filter (Code A)*
4. *Pre-filter*
5. *Fluorescent lamp*
6. *Tempered side glass window*
7. *Plug penetration (2 holes on each side)*
8. *Stainless steel worktop*
9. *AutoPurge™ holes*
10. *Electrical outlet Retrofit Kit™ provision*
11. *Tempered glass sliding sash window*
12. *Esco Sentinel™ microprocessor control system*

Optional Features & Accessories

Most optional accessories for Esco Ascent™ Max Ductless Fume Cabinets are available as Retrofit Kit™ items, which means all provisions for these items have already been pre-fitted on all standard models. NB: Some items, such as the Swan-neck faucet and PP round drip-cup sink need to be pre-fitted at the factory.

Transparent Back Wall *(ADC-_T_)*

- Esco ductless fume cabinets may be fitted with a transparent glass back wall, for maximum visibility of the work zone from different angles. This feature is ideal for classrooms and educational demonstrations.

HEPA Filter *(ADC-_H_)*

- H14 HEPA filter with efficiency of 99.99% at 0.3 microns is available as a substitute to the activated carbon filter OR in addition to carbon filter.
- Suitable when the application involves the generation of biohazardous aerosols in the work zone.
- For higher filtration efficiency requirements, request for ULPA filter with typical efficiency of 99.999% at 0.12 microns.

Secondary Backup Filter (Exhaust)

- Secondary (backup) exhaust filter offers a higher filtration efficiency against toxic fumes.
- When installed the cabinet complies with the requirements of ANSI/AIHA Z9.5-2003.

Base Cabinet with Castor Wheels

- Base storage cabinet with one powder-coated steel shelf. Cabinet maximizes storage space in the laboratory; convenient for solvents, acids and other laboratory chemicals. Each cabinet includes an adjustable white powder-coated steel shelf.
- Industrial-grade support structure constructed of electro-galvanised steel and abrasion resistant oven-baked powder-coated finish.
- Durable polyurethane castor wheels with 360 degree horizontal rotation for convenient relocation and movement of cabinet.
- Total brake system on front wheels.
- Maximum weight tolerance of 600kgs / 1323lbs in total.

Support Stand with Castor Wheels

- Durable polyurethane castor wheels with 360 degree horizontal rotation for convenient relocation and movement of cabinet.
- Total brake system on front wheels.
- Maximum weight tolerance of 600kgs / 1323lbs in total.
- Available in two standard heights:
- 28 "/ 710mm and 34"/ 860mm.

Support Stand with Levelling Feet

- Levelling feet prevent the cabinet from being relocated/moved without authorization.
- Heavy duty stainless steel legs.
- Maximum weight supported: 500 kgs /1,100 lbs in total.
- +/-1.5" / 38.1 mm adjustment range for each leg.
- Available in two standard sizes:
  29" / 737 mm (+/-1.5"/38.1 mm)
  33" / 838 mm (+/-1.5"/38.1 mm)

Telescopic Support Stand

- Prevents removal/relocation of the cabinet without authorization.
- Adjustable height range: 26" - 37.8" (660mm - 960mm)
- Height is adjustable in 1" / 25.4 mm increments.
- Support stand height is to be adjusted prior to the installation of cabinet onto the support stand.
- Maximum weight tolerance of 600 kg (1323 lbs) in total.
- Available for 4ft (1.2m) and 6ft (1.8m) cabinet widths.

Hydraulic Support Stand

- Motorized electrically-adjustable
- Adjustable height range:
  710~863 mm / 28"~34".
- Maximum weight supported:
  500 kgs / 1,100 lbs.
- Available with:
  castor wheels or levelling feet
- White oven-baked epoxy coating.

Factory-Fitted Service Fixtures

- Polypropylene drip-cup sink.
- Epoxy coated swan-neck faucet manufactured according to BS 2874, DIN 12898, DIN 12919 and DIN 3537.

Note: These items must be pre-fitted at the factory.

Retrofit Kit™ Service Fixtures

- Service fixture outlets for air / water / vacuum / gas supplies within the working area of the cabinet. Manufactured according to DIN 12898, DIN 12919 and DIN 3537.

Electrical Outlets

- Powder-coated panel-mounted single electrical outlet. Available in all international socket outlet types. Specify when ordering.

Optional VOC Sensor

- Optional VOC Sensor may be installed to monitor the chemical concentration within the cabinet work zone. The microprocessor control will activate audible / visual alarms for dangerously high concentration of chemical vapour.

Today, the Esco Ascent Opti Ductless Fume Hood is probably the most advanced in the world, from a design and engineering point of view, of any low-cost ductless fume hood. Now users can enjoy, at an economical cost, the benefits of features previously found only on high-end ductless fume hoods - a unique filter mounting system that eliminates bypass leaks inherent in conventional clamping systems, a generously-sized main filter with higher chemical retention capacities, all designed to meet the requirements of French Standard AFNOR NF X 15-211. Microprocessor-based control system provides the user with numerous safety and operational features, ensuring enhanced safety in the laboratory.

With the blower system running at less than maximum capacity, longer operating lifetimes and lower noise levels are achieved. The motorised impeller design of our blower system and our internal optimised baffle design ensure better airflow uniformity and distribution within the cabinet for better operator protection. Another key advantage of these models is their low energy consumption, due to Esco's employment of exclusive external rotor technologies.

Ascent™ Opti Ductless Fume Hood, Model SPD-3A_. Shown with MBC-3A0 (mobile cart).

Construction Features

- Industrial-grade main body constructed of electro-galvanised steel: with an abrasion-resistant white oven-baked powder-coated finish.
- Chemical and abrasion resistant stainless steel work surface will never chip. Lip at front edge of the work surface contains spills in the work zone. Curved front edge minimizes airflow turbulence and improves user comfort.
- All components designed for maximum chemical resistance for long service life and durability.
- 13-degree sloped front allows easy access to work zone - enhancing ergonomics, eliminating operator fatigue and increasing productivity.
- Permanently lubricated direct drive centrifugal blower(s); energy efficient external rotor motor type design reduces operating costs; extremely low noise and vibration levels (less than 55dBA at working position) due to proprietary construction and mounting technology.
- Transparent frameless acrylic front window and sides provide a high degree of visibility and operator comfort; front window is mounted on self-supporting pre-tensioned hinges, allowing for easy access during cabinet loading and startup.
- Ergonomic apertures for hands in the front window allows for maximum movements within the workzone while providing the operator with extra protection from any possible chemical spillage.
- The cabinet work zone comes factory-fitted with 2 provisional round openings for power cords of equipment to be used in the cabinet.
- Integral fluorescent lighting is mounted out of the air stream for better airflow uniformity; the aerodynamic design of the enclosure ensures maximum containment possible.

Filtration System

- Activated carbon filter (7 different filter types available depending on the requirements of your application) and built-in pre-filter (replaceable from within work zone).
- State-of-the-art baffle system constructed of 1.2mmt epoxy powder-coated electro-galvanized steel delivers maximum containment by ensuring airfow uniformity throughout the main chamber of the cabinet.

Control System

- Esco Sentinel™ Microprocessor control with built-in visual / audible airflow alarms ensures superior operator protection and alerts the user in case of any malfunction; Cabinet inflow velocity is constantly displayed on the backlit LCD screen, allowing for full monitoring of the cabinet performance.
- Sentinel microprocessor control settings are fully configurable according to the operator's requirements.
- Built-in solid state variable speed controller(s) (infinitely adjustable from zero to the maximum setting) with built-in RFI and noise filters is superior to conventional "step" controllers.
- Compliant to International Standards: Esco Ascent Opti Ductless Cabinets are designed and manufactured to meet and exceed the requirements of French Standard AFNOR NF X 15-211.
- Designed to meet the general safety requirements of the IEC 61010-1 / EN 61010-1 / UL 61010A-1 / CAN/CSA C22.2 No. 61010-1.

Options & Accessories

(applicable for SPD 3ft and 4ft only)

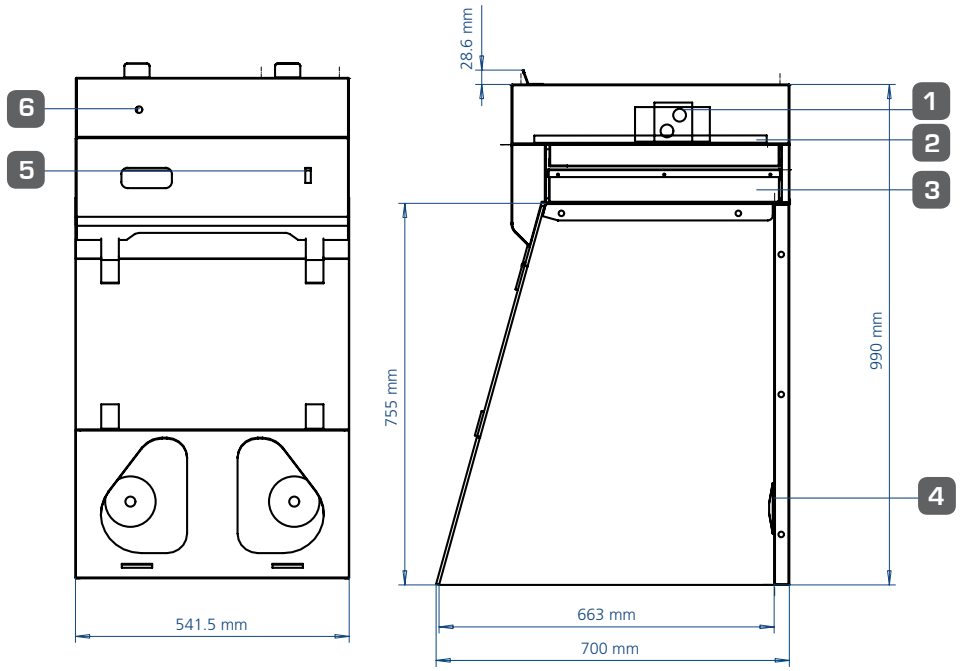
- **Transparent Backwall** *(SPD-3T_, SPD-4T_)*

  Cabinet is available with a transparent acrylic back-wall, ideal for classrooms and educational demonstrations.

- **Mobile Cart** *(MBC-3A0, MBC-4A0)*

  Optional mobile cart for placement of Ascent Opti. It has foldable trays to accomodate storage of large equipments.

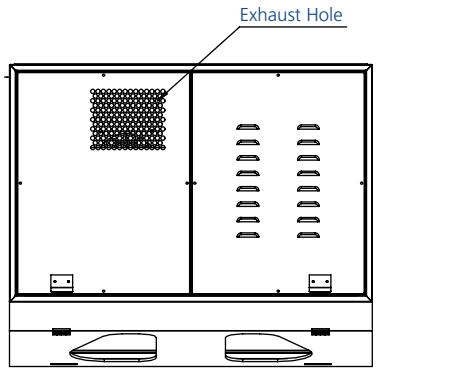
Model SPB, Ascent Opti Basic Ductless Fume Hood Technical Specification



1. *Blower*
2. *Electrical panel*
3. *Activated carbon filter*
4. *Electrical cable provision*
5. *Blower switch control*
6. *Test port*

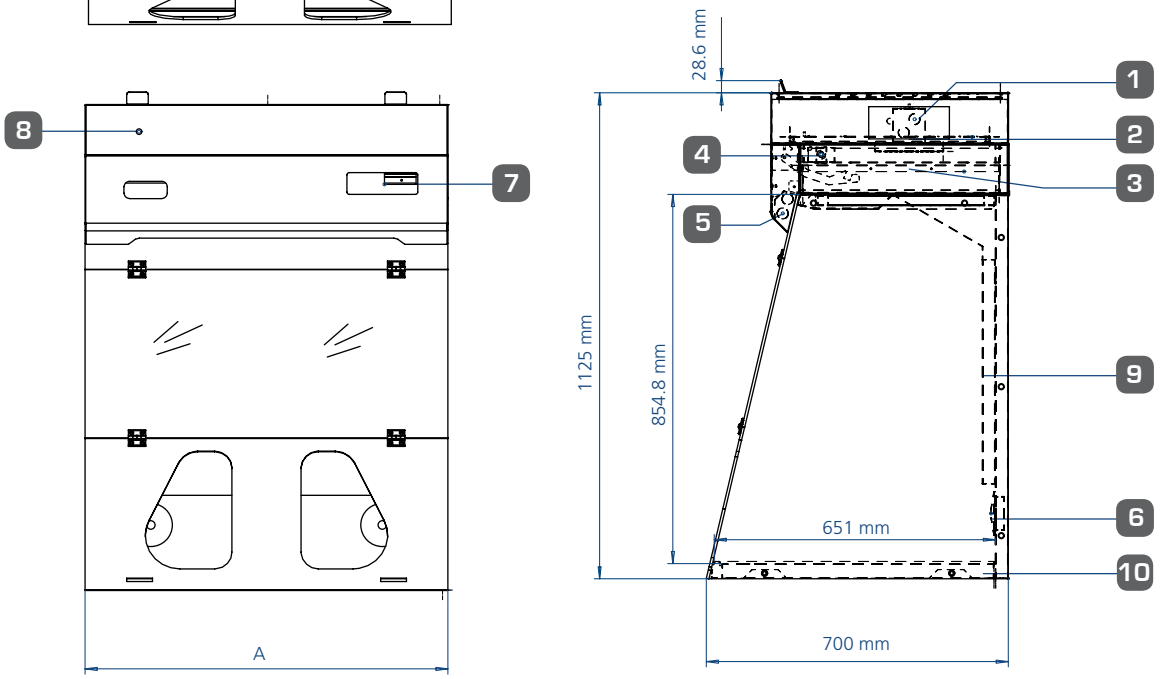
Note: SPB is a basic benchtop unit that does not come with microprocessor control, worktop, internal lighting and back baffles.

Model SPD, Ascent Opti Ductless Fume Hood Technical Specification



	A
SPD-3A_	840 mm
SPD-4A_	1140 mm

1. *Blower*
2. *Electrical panel*
3. *Activated carbon filter*
4. *Sensor box*
5. *Fluorescent lamp*
6. *Electrical cable provision*
7. *Microprocessor control*
8. *Test port*
9. *Back baffle*
10. *Stainless steel worktop*



General Specifications, Ascent™ Max Ductless Fume Hood

Model		ADC-2B_	ADC-3B_	ADC-4B_	ADC-5B_	ADC-6B_
External Dimensions (W x D x H)		730 x 735.5 x 1460 mm 28.7" x 28.9" x 57.5"	1035 X 713 X 1410 mm 40.7" x 28.1" x 55.5"	1340 x 713 x 1410 mm 52.8" x 28.1" x 55.5"	1645 x 713 x 1410 mm 64.8" x 28.1" x 55.5"	1950 x 713 x 1410 mm 76.8" x 28.1" x 55.5"
Internal Work Zone (W x D x H)		660 x 596 x 765 mm 30.0" x 23.5" x 30.1"	965 x 642 x 780 mm 40.7" x 25.3" x 30.7"	1268 x 642 x 780 mm 50.0" x 25.3" x 30.7"	1575 x 642 x 780 mm 64.8" x 25.3" x 30.7"	1880 x 642 x 780 mm 76.8" x 25.3" x 30.7"
Standard Filtration Elements		Main filter: Activated carbon with granular media bed *(7 different filter types available - refer to page 4 of this catalogue. State required filter type when ordering).* Pre-filter: Washable non-woven polyester fibres with an efficiency of 20% against gross particulate matter				
Total Weight of Carbon in Main Filter		1 filter (8.5 kg)	2 filters x (10.3 kg) each	2 filters x (13.9 kg) each	2 filters x (17.4 kg) each	3 filters x (13.9 kg) each
Inflow Air Velocity		Initial setpoint :0.40 m/s or 800 fpm				
Inflow		237.6 m^3/h (140 cfm)	347.4 m^3/h (205 cfm)	456.5 m^3/h (269 cfm)	567 m^3/h (334 cfm)	676.8 m^3/h (399 cfm)
Fluorescent Light Intensity		>1000 Lux (>93 foot-candles) The measurements were taken at work surface level (zero background)				
Construction		Main Body: 1.2mm - 1.5mm / 0.05" - 0.06" / 16 gauge electro-galvanised steel with white oven-baked epoxy powder-coated finish				
Electrical	1. 220-240V, AC, 50Hz, 1Ø 3. 220-240V, AC, 60HZ, 1Ø	ADC-2B1 ADC-2B3	ADC-3B1 ADC-3B3	ADC-4B1 ADC-4B3	ADC-5B1 ADC-5B3	ADC-6B1 ADC-6B3
	Hood Power/ Amp	350W/ 2A	350W/ 2A	350W/ 2A	550W/ 3A	550W/ 3A
	Outlet Maximum Amp	5A	5A	5A	5A	5A
	Total Amp	7A	7A	7A	8A	8A
	BTU/ Hr	714	714	714	1122	1122
	2. 110-130V, AC, 60Hz, 1Ø 4. 110-130V, AC, 50HZ, 1Ø	ADC-2B2 ADC-2B4	ADC-3B2 ADC-3B4	ADC-4B2 ADC-4B4	ADC-5B2 ADC-5B4	ADC-6B2 ADC-6B4
	Hood Power/ Amp	350W/ 3.5A	350W/ 3.5A	385W/ 3.5A	450W/ 4A	450W/ 4A
	Outlet Maximum Amp	5A	5A	5A	5A	5A
	Total Amp	8.5A	8.5A	8.5A	9A	9A
	BTU/ Hr	714	714	785	918	1020

General Specifications, Ascent™ Opti Ductless Fume Hood

Model		SPB-2A_	SPD-3A_	SPD-4A_
External Dimensions (W x D x H)		542 x 700 x 990 mm 21.3" x 27.6" x 39.0"	840 x 700 x 1125 mm 33.1" x 27.6" x 44.3"	1140 x 700 x 1125 mm 44.9" x 27.6" x 44.3"
Air Volume (At Initial Velocity)		173 m^3/h (102 cfm)	234 m^3/h (138 cfm)	
Inflow Velocity		Initial setpoint: average of 0.5 m/s or 100 fpm measured in plane of work aperture		
Standard Filtration Elements		Main filter: Activated carbon with granular media bed *(7 different filter types available - refer to page 4 of this catalogue. State required filter type when ordering).* Pre-filter: Washable non-woven polyester fibres with an efficiency of 20% against gross particulate matter		
Total Weight of Carbon Filter		1 filter (9.1 kg)	1 filter (15.4 kg)	2 filters X (9.1 kg) each
Sound Emission		<62 dBA	<58 dBA at initial blower speed setting measured at typical operator work position	
Fluorescent Light Intensity		No Light	>350 lux / >28 foot candles at work surface level	
Controller		On/ Off Switches	Esco Sentinel Microprocessor Control	
Construction	Main Body & Internal Baffle System	1.2mm / 0.05" / 16 gauge electrogalvanized steel with white oven-baked epoxy Isocide antimicrobial powder coated finish		
	Front Window/ Side Panels	6mm / 0.2" acrylic		
	Work Top	None *(easy adaptability to any work surface)*	Built-in 304 stainless steel work top	
Electrical	1. 220-240V, AC, 50Hz, 1Ø 3. 220-240V, AC, 60HZ, 1Ø	SPB-2A1 SPB-2A3	SPD-3A1 SPD-3A3	SPD-3A1 SPD-3A3
	Hood Power/ Amp	70W/ 0.3A	110W/ 0.5A	110W/ 0.5A
	Outlet Maximum Amp	NA	NA	NA
	Total Amp	0.3A	0.5A	0.5A
	BTU/ Hr	143	224	224

** Additional voltages may be available; contact Esco for ordering information.*

Tests and Certification by INVENT UK LTD in accordance with the British Standard BS 7989

Certificate and Report No: INV/BS7989/327

1. Introduction

Gaseous filter tests carried out in a 1.34m side bench-type ADC-A41 re-circulatory filtration fume cupboard of Esco Micro Pte Ltd are reported. General information on filter test methods, procedures and requirements are given in reference 1 *(BS 7989)*. Information on frontal containment and velocity test methods, procedures and requirements can be found in reference 2 *(BS 7258, Part 1 & 4)*, with the corresponding test results in reference 3.

2. Filter Tests

The filter was tested using Propan-2-ol. Propan-2-ol was evaporated in the fume cupboard at a rate of 20.55 ml/min so that the average concentration in the enclosure during tests was 800ppm±40ppm.

2.1 Filter Efficiency Test:

The tests were carried out in accordance with Annex A of BS 7989 and the results for both sets of filters were as follows:

- max concentration detected after 60 sec = <0.6ppm
- max concentration detected after 300 sec = <0.6ppm
- filter efficiency = >99.9%

2.2 Filter Capacity Test:

The tests were carried out in accordance with Annex C of BS 7989 and the results were as follows:

First set of filters:

- max concentration detected after 1000ml evaporated = 29ppm
- measured time for 1000ml evaporation = 46 min
- filter efficiency at 1000ml evaporation = 96.4%
- max concentration detected after 2000ml evaporated = 198ppm
- measured time for 2000ml evaporation = 93 min
- filter efficiency at 2000ml = 75.2%

Second set of filters:

- max concentration detected after 1000ml evaporated = 34ppm
- measured time for 1000ml evaporation = 45 min
- filter efficiency at 1000 evaporation = 95.8%
- max concentration detected after 2000ml evaporated = 209ppm
- measured time for 2000ml evaporation = 91 min
- filter efficiency at 2000ml evaporation = 73.9%

Chemical & airflow conditions used during tests:

- Fume cupboard air flow rate = 0.145m³/s
- Fume cupboard air velocity at sash opening = 0.54 m/s

Tests and Certification by INVENT UK LTD in accordance with ANSI/ASHRAE 110-1995 standard

Certificate and Report No: INV/ASHRAE 110-1995/325

1. Introduction

ANSI/ASHRAE 110-1995 type test carried out for a 1.34m wide bench-type ductless recirculatory filtration fume hood of Esco Micro are reported.

2. Velocity Tests

The velocity tests were performed with the sash set at 200mm from the work top. The velocity type-test grid was spread over 4 points across the sash opening and the velocity results ranged from 0.51 m/s to 0.55 m/s, averaging at 0.53 m/s.

3. Flow Visualisation Tests

3.1 Local Visualisation (Low Volume Smoke) Tests

The following observation were made:

- Along the sash edge = GOOD
- Top LHS corner = GOOD
- Top RHS corner = GOOD
- Bottom LHS corner = FAIR
- Bottom RHS corner = FAIR

3.2 Large Volume Smoke Test

The entry flow to the hood is good. The internal smoke clears within less than 5 sec.

4. Containment Tests

Static sash Tests

The containment tests were performed for the same sash opening as in the velocity tests. A mannequin is placed at 3 different points 100mm away from sash plane. Sampling probe is at breathing zone of mannequin and 75mm away from sash plane. Test gas injector is positioned on work top at the 3 corresponding locations of mannequin. At all locations, the injector is at 150mm away from the sash plane. Test gas is 100% SF6 and the flow rate is 4.0 lt/min. The results show that the hood containment performance is very good.

Kindly fill up and return to us the following form in order for us to assess the compatibility of your application with Esco ductless fume cabinets. Refer to the next page for more details on the information that has been sought under the various columns.

ESCO® FILTRACHECK™ FORM										
Chemical			Container		Handling					
No	Name	Dilution (%)	Type	Surface Area of Evaporation	Open or Covered	Type of Work	Temperature of handling	Frequency of Work Per Day (PD) Per Week (PW) Per Month (PM)	Quantity of Chemical used (ml. or gm.)	Duration of Handling (mins. or hrs.)
Ref	I	II	III	IV	V	VI	VII	VIII	IX	X
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

Any additional comments:

Any specific need or requirement:

Name:
Company name:
Address:

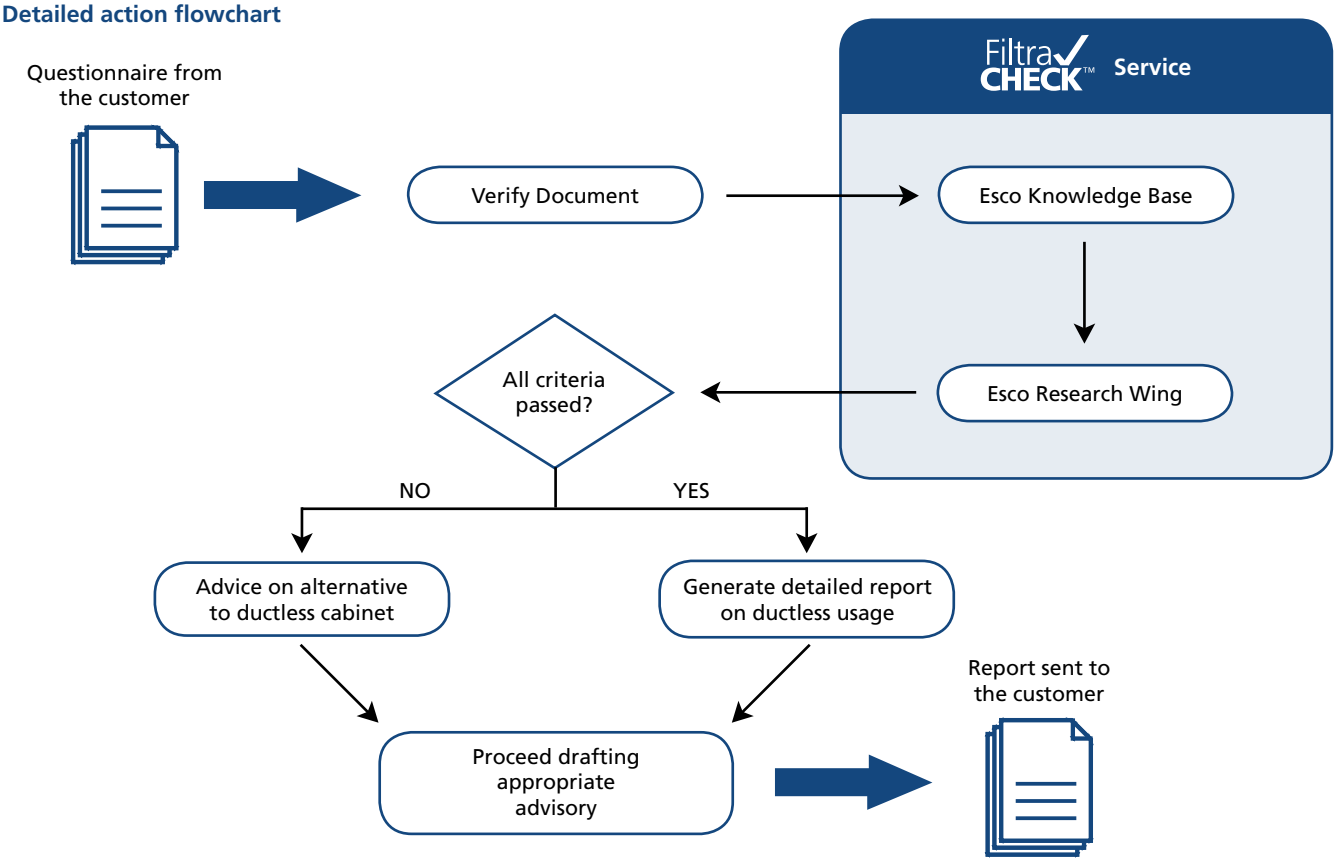
Postal code:
City: Country:
Telephone: Fax:
Email:

What is FiltraCheck™?

FiltraCheck is a trademark service provided by Esco's Fume Filtration Division. Customers who intend to purchase a ductless fume hood but are unsure whether the cabinet is suitable for their application, can forward a list of chemicals that they will be handling and their pattern of usage to Esco's FiltraCheck service team. The document can be either forwarded by email or by fax to Esco. Please provide as much detail as possible in order for us to assess the compatibility of your application with Esco's ductless fume cabinets.

After careful analysis of the provided chemicals list and pattern of usage, a proper advice document will be generated and provided to the customer. A proper recommendation, with reasons and validations will be made for the right laboratory equipment to be installed. This document will recommend the appropriate laboratory equipment; ducted fume hood or ductless fume hood or neither based on the investigation done by the FiltraCheck team. Depending on the type of chemicals used, the document may also contain a list of procedures, warnings, etc that will help in ensuring a safer laboratory working environment.

Detailed action flowchart



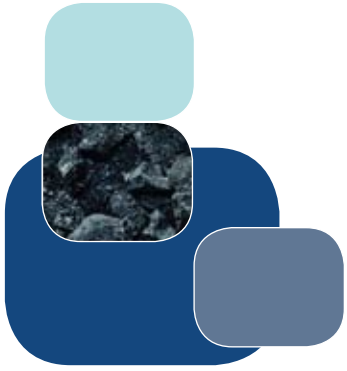
FiltraCheck™ Guidance

Ref	
I	*The name of the chemical used in the ductless fume cabinet e.g. Toluene*
II	*The extent to which the chemical has been diluted (in %)*
III	*Type of container used to hold the chemical e.g. plate, beaker etc*
IV	*Surface area through which the chemical can evaporate*
V	*Mention whether the process is being carried out open or covered*
VI	*Provide more details on the type or nature of the work / process being carried out e.g. distillation, transfer etc.*
VII	*The temperature at which the work / process is being carried out. This is specially important in case the process requires the chemical to be heated.*
VIII	*Mention how frequently the concerned work / process is carried out*
IX	*Quantity of chemical (in ml. or gm.) used during the process*
X	*Time taken for carrying out the process*

Esco Containment, Clean Air and Laboratory Equipment Products

Biological Safety Cabinets, Class II, III
Fume Hoods, Conventional, High Performance, Ductless Carbon Filtered
Laminar Flow Cabinets, Horizontal, Vertical, PCR
Animal Containment Workstations
Hospital Pharmacy Isolators, Cytotoxic Safety Cabinets
Specialty Workstations: *In-Vitro* Fertilization, Powder Weighing
PCR Thermal Cyclers, Conventional, Real-Time
Cleanroom Fan Filter Units, Modular Rooms, Air Showers, Pass Thrus

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. www.escoglobal.com.



NSF / ANSI 49 Biological Safety Cabinets • Animal Containment Workstations • Fume Hoods • Clean Benches

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