



# Oil and Gas Industry





## Welcome to Esco

*Esco's Vision is to provide enabling technologies for scientific discoveries to make human lives healthier and safer.*

The Esco Lifesciences Group is committed to deliver innovative solutions for the clinical, life sciences, research, industrial, laboratory, pharmaceutical, and IVF community. With the most extensive product line in the industry, Esco have passed a number of international standards and certifications. Esco represents innovation and forward-thinking designs, that are of the highest standard quality since 1978.

**Availability and Accessibility.** Esco has headquarters in Singapore, Indonesia, and Philippines, with manufacturing facilities are located in Asia and Europe. Research and Development (R&D) is conducted worldwide spanning the US, Europe and Asia. Sales, services and marketing subsidiaries are located in 42 major markets including US, UK, Japan, China and India. Esco regional distribution centers are located in Singapore, Malaysia, Thailand, Vietnam, Myanmar, Indonesia, Philippines, Bangladesh, Hong Kong, Taiwan, South Korea, China, Japan, India, UAE, Central and South Africa, Denmark, Germany, Italy, Lithuania, Russia, United Kingdom, and USA. Because of our worldwide presence, you can be sure that Esco is within your reach.

**High Quality, Reliable, and Dependable.** Esco products are of high quality, reliable, and dependable; assuring customers of research accuracy. Cross functional teams from Esco Production, R&D, Quality Assurance, and Senior Management, are regularly assembled to review and implement areas for improvement.

**Esco Cares for Your Safety.** Esco focuses on providing safety not just for your samples but also for you and the environment.

**Esco Cares for Your Comfort.** Building ergonomic designs and reducing noise levels of the units ensures comfort for our users.

**Esco Cares for the Environment.** One in every four of Esco's employees is involved in R&D and a number of them evaluate new components and/or designs to produce energy efficient equipment. Being GREEN is more than just modifying parts used to produce a new energy efficient technology, it is also embodied in the every aspect of the company.

**Customer Service and Support.** Our service does not stop once purchase has been done. Esco gives on-time customer service and offers end-user seminars, service training, preventive maintenance, and provides educational materials and informative videos.

As Esco takes the opportunity to respond to the world's needs, we aim not only to contribute in the advancement of scientific discoveries but also in making the world a safer, healthier, and better place to live in.

## Oil and Gas Industry



## OVERVIEW

The oil and gas industry is the biggest sector in the world, employing hundreds of thousands of workers and generating hundreds of billions of dollars globally each year. It includes the global processes of exploration, extraction, refining, transporting (often by oil tankers and pipelines), and marketing of petroleum products. It can be broken down into three key areas: upstream, midstream and downstream.

The upstream component involves search for underground natural gas and drilling of exploration wells to recover oil and gas. Downstream component involves filtration and purification of crude oil and natural gas, as well as marketing and commercial distribution of these products in the form of diesel oil, petrol, gasoline, etc. The midstream component is generally classified under the downstream category.

Fuel oil and gasoline (petrol) make up most of the large volumes of the oil and gas industry. Petroleum is vital to many industries, and is of importance to the maintenance of industrial civilization in its current configuration. Transportation, defense, technology, industry, commerce, research and development and many other facets of human activities are directly or indirectly linked with the use of petroleum or its sub-products. Its most notable application is powering internal combustion engines but it is also the primary material for numerous chemical products, such as fertilizers, solvents, and plastics. Therefore, petroleum is of critical importance as it serves as foundation for many other industries.

Petroleum testing is most commonly used in the petroleum industry, to test product, product components and petroleum byproducts of crude oil, fuel, natural gas, shale oil, and upstream oil and gas. As a market leader in containment, clean air, pharmaceutical, and laboratory equipment technologies, Esco provides state of the art tools to make your laboratory safe and efficient. Esco manufactures a wide array of sizes and configuration to guarantee that there is always an Esco equipment that fits your laboratory needs.

### Sample Cultivation/Incubation

- Laboratory Shaker

### General Equipment

- Refrigerated Incubator
- Laboratory Oven

### Chemical Analysis (QA/QC)

- Laboratory Fume Hood
- Filtered Storage Cabinet





## HAZARDOUS AREA

A flammable substance, an oxidizer, and a source of ignition are three fundamental components that make up a hazardous area. Flammable substances may exist as gas or liquid like hydrogen, gasoline and kerosene, or even solid particulates like dusts or small fibers. An oxidizer is usually just the oxygen present in the open air. The ignition source can be something obvious like a spark or open flame, or something like excessive heat which can cause spontaneous combustion of certain materials.

Due to explosion risks posed by flammable gases, mists or vapors, and combustible gases used and generated, especially in the oil and gas industry, necessary precautions must be taken to ensure safety in the laboratory. Two widely used method to reduce this risk is by preventing the release of dangerous substances that may create an explosive atmosphere and by preventing sources of ignition. Using the correct equipment can greatly help in risk reduction.

Areas that have the potential for an explosion to occur are classified as hazardous areas and are regulated by multiple organizations and standards worldwide. These organizations are in place in order to ensure that the safety of personnel is maximized and the possibility of property damage is reduced.

## UNDERSTANDING ATEX and IECEx

Today, two international certification schemes exist for hazardous locations or "Ex Areas". One is endorsed in Europe under the ATEX Directives, while the other scheme is the IECEx system which provides a more international equipment certification scheme accompanied with the conformity mark license scheme and other certification schemes for service facilities and personnel.

### • ATEX DIRECTIVE

ATEX refers to two separate European Union (EU) Directives that describes the proper equipment and work environment that is allowed in an explosive atmosphere. The term ATEX is derived from the French phrase *Atmosphères Explosibles*.

- Directive 99/92/EC (also known as 'ATEX 137' or the 'ATEX Workplace Directive') describes the minimum requirements for improving the health and safety protection of workers potentially at risk from explosive atmospheres. This directive classifies areas where hazardous explosive atmospheres may occur into zones. The classification assigned to a particular zone depends on the likelihood and persistence of an explosive atmosphere.

- Directive 94/9/EC (also known as 'ATEX 95' or 'the ATEX Equipment Directive') concerns about equipment and protective systems intended for use in potentially explosive atmospheres. It controls all manufacture and import of equipment, including non-electrical items.



• **IECEx SYSTEM**

Outside of the European Union, similar regulations apply under the IECEx certification system. The IECEx System, controlled by the International Electrotechnical Commission (IEC), provides means for assessment and certification of multiple aspects related to hazardous area. Equipment used in explosive atmospheres are covered and highly regulated by this scheme.

Industries covered by IECEx System	
Automotive refueling stations or petrol stations	Underground coalmines
Oil refineries, rigs and processing plants	Sewerage treatment plants, Gas pipelines and distribution centers
Chemical processing plants	Grain handling and storage
Printing industries, paper and textiles	Woodworking areas
Aircraft refueling and hangars	Sugar refineries
Surface coating industries	Metal surface grinding, especially aluminum dusts and particles

• **ZONE AND EQUIPMENT CLASSIFICATION**

Hazardous places are classified in terms of zones on the basis of frequency and duration of the occurrence of an explosive atmosphere. Both the IECEx and ATEX 137 use this zone classification to differentiate between gas and dust-based fuels.

Zone	Description
<b>Gas</b>	
0	A place in which an explosive atmosphere consisting of a mixture with air of dangerous substances in the form of gas, vapor or mist is present continuously or for long periods or frequently.
1	A place in which an explosive atmosphere consisting of a mixture with air of dangerous substances in the form of gas, vapor or mist is likely to occur in normal operation occasionally.
2	A place in which an explosive atmosphere consisting of a mixture with air of dangerous substances in the form of gas, vapor or mist is not likely to occur in normal operation but, if it does occur, will persist for a short period only.
<b>Dust</b>	
20	A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is present continuously, or for long periods or frequently.
21	A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is likely to occur in normal operation occasionally.
22	A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is not likely to occur in normal operation but, if it does occur, will persist for a short period only.

Equipment are also classified into categories according to the level of risk in its intended area of use. Special precautions need to be taken in hazardous areas to prevent equipment from being a source of ignition. In situations where an explosive atmosphere has a high likelihood of occurring, reliance is placed on using equipment with a low probability of creating a source of ignition.

Zones		Equipment	
Gas	Dusts	Category	Description
0	20	1	Equipment intended for high-risk areas where an explosive atmosphere is present long periods.
1	21	2	Equipment intended for medium-risk areas where an explosive atmosphere may occur under normal operating conditions.
2	22	3	Equipment intended for areas where an explosive atmosphere is only likely under abnormal circumstances.

When electrical equipment or component of any type is intended for use in a hazardous area, it must be ATEX-certified as required by the EU directive 94/9/EC. Within Europe, ATEX certification of products for use in potentially hazardous atmospheres is compulsory.



Standardized marking schemes is applied to identify equipment suitable for a specific location. Equipment built to the requirements of ATEX and IECEx display codes and information such as the explosion-proof symbol “Ex” in a hexagon, the equipment category number (1, 2, or 3), the letter G and/or D depending on whether it is intended for use in gas or dust atmospheres, and other essential safety information.

# OrbiCult™ Laboratory Shaker

IBS-R-19



AS1-NC-19



## Features

- Heavy-duty and high-speed application
- Reduce maintenance
- Versatile for microorganism cultivation
- Easy-to-use design
- Audible and visible alarms
- World class compressor with low energy consumption
- External surfaces are powder coated with Esco ISOCIDE™



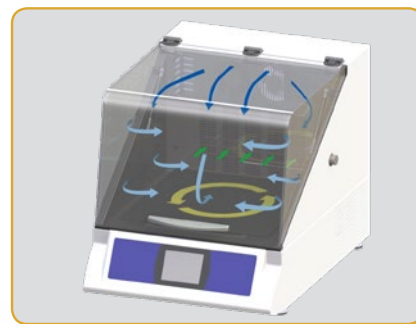
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## Introduction

OrbiCult™ Laboratory Shakers offer versatile models designed with outstanding features to provide reliable results for various applications such as general mixing, solubility, extraction and washing procedures.

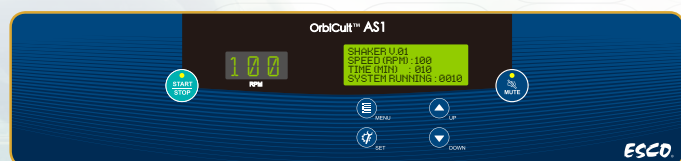
## Airflow Circulation

- Two circulating fans located on top of the perforated panel, disperse and distribute the air inside the chamber
- Perforation located below the circulating fan absorbs the air to recirculate the air inside the chamber
- Platform performs counterclockwise rotation based on the motor drive motion
- Air temperature changes during suction process
  - For refrigerated unit, evaporator located behind the perforated panel will cool down the air
  - For non-refrigerated unit, heater located below the circulating fan will heat up the air

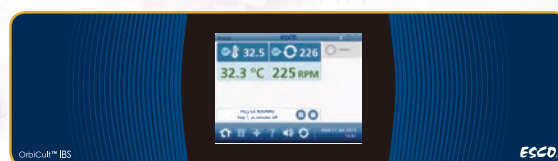


- Discharge Air
- Circulating Air
- Suction Air
- Motor Drive Rotation

## Digital LED Controller (for AS1 model)



## SmarTouch™ Controller (for IBS model)



## OPTIONS AND ACCESSORIES



### Universal Platform

Have standard holes pattern that can fit any flask clamps and test tube rack. All multiple flask clamps and labware holders are shipped separately and installed by the end user.



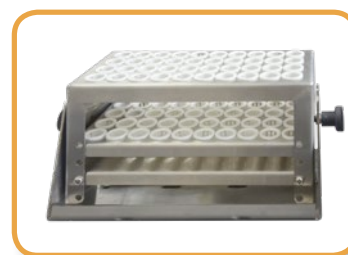
### Dedicated Platform

Platforms have a customized pattern to optimize the number of a particular size of flask clamp on a platform. Dedicated platforms are pre-installed with the flask clamps.



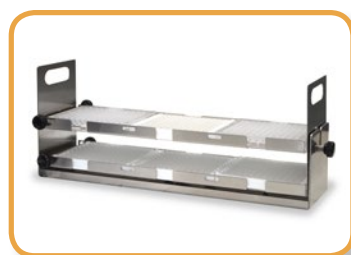
### Flask Clamps

Single-piece stainless steel clamps that provide enough strength and security to hold flasks.



### Test Tube Rack

Stainless steel rack that stabilizes and holds the test tubes.



### Microplate Holder

Double layer racks that hold up to six standard deep well plates.



### Utility Carrier

Made of stainless steel that holds different glassware in between of adjustable stainless steel bars.



### Sticky Mats

Allows the user to place the flask directly on the mat without the use of a clamp. Sticky mats are very convenient if the user desires to rotate at less than 350 rpm. This can be ordered separately and attach on Universal Platform.



### Gas Manifold

Contain 12 gas ports that add versatility for aerobic and anaerobic cell cultivation.

The IBS is available with a 12-port gas manifold option to allow operator to supply gas directly to the culture medium of 12 individual flasks.



IFA-110

# Isotherm®

## Forced Convection Laboratory Incubators

### Features

- Ventiflow™ Ventilation System – Forced air convection design
- Pre-heat Chamber Technology – 4-zone heated air jacket
- SmartSense™ Microprocessor PID Control Technology
- ISOCIDE™ Antimicrobial Powder Coating
- Door Keylock
- Multiple Redundant Over-Temperature Protection System
- Superior Insulation

Available sizes: 32, 54, 110, 170, and 240 L

**ISOCIDE™**



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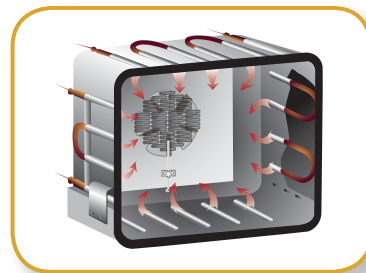
### Introduction

Esco Isotherm® world class laboratory incubators are used for thermal convection applications such as bacteria culture and Coliform determination among many others. With ergonomic design, microprocessor PID controls, 4-zone heated air jacket and precisely tuned and tested ventilation and insulation package, Esco Isotherm® is your reliable incubator for universal application.



#### Ventiflow™ Ventilation System

- Forced convection design produces faster temperature response rates, improves uniformity and reduces fluctuation
- Low energy consumption and low noise level



#### Pre-Heat Chamber Technology

- 4-zone heated air jacket ensures stable heating and maximum temperature uniformity in the chamber
- 2-point door seal and eccentric hinge ensures maximum gasket



#### Multiple redundant over-temperature protection system

- Over-all temperature protection meets DIN 12880 Class 3.1 standards
- All electrical components are UL recognized



#### SmartSense™ Microprocessor PID Control Technology

- Connected to an instrument-grade precision platinum temperature probe
- Ensures fast ramp time. Prevents overshoot and ensures stable temperature once set point is achieved





IFC-110

# Isotherm®

## Refrigerated Incubators

### Features

- Ventiflow™ Ventilation System – Forced air convection design
- Pre-heat Chamber Technology – 4-zone heated air jacket
- SmartSense™ Microprocessor PID Control Technology
- ISOCIDE™ Antimicrobial Powder Coating
- Auto-Defrost System
- German-made EBM Papst Fan

Available sizes: 110, 170, and 240 L

**ISOCIDE™**

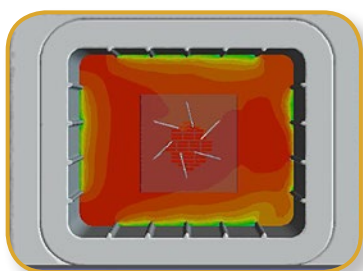


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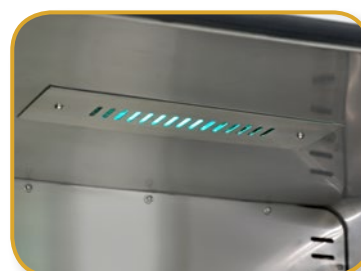
### Introduction

The Esco Isotherm® world class laboratory incubators are used for applications such as BOD determination and environmental research among many others. With ergonomic design, microprocessor PID controls, 4-zone heated air jacket and precisely tuned and tested ventilation and insulation package, Esco Isotherm® is your reliable refrigerated incubator for universal application.



#### Pre-Heat Chamber Technology

- Connected to an instrument-grade precision platinum temperature probe
- Ensures fast ramp time. Prevents overshoot and ensures stable temperature once set point is achieved



#### UV Disinfection

- Can be manually or automatically operated



#### Auto-Defrost System

- Auto-heating activates and continues for a predetermined time during operation
- Auto-defrosting during operation and activates regularly



#### German-made EBM Papst Fan

- Permanently lubricated and maintenance-free for uniform air circulation



OFA-110

# Isotherm®

## Forced Convection Laboratory Oven

### Features

- Ventiflow™ Ventilation System – Forced air convection design
- Pre-heat Chamber Technology – 4-zone heated air jacket
- SmartSense™ Microprocessor PID Control Technology
- ISOCIDE™ Antimicrobial Powder Coating
- Door Keylock
- Multiple Redundant Over-Temperature Protection System
- Superior Insulation

Available sizes: 32, 54, 110, 170, and 240 L

**ISOCIDE™**



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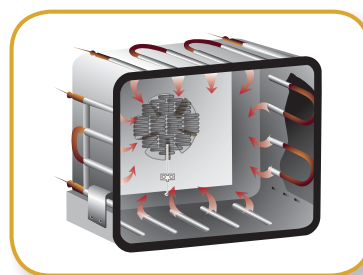
### Introduction

The Esco Isotherm® world class laboratory ovens are used for high-forced volume thermal convection applications such as drying and curing among many others. With ergonomic design, microprocessor PID controls, 4-zone heated air jacket and precisely tuned and tested ventilation and insulation package, Esco Isotherm® is your reliable oven for universal application.



#### Ventiflow™ Ventilation System

- Forced convection design produces faster temperature response rates, improves uniformity and reduces fluctuation
- Low energy consumption and low noise level



#### Pre-Heat Chamber Technology

- 4-zone heated air jacket ensures stable heating and maximum temperature uniformity in the chamber
- 2-point door seal and eccentric hinge ensures maximum gasket



#### Multiple redundant over-temperature protection system

- Over-all temperature protection meets DIN 12880 Class 3.1 standards
- All electrical components are UL recognized



#### SmartSense™ Microprocessor PID Control Technology

- Connected to an instrument-grade precision platinum temperature probe
- Ensures fast ramp time. Prevents overshoot and ensures stable temperature once set point is achieved

### Oil and Gas Industry

## OPTIONS AND ACCESSORIES (for Isotherm® products)



### Wall bracket (only for 32 L and 54 L chambers)

- Accommodates desired operating heights



### Reversed Door Swing (Factory-installed)



### Voyager® Software Kit

- Esco Voyager® is a PC-based software package developed for remote monitoring, datalogging and programming/device configuration of Esco controlled environment laboratory equipment



### Support stands fixed height at 720 mm (28.3")



### Additional Shelf

- Two shelves are included for 32 L, 54 L, 110 L, 170 L and 240 L models as standard. Additional shelves may be ordered.



### Optional Stainless Steel Exterior

- Robust construction and corrosion-resistant surface that meets pharmaceutical and clinical laboratory requirements





EFA-4UDRVW-\_-XP

# Frontier® Acela™ XP Laboratory Fume Hoods

## Features

- Tri-wall construction for maximum robustness
- Compliant to both ASHRAE110 and EN14175 standards for fume hood safety
- Chain and sprocket sash system requires minimal service

Available sizes: 4, 5, 6 and 8 ft



## Introduction

The Frontier® Acela™ XP Series Fume Hood is an explosion proof fume hood designed and fitted with ATEX/IECEx Zone 1 rated electrical components. It provides the highest level of chemical containment and almost no possibility of sparks in the workzone.\*

*\*Disclaimer: The Frontier® Acela™ XP Fume Hood is not designed or independently tested to comply to any Explosion Proof Rating Standards such as ATEX/IECEx at system level. If required, the user is responsible for certification of the fume hood according to the ATEX/IECEx rating.*

## Optional Accessories:



Installation ON-OFF  
Light Switch - 8030



Explosion Proof Junction  
Box & Cable Gland



Explosion Proof  
Light Box - 9E



Electrical Socket Outlet



Base Cabinet (EBA)



Service fixtures



EFA-4UMUVW-\_\_

## Frontier® Acela™ M Laboratory Fume Hoods

### Features

- Inner work depth is 100 mm deeper than conventional hoods
- Designed specifically for users in the mining industry
- Provides the highest level of containment and protection against highly corrosive chemicals at high temperature
- With ceramic worktop
- Has gas and water service fixtures

Available sizes: 4, 5, 6 and 8 ft



### Introduction

The Frontier® Acela™ M Series Fume Hood is designed specifically for users in the mining industry. It provides the highest level of protection and containment against highly corrosive chemicals at high temperatures.

### Optional Accessories:



Base Cabinet (EBA-M)



Circuit board protection



Service fixtures

Sentinel™ XL Airflow  
Alarm

Scrubber



Support Stand (ASL)



PPH-4UDPVW-<sub>-</sub>

# Frontier® PPH™ Laboratory Fume Hoods

## Features

- ASHRAE 110-2016 certified
- Full polypropylene construction
- Polycarbonate sash window
- Tapered Exhaust Collar

Available sizes: 4, 5, 6 and 8 ft



## Introduction

The Frontier® PPH™ Fume Hood provides the highest level of protection and containment against highly corrosive chemicals. Full polypropylene (PP) interior makes the hood metal-free and ideal for sensitive work such as trace metal analysis. PP also has an excellent rating against corrosion and chemical staining.

## Optional Accessories:



Base Cabinet (EBP)



Circuit board protection



Service fixtures



Sentinel™ XL Airflow Alarm





ASC\_

# Ascent™ Filtered Storage Cabinet

## Features

- ISOCIDE™ antimicrobial powder coating
- Sentinel™ microprocessor controller
- Door safety lock restricts access
- Multiple filter configurations

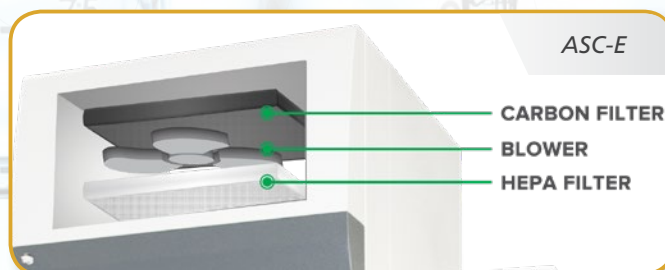
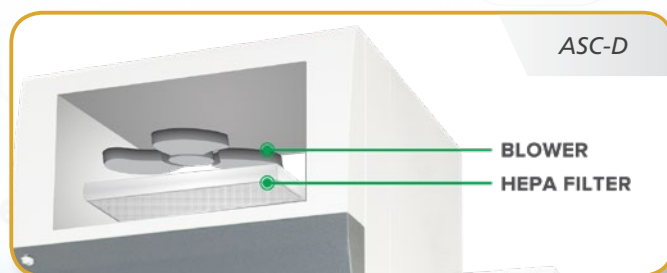
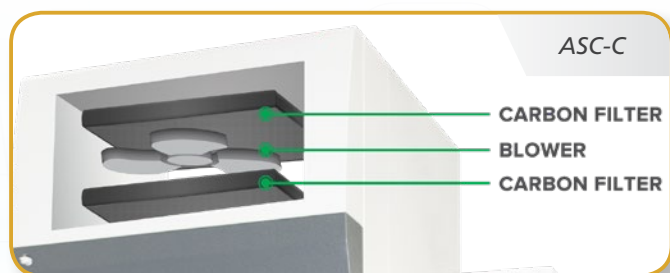
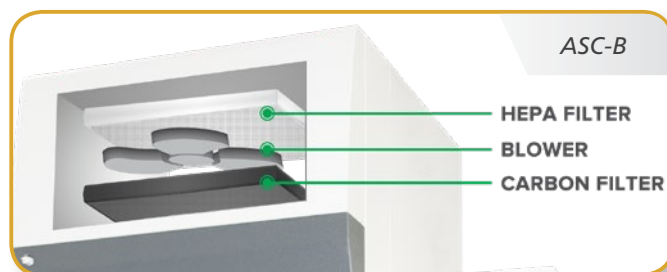
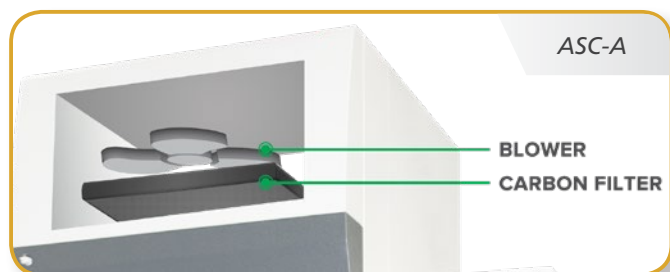
Available sizes: 2, 4 and 6 ft



## Introduction

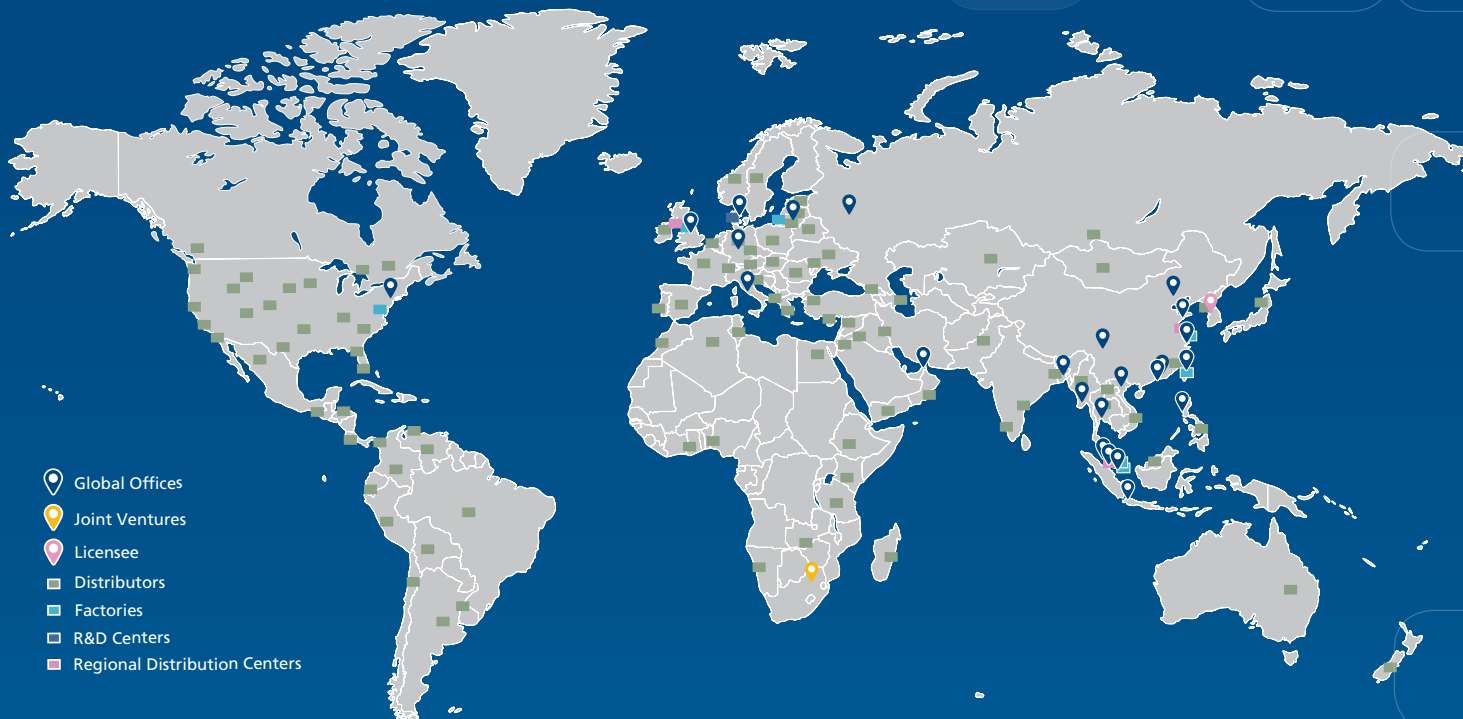
Fumes from chemical containers often result to the storage cabinet's corrosion and contaminated air in the laboratory. Ascent™ storage cabinet is ideal in providing a safe and convenient storage solution. This cabinet is equipped with Nanocarb™ filters that effectively adsorb chemical fumes to provide operator and environment protection.

## Overview of Models:



# ESCO LIFESCIENCES GROUP

42 LOCATIONS IN 21 COUNTRIES ALL OVER THE WORLD



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- Distributors
- Factories
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FLTRA CHECK  
The World's First Chemical Evaluation App

Esco Social Media and Apps



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