

Product Handbook

COMPLETE OVERVIEW

USED IN:

- - - - -
CLEANROOMS
- - - - -
NANOTECHNOLOGY
- - - - -
MICROELECTRONICS
- - - - -
MEDICAL DEVICES
- - - - -
SEMICONDUCTORS
- - - - -
DISK DRIVES
- - - - -
LABORATORIES
- - - - -
PHARMACEUTICAL MARKETS
- - - - -
COMPOUNDING PHARMACIES
- - - - -
HOSPITALS

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■ About ENVIRCO®

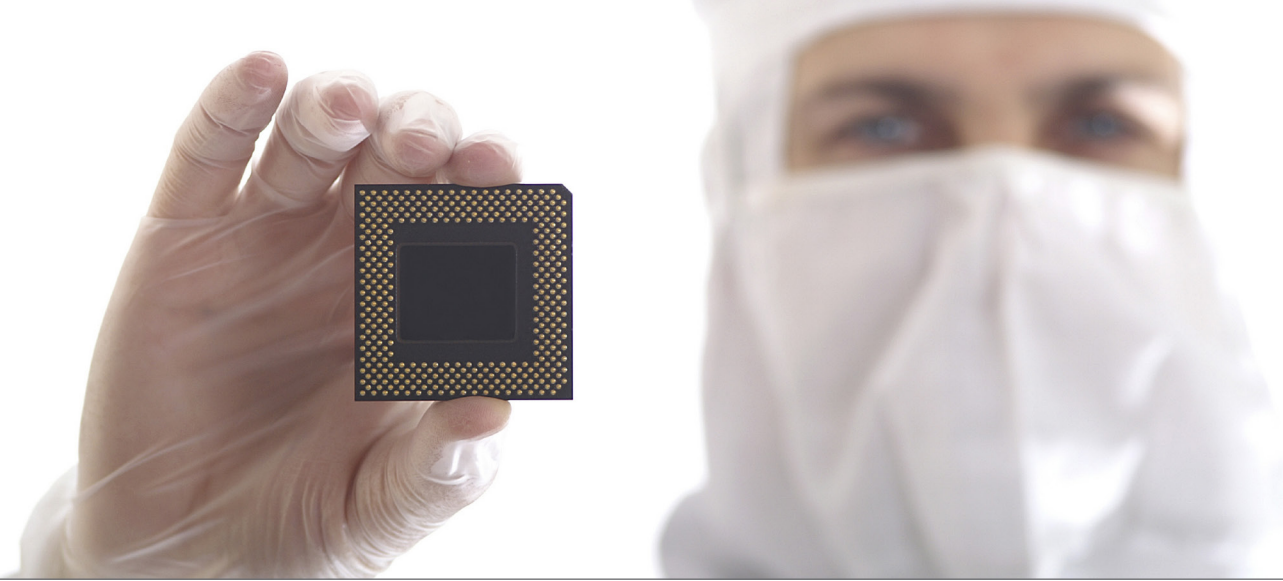
ENVIRCO is a recognized worldwide leader in clean air products for the semi-conductor, microelectronics, medical device, pharmaceutical, biotechnology, hospital and laboratory markets. For more than 50 years, ENVIRCO has been an innovator in clean air technology, enjoying a history of developing cutting-edge product breakthroughs that continues through today. Its reputation for product innovation and high quality has positioned ENVIRCO to be at the forefront of many industry firsts, including the first low-power Fan Filter Unit (FFU) and the first commercial cleanroom. Whether an organization's needs involves the production of medical devices, pharmaceuticals, university research, nanotechnology science, semiconductors or other advanced technologies, ENVIRCO products provide clean air environment that ensures the integrity of a sample or material. Within a medical and/or operating room setting, ENVIRCO continues to build upon its reputation as the industry's first manufacturer of a laminar flow surgical suite, providing infection control to hospital rooms and staff and preventing the spread of airborne contaminants.

ENVIRCO's complete product line is rigorously tested and is renowned for providing an economical and energy efficient method for implementing a cleanroom environment, boasting ease of installation, operation and maintenance. Above all, ENVIRCO products deliver high performance.

■ Service & Support

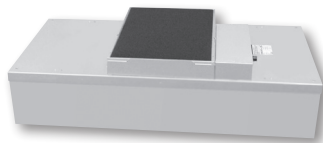
The ENVIRCO combination of innovation and high quality clean air products is surpassed only by the company's superior service it offers customers to ensure the ENVIRCO product/system they purchase meets their needs. Highly trained and experienced engineers provide superior life cycle support, from system design and installation to final performance testing and follow up.

Learn how ENVIRCO cleanroom products and air filtration systems can help companies improve their bottom line by maximizing product yield, improving patient care and hospital staff safety and ensuring the integrity of laboratory research. Call 1.800.884.0002, email info@envirco.com, or visit www.envirco.com for more information.



Cleanroom Products

ENVIRCO industrial cleanroom products satisfy the basic principle of a manufacturing business. In microelectronics market segments, a single submicron-sized particle can render thousands of microprocessors, transistors or other highly sensitive technologies useless. Cleanroom technologies are a critical component to maximizing production yields. While used for a variety of critical clean air applications, the MAC 10 line of fan filter units (FFUs) are ideal cleanroom solutions for the worldwide industrial market. The FFU design (a fan, motor and filtration system all in a single unit) draws air in from a motor assembly and through the filtration system, then exhausts it across the filter face, supplying particle-free, unidirectional airflow to the room. Renowned for their ease of installation and operation, the MAC 10 line of FFUs offer low energy consumption, low sound levels and a low profile.

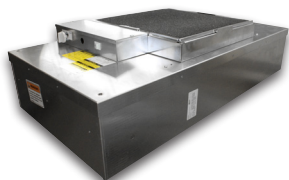


■ MAC 10 Original

The ENVIRCO MAC 10 fan filter unit was the first (FFU) to combine low sound, low watts and a low profile. Measuring only 51 dBA, the MAC 10 Original Standard 2 x 4 ft. (600 x 1,210 mm) provides one of the lowest sound levels of any FFU in the industry. Running at only 310 watts at 90 fpm, the unit uses less energy than traditional FFUs, while lowering total operating costs. The MAC 10 Original maintains a low profile and comes standard with the filter integral with the unit housing, requiring the unit to be removed from the ceiling grid to replace the filter. The RSR unit has the filter sealed to the unit using the knife edge/gel seal construction, allowing the filter to be replaced from the roomside. The RSRE unit has the added feature of allowing the motor/blower and filter to be replaced from the room side.

■ MAC 10 LEAC2

The ENVIRCO LEAC2 fan filter unit (FFU) has low watts, a low profile, and a high airflow. The MAC 10 LEAC2 2x4 ft (600x1210 mm) provides one of the lowest power consumption levels of any FFU in the industry. Running at only 208 watts @ 90 fpm, the unit uses less energy than traditional FFUs and reduces operating costs. The MAC 10 LEAC2 standard model maintains a low profile, measuring less than 13" (318 mm) tall. The MAC 10 LEAC2 comes standard with the filter integral with the unit housing. Roomside replaceable filters and motor blower removable from roomside are available.



■ MAC 10 LEAC

The ENVIRCO LEAC fan filter unit (FFU) is the first FFU with low watts, low profile, and high airflow. The MAC 10 LEAC 2 x 4 ft. (600 x 1210 mm) provides one of the lowest levels of any FFU in the industry. Running at only 185 watts at 90 fpm, the unit uses less energy than traditional FFUs, lowering operating costs. The MAC 10 LEAC maintains a low profile, measuring less than 13" (330 mm). The MAC 10 LEAC comes standard with the filter integral with the unit housing, requiring the unit to be removed from the ceiling grid to replace the filter.

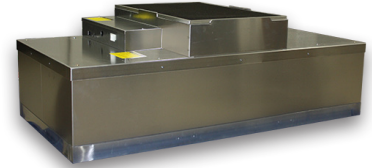
■ MAC 10 RFAC

ENVIRCO developed the MAC 10 RFAC for applications requiring negative pressure reverse flow FFUs. The RFAC is designed to pull contaminated air from the intake side of the filter, filter the air, and then exhaust it outside of the area required. The RFAC is a versatile FFU capable of being used in ceiling grids, installed inside equipment, or wall-mounted. RFAC FFUs are available in Standard or RSR style configurations and in 2 x 4 ft. or 2 x 2 ft. configurations. RSR RFACs come standard with MERV 8 20" x 20" x 1" pleated roomside pre-filter(s). To increase HEPA filter life, the inexpensive pre-filter is intended to capture larger airborne particles and dust.



■ MAC 10 IQ

The MAC 10 IQ® is the world's first smart fan filter unit. With its microcomputer-controlled EC motor, the MAC 10 IQ dynamically adjusts itself to maintain the set airflow, compensating for changes in static pressure, filter loading or other local conditions. Unlike conventional induction motors, the EC motor regulates itself, automatically adjusting its torque and speed to provide a constant air volume of 250-660 CFM over a wide range of static pressure. The MAC 10 IQ maintains airflow at such a constant rate that the need for future balancing is greatly reduced. A Universal Control Card with three different control modes, provides installation versatility by allowing the FFU to be controlled via a MODBUS RTU network, an analog 0-10 VDC control signal, or by adjusting the onboard potentiometer. The novel MAC 10 IQ FFU uses a combination of EC motor technology with ENVIRCO's unique baffling system and forward curve fan to make it intelligent and energy-efficient. The electronically commutative (EC) motor with internal micro-computer provides low energy consumption (235 watts at 90 fpm (0.45 m/s)), high performance and long motor life. The IQ utilizes ENVIRCO's VE5 baffling technology, offering low sound levels that are a MAC 10 family benchmark.



■ MAC 10 IQ LAF

Programmed for Low Flow and Low Sound applications, the MAC 10 IQ LAF is the world's first smart fan filter unit to take advantage of torque programming to achieve low airflow set-points using a microcomputer-controlled ECM motor. This was previously not possible with units programmed for constant airflow. With the advancement in ECM motor technology, we are able to provide a fan filter unit that delivers low airflow and maintains airflow within 10% for up to .2" WC changes in static pressure. The ability to adjust to limited changes in static pressure gives the fan the ability to supply reduced airflow for critical applications requiring low flow and low sound. A Universal Control Card with three different control modes, provides installation versatility by allowing the FFU to be controlled via a MODBUS RTU network, an analog 0-10 VDC control signal, or by adjusting the onboard potentiometer. The MAC 10 LAF FFU uses a combination of ECM motor technology with Enviro's unique baffling system and forward curve fan to make it intelligent and energy-efficient.



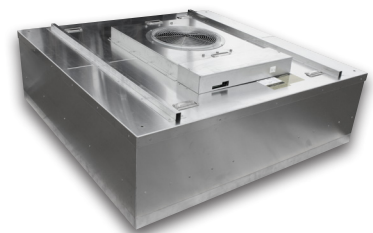
■ MAC 10 LEDC

The MAC 10 LEDC, ENVIRCO's® second generation EC FFU, features the most control options and the most versatile control system available on the market today. By taking advantage of a unique combination of Electronically Commutative (EC) motor technology with ENVIRCO's proprietary baffling system and backward inclined fan, the LEDC tops the industry in energy-efficiency. The MAC 10 LEDC FFU can help provide opportunities to earn LEED* points with its many energy-saving features. Its EC motor with internal micro-

computer provides energy consumption rates as low as 90W at 90 fpm, offers high performance, and delivers a long motor life. Utilizing ENVIRCO's experience in FFU development, the LEDC also features low sound levels of 52.3 dBA, which are a MAC 10 family benchmark. A Universal Control Card with three different control modes, provides installation versatility by allowing the FFU to be controlled via a MODBUS RTU network, an analog 0-10 VDC control signal, or by adjusting the onboard potentiometer. *Note: LEED (Leadership in Energy and Environmental Design) is the rating system of US Green Building Council by which building designs are certified.*

■ MAC 10 LEDC 4x4

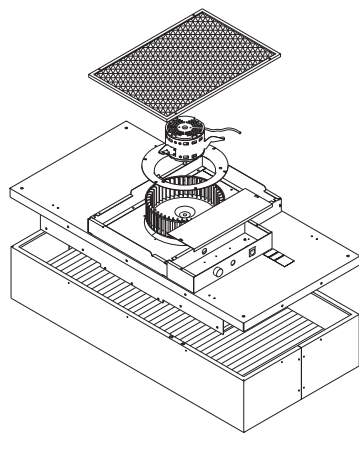
Optimize clean room operations with ENVIRCO's controlled environment solution, the new MAC 10 LEDC 4 x 4 ft unit. It is ENVIRCO's latest design for today's most challenging clean room applications. This low energy unit offers significant cost savings and electrical efficiencies for large clean rooms by using a backward inclined wheel, which provides 90 FPM airflow at a static pressure level of 1.0" wg., yielding a lower sound level than most competitive 2 x 4 ft units. Fewer components mean lower installed costs. With use of the MAC 10 LEDC 4 x 4 ft unit, additional savings are captured in the ceiling plenum because less grid is required and fewer electrical connections are needed. A Universal Control Card with three different control modes, provides installation versatility by allowing the FFU to be controlled via a MODBUS RTU network, an analog 0-10 VDC control signal, or by adjusting the onboard potentiometer.



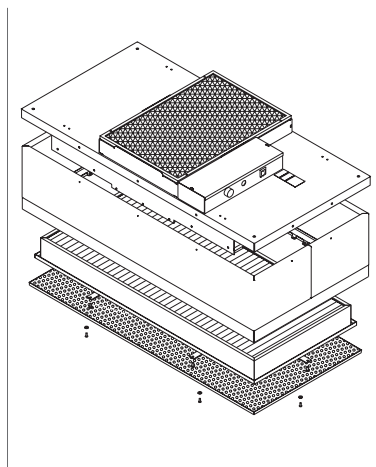
■ MAC 10 Model Comparison

Model	Original AC	LEAC2	LEAC	RFAC	IQ	IQ LAF	LEDC	LEDC 4x4
Size	2x4, 2x3, 2x3.5, 2x2	2x4, 2x3, 2x2	2x4	2x4, 2x2	2x4, 2x3, 2x3.5, 2x2	2x4, 2x3, 2x3.5, 2x2	2x4, 2x3, 2x3.5, 2x2	4x4
Motor Type	AC	AC	AC	AC	ECM	ECM	ECM	ECM
Voltage	115/60Hz, 208-240/50-60Hz, 277/60Hz	115/60Hz, 277/60Hz	115/60Hz, 208-240/50-60Hz, 277/60Hz	115/60Hz, 277/60Hz	115/60Hz, 208-240/50-60Hz, 277/60Hz	115/60Hz, 208-240/50-60Hz, 277/60Hz	115/60Hz, 208-240/50-60Hz, 277/60Hz	115/60Hz, 208-240/50-60Hz, 277/60Hz
Motor Feature	Standard Airflow	Standard Airflow	High Airflow	Standard Airflow	Constant CFM / RPM Feedback	Torque Programming / RPM Feedback	High Airflow / RPM Feedback	High Airflow / RPM Feedback
Blower Type	Forward Curve	Backward Curve	Backward Curve	Backward Curve	Forward Curve	Forward Curve	Backward Curve	Backward Curve
Sound	Dependent on Air-flow/External Static Pressure	Dependent on Air-flow/External Static Pressure	Dependent on Air-flow/External Static Pressure	Dependent on Air-flow/External Static Pressure	Dependent on Air-flow/External Static Pressure	Low	Dependent on Air-flow/External Static Pressure	Dependent on Air-flow/External Static Pressure
Velocity	90 FPM	90 FPM	90 FPM or Higher	90 FPM	90 FPM	90 FPM	90 FPM or Higher	90 FPM or Higher
Power Consumption	Highest	Low	Low	Low	Low	Low	Lowest	Lowest
VAV Box Design	Recommended	Recommended	Recommended	Recommended	Not Recommended	Recommended	Recommended	Recommended
BMS Communications	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Standard Control Option (* See Notes)	3 Speed Switch, SSSC*, Modbus (ENAC)	Variable Speed Switch	3 Speed Switch	Variable Speed Switch	UCC, IR*	UCC, IR*	UCC, IR*	UCC*
Cabinet Styles (* See Notes)	Standard/RSR/RSRE	Standard/RSRE-All*	Standard/RSR/RSRE	Standard/RSR	Standard/RSR/RSRE/RSRC	Standard/RSR/RSRE/RSRC	Standard/RSR/RSRE/RSRC	Standard/RSR/RSRE
Diffuser Options	Aluminum/SST	Aluminum/SST	Aluminum/SST	Aluminum/SST	Aluminum/SST	Aluminum/SST	Aluminum/SST	Aluminum/SST
Painted Option	British White	British White	British White	British White	British White	British White	British White	British White
Sheet Rock Adapters	Stainless Steel/White Painted Steel	White Painted Steel	Stainless Steel/White Painted Steel	Stainless Steel/White Painted Steel	Stainless Steel/White Painted Steel	Stainless Steel/White Painted Steel	Stainless Steel/White Painted Steel	N/A
Grid Size	1 1/2" or 2" Standard as required	1 1/2" or 2" Standard as required	1 1/2" or 2" Standard as required	1 1/2" or 2" Standard as required	1 1/2" or 2" Standard as required	1 1/2" or 2" Standard as required	1 1/2" or 2" Standard as required	1 1/2" or 2" Standard as required
Duct Collars	10" and 12"	10", 12", 14"	10", 12", 14"	N/A	10" and 12"	10" and 12"	10", 12", 14"	N/A
Pre-Filter	Standard Foam	Standard Foam/Optional 2" Pleated	Standard Foam/2" Pleated	1" Pleated	Standard Foam	Standard Foam	Standard Foam/Optional 2" Pleated	Finger Guard
Filter	HEPA/ULPA/Other	HEPA/ULPA/Other	HEPA/ULPA/Other	HEPA	HEPA/ULPA/Other	HEPA/ULPA/Other	HEPA/ULPA/Other	HEPA/ULPA/Other

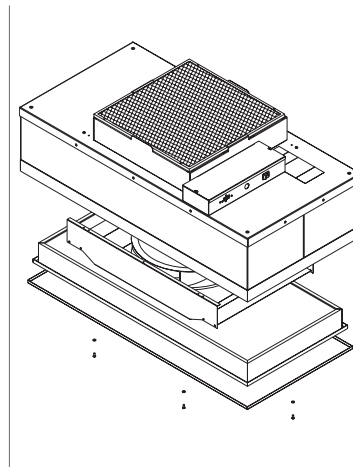
* Notes: 1. SSSC refers to Solid State Speed Control. 2. UCC refers to Universal Control Card for MODBUS RTU network, 0-10VDC analog signal, or manual potentiometer. 3. Modbus RTU (ENAC) Control Card. 4. IR refers to Infrared Control. 5. ECM refers to Electrically Commutated Motor. 6. All Roomside Removable (RSR) units have the RSRE feature of Filter and Motor Blower Removable from Rooms.



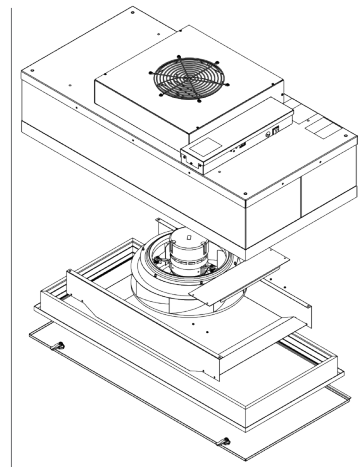
MAC 10® Standard Exploded View



MAC 10® RSR Exploded View



MAC 10® RSRE Exploded View



MAC 10® RSRC Exploded View

■ Introduction

ENVIRCO offers a complete family of control solutions providing machine intelligence to monitor and control clean room environments of all sizes - from small to very large.

■ Features

Various fan filter unit control options

- » Single FFUs
- » Multiple FFUs organized in a zone
- » Multiple zones, each independently managed
- » Animated ceiling grids with touchscreen displays

Simplified setup and more flexible cleanroom operation

- » Automated roomside fan speed setup and control
- » EC motor control with RPM monitoring
- » Automatic controls with integrated clock calendar
- » Closed-loop runtime fan speed monitoring and control
- » Remote control from outside cleanroom or off-site

Lowers clean room energy cost and operating expense

- » Clock calendar sequenced FFU power ON/OFF
- » Monitor and adjust airflow as needed
- » Asset life extension from smarter FFU use
- » Central monitor of particle counters, pressure transducers

Expanded and extended cleanroom control

- » Door interlocking
- » Event logging and reporting
- » Automatic occupancy sensing
- » Automatic alarms from multiple causes and fault sensors
- » Performance logging supports as-needed maintenance
- » Connectable to overall building management systems

■ Advanced Controllers

ACC7152 Touchscreen

- » 12.1" touchscreen display
- » Controls up to 400 FFUs
- » Ethernet option available
- » Animated ceiling grid
- » Closed Loop available
- » Facility Optimization included
- » Up to 24 PID loops



ACC7050/52/72 Touchscreen

- » 5.7" - 7" touchscreen display
- » Controls up to 400 FFUs
- » Ethernet option available
- » Animated ceiling grid
- » Closed Loop available
- » Facility Optimization included
- » Up to 24 PID loops



■ Intermediate Controllers

ACC7030/31/32 Touchscreen

- » 3.5" touchscreen display
- » Supports eight groups
- » Controls up to 100 FFUs
- » Ethernet option available
- » Communication, unit control, and system monitoring all in one



■ Extended Controllers

ACC7020/22 Consoles

- » 2.4" monochrome display
- » Supports 25 groups
- » Controls up to 200 FFUs
- » Ethernet option available
- » Facility Optimization included



■ Small Auto Controllers

ACC7015/16/17 Consoles

- » 2.4" LED display
- » Supports five groups
- » Controls up to 50 FFUs
- » Designed for small systems
- » Facility Optimization included



■ Small Manual Controllers

ACC1001 Panel Mount Console

- » Mini environment single room FFU control
- » Control and monitor up to 25 FFUs
- » Audible alarm pressure sensor monitoring
- » EC smart motor RPM monitoring



MDR16 Remote Mount

- » Controls up to 16 FFUs
- » Manual automatic control input
- » LED provides visual feedback of FFU indexing as percentage of speed
- » Internal jumper configurable control options
- » Exclusively compatible with MAC10 IQ & LEDC FFUs



■ Single FFU Controllers

IR Remote

- » Handheld controller for point and control - one FFU at a time
- » Remotely adjusts outputs of ECM motor
- » Maintains a constant airflow
- » Lamps/sensors may be mounted or remoted



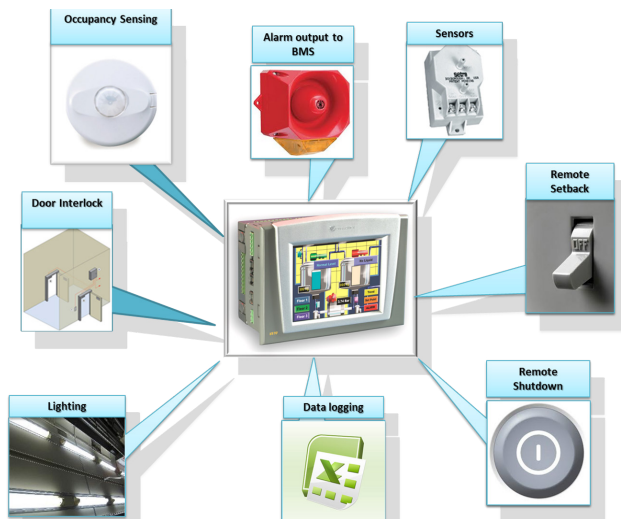
Capabilities

ENVIRCO Controls Functional Matrix		Interfaces and FFU Capability				Most Popular Features					Remote & Auto Control			Extended Features					Advanced Features				
		Serial Interfaces MODBUS-RTU	Max # of FFUs	Max # of Groups	Ethernet	Alarm Outputs	Set Speed Unit/Global	Communication Alarm	ECM RPM Monitoring	Fan Performance Alarm	Remote Shutdown	Remote Setback	Clock Calendar Control	Door Interlocking	Animated Ceiling Grid	Occupancy Sensor	Pressure, Temp Humidity	Particle Counters	Lighting Control	Exhaust Air Control	Data Logging	Building Management I/O	Closed Loop Auto Controls
Advanced Controllers	ACC7152 12.1" Touchscreen	2	400	50	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ACC7072 7" Touchscreen	2	400	50	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ACC7052 5.7" Touchscreen	2	400	50	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ACC7050 5.7" Touchscreen	2	400	50		✓	✓	✓	✓			✓	✓	✓							✓		
Intermediate Controllers	ACC7032 3.5" Touchscreen	1	100	8	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓					✓			
	ACC7031 3.5" Touchscreen	1	100	8	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓					✓			
	ACC7030 3.5" Touchscreen	1	100	8	✓	✓	✓	✓	✓			✓	✓							✓			
Extended Controllers	ACC7022 2.4" Mono Display	1	200	25	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓				
	ACC7020 2.4" Mono Display	1	200	25		✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓					
Small Auto Controllers	ACC7017 2.4" LED Display	1	50	5		✓	✓	✓	✓	✓	✓	✓	✓		✓								
	ACC7016 2.4" LED Display	1	50	5		✓	✓	✓	✓	✓	✓	✓	✓										
	ACC7015 2.4" LED Display	1	50	5			✓	✓	✓		✓	✓											
Small Manual Controllers	ACC1001	1	25	1		✓	✓	Compatible with control card equipped FFUs															
	MDR16	0	16	1		✓	✓	J-Box sized controller exclusively compatible with MAC 10 IQ & LEDC FFUs															
Single FFU Controllers	IR Remote	0	0	N/A		✓	Handheld remote controller compatible with MAC 10 IQ & LEDC FFUs, one at a time																
	Remote DC CB	1	1	N/A		✓	Standalone control board and electrical control box for MAC10 IQ & LEDC FFUs																
	Remote AC CB	1	1	N/A		✓	Standalone control board and electrical control box for MAC10 Original only FFUs																

I/O Options

ENVIRCO Consoles have multiple input and output options available for a cleanroom builder to implement at a low cost. The actual sensors are supplied by the customer.

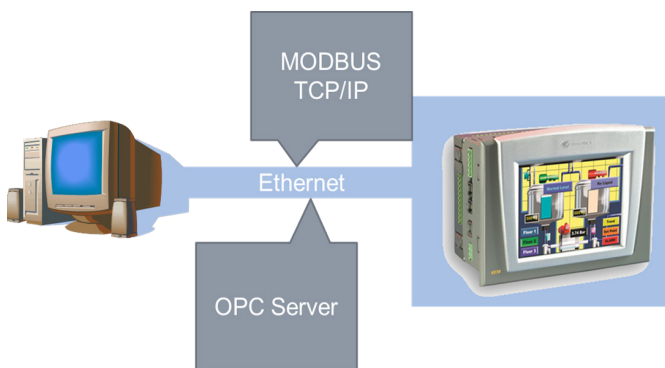
- » Room control
- » Occupancy sensing
- » Remote setback
- » Remote shutdown
- » Alarm output to BMS
- » Door interlock
- » Analog sensors
- » 0-10VDC
- » 4-20mA
- » Lighting control
- » Data logging
- » Clock calendar



Ethernet Options

ENVIRCO Consoles allow several Ethernet options to integrate with building management systems.

- » Modbus TCP/IP
- » OPC Server
- » Remote Operator
- » BACnet I/P (requires ACGW003)



Closed Loop Control Options

ENVIRCO touchscreen consoles ACC7050/2 and ACC7152 can provide the following:

- » Up to 24 Loops
- » Input from either:
 - » Analog sensor directly into the Console
 - » 0-10VDC
 - » 4-20mA
 - » 0-20mA
 - » Connected to AirCare Motor controller
 - » 0-5VDC

Typical sensors include but not limited to:

- » Pressure
- » Temperature
- » Humidity
- » Particle count
- » CLIMET CI-3100
- » TSI 7301 and 7501
- » LIGHTHOUSE 3104

Particle counters can also be tied using MODBUS RTU or MODBUS TCP (sensors supplied by others).

Panel Box Options

Material	Item No.	Size	For Units
Polycarbonate Wall Mount	ACP NL01	10x8x2	ACC7020/22
	ACP NL02	12x10x4	ACC7050/52
	ACP NL04	14x12x6	ACC7152
Steel Flush Mount	ACP NL03	16x12x4	ACC7050/52
	ACP NL05	24x20x4	ACC7152
Stainless Steel Wall Mount (Pharma)	ACP NL06	14x12x6	All Consoles
Stainless Steel Flush Mount (Pharma)	ACP NL07	20x14x4	All Consoles



■ Ducted Ceiling Module (DCM)

The Ducted Ceiling Module from ENVIRCO is a terminal filter for use in standard T-bar drop ceiling systems, used in cleanrooms with centralized air. It is lightweight and easy to install.

Designed as a fully disposable unit, the Ducted Ceiling Module is inexpensive and easily replaceable. The Ducted Ceiling Module offers a modular design to provide filtered air from ISO 4 to ISO 5. The standard size fits into 1-1/2" (38.1 mm) T-bar grid systems. Its low weight, less than 35 lbs. (15.876 kg) makes it easy to lift into place.

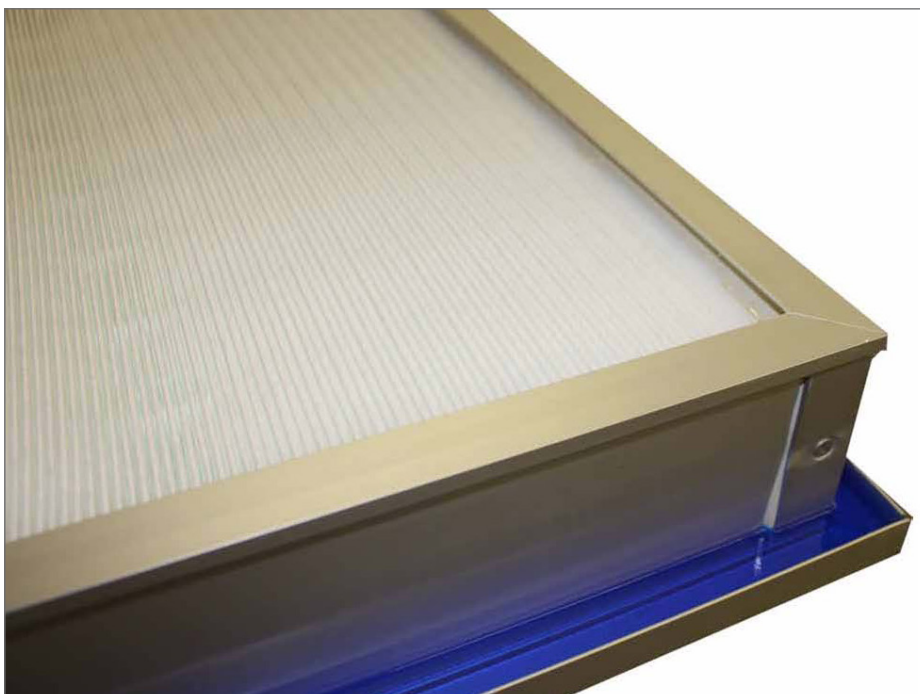
The Ducted Ceiling Modules are used in a variety of cleanroom applications including Semiconductor fabrication, disc drive manufacturing, pharmaceutical production, biotechnology, aerospace, and food processing.



■ Ducted Ceiling Module - RSR (DCM-RSR)

The RSR Ducted Ceiling Module is a lightweight, low profile, terminal filter with room side replaceable, gel seal, HEPA or ULPA filters. The filters are designed to provide unidirectional airflow for the most challenging 'Life Sciences' applications. The removable gel seal filter enables end users to replace or change HEPA or ULPA filters without removing the entire filter from the drywall or T-bar ceiling grid.

The ENVIRCO RSR Ducted Ceiling Module is available in two sizes: nominal 24" x 48" and 24" x 24" with a 10" or 12" inlet collar. The gel seal filter element is available in HEPA and ULPA efficiencies. The dimple pleat filter pack is sealed in an anodized aluminum frame that contains penetrations for in-room damper adjustments, as well as the measurement of challenged aerosol.



UL 900 INTEGRITY & PROTECTION

OUR GEL SEAL FILTER DESIGN ASSURES THE **INTEGRITY** OF THE FILTER SEAL.

THE GEL SEAL OFFERS SUPERIOR **PROTECTION** AGAINST BYPASS LEAKAGE.

■ MAC-T Ceiling Grid System

ENVIRCO's cleanroom ceiling solution, a 2" Gasket Seal Grid Cleanroom Ceiling System is fabricated using superior materials to provide both a structural grid system and zinc alloy die-castings.

The building block of a cleanroom ceiling grid system is the connection and suspension system. ENVIRCO offers a true, extruded aluminum 2" cleanroom ceiling system. It is the most cost efficient system for cleanroom classes for ISO 8 (Class 100,000) to ISO 5 (Class 100), or any full HEPA coverage application.

ENVIRCO's rod suspended cleanroom ceiling systems share attributes that in combination create a common design platform. Customizing this system to meet your specific needs is easy and worry-free. Call one of our engineers today to discuss options and find the system that best meets your needs.

■ Standard Features

ENVIRCO's gasket seal grid ceiling system has a continuous 1/4-20 thread for connection and suspension at any point. It also has lightweight multi-purpose connectors that join the grid members, providing a suspension point for the threaded rods or wire-hung eye bolts.

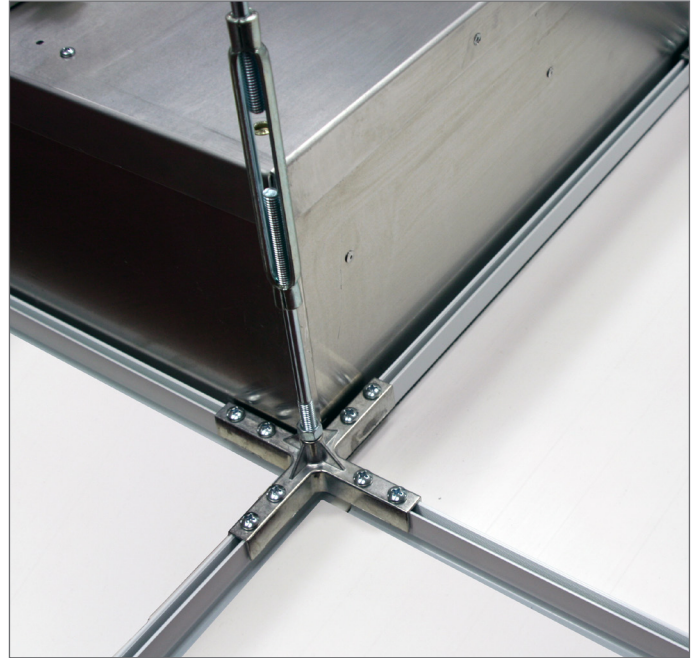
- » 2" wide extruded aluminum flange for HEPA filter, ceiling tile, and light fixture mounting.
- » 3/8" thread rod and turnbuckle adjustable or 3/8" eye bolt and 12 ga. ceiling wire.
- » Full 2" face.
- » Painted white polyester finish, more durable than powder coating.
- » Gasketed (closed cell white).
- » Can be used with 100% HEPA coverage.
- » Can be used with cleanroom lights made for 2" grid or teardrop light fixtures.
- » Easy assembly.
- » Zinc alloy castings.
- » Center Line of Grid - 24 1/2" x 48 1/2"
- » Module, Fixture, and Ceiling Tile Size - 23 5/8" x 47 5/8"

■ Optional Feature

- » Clear anodized aluminum finish.

■ Warranty

- » Limited 1-year warranty.



■ ENVIRCO MAC-T Grid Load Table

Deflection Formula	L/360	L/180	L/360
Hanger Spacing (Span)	48"	48"	24"
Main Tee Spacing	48"	48"	48"
Maximum Point Load (Lbs)	133	133	238
Maximum Uniform Load (Lbs/LF)	96	96	48
Applied Load (Lbs/SF) (Dead+Live with Filter)	24	24	24
Deflection at Mid-Span	1/8"	1/4"	1/16"

■ Introduction

In addition to industry-leading fan filter units and accessories such as controls and ceiling grids, ENVIRCO offers a complete line of custom and standard stainless steel supply grilles, return grilles, filter grilles, and dampers for those industries specializing in critical environments. These custom-built and designed products serve to meet your project's unique site characteristics and challenges.

■ Applications

- » Cleanrooms
- » Hospitals
- » Laboratories
- » Industrial facilities
- » Manufacturing facilities
- » Corrosive environments
- » High humidity environments
- » Environments using strong chemicals where frequent cleaning is required

■ Available Finishes*

Standard

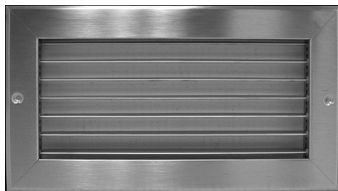
- » 304 stainless steel - 18% chromium, 8% nickel

Special

- » 316 stainless steel - 18% chromium, 8% nickel, 2% molybdenum
- » White powder coat
- » Satin anodized
- » Dark bronze anodized



* Finishes are available on most products. Finish options may vary depending on product type. Contact the factory for more details.

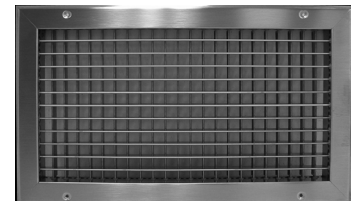


■ 3/4" Single Deflection Supply Grille

The 3/4" single deflection supply grille provides effective directional control of the air stream in one or two directions. The bars are pivoted at the face, giving a uniform, aligned appearance regardless of blade angle setting. The hollow, air-foil grille bars are spaced on 3/4" centers. Each bar is adjusted for the desired air deflection without effecting the setting of any other bar. The SDSG is available with horizontal face bars (SDSG-H) or vertical face bars (SDSG-V). It is also available with or without an opposed blade damper (OBD). The OBD assures even distribution of air across the grille face as well as positive volume control.

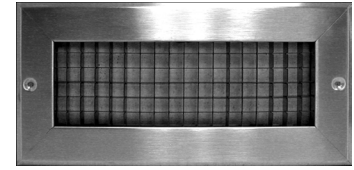
■ 3/4" Single Deflection Supply Grille

The double deflection supply grille provides effective directional control of the air stream in one, two, three, or four directions. Each bank of bars is pivoted at the front which gives a uniform appearance regardless of blade angle setting. The hollow air-foil grille bars are spaced on 3/4" centers. Each bar is adjusted for the desired air deflection without affecting the setting of any other bar. The DDSG is available with horizontal face bars (DDSG-H) or vertical face bars (DDSG-V). It is also available with or without an opposed blade damper (OBD). The OBD assures even distribution of air across the grille face as well as positive volume control.



■ Egg Crate Return Grille

The egg crate return grille series provides 90% free area. Bars are 24-gauge, Type 304 stainless steel in a 1/2" x 1/2" x 1/2" grid core. Type 316 stainless steel is available at an additional cost. The egg crate core offers a large opening area for return airflow. Other blade size and spacings are available; consult with the factory for availability.



■ Return Grilles (3/4" and 1/2")

The 3/4" and 1/2" return grilles are styled to match our supply grilles. The face bars are non-adjustable and are available in either a horizontal or vertical position, factory set at either 0° or 45°, spaced on 3/4" or 1/2" centers. The same hollow air-foil bars used on the supply grilles are used on the return air grilles. The 34RG or 50RG are available with or without an opposed blade damper (OBD). The OBD assures even distribution of air across the grille face as well as positive volume control.

■ Filter Return Grilles (3/4" and 1/2")

The 3/4" and 1/2" filter return grilles have fixed horizontal blades (parallel to width/first specified dimension) spaced on 3/4" or 1/2" centers with 45° straight face deflection. The grille core is secured to the face of the outer frame with stainless steel 1/4-turn fasteners, allowing quick removal for cleaning or changing the filters. The streamlined blades and opened spacing maintain a minimum effective free area of 50%, which minimizes intake velocity, reduces inlet pressure, and provides quiet operation. The 34FRG and 50FRG are available with or without an opposed blade damper (OBD). The OBD assures even distribution of air across the grille face as well as positive volume control.



■ Hinged Filter Return Grilles (3/4" and 1/2")

The 3/4" and 1/2" hinged filter return grilles have non-adjustable, hinged horizontal blades spaced on 3/4" or 1/2" centers. The grille core is secured to the face of the outer frame with stainless steel 1/4-turn fasteners, allowing quick removal for cleaning or changing the filters. The streamlined blades and opened spacing maintain a minimum effective free area of 50%, which minimizes intake velocity, reduces inlet pressure, and provides quiet operation. The 34HFRG and 50HFRG are available with or without an opposed blade damper (OBD). The OBD assures even distribution of air across the grille face as well as positive volume control.

■ Opposed Blade Damper

The opposed blade damper assures even distribution of air as well as positive volume control. The damper can be attached to any of our grille products. The face operating mechanism is controlled with a screwdriver.





Pharmaceutical & Medical Device

Within the pharmaceutical and medical device production environments, particles containing living microorganisms can adversely affect the sterility of products both in manufacturing and storage. Preventing lapses in product sterility will save a company considerable time and money. Innovative cleanroom technologies from ENVIRCO address the stringent contamination control needs of pharmaceutical and medical device production settings. The entire line of MAC 10 and clean bench/workstation products feature the following.

- » Roomside replaceable (RSR), gel-seal HEPA filters that protect the integrity of grid seals and change out much more easily.
- » ISO Class 5 (Class 100) cleanliness levels; allows compounding pharmacies to meet USP 797 requirements.



■ Unimodule M2 Vertical Laminar Flow Workstation

The self-contained, product-protection unit provides HEPA-filtered air to critical work areas in a positive-pressure laminar flow pattern.

- » ISO Class 5 (Class 100) clean air work zone.
- » Vertical, freestanding, positive-pressure workstation.
- » Modular design with an isolated work table.
- » Range of sizes: 3' to 8'.
- » Quiet operation.
- » Isolated work surface, no vibration.



■ METD 100% Exhausted Vertical Flow Workstation

Designed for operations involving toxic or noxious fumes that can be potentially harmful to workers; a rear plenum and workstation exhaust slots remove exhaust fumes from within the cabinet. The open front features vertical airflow for personnel protection; the HEPA filter ensures product protection.

- » ISO Class 5 (Class 100) clean air work zone.
- » 100% exhausted air used for application with toxic or noxious fumes.
- » Provides personnel and product protection.
- » Sizes: 4, 6 and 8 ft.
- » Removable stainless steel work deck for easy cleaning.



■ Laminar Downflow Module

Portable, self-contained and modular units provide ultra-clean airflow and contamination control for specific zones within a larger, ballroom environment. Ceiling-suspended or free-standing with optional support legs; modules provide easy access to filter, mowers and blowers.

- » ISO Class 5 (Class 100) clean air work zone.
- » Vertical laminar flow.
- » ENVIRALOK® Filter Framing System prevents filter leaks.
- » Nine sizes from which to choose or custom sizes are available.
- » Quiet operation.
- » Corrosion resistant.
- » Uniform airflow.





Hospital & Healthcare

By their very nature, cleanroom and air filtration products for hospital and healthcare facilities are critical to the well being of the people that pass through their doors. Hospital isolation rooms must provide infection control, protecting hospital staff from patients with airborne pathogens such as tuberculosis. The threat of potential biohazards has also become increasingly important for hospitals to address in terms of clean air solution capabilities and preparedness.

In the operating room (OR), removing airborne contaminants can decrease the likelihood of surgical-site infections (SSI), especially in procedures such as orthopedic transplants, where deep wounds are open and exposed to contaminants for several hours.

ENVIRCO has designed and manufactured cutting-edge air filtration and surgical suite products that address the needs of hospitals and healthcare facilities.

Hospi-Gard® Products

ENVIRCO's Hospi-Gard® line offers a variety of airborne infection control products for patient rooms and clinics. The IsoClean® and AirCeil® air filtration systems create low-cost, negative pressure isolation rooms to help contain and minimize the spread of airborne viruses and disease. These same systems can also be used as recirculating air systems.



1 Injuries in Hospitals Pose a Significant Threat to Patients and a Substantial Increase in Health Care Costs. Press Release, October 7, 2003. Agency for Healthcare Research and Quality, Rockville, MD. Available at <http://www.ahrq.gov/news/press/pr2003/injurypr.htm>

■ Hospi-Gard IsoClean and IsoClean with UV Light

These self-contained, portable laminar flow HEPA air filtration systems are ideal for use in hospitals, clinics, nursing homes, addiction recovery centers and the like. The IsoClean UV model contains an ultraviolet lamp that helps maximize air purification.

- » Portable for emergency response.
- » Provides up to 27 room air changes per hour in an 18 x 12 x 8 ft room.
- » Easy to maintain.
- » Quiet operation.
- » Three speed adjustable airflow control.
- » Available with UV.



■ Hospi-Gard AirCeil

The versatile and flexible HEPA filtration system provides a high-velocity airflow pattern to maximize particle and contaminant removal in both negative or, when combined with the optional ceiling air diffuser, positive air pressure environments.

- » Ceiling mounted with side exhaust duct.
- » Infrared control.
- » Provides up to 22 room air changes per hour in an 18 x 12 x 8 ft room.
- » Modular design for easy installation.
- » Quiet operation.
- » Helps protect patient and hospital staff.
- » Available with UV.



■ Hospi-Gard Room Pressure Monitor & Remote Annunciator

Easily installed on any wall, the Setra Monitor is required for all Hospi-Gard units to ensure the room maintains negative pressure, which is required for all isolation rooms.

The SRPM room pressure monitor is designed for critical care low differential pressure applications that require stringent pressure monitoring and alarming. True differential pressure is measured and displayed with a resolution of 0.0001" W.C. The SRPM is a complete system that includes a convenient backlit RGB LCD display with an intuitive graphic user interface for pressure, security, calibration, and alarm setup.

Our Remote Annunciator (SRAN) allows remote indication of room pressure status at monitoring/nurses station. A Green LED indicates Normal room condition, a Red LED and Audible Alarm, signaling a breach in room pressure status.

The SRAN is the same size as a standard electrical wall plate (2.75"W x 4.5"H) and fits flush to the wall. It can be mounted to the wall using a standard electrical box.



Laboratory & Research

■ Table Top Horizontal Flow Clean Bench (TT)

The bench or table-mountable TT Table Top provides an ISO Class 5 product-protection environment using an aerosol-challenged HEPA filter.

- » ISO Class 5 (Class 100) clean air work zone.
- » Positive-pressure horizontal airflow.
- » Sizes: 3 to 6 ft.
- » Lighted work surface.
- » Non-glare work surface.



■ EnviraLab Sterility Module (ESM)

The self-contained, clean bench features a modular design and unique vertical and horizontal airflow pattern that sweeps around obstructions, minimizes reverse turbulence and maximizes cleansing within the critical work area. The ESM workstation provides an ISO Class 5 product-protection environment using an aerosol-challenged HEPA filter.

- » ISO Class 5 (Class 100) clean air in a stainless-steel work zone.
- » Positive-pressure vertical airflow.
- » USP 797 IV application.
- » Sizes: 3, 4 and 6 ft.
- » Shielded UV lamp for enhanced sterilization.
- » Perforated, anodized, aluminum diffuser screen protects the HEPA filter and maintains a uniform airflow velocity within the work area.



■ Laminar Flow Horizontal Flow Bench (LF)

The freestanding unit features a unique separate plenum and table design. Positive pressure laminar airflow provides product protection within the work area.

- » ISO Class 5 (Class 100) clean air work zone.
- » Two piece design allows unit to move through laboratory doors with ease.
- » Provides a lighted surface for easy location within a laboratory.
- » Two-piece construction allows easy passage through a standard doorway
- » Non-glare plastic laminated work surface for easy cleaning.
- » Solid state speed control with RFI suppression.





Clean air solutions built for you.

MORE INFORMATION AVAILABLE AT WWW.ENVIRCO.COM

■ Industrial

Cleanroom Products

- » MAC 10 Original
- » MAC 10 IQ
- » MAC 10 IQ LAF
- » MAC 10 LEAC
- » MAC 10 LEAC2
- » MAC 10 LEDC
- » MAC 10 RFAC
- » Ducted Ceiling Module:
DCM & DCM-RSR
- » AC or DC Control Systems
- » MAC-T Ceiling Grid System

■ Hospital & Healthcare

Hospital & Healthcare

- » IsoClean® and IsoClean
with Ultraviolet Light
- » Hospi-Gard® AirCeil®
- » Hospi-Gard Room
Pressure Monitor

■ Pharmaceutical

Pharmaceutical & Medical Device

- » Unimodule M2 Vertical
Laminar Flow Workstation
- » METD 100% Exhausted
Vertical Flow Workstation
- » Laminar Downflow Module

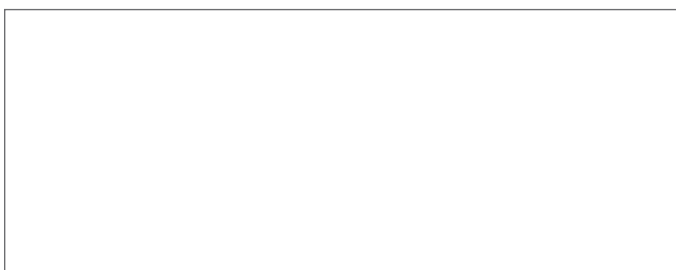
■ Laboratory & Research

Laboratory & Research

- » Unidirectional Flow
Horizontal Flow Bench (LF)
- » Table Top Horizontal Flow
Clean Bench (TT)
- » EnviraLab Sterility Module
(ESM)

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 **ENVIRCO®**
Innovators in clean air technology