

ENVIRCO MAC 10® LEDC Fan Filter Unit

Room-side replaceable filters (RSR/MDR), motors (RSRE/MDRE), controls (RSRC/MDRC)

SECTION 23 37 13 – Diffusers, Registers, and Grilles

PART 1 - GENERAL

1.01 Section Includes

- A. Fan Filter Unit

1.02 Relevant Codes and Standards

- A. UL 507, Standard for Safety Electric Fans
- B. UL 900, Standard for Air Filter Units
- C. IEST-RP-CC001, Institute of Environmental Sciences HEPA and ULPA Filters
- D. IEST-RP-CC002, Institute of Environmental Sciences Recommended Practice for Unidirectional-Flow of Clean Air Devices
- E. IEST-RP-CC006, Institute of Environmental Sciences Recommended Practices for Testing Clean Rooms
- F. IEST-RP-CC034, Institute of Environmental Sciences Recommended Practices for HEPA and ULPA Filter Leak Tests

1.03 Submittals

- A. Product Data shall indicate materials utilized for fabrication and finish, electrical details, and data including air flow & sound ratings.
- B. Operation and Installation manual shall include operating instructions, maintenance requirements, and replacement parts lists.

PART 2 - PRODUCTS

2.01 Fan Filter Units

- A. Basis of Design: ENVIRCO
 - 1. Fan Filter unit shall be UL 507 listed with room-side replaceable filters (RSR/MDR), motors (RSRE/MDRE), and controls (RSRC/MDRC).
- B. Fan Filter Unit
 - 1. Construction:
 - a. The filter of the unit shall be removable from the room-side (RSR/MDR)
 - b. The fan and motor assembly shall be removable from the room-side (RSRE/MDRE)
 - c. The fan, motor assembly, and control components shall be removable from the room-side (RSRC/MDRC)
 - d. The lid shall be constructed of min. 0.063" aluminum with ¼"-20 threaded inserts in four corners for suspension.
 - i. (Optional) Unit lid shall be constructed of 304 Stainless Steel
 - e. The filter housing shall be constructed of 0.063" aluminum with integral knife edge, which penetrates gel in the filter frame. Knife edge shall be an integral part of the diffuser mounting frame to assure leakage is consistent with that of the filter.
 - i. (Optional) Filter housing shall be constructed of 304 Stainless Steel
 - f. Unit plenum shall be walkable up to 250 lbs.
 - g. RSR (MDR) and RSRE (MDRE) shall be provided with removable perforated screen, constructed of 0.063" aluminum with 51% free area.
 - i. (Optional) Perforated screen to be constructed of 304 Stainless Steel
 - h. RSRC (MDRC) shall be provided with perforated screen, constructed of 0.063" aluminum with 51% free area secured to the unit with quarter-turn fasteners with stainless steel retainer cables for ease of installation and removal.
 - i. (Optional) Perforated screen to be constructed of 304 Stainless Steel
 - i. The fan shall be direct drive, single inlet, single width, backward inclined type and shall be constructed of anodized surface aluminum and balanced to 0.5g.
 - j. The motor shall be an electronically commutated (ECM) brushless DC motor programmed for constant torque by adjusting motor RPM. Motor shall be fully enclosed, furnished with thermal overload protection, and permanently lubricated sealed ball bearings. Motor control design to meet 50,000 hours of full load operation.
 - k. RSR (MDR) and RSRE (MDRE) fan filter units shall be supplied with a MERV4 polyurethane foam, washable pre-filter.

- i. (Optional) 2" Pleated Pre-filter, MERV8; shipped loose, field installed
 - ii. (Optional) 2" Pre-filter side load plenum for use with duct collar; shipped loose, field installed.
 - l. RSRC (MDRC) fan filter unit shall be supplied with finger guard.
 - i. (Optional) 2" Pre-filter side load plenum for use with duct collar; shipped loose, field installed.
 - m. The fan filter unit shall be equipped with a dedicated aerosol injection/challenge port and static/concentration port to allow field testing of filter performance in accordance with industry leakage standards.
- 2. Unit Controls:
 - a. The fan filter unit shall be supplied with a universal control card allowing for user selected control via on-board potentiometer, 0-10V analog input, or network mode via MODBUS RTU. Dip switches will select the required mode of operation. In network control mode, the following control points shall be available for read and/or write functionality:
 - i. Unit Start/Stop
 - ii. Demand Setpoint (0-100%)
 - iii. Motor Speed (RPM, 0-2000)
 - iv. Analog Input 1 (0-1000)
 - v. Minimum Setpoint (0-100%)
 - vi. Run/Stop Status (0,2)
 - vii. Network Default Setpoint (0-100%)
 - viii. Actual Setpoint (0-100%)
 - ix. Analog Input 2 (0-1023) [Filter Pressure Drop - when equipped and wired with Continuous Filter Monitor]
 - b. (Optional) Unit Shall be Provided with Remote Mount Controller
 - i. Wall mounted speed controller shall allow for adjustment via potentiometer and visually display unit setpoint and RPM.
 - ii. Unit control box and wall controller are supplied with 1/4" spade terminals for field connection.
 - c. (Optional) Unit Shall be Provided with Infrared Control
 - i. Adjustment made via handheld infrared remote (ships separately) and unit mounted indicator lights provide unit running status and unit setpoint.
- 3. Unit Finish: shall be one of the following:
 - a. M01/D01 Mill finish
 - b. (Optional) M02/D02 White
- 4. Unit Main Filter:
 - a. Air filters shall be high-efficiency, individually tested, and certified panel filters consisting of aluminum enclosing frame, low-outgassing sealant, continuous glue bead separators, and micro glass media filter pack.
 - b. Filter shall be manufactured in a class 10,000 (M5.5, IO Class 7) cleanroom and tested in a Class 100 (M3.5, ISO Class 5) clean space.
 - c. Filter media shall be one continuous pleating of micro glass fiber media formed into a uniform pack depth of 53mm.
 - i. (Optional) Filter media formed into a uniform pack depth of 70mm.
 - d. Pleat spacing shall be by continuous glue bead separators to prevent media-to-media contact and promote uniform airflow through the media pack.
 - e. The media pack shall be completely encapsulated in a polyurethane sealant creating a rigid self-supporting pack. The sealant shall be low-outgassing, fire-retardant, and self-extinguishing.
 - f. The enclosing frame of anodized aluminum profiles shall be joined together with secure internal clips for a rugged and durable enclosure. Overall dimensional tolerance shall be within +0, -1/8", and square within 1/4".
 - g. Filter frame shall have an integral gel channel that is filled with a cleanroom grade low-outgassing polyurethane-based gel.
 - h. Filters shall be listed per Underwriters Laboratories as UL 900.
 - i. Filters shall be tested in accordance with IEST-RP-CC-034.
 - j. The filter shall be identified on a label indicating minimum efficiency, tested airflow, and pressure drop.
 - k. The unit shall be bar code serialized for individual unit identification.
 - l. Filter shall be HEPA, TYPE J per IEST-RP-CC-001.
 - i. (Optional) Filter shall be ULPA, Type F per IEST-RP-CC-001.
 - ii. (Optional) Filter shall be PTFE Boron-free ULPA, Type F per IEST RP-CC-001.
- 5. Unit Options:
 - a. (Optional) Filter Load Indicator Light: factory mounted and wired pressure switch and red LED indicator light. When unit internal static pressure exceeds switch set point the LED is illuminated indicating the filter should be replaced. Pressure switch requires adjustment in installed space for proper functionality.
 - b. (Optional) Airflow Indicator Light: factory mounted green LED indicator light to illuminate when motor is operation.

- c. (Optional) Continuous Filter Monitor: Factory mounted and wired pressure transducer. Pressure transducer measures unit internal static pressure and outputs a 0-10V signal for 0-1 iwc. This signal can be monitored by a control device (by others) or via register 24 through universal control card and MODBUS network.
- d. (Optional) Surface Mount Adapter: Fan filter unit to be supplied with surface mount adapter for mounting in plaster or sheet rock ceiling; shipped loose, field installed.
- e. (Optional) Duct Collar: Fan filter unit to be supplied with 8", 10", 12", or 14" duct collar; shipped loose, field installed.

2.02 Source Quality Control

- A. The manufacturer shall provide published performance data for fan filter units.
 - 1. The fan filter unit shall be tested in accordance with ANSI/ASHRAE Standard 51-2007
 - 2. The fan filter unit shall be tested in accordance with ANSI/AMCA Standard 210-07

PART 3 - EXECUTION

3.01 Examination

- A. Examine areas where fan filter units are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 Installation

- A. Install in accordance with the manufacturer's instructions and recommended practices.
- B. Review drawings for unit sizes and the appropriate installation locations to achieve design requirements for air volume, noise criteria, and airflow pattern. Notify Engineer for determination of final location where architectural features or other items conflict with installation.
- C. Connect to ductwork in accordance with Section 203 21 00.

3.03 Adjusting

- A. Verify supply air to the fan filter units by performing pitot traverse of the main supply duct.
- B. Perform field measurements for airflow and compare to values expected shown on drawings.

END OF SECTION 23 37 13