FAPCU Specification

SECTION 44 10 00 Air Pollution Control

SECTION 44 11 00 Particulate Control Equipment

SECTION 44 11 96 Dry Plate Electrostatic Precipitator Equipment

SPECIFICATIONS

TAG: PCU, PCU CORE, PCU-ESP

PART 1 - GENERAL

1.1 SUMMARY

A. Unit modules shall be factory-assembled, capable of significantly reducing smoke, grease, and odor from the exhaust air stream.

1.2 SUBMITTALS

A. The manufacturer assumes no liability for the use or results of use from this document. Specifications are to be reviewed by the engineer to confirm the requirements of the project and meet Federal, State, and Local building codes.

B. As the manufacturer continues product development, it reserves the right to change design and specifications without notice.

1.3 QUALITY ASSURANCE

A. All units shall be ETL listed to UL-710, CAN/ULC-S646, CAN/ULC-S647 (National Fire Protection Association Standard ("NFPA 96, Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations").

B. ETL/UL listed to UL-8782, and UL-1978/CAN/ULC-S662 (Bolted door design) when installed in accordance with these installation instructions.

C. The Electrostatic Precipitator (ESP) module is ETL listed to UL 867, ULC STD C22.2 No. 187; The Standard for Safety for Electrostatic Air Cleaners.

D. Units equipped with a KB fan shall be listed to ETL standard UL-705 (electrical). Fan complies with UL-762 and CSA Std C22.2, No.113 listing when attached to a multi-pass air-cleaning unit and installed in accordance with National Fire Protection Association Standard ("NFPA 96, Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations").

E. KB-Inline is ETL listed and complies with UL705 (electrical) and UL762 and CSA Std C22.2, No 113.

F. Models USBI11-RM thru USBI36-RM (SIF11DD-HESS thru SIF36DD-HESS) are ETL Listed and comply with UL705 (electrical), UL762, and ULC-S645 Standards and CSA Std C22.2, No 113.

1.4 WARRANTY

A. All units are provided with the following 2-year standard warranty.

B. This warranty shall not apply if:

1. The equipment is not installed by a qualified installer per the manufacturer's installation instructions shipped with the product.
2. The equipment is not installed in accordance with Federal, State, Local codes and regulations.
3. The equipment is misused or neglected, or not maintained per the manufacturer's maintenance instructions.
4. The equipment is not operated within its published capacity.
5. The invoice is not paid within the terms of the sales agreement.

C. The manufacturer shall not be liable for incidental and consequential losses and damages potentially attributable to malfunctioning equipment. Should any part of the equipment prove to be defective in material or workmanship within the 2-year warranty period, upon examination by the manufacturer, such part will be repaired or replaced by the manufacturer at no charge. The buyer shall pay all labor costs incurred in connection with such repair or replacement. Equipment shall not be returned without manufacturer's prior authorization, and all returned equipment shall be shipped by the buyer, freight prepaid to a destination determined by the manufacturer.

PART 2 - PRODUCTS

2.1 GENERAL

A. Pollution control units designed per the following specification, deliver all capacities listed, and conform to design indicated herein. Alternate layouts or dimensional changes will not be accepted.

B. Installation of unit: Indoor (must be conditioned space), Outdoor.

2.2 UNIT CONSTRUCTION

A. Unit(s) shall be constructed of 430 SS polish 2B or better. All metal in contact with the air- stream is to be constructed of 430SS.

1. Construction: Steel will be riveted together via 3/16" rivets. All metal shall be CNC bent for precise assembly. The base shall be constructed of galvanized steel for improved rigidity. Base shall be structurally reinforced to accommodate the filter assembly.
2. Sealing: 1500°F Ceramic based gasket must be in place for all internal seams exposed to airflow. High temperature weatherproofing gasket must be used on all exterior seams
3. Joints shall be sealed with 3M Fire Barrier 2000+.
4. Rigging Provisions: Unit equipped with lifting lugs at the top of base unit.
5. Service Access Doors: All door jambs shall be gasketed around their perimeter, and allow for doors to be mounted via removable, spring-actuated, stainless steel hinges with stainless steel rivets, and self-compressing latches. All doors shall latch that are pad-lockable. Electrical cabinet doors shall be outfitted with a wiring diagram attached to the inside of the door from the factory.

2.3 BLOWER AND MOTOR

A. Exhaust fan(s) may be direct-drive or belt-drive.

B. Blower Motor: Motor shall be a premium efficiency motor available as:

1. Open Drip Proof (ODP) or Totally Enclosed Fan Cooled (TEFC) - washdown with Class H insulation, Explosion Proof.
2. VFD may be unit mounted in PCU or remote mounted in Electrical Control Panel (ECP).

C. Fans to be selected at or near efficiency peak.

D. Blower and motor assembly shall be dynamically balanced. The entire blower and motor assembly shall be mounted on rubber vibration isolators. Wheels balanced as per AMCA 204-96, Balance Quality and Vibration Levels for fans.

2.4 FILTERS

A. Provide filters as part of unit. All filters shall be furnished and installed to meet the performance requirements set forth in the schedule and as specified under another section of this work.

B. All filters shall be installed on tracks for easy removal from the unit.
   1. Pre-Filter Section: The pre-filter section shall include 2-inch deep steel washable permanent filters. Filter frames shall be constructed of steel. Disposable Grease Lock filters (optional) placed upstream of the permanent filters shall be provided for improved filtration and longevity of High Efficiency Filters. Filters shall be arranged in a v-bank configuration to increase filter area and reduce static pressure. All filters shall be removable without the use of tools through side access doors. Cleanable filters are available.
   2. High Efficiency Filter Section: The phase two filters shall consist of 4-inch deep rigid cell extended surface filters. Filter cell sides shall be constructed of metallic frame with downstream mesh for durability. Beverage board filter sides shall not be permitted. Filters shall be arranged in a v-bank configuration to increase filter area and reduce static pressure. All filters shall be removable without the use of tools through side access doors. Filters are to be rated MERV15 minimum in accordance with ASHRAE standard 52.2 and have a minimum average arrestance of 98% in accordance with ASHRAE 52.1-1992. High Efficiency module must be installed downstream of pre-filter module.
   3. ESP Filter Section: The ESP section shall consist of metal electrostatic precipitator cells. Cells should have a minimum rating of MERV 15 in accordance to ASHRAE standard 52.2. Cells should be constructed of stainless steel and aluminum. Cells should use rigid-type spiked ionizing plates. Glazed ceramic isolators should be used for isolating high voltage components. Metal pre-filters and metal post-filters should be used on the inlet and outlet of this section. This ESP section should have an internal wash system for the ESP cells. The ESP section should be installed downstream the Pre-Filter or High Efficiency module. All filters shall be removable without the use of tools through side access doors.
   4. HEPA Filter Section: The phase two filters shall consist of 4-inch deep rigid cell extended surface filters. Filter cell sides shall be constructed of metallic frame with downstream mesh for durability. Beverage board filter sides shall not be permitted. Filters shall be arranged in a v-bank configuration to increase filter area and reduce static pressure. All filters shall be removable without the use of tools through side access doors. Filters are to be rated MERV17 minimum in accordance with ASHRAE standard 52.2. HEPA module must be installed downstream of High Efficiency filter module.
   5. Odor Control Media Section (Optional): The filters shall consist of 4-inch deep rigid cell extended surface filters. Filter cell sides shall be constructed of metallic frame. Beverage board filter sides shall not be permitted. Filters shall be arranged in a v- bank configuration to increase filter area and reduce static pressure. All filters shall be removable without the use of tools through side access doors. High Efficiency module must be installed downstream of pre-filter module.
   6. Advanced Filter Monitoring System (Optional) - The Advanced Filter Monitoring includes a module that provides the necessary precision pressure measurements for accurate monitoring of the complete system. Based on the measurements the AFM will initiate suitable actions via the electric control package in case of a fault. Direct access to the operating conditions are also provided through the use of a HMI (Human Machine Interface), which is conveniently located on the PCU.

2.5 FIRESYSTEM(S)

A. The detection portion of the fire suppression system allows for automatic detection using an electric thermal detector located in the intake and outlet of the unit.

B. PCU CORE Protection Fire System (Optional): If the Pollution Control Unit Firestat senses a temperature hotter than its internal setpoint, an electric signal is sent to the CORE Fire System Cabinet. An electric water solenoid is energized, allowing the flow of water to the Pollution Control Unit mounted manifold. The CORE fire suppression system is a pre-engineered, pollution control unit fire system that utilizes a water spray system.

C. PCU TANK Suppression Fire System (Optional): If the Pollution Control Unit Firestat senses an extreme heat rise, an electric signal is sent to the Fire System Control Cabinet. When activated, stored pressure will flow chemical agent to the Pollution Control Unit mounted manifold. The TANK Suppression Fire system is a pre-engineered, pollution control unit fire system that utilizes a wet chemical agent.

D. Electrical Wet Chemical (Optional): If the Pollution Control Unit Firestat senses an extreme heat rise, an electric signal is sent to the Fire System Control Cabinet. When activated, a wet chemical agent will flow to the Pollution Control Unit mounted manifold. The Electric Wet Chemical system is a pre-engineered, pollution control unit fire system that utilizes a wet chemical agent.

2.6 ELECTRICAL

A. All controls shall be pre-wired and housed in an electrical cabinet within the unit to protect against the risk of condensation.

B. The electrical cabinet shall be outfitted with the following:
   1. Color wiring schematics, laminated to the interior wall of the cabinet doors.
   2. Factory mounted disconnect with unit bottom knockouts.

2.7 CONTROLS

A. Unit shall be outfitted with a control board (located in the control cabinet) to allow for full control of the entire unit.

B. Fault detection through control board, faults displayed on the board's LCD.

2.8 RAILS

A. Outdoor units will be mounted on rails.

B. Indoor units must mount with indoor hanging cradle.

2.9 VARIABLE FREQUENCY DRIVES

A. Provide Variable Frequency Drive for the unit. VFD shall be furnished and installed to meet the performance set forth in the schedule and as specified under another section of this work.
   1. Accessories to be furnished and mounted by the drive manufacturer and contained in a single enclosure. (The use of more than one enclosure is not acceptable).

B. Provide Variable Frequency Drive for speed control on all non-ECM direct drive fans.

C. All VFDs shall provide the following inherent protections:
   1. Phase protection
   2. Brownout protection

3. Overload/Overheat protection
4. Soft starts to protect bearings/hardware.
5. Low & High voltage & over-torque protections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which units are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions, drawings, written specifications, manufacturer's installation manual, and all applicable building codes.

3.3 CONNECTIONS

A. Piping installation requirements are specified in Division 22 Sections. Drawings indicate the general arrangement of piping, fittings, and specialties. Install piping to allow service and maintenance.
B. Duct installation requirements are specified in other Division 23 Sections. Drawings indicate the general arrangement of ducts.
C. Electrical: Conform to applicable requirements in Division 26 Sections.

3.4 SYSTEM START-UP

A. System start-up is performed by a factory-trained Service Technician.

Product: Fan shall be model FAPCU as manufactured by FloAire.