

**SECTION 15845**  
**RECIRCULATING AIR ENTRANCE SYSTEM**

**PART 1 – GENERAL**

1.01 WORK INCLUDED

- A. Section Includes:
  - 1. Recirculating Air Entrance System
  - 2. Receipt and Storage
  - 3. Installation
  
- B. Related Sections:
  - 1. Section 16 - Electrical
  - 2. Section 3 - Concrete Work
  - 3. Section 7 - Joint Sealers: Air tight penetration sealant
  - 4. Section 15 – Building Services Piping: Water supply and connections

1.02 REFERENCES

- A. Air Movement and Control Association (AMCA)
  - 1. AMCA Standard 210 – Laboratory Test Methods of testing Fans for Ratings
  
- B. National Fire Protection Association (NFPA)
  - 1. NFPA 70 – National Electrical Code (NEC)
  
- C. National Electrical Manufacturer's Association (NEMA)

1.03 SYSTEM DESCRIPTION

- A. Performance Requirements: Where required, the recirculating air entrance system manufacturer shall be responsible for conforming to state and local codes.

1.04 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in the manufacturing of all components and products of recirculating air entrance systems as specified under this section.
  
- B. Electrical Components, Devices and Accessories: ETL Listed, UL Listed or CUL Listed and labeled as defined in NFPA 70.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Product Delivery: Recirculating air entrance system manufacturer shall deliver products to the jobsite as per the established delivery date as established by the contractor or owner.
  - 1. Schedule floor grating support and equipment base for installation prior to placement of concrete for the air entrance pit.
  
- B. Installation Drawings and Instructions: Transmitted to contractor or owner upon receipt of order or contract including (6) copies of manufacturer drawings and product specifications.
  
- C. Product Packaging: Products shall be packaged using manufacturer's standard cartons with clearly labeled markings on each package.

*Berner reserves the right to alter specifications without prior notice.*

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## PART 2 – PRODUCTS

### 2.01 MANUFACTURER

A. Berner International Corporation, New Castle, PA. (P) 724.658.3551 or 800.245.4455. (F) 724.652.0682

### 2.02 RECIRCULATING AIR ENTRANCE SYSTEM

#### A. AIR HANDLING CABINET

##### 1. CABINET

- a. The cabinet shall be constructed of a minimum of 16 gauge aluminized steel and shall have a gray baked-on enamel finish.
- b. Two hinged access doors shall be installed on the front of the air handling cabinet and shall be of sufficient size to allow for inspection, cleaning, access and removable of all internal components.
- c. A steel angle iron base shall be provided for support of the fan and shall be designed to allow for the entire fan assembly to slide along the steel angle for inspection, cleaning or removal of the fan, motor and drive system.
- d. A filter frame shall be supplied on the base of the central air handling cabinet and shall be designed to allow for installation and removal of the filters through the two access doors.

##### 2. FAN

- a. The fan shall be of forward curved design and shall be supported on a structural steel angle iron frame. The fan shall be isolated from vibration.
- b. The fan shall be rated and tested in accordance with AMCA standard 210.
- c. The fan wheel and the housing shall be of matched design and shall be statically and dynamically balanced to ensure vibration free performance.
- d. The fan housing shall include aerodynamically formed air inlet rings for smooth and turbulent free air into the fan wheel. All wheels and housings shall be constructed of steel and shall have gray epoxy paint.
- e. The fan shall be sized to deliver the specified airflow at the design static pressure.
- f. Fan shall be belt driven.

##### 3. MOTOR

- a. High efficiency type, totally enclosed fan cooled (TEFC) NEMA type B design with a minimum service factor of 1.15. Motor shall be designed to accept 208/240/480/3/60.

##### 4. CENTRAL CONTROL PANEL

- a. The control panel shall be U. L. listed, factory wired and mounted on the exterior of the central air handling cabinet. Components shall include but not limited to: indicator lights, switches for operator interface, temperature controls, PLC (programmable logic controller), motor starter and fused disconnect switch.

##### 5. WASHABLE FILTERS

- a. The filter shall be of 1" thick hog hair washable media composed of natural fibers that are UL Classified Class 2.

##### 6. WATERWASH SYSTEM

##### 7. AIR DISTRIBUTION PLENUM

- a. The air distribution plenum shall be one piece construction and exterior shall be a minimum of 20 gauge aluminized steel. All seams on the air distribution plenum shall be

sealed with a waterproof construction adhesive. Heavy gauge steel straps shall be equally spaced along the top of the duct for field attachment of the plenum to the building structure. Air straightening vanes, mixing dampers and isolated air chambers shall be included in the air distribution plenum.

- b. An 18" wide air outlet nozzle shall be centered in the bottom of the air distribution plenum. The outlet nozzle shall run the full length of the opening and shall include 4" high honeycomb cells to ensure uniform air velocity along the full width and length of the outlet nozzle. The honeycomb cells shall be constructed of aluminum. Satin anodized aluminum egg crate grilles shall be installed on the bottom side of the honeycomb cells. Each grille and honeycomb cell shall be easily removable for inspection and cleaning of the air distribution plenum.
  - c. Recessed florescent lights shall run along the longitudinal edge of the air outlet nozzle. The lights shall be equally spaced on each side of the air outlet nozzle and shall run the full width of the opening. Each lighting fixture shall consist of four feet sections with each section containing two florescent bulbs. The total number of fixtures and bulbs will vary depending on the width of the opening. A parabolic light diffuser shall be installed below each lighting fixture and shall be easily removable for fixture service and bulb replacement. All lighting fixtures shall be UL recognized and shall be factory wired to a single point power connection.
8. FLOOR GRATING
- a. Floor grating sections shall be provided for return air and shall be designed to maintain even air distribution along the entire grating surface. The grating shall be constructed of aluminum and shall be 1/8" thick with individual surface T-bars 1/4" x 1" with a 3/16" opening between each bar. Each individual grating bar shall be tapered at the bottom allowing dirt and debris to easily pass through the grating to the concrete pit. The grating shall be suitable for heavy pedestrian traffic and light duty cart traffic. The flooring shall be suitable for supporting a load of 500#/sq. ft. Each grating section shall be mechanically fastened to the structural steel floor grating support frame.
9. CONCRETE PIT AIR BAFFLES
- a. Special designed air baffles shall be field installed on each side of the concrete pit. The angle and length of each baffle shall permit uniform velocity along the full area of the floor grating. All baffles shall be manufactured of Type 316 stainless steel. Stainless steel or non-corrosive fasteners shall be used for securing the baffles to the pit.

#### 2.03 ACCESSORIES AND RELATED ITEMS (CONTRACTOR FURNISHED AND INSTALLED)

- A. Concrete pit/return air plenum of size and configuration as indicated on the drawings.
- B. Temporary cover of floor grating framing.
- C. Cold water supply lines/piping to the air handling cabinet as indicated on the drawings.
- D. Concrete pit drain and waste line as indicated on the drawings.
- E. Electrical wiring to the air handling cabinet and florescent lights.

### Part 3 – EXECUTION

#### 3.01 INSTALLATION

- A. Install all air entrance equipment in accordance with the manufacturers published instructions and installation drawings.
- B. Install floor grating support and equipment base for the air handling cabinet prior to concrete placement of the air entrance concrete pit.
  - 1. Provide temporary cover to allow traffic flow of not more than 500#/sq.ft. through opening and to protect the floor grating support angle.
  - 2. Install filter rack housing onto pit (do not install filters at this time).

3. Place air handling cabinet on floor grating/equipment base.
4. Install pit wash tubing and nozzles in pit and plumb.
5. Place elbow on air handling cabinet duct/heating source.
6. Attach upper air plenum to elbow riser.
7. Attach all electrical, plumbing and mechanical connections.
8. Proceed to cleaning before system start-up.

### 3.02 CLEANING

- A. Upon completion of air entrance system installation, clean exterior and remove excess packaging materials and debris.
- B. Clean air entrance pit before system startup.
  1. Clean pit and drain of dirt and debris.
  2. Rinse pit with water to ensure that it is clean and the drain is not obstructed (Hose bib located inside air handling cabinet).
  3. Install unit filters in filter racks.
  4. Upon completion of cleaning and prior to opening for customer traffic, install the floor grating. Ensure that all floor grating rests flush in frame so that no edges protrude.

### 3.03 SYSTEM STARTUP

- A. The installing contractor shall be responsible for the testing of all mechanical and electrical systems. Unit shall be run for a sufficient time period demonstrating the correct operation of the system and its components.
- B. Refer to manufacturers installation, operation and maintenance manual for detailed start-up procedures. (Refer to Installation, Operation and Maintenance Manual)
  1. Perform final visual inspection to confirm that all debris has been removed. Check fan for free rotation.
  2. Verify that the voltage provided is the same voltage labeled on the control panel.
  3. Turn the main power disconnect switch to the on position.
  4. Check fan for proper rotation:
    - a. Set unit in "manual" mode.
    - b. Press "start" button to start unit.
    - c. Press "stop" button.
    - d. Open access doors and carefully observe fan rotation. **DO NOT REACH INTO CABINET WHILE FAN IS MOVING.** If fan is rotating backwards, correct rotation and continue with start-up.
  5. Refer to manufactures operating instructions and test unit for control sequence to verify correct operation.
  6. Installer shall supply complete list with Installation, Operation and Maintenance Manual to owner.