Wall Mounted Displacement Diffusers

SECTION 23 06 30 – PRODUCT
PART 1 - GENERAL

1.1 Summary
A. This section includes the following:
   1. Floor mounted displacement diffusers

1.2 Related Documents
A. 23 01 00 – Operation and Maintenance of HVAC Systems
B. 23 05 00 – Common Work Results for HVAC
C. 23 09 00 – Instrumentation of Control for HVAC
D. 23 20 00 – HVAC Piping and Pumps
E. 23 30 00 – HVAC Air Distribution

1.3 Submittals
A. Product Data: For each type of product indicated, include rated capacities, furnished specialties and accessories.
B. Shop Drawings: For each type of product indicated, include the following:
   1. Detail equipment assemblies and indicated dimensions.
   2. Required clearances.
   4. Revit models
C. Coordination Drawings: Include floor plans, and other details, drawn to scale, one which the following items are shown and coordinated with each other, based on input from installers of the items involved:
   1. Ceiling-mounted items including:
      a. Fixtures
      b. Lightning fixtures
      c. Speakers
      d. Sprinklers
      e. Access panels
      f. Diffusers
      g. Grilles
      h. Air inlets
      i. Perimeter molding for exposed or partially exposed cabinets.
D. Operation and Maintenance Data: To include in emergency, operation and maintenance manuals, maintenance schedules and repair part lists for all parts.

1.4 Quality Assurance
A. Product Options: Include drawings indicating size, profiles and dimensional requirements of the displacement ventilation diffusers that are based on the specific system indicated.
B. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100 by a testing agency acceptable to authorities having jurisdiction and marked for intended use.

1.5 Coordination
A. Coordinate layout and installation of diffusers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.
B. Specific configuration of the supply and return ductwork and at each unit has been indicated on the drawings. If the configuration of the units furnished on the project differs from that indicated on the drawings (whether or not the units furnished are the specific units or an acceptable substitute), it shall be the contractor’s responsibility to modify ductwork, etc., as required to accommodate the actual configuration of units furnished on the project.

PART 2 – PRODUCTS

2.1 General
A. Manufacturer shall be responsible for examining applications of each type of unit to assure that each will operate properly in the intended application.
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B. Unit sizes are shown as selected in accordance with the principles set forth in the ASHRAE Guide and Manufacturer’s literature.

C. All items of a given type shall be the products of the same manufacturer.

2.2 Manufacturers

A. In Part 2 articles where titles below introduce lists, the following requirements apply to selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

Manufacturers shall demonstrate that they have successfully supplied and installed displacement ventilation products, as well as the computer modeling thereof for a minimum of 10 years. Manufacturers must be pre-qualified to bid based on the completion of a minimum of x jobs in similar climates.

Manufacturers shall provide a list of completed jobs and references.

2.3 DF1 Displacement Diffusers

A. Approved Manufacturers:

1. Price

B. Description: Furnish and install Price model series DF1 (WxHxD) with the sizes and capacities indicated on the plans and air outlet schedule.

C. Performance: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face, in all ducting configurations and without the use of nozzles.

Diffuser Manufacturer shall provide sound and pressure drop data derived from tests in accordance with ASHRAE Standard 70-2006. Performance data for Draft Rate (%DR) shall be provided based on tests in accordance with ASHRAE Standard 55-2004. A manufacturer software program that allows room comfort evaluation for specific operating conditions and diffuser locations shall be available to aid in performance assessment. If such a computer program is not available from the manufacturer, the manufacturer shall supply, free of charge, a CFD model of the representative spaces completed by a modeling contractor who has demonstrable qualifications to model such spaces. These shall include no less than 10 years of experience in the modeling of displacement ventilation systems, thorough validation of the code through comparison to empirical data as well as a list of references.

D. Construction: The 1 way flat faced Displacement diffuser, model DF1 shall be constructed with an equalization baffle behind the operative diffuser face for uniform, low velocity, distribution of supply air. Both the equalization baffle and face shall be securely retained in the diffuser frames. Plastic nozzle arrays or any plastic components are unacceptable. The diffuser frames shall be constructed of high strength aluminum extrusion for rigidity and protection of the operative face and side panels. There shall be no visible fasteners on the front or side panels. The operative face shall be constructed of painted 16 gauge perforated steel, rear side and end panels shall be provided in painted 20 gauge steel. The frame and internal baffling elements shall be constructed of Aluminum. The diffuser shall be available for duct connection at the top, bottom, side or rear of the diffuser with a factory or field cut inlet. The paint shall be powder coat polyester. Epoxies and their derivatives are unacceptable. Visible non-metallic component are unacceptable. The diffuser shall be supplied with a rail mounting system that does not require punching the diffuser to install.

Mounting/Fastening: The diffuser shall fasten to the wall via a rail mounting system. The rail mounting system with metal cover strips to conceal all visible fasteners.

2.4 DF3 Displacement Diffusers

A. Approved Manufacturers:

1. Price

B. Description: Furnish and install Price model series DF3 (WxHxD) with the sizes and capacities indicated on the plans and air outlet schedule.

C. Performance: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face, in all ducting configurations and without the use of nozzles. Diffuser Manufacturer shall provide sound and pressure drop data derived from tests in accordance with ASHRAE Standard 70-2006. Performance data for Draft Rate (%DR) shall be provided based on tests in accordance with ASHRAE Standard 55-2004. A software program that allows room comfort evaluation for specific operating conditions and diffuser locations shall be available to aid in performance assessment. If such a computer program is not available from the manufacturer, the manufacturer shall supply, free of charge, a CFD model of the representative spaces completed by a modeling contractor who has demonstrable qualifications to model such spaces. These shall include no less than 10 years of experience in the modeling of displacement ventilation systems, thorough validation of the code through comparison to empirical data as well as a list of references.

D. Construction: The 3 way flat faced Displacement diffuser, model DF3 shall be constructed with an equalization baffle behind the operative diffuser faces for uniform, low velocity, distribution of supply air. Both the equalization baffle and faces shall be securely retained in the diffuser frames. Plastic nozzle arrays or any plastic components are unacceptable. The diffuser frames shall be constructed of high strength aluminum extrusion for rigidity and protection of the operative face and side panels. There shall be no visible fasteners on the front or side panels. The operative faces shall be constructed of painted 16 gauge perforated steel, rear and end panels shall be provided in painted 20 gauge steel. The frame and internal baffling elements shall be constructed of Aluminum. The diffuser shall be available for duct connection at the top, bottom, or rear of the diffuser with a factory or field cut inlet. The paint shall be...
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powder coat polyester. Epoxies and their derivatives are unacceptable. Visible non-metallic components are unacceptable. The diffuser shall be supplied with a rail mounting system that does not require puncturing the diffuser to install.

E. Mounting/Fastening: The diffuser shall fasten to the wall via a rail mounting system. The rail mounting system with metal cover strips to conceal all visible fasteners.

2.5 DF1C Displacement Diffusers

A. Approved Manufacturers:

1. Price

B. Description: Furnish and install Price model series DF1C (WxH) with the sizes and capacities indicated on the plans and air outlet schedule.

C. Performance: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face, in all ducting configurations and without the use of nozzles. Diffuser Manufacturer shall provide sound and pressure drop data derived from tests in accordance with ASHRAE Standard 70-2006. Performance data for Draft Rate (%DR) shall be provided based on tests in accordance with ASHRAE Standard 55-2004. A software program that allows room comfort evaluation for specific operating conditions and diffuser locations shall be available to aid in performance assessment. If such a computer program is not available from the manufacturer, the manufacturer shall supply, free of charge, a CFD model of the representative spaces completed by a modeling contractor who has demonstrable qualifications to model such spaces. These shall include no less than 10 years of experience in the modeling of displacement ventilation systems, thorough validation of the code through comparison to empirical data as well as a list of references.

D. Construction: The 1 Way Flat Faced Corner Displacement diffuser, model DF1C, shall be constructed with an equalization baffle behind the operative diffuser face for uniform, low velocity, distribution of supply air. Both the equalization baffle and face shall be securely retained in the diffuser frames. Plastic nozzle arrays or any plastic components are unacceptable. The diffuser frames shall be constructed of high strength aluminum extrusion for rigidity and protection of the operative face and side panels. There shall be no visible fasteners on the front or side panels. The operative face shall be constructed of painted 16 gauge perforated steel, side and end panels shall be provided in painted 20 gauge steel. The frame and internal baffling elements shall be constructed of Aluminum. The diffuser shall be available for duct connection at the top, bottom, or rear of the diffuser with a factory or field cut inlet. The paint shall be powder coat polyester. Epoxies and their derivatives are unacceptable. Visible non-metallic components are unacceptable. The diffuser shall be supplied with concealed mounting brackets that do not require puncturing the diffuser to install.

E. Mounting/Fastening: The diffuser shall be supplied with concealed mounting bracket that do not require puncturing the diffuser to install.

2.6 DR90 Displacement Diffusers

A. Approved Manufacturers:

1. Price

B. Description: Furnish and install Price model series DR90 (DiaxH) with the configurations and mounting types indicated on the plans and air outlet schedule.

C. Performance: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face, in all ducting configurations and without the use of nozzles. Diffuser Manufacturer shall provide sound and pressure drop data derived from tests in accordance with ASHRAE Standard 70-2006. Performance data for Draft Rate (%DR) shall be provided based on tests in accordance with ASHRAE Standard 55-2004. A software program that allows room comfort evaluation for specific operating conditions and diffuser locations shall be available to aid in performance assessment. If such a computer program is not available from the manufacturer, the manufacturer shall supply, free of charge, a CFD model of the representative spaces completed by a modeling contractor who has demonstrable qualifications to model such spaces. These shall include no less than 10 years of experience in the modeling of displacement ventilation systems, thorough validation of the code through comparison to empirical data as well as a list of references.

D. Construction: The 90 Degree Supply Radial Displacement diffuser, model DR90 shall be constructed with an equalization baffle behind the operative diffuser face for uniform, low velocity, distribution of supply air. Both the equalization baffle and face shall be securely retained in the diffuser frames. Plastic nozzle arrays or any plastic components are unacceptable. The diffuser frames shall be constructed of high strength aluminum extrusion for rigidity and protection of the operative face and side panels. There shall be no visible fasteners on the front or side panels. The operative face shall be constructed of painted 18 gauge perforated steel, side and end panels shall be provided in painted 20 gauge steel. The frame and internal baffling elements shall be constructed of Aluminum. The diffuser shall be available for duct connection at the top, bottom, or rear of the diffuser with a factory or field cut inlet. The paint shall be powder coat polyester. Epoxies and their derivatives are unacceptable. Visible non-metallic components are unacceptable. The diffuser shall be supplied with a rail mounting system that does not require puncturing the diffuser to install.

E. Mounting/Fastening: The diffuser shall be supplied with concealed mounting brackets that do not require puncturing the diffuser to install.

2.7 DR180 Displacement Diffusers

A. Approved Manufacturers:
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1. Price

B. Description: Furnish and install Price model series DR180 (DiaxH) with the configurations and mounting types indicated on the plans and air outlet schedule.

C. Performance: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face, in all ducting configurations and without the use of nozzles. Diffuser Manufacturer shall provide sound and pressure drop data derived from tests in accordance with ASHRAE standard 70-2006. Performance data for Draft Rate (%DR) shall be provided based on tests in accordance with ASHRAE Standard 55-2004. A manufacturer software program that allows room comfort evaluation for specific operating conditions and diffuser locations shall be available to aid in performance assessment. If such a computer program is not available from the manufacturer, the manufacturer shall supply, free of charge, a CFD model of the representative spaces completed by a modeling contractor who has demonstrable qualifications to model such spaces. These shall include no less than 10 years of experience in the modeling of displacement ventilation systems, thorough validation of the code through comparison to empirical data as well as a list of references.

C. Construction: The 180 Degree Supply Radial Displacement diffuser, model DR180 shall be constructed with an equalization baffle behind the operative diffuser face for uniform, low velocity, distribution of supply air. Both the equalization baffle and face shall be securely retained in the diffuser frames. Plastic nozzle arrays or any plastic components are unacceptable. The diffuser frames shall be constructed of high strength aluminum extrusion for rigidity and protection of the operative face and side panels. There shall be no visible fasteners on the front or side panels. The operative face shall be constructed of painted 18 gauge perforated steel, top and bottom panels shall be provided in painted 20 gauge steel. The frame and internal baffling elements shall be constructed of aluminum. The diffuser shall be available for duct connection at the top, bottom, or rear of the diffuser with a factory or field cut inlet. The paint shall be powder coat polyester. Epoxies and their derivatives are unacceptable. Visible non-metallic components are unacceptable. The diffuser shall be supplied with a rail mounting system that does not require puncturing the diffuser to install.

D. Mounting/Fastening: The diffuser shall fasten to the wall via a rail mounting system. The rail mounting system with metal cover strips to conceal all visible fasteners.

2.8 DR180U Displacement Diffusers

A. Approved Manufacturers:

1. Price

B. Description: Furnish and install Price model series DR180U (DiaxH) with the configurations and mounting types indicated on the plans and air outlet schedule.

C. Performance: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face, in all ducting configurations and without the use of nozzles. Diffuser Manufacturer shall provide sound and pressure drop data derived from tests in accordance with ASHRAE standard 70-2006. Performance data for Draft Rate (%DR) shall be provided based on tests in accordance with ASHRAE Standard 55-2004. A manufacturer software program that allows room comfort evaluation for specific operating conditions and diffuser locations shall be available to aid in performance assessment. If such a computer program is not available from the manufacturer, the manufacturer shall supply, free of charge, a CFD model of the representative spaces completed by a modeling contractor who has demonstrable qualifications to model such spaces. These shall include no less than 10 years of experience in the modeling of displacement ventilation systems, thorough validation of the code through comparison to empirical data as well as a list of references.

D. Construction: The 180U Degree Supply Radial Displacement diffuser, model DR180U shall be constructed with an equalization baffle behind the operative diffuser face for uniform, low velocity, distribution of supply air. Both the equalization baffle and face shall be securely retained in the diffuser frames. Plastic nozzle arrays or any plastic component are unacceptable. The diffuser frames shall be constructed of high strength aluminum extrusion for rigidity and protection of the operative face and side panels. There shall be no visible fasteners on the front or side panels. The operative face shall be constructed of painted 18 gauge perforated steel, top and bottom panels shall be provided in painted 20 gauge steel. The frame and internal baffling elements shall be constructed of Aluminum.

The equalization baffle shall be no less than 10 years of experience in the modeling of displacement ventilation systems, thorough validation of the code through comparison to empirical data as well as a list of references.

E. Mounting/Fastening: The diffuser shall fasten to the wall via a rail mounting system. The rail mounting system with metal cover strips to conceal all visible fasteners.

2.9 Diffuser Accessories

A. Bases for displacement diffuser models: DF1, DF3, DF1C, DR90, DR180, DR180U

Diffuser manufacturer shall provide bases under each displacement diffuser. The base shall allow for removal from the space for access to the inlet of the diffuser if ducted from below. The base shall have an extruded aluminum frame and 20 gauge solid steel face. Base heights shall be as indicated on the drawings. Finish shall be B12 – white, or as indicated.

B. Duct Covers for displacement diffuser models: DF1, DF3, DR90, DR180, DR180U

Diffuser manufacturer shall provide duct covers available for all inlet locations. The duct covers shall be manufactured by the diffuser manufacturer. The duct cover face shall be constructed of painted 18 gauge (solid/perforated) steel. The duct cover frames shall be...
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constructed of high strength aluminum extrusion for rigidity and protection of the face and side panels. The duct cover shall be supplied with a rail mounting system with metal cover strips to conceal all fasteners. All duct covers shall be factory assembled and shipped complete with the associated diffuser. There shall be no visible fasteners on the duct cover panels. The paint shall be powder coat polyester to match the diffuser or as selected by the architect. Epoxies and their derivatives are unacceptable. Visible non-metallic components are unacceptable. The paint shall be powder coat polyester to match the diffuser or as selected by the architect.

C. Duct Covers for displacement diffuser models: DF1C
   Diffuser manufacturer shall provide duct covers available for all inlet locations. The duct cover face shall be securely retained in the mounting frames. The duct cover face shall be constructed of painted 18 gauge (solid/perforated) steel. The duct cover frames shall be constructed of high strength aluminum extrusion for rigidity and protection of the face. There shall be no visible fasteners on the duct cover panels. The paint shall be powder coat polyester to match the diffuser or as selected by the architect. Epoxies and their derivatives are unacceptable. Visible non-metallic components are unacceptable. All duct covers shall ship complete with the associated diffuser.

D. AFSD’s for displacement diffuser models: DF1, DF3, DF1C, DR90, DR180, DR180U
   1. Approved Manufacturers:
      a. Price

B. Description: Furnish and install Price model series Adjustable Flow Station for Displacement Diffusers, AFSD, (DiaxH) as indicated on the plans and air outlet schedule.

C. Performance: The manufacturer shall supply pressure loss data and air flow ranges for the various sensing device sizes.

D. Construction: The air flow sensor shall be of a cross configuration. The sensor shall have twelve total pressure sensing ports and a center averaging chamber designed to accurately average the flow across the inlet of the assembly. Sensor shall meet accuracy within 5% with a 90° sheet metal elbow directly at the inlet of the assembly. The air flow sensor shall amplify the sensed air flow signal. Two flexible tubes, one connected to the high pressure port and the other connected to the low pressure port of the air flow sensor, shall extend through the assembly housing to allow for easy monitoring of the air flow.

The unit shall be constructed of 22 gauge zinc coated steel. The damper shall incorporate a lever for manual adjustment and a wing-nut for locking the damper in position.

PART 3 – EXECUTION

3.1 Installation – General
   A. Install displacement diffusers level and plumb. Maintain sufficient clearance for normal services, maintenance, or in accordance with construction drawings.

   B. Complete installation and startup checks according to manufacturer’s instructions and perform the following.
      1. Verify that inlet duct connections are as recommended by manufacturer to achieve proper performance.
      2. Verify that any identification tags are visible.
      3. Verify locations of thermostats, humidistats, and other exposed control sensors with Drawings and room details before installation.