

**SECTION 23 37 00
AIR OUTLETS AND INLETS**

SPEC WRITER NOTES:

1. Use this section only for NCA projects.
2. Delete between // // if not applicable to project. Also delete any other item or paragraph not applicable in the section and renumber the paragraphs.
3. References to pressure in this section are gage pressure unless otherwise noted.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Air outlets and inlets, including the following: Grilles, registers, and diffusers.
- B. A complete listing of common acronyms and abbreviations are included in Section 23 05 11, COMMON WORK RESULTS FOR HVAC.

1.2 RELATED WORK

SPEC WRITER NOTE: Retain one of two paragraphs below.

- A. //Section 01 00 01, GENERAL REQUIREMENTS (Major NCA Projects).//
- B. //Section 01 00 02, GENERAL REQUIREMENTS (Minor NCA Projects).//
- C. Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- D. Section 01 42 19, REFERENCE STANDARDS.
- E. Section 01 81 13, SUSTAINABLE DESIGN REQUIREMENTS.
- F. //Section 01 91 00, GENERAL COMMISSIONING REQUIREMENTS.//
- G. Section 08 90 00, LOUVERS AND VENTS: Outdoor and Exhaust Louvers.

SPEC WRITER NOTE: If Section 13 05 41 is included in this project the section shall be obtained from VA Masters.

- H. //Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS: Seismic reinforcing.//
- I. Section 23 05 11, COMMON WORK RESULTS FOR HVAC: General mechanical requirements and items which are common to more than one section of Division 23.
- J. Section 23 05 41, NOISE AND VIBRATION CONTROL FOR HVAC PIPING AND EQUIPMENT: Noise Level Requirements.
- K. Section 23 05 93, TESTING, ADJUSTING, AND BALANCING FOR HVAC: Testing and Balancing of Air Flows.

L. //Section 23 08 00, COMMISSIONING OF HVAC SYSTEMS.//

1.3 APPLICABLE PUBLICATIONS

SPEC WRITER NOTE: Make material requirements agree with requirements specified in the referenced Applicable Publications. Verify and update the publication list to that which applies to the project, unless the reference applies to all mechanical systems. Publications that apply to all mechanical systems may not be specifically referenced in the body of the specification, but, shall form a part of this specification.

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society of Civil Engineers (ASCE):
ASCE 7-2010.....Minimum Design Loads for Buildings and Other Structures
- C. American Society for Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE):
70-2006 (R2011).....Method of Testing for Rating the Performance of Air Outlets and Inlets
- D. American Society for Testing and Materials (ASTM):
B209-2014.....Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
- E. National Fire Protection Association (NFPA):
90A-2015.....Standard for the Installation of Air Conditioning and Ventilating Systems
- F. Underwriters Laboratories, Inc. (UL):
181-2013.....Standard for Factory-Made Air Ducts and Air Connectors

1.4 SUBMITTALS

- A. Submittals, including number of required copies, shall be submitted in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Information and material submitted under this section shall be marked "SUBMITTED UNDER SECTION 23 37 00, AIR OUTLETS AND INLETS", with applicable paragraph identification.
- C. Manufacturer's Literature and Data including: Full item description and optional features and accessories. Include dimensions, weights,

materials, applications, standard compliance, model numbers, size, and capacity.

1. Air intake/exhaust hoods.
 2. Grilles, resistors, diffusers, and accessories.
- D. Coordination Drawings: Refer to paragraph SUBMITTALS, in Section 23 05 11, COMMON WORK RESULTS FOR HVAC.
- E. Complete operating and maintenance manuals including wiring diagrams, technical data sheets, information for ordering replacement parts, and troubleshooting guide:
1. Include complete list indicating all components of the systems.
 2. Include complete diagrams of the internal wiring for each item of equipment.
 3. Diagrams shall have their terminals identified to facilitate installation, operation and maintenance.
- F. //Completed System Readiness Checklist provided by the Commissioning Agent and completed by the contractor, signed by a qualified technician and dated on the date of completion, in accordance with the requirements of Section 23 08 00, COMMISSIONING OF HVAC SYSTEMS.//
- G. //Submit training plans and instructor qualifications in accordance with the requirements of Section 23 08 00, COMMISSIONING OF HVAC SYSTEMS.//

1.5 QUALITY ASSURANCE

- A. Refer to paragraph QUALITY ASSURANCE, in Section 23 05 11, COMMON WORK RESULTS FOR HVAC.
- B. Fire Safety Code: Comply with NFPA 90A.

1.6 AS-BUILT DOCUMENTATION

SPEC WRITER NOTE: Coordinate O&M Manual requirements with Section 01 00 01, GENERAL REQUIREMENTS (Major NCA Projects) or Section 01 00 02, GENERAL REQUIREMENTS (Minor NCA Projects). O&M manuals shall be submitted for content review as part of the close-out documents.

- A. Submit manufacturer's literature and data updated to include submittal review comments and any equipment substitutions.
- B. Submit operation and maintenance data updated to include submittal review comments, substitutions and construction revisions shall be //in electronic version on CD or DVD// inserted into a three ring binder. All aspects of system operation and maintenance procedures, including applicable piping isometrics, wiring diagrams of all circuits, a

written description of system design, control logic, and sequence of operation shall be included in the operation and maintenance manual. The operations and maintenance manual shall include troubleshooting techniques and procedures for emergency situations. Notes on all special systems or devices shall be included. A List of recommended spare parts (manufacturer, model number, and quantity) shall be furnished. Information explaining any special knowledge or tools the owner will be required to employ shall be inserted into the As-Built documentation.

- C. The installing contractor shall maintain as-built drawings of each completed phase for verification; and, shall provide the complete set at the time of final systems certification testing. As-built drawings are to be provided, and a copy of them in Auto-CAD version //____// provided on CD or DVD. Should the installing contractor engage the testing company to provide as-built or any portion thereof, it shall not be deemed a conflict of interest or breach of the 'third party testing company' requirement.
- D. Certification documentation shall be provided to COR 10 working days prior to submitting the request for final inspection. The documentation shall include all test results, the names of individuals performing work for the testing agency on this project, detailed procedures followed for all tests, and certification that all results of tests were within limits specified.

SPEC WRITER NOTE: If design wind speed is greater than 144 km/h (90 mph) delete bracketed phrase in 2.1.A and keep paragraph 2.1.D, otherwise delete paragraph 2.1.D.

PART 2 - PRODUCTS

2.1 GRAVITY TYPE AIR INTAKE/EXHAUST HOODS

- A. Aluminum, ASTM B209, spun, or fabricated using panel sections with roll-formed edges, 15 mm (1/2 inch) mesh aluminum or galvanized welded wire bird screen, with motorized dampers where shown on the drawings, accessible interior//, designed for wind velocity 144 km/h (90 mph)//.
- B. See hood schedule on the drawings. Sizes shown on the drawings designate throat size. Area of hood perimeter opening shall be not less than the throat area.
- C. Dampers: Construct damper of the same material as the ventilator and of the design to completely close opening or remain wide open.

D. //See paragraph INTAKE/EXHAUST HOODS EXPOSED TO WIND VELOCITY for intake/exhaust exposed to high wind velocities.//

E. Finishes:

1. //None.//

2. //Baked Enamel Finish: Apply primer coat and thermosetting topcoat with a minimum dry film thickness of 0.025 mm (1 mil) for topcoat and an overall minimum dry film thickness of 0.05 mm (2 mil).

a. Color: // //.

2.2 PREFABRICATED ROOF CURBS

A. Galvanized steel or extruded aluminum 300 mm (12 inches) above finish roof service, continuous welded corner seams, treated wood nailer, 40 mm (1-1/2 inch) thick, 48 kg/cubic meter (3 pounds/cubic feet) density rigid mineral fiberboard insulation with metal liner, built-in cant strip (except for gypsum or tectum decks). For surface insulated roof deck, provide raised cant strip (recessed mounting flange) to start at the upper surface of the insulation. Curbs shall be constructed for pitched roof or ridge mounting as required to keep top of curb level.

2.3 EQUIPMENT SUPPORTS

A. Refer to Section 23 05 11, COMMON WORK RESULTS FOR HVAC.

2.4 AIR OUTLETS AND INLETS

A. Materials:

1. Steel or aluminum: Provide manufacturer's standard gasket.

2. Exposed Fastenings: The same material as the respective inlet or outlet. Fasteners for aluminum may be stainless steel.

3. Review all ceiling drawings and details and provide all ceiling mounted devices with appropriate dimensions and trim for the specific locations.

B. Performance Test Data: In accordance with ASHRAE 70. Refer to Section 23 05 41, NOISE AND VIBRATION CONTROL FOR HVAC PIPING AND EQUIPMENT for NC criteria.

C. Air Supply Outlets:

1. Ceiling Diffusers: Suitable for surface mounting, exposed T-bar //or special tile// ceilings, white finish, square or round neck connection as shown on the drawings.

a. //Louver face, 360 degree pattern: Round neck, surface mounting unless shown otherwise on the drawings.//

b. //Modular core type: Square, removable core for 1, 2, 3, or 4 way directional pattern.//

- c. //Perforated face type: Manual adjustment for one-, two-, three-, or four-way horizontal air distribution pattern without change of air volume or pressure. Perforated face diffusers shall have the pattern controller on the inner face, rather than in the neck, and designed to discharge air horizontally at the ceiling maintaining a Coanda effect.//
- d. //Slot diffuser/plenum:
 - 1) Galvanized steel boot lined with 15 mm (1/2 inch) thick fiberglass conforming to NFPA 90A and complying with UL 181 for erosion. Form slots or use adjustable pattern controllers to provide stable, horizontal air flow pattern over a wide range of operating conditions.
 - 2) Provide inlet connection diameter equal to duct diameter shown on drawings.
 - 3) Maximum pressure drop at design flow rate: 37 Pa (0.15 inch WG)//
- 2. Accessories:
 - a. Dampers: //Radial opposed blade// //Butterfly// //Combination Damper and Grid//.
 - b. Equalizing Grid.
 - c. Insulation Blanket.
- 3. Supply Grilles and Registers: Extruded aluminum, white finish, and individually adjustable blades. Front bars parallel to the short dimension.
 - a. Border: Flat, 32 mm (1-1/4 inch) wide.
 - b. Bar spacing: 20 mm (3/4 inch) maximum.
 - c. Provide opposed blade damper.
- 4. Double Deflection Supply Grilles and Registers: Extruded aluminum, white finish, and individually adjustable blades. Front bars parallel to the short dimension.
 - a. Border: Flat, 32 mm (1-1/4 inches) wide.
 - b. Bar spacing: 20 mm (3/4 inch) maximum.
 - c. Provide opposed blade damper.
- 5. Grilles: Same as registers but without the opposed blade damper.
- D. Return and Exhaust Registers and Grilles: Provide opposed blade damper for registers.
 - 1. Finish: white baked enamel.

2. //Standard Type: Fixed horizontal face bars set at 35 degrees, 32 mm (1-1/4 inch) margin.//
3. //Perforated Face Type: To match supply units.//
4. //Grid Core Type: 15 mm by 15 mm (1/2 inch by 1/2 inch) core with 32 mm (1-1/4 inch) margin.//
5. //Linear Type: To match supply units.//
6. //Door Grilles: Are furnished with the doors.//
7. //Filter Grilles: Standard face hinged to a mounting frame with space for a 25 mm (1 inch) throwaway filter. Hold face closed by a locking screw. Provide retaining clips to hold filter in place. Provide one inch thick fiberglass throwaway filter.//

2.5 WIRE MESH GRILLE

- A. Fabricate grille with 2 x 2 mesh 15 mm (1/2 inch) galvanized steel or aluminum hardware cloth in a spot welded galvanized steel frame with approximately 40 mm (1-1/2 inch) margin.
- B. Use grilles where shown in unfinished areas such as mechanical rooms.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. If an installation is unsatisfactory to the COR, the Contractor shall correct the installation at no additional cost or time to the Government.
- B. Comply with provisions of Section 23 05 11, COMMON WORK RESULTS FOR HVAC, particularly regarding coordination with other trades and work in existing buildings.
- C. Protection and Cleaning: Adequately protect equipment and materials against physical damage. Place equipment in first class operating condition, or return to source of supply for repair or replacement, as determined by COR. Protect equipment during construction against entry of foreign matter to the inside and clean both inside and outside before operation and painting.

SPEC WRITER NOTE: Specify wind velocity as per Fig. 1 in Handbook ASCE 7 where wind velocity exceeds 144 km/h (90 mph) in coastal areas.

3.2 //INTAKE/EXHAUST HOODS EXPOSED TO WIND VELOCITY

- A. Provide additional support and bracing to all exposed ductwork installed on the roof or outside the building to withstand wind velocity of // // km/h (// // mph).//

3.3 TESTING, ADJUSTING, AND BALANCING (TAB)

- A. Refer to Section 23 05 93, TESTING, ADJUSTING, AND BALANCING FOR HVAC.

3.4 STARTUP AND TESTING

- A. Make tests as recommended by product manufacturer and listed standards and under actual or simulated operating conditions and prove full compliance with design and specified requirements. Tests of the various items of equipment shall be performed simultaneously with the system of which each item is an integral part.
- B. When any defects are detected, correct defects and repeat test at no additional cost or time to the Government.
- C. //The Commissioning Agent will observe startup and contractor testing of selected equipment. Coordinate the startup and contractor testing schedules with the COR and Commissioning Agent. Provide a minimum notice of 10 working days prior to startup and testing.//

3.5 //COMMISSIONING

- A. Provide commissioning documentation in accordance with the requirements of Section 23 08 00, COMMISSIONING OF HVAC SYSTEMS.
- B. Components provided under this section of the specification will be tested as part of a larger system.//

3.6 DEMONSTRATION AND TRAINING

- A. Provide services of manufacturer's technical representative for //four// // // hour//s// to instruct each VA personnel responsible in the operation and maintenance of units.
- B. //Submit training plans and instructor qualifications in accordance with the requirements of Section 23 08 00, COMMISSIONING OF HVAC SYSTEMS.//

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