

SECTION 233248 – Acoustical Air Plenums

[INFORMATIONAL NOTE to be removed by user of this specification: This specification is meant to be incorporated into the applicable portions of the MasterFormat specification. This specification may be used in its entirety as an acoustical or thermal plenum section of the MasterFormat specification.]

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Acoustical Air Plenums.
- B. Related Sections:
 - 1. Division 23 – “Vibration and Seismic Controls for HVAC Piping and Equipment”.
 - 2. Division 23 – “Hangers and Supports for HVAC Piping and Equipment”
 - 3. Division 23 – “Meters and Gages for HVAC Piping”
 - 4. Division 23 – “HVAC Insulation”
 - 5. Division 23 – “Hydronic Piping”
 - 6. Division 23 – “Steam and Condensate Piping”
 - 7. Division 23 – “Refrigerant Piping”
 - 8. Division 23 – “Metal Ducts”
 - 9. Division 23 – “Duct Silencers”
 - 10. Division 23 – “Air Terminal Units”
 - 11. Division 23 – “Instrumentation and Control for HVAC”
 - 12. Division 23 – “Testing, Adjusting, and Balancing for HVAC”
 - 13. Division 26 – “Low-Voltage Electrical Distribution”

1.3 SUBMITTALS

- A. Performance Data:
 - 1. Submit manufacturer’s technical product data for acoustical air plenums showing transmission loss, absorption coefficients, and thermal conductance.

B. Shop Drawings:

1. Submit shop drawings showing unit dimensions, weight loading, required clearances, field connection details and methods of support. Draw to a scale of 3/8" to one foot, using same sheet size as Contract Drawings. Include dampers and duct connections, finishes of materials, and installation instructions.

C. Maintenance Data:

1. Submit maintenance instructions. Include this data, product data, shop drawings, and wiring diagrams in operating and maintenance manuals; in accordance with requirements of Division 01.

1.4 QUALITY ASSURANCE

- A. **Manufacturer's Responsibility:** Enclosure or plenum manufacturer shall have sole source responsibility for the design, factory fabrication and supply of all components and equipment as noted below. Provide enclosure/plenums that are a product of an equipment manufacturer regularly engaged in the production of such product. Unit components and equipment fabricated and supplied by the contractor will not be permitted.
- B. **Contractor's Responsibility:** The Contractor shall be responsible for the field assembly of the enclosure/plenum per the instructions and submittal documents supplied by the manufacturer. The Contractor shall be responsible for providing and installing equipment safing. The Contractor shall provide the manufacturer with all field dimensions, mounting locations and duct openings as required for coordination of the design and fabrication of the enclosure or plenum.
- C. **Certifications:** Provide certified performance of plenum/enclosure panels based on tests performed in accordance with ASTM E90 and ASTM C423.
- D. **Manufacturer shall provide a written test report by a third party organization showing panel assemblies have flame-spread index not exceeding 25 and smoke-developed index not exceeding 50 when tested according to ASTM E 84, NFPA 255 or UL 723.**
- E. **Codes and Standards:** Provide air handling units conforming to the following:
 1. **National Electrical manufacturers Association (NEMA):** Provide electrical components required as part of the plenums/enclosures, which comply with NEMA Standards.
 2. **National Fire Protection Association (NFPA):** Provide components complying with NFPA 90A, "Standard for the Installation of Air Condition and Ventilating Systems". Comply with NFPA 70, "National Electrical Code", as applicable for installation and electrical connections of ancillary electrical components.

3. Sheet Metal and Air Conditioning Contractors' National Association, Inc. (SMACNA): Comply with applicable SMACNA standards including "HVAC Duct Construction Standards - Metal and Flexible".
4. Underwriter's Laboratories, Inc. (UL/ULC): Provide electrical components required as part of plenums/enclosures, which have been listed and labeled by UL/ULC.

1.5 EXTRA MATERIAL

1. None required for plenums/enclosures.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 1. Galvanized Coating Designation: G90 (Z275).
 2. Exposed-Surface Finish: Mill phosphatized.
- C. Stainless-Steel Sheets: Comply with ASTM A480/A480M, Type 304 or 316 as specified below, and having a mill finish.
- D. Aluminum Sheets: Comply with ASTM B209/B209M, Alloy 3003, Temper H14; with mill finish.
- E. Aluminized Steel Sheets: Comply with ASTM A463 / A463M.
 1. Aluminized Coating Designation: T1 40
 2. Exposed-Surface Finish: Mill phosphatized.
- F. Structural Steel Shapes and Plates: Comply with ASTM A36/A36M. Provide zinc rich weldable primer finish unless otherwise scheduled.

2.2 Acoustical Air Plenums

- A. Basis-of-Design Product: Plenums/Enclosures shall be Vibro-Acoustics.
- B. General Requirements:

1. Scope of supply shall include wall and roof panels, access doors, and support steel as required by the contract drawings and schedules. Manufacturer shall supply all flashing, sealant and hardware required to assemble the plenum/enclosure. Physical dimensions must be maintained as shown on the contract drawings. If dimensions are different from that shown, the owner and engineer must be advised at the time of bid review.
2. Design plenums/enclosures which are suitable for the maximum, total static pressure of the system under all conditions.

C. Construction:

1. Wall and Roof Panels: Panels shall be Model **PS3b-S**, 4 inch (102mm) absorption type. The exterior sheet shall be a minimum of 22 gauge (0.85 mm) G90 (Z275) galvanized steel. Media shall be held in place by 22 gauge (0.85 mm) G90 (Z275) galvanized steel back straps. The interior sheet shall be perforated with 3/32" diameter holes on 3/16" centers in all areas, except downstream of cooling coils and humidifiers. In these areas the interior sheet shall be solid for a distance of 42" (1067mm). Panels shall be filled with 4 inch (102mm) acoustic media. In all exhaust air areas the interior sheet shall be solid 16 gauge 304 stainless steel.
2. Removable Panels: Bolted panels of the Internal Flange Butt Connection type shall be provided for equipment removal. Panels shall be 4 inch (102mm) with construction as noted above.
3. Safing And Single Wall Panels: All safing and single wall panels shall be 16 gauge (1.63 mm) G90 (Z275) galvanized steel, except for areas with moisture, those areas shall be 16 gauge (1.63 mm) 304 stainless steel. Safing and single wall panels shall be field measured and supplied by the contractor.
4. Structural Support Steel: Absorption panels shall be fastened to architectural walls according to manufacturer's written installation instructions. No attempt should be made to use absorption panels as a vapor barrier or to make an architectural enclosure airtight.
5. Media: Media shall be incombustible, acoustical quality, shot-free fiberglass with long, resilient fibers bonded with a thermosetting resin. Media shall be packed with 15% compression during panel assembly. Media shall be bacteria and fungus resistant and conform to irregular surfaces. Media shall not cause or accelerate corrosion of aluminum or steel. Mineral wool will not be permitted as a substitute for fiberglass. Density shall be as required to achieve specified thermal and acoustic performance.
6. Access Doors: Doors shall be provided for each component section. Doors shall be 4 inch (102mm) x 36 inch (915mm) wide x 72 inch (1829mm) high with the same construction as the acoustic panels, except that the interior sheet shall be solid. Doors shall be mounted in a 10 gauge (3.5 mm) G90 (Z275) galvanized steel angle frame with a single "P" gasket. Hardware shall include (2) cam-type latches and 2 butt hinges.
7. Finish: Acoustic panel shall be supplied with standard mill finish.
8. Electrical: All electrical fixtures and installation by others.

D. Performance:

1. Leakage: Not applicable for absorption panels

2. Performance: The acoustical performance of the panels shall be equal to or greater than the following based on testing to ASTM E90-09 and ASTM C423-09a:

Octave Band, Hz	<u>125</u>	<u>250</u>	<u>500</u>	<u>1000</u>	<u>2000</u>	<u>4000</u>
Transmission Loss, dB	-	-	-	-	-	-
Absorption Coefficients	0.55	0.99	0.99	0.99	0.99	0.99

3. The thermal conductance of the media shall be less than 0.06 BTU/hr/sq.ft./°F at 50 degrees F mean temperature. The overall thermal conductance of the assembled structure shall not exceed 0.15 BTU/hr/sq. ft./°F at 50 degrees F mean temperature.
4. Fire-Performance Characteristics: Plenum/enclosure assemblies, including acoustic media fill, Vibar™ film liner, sealants, and acoustical spacer, shall have flame-spread index not exceeding 25 and smoke-developed index not exceeding 50 when tested according to ASTM E 84, NFPA 255 or UL 723

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

- A. Delivery: Deliver plenum/enclosure components on factory-installed shipping skids or lifting lugs; pack small components in factory-fabricated protective containers.
- B. Handling: Handle components carefully to avoid damage to components, enclosures, and finishes. Do not install damaged components; replace and return damaged components to the manufacturer.
- C. Storage: Store plenums/enclosures in a clean dry place and protect from weather and construction traffic.

3.2 INSTALLATION

- A. General: Install plenums/enclosures where indicated on the contract drawings, in accordance with the equipment manufacturer's published installation instructions.
- B. Access: Provide access space around the plenum/enclosure for service as indicated on the drawings, but not less than that recommended by the manufacturer.
- C. Electrical Wiring: Install electrical devices furnished by manufacturer, if any, but not specified to be factory mounted. Verify that electrical wiring installation is in accordance with manufacturer's submittal and installation requirements of Division 26 sections.
- D. Piping Connections: Provide piping, valves, accessories, gauges, supports, and flex connections as indicated on the contract drawings.
- E. Duct Connections: Provide ductwork, accessories, and flex connections as indicated on the drawings.

3.3 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Upon completion of the plenum/enclosure installation, start-up and operate equipment to demonstrate capability and compliance with contract document requirements. Field correct any deficiencies and retest to demonstrate compliance.

END OF SECTION 233248