

## University of Houston Master Specification

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<Insert U of H Proj #>

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<Insert Issue Date>

### SECTION 23 3319 - SOUND ATTENUATORS

Maintain Section format, including the UH master spec designation and version date in bold in the center columns of the header and footer. Complete the header and footer with Project information.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

Delete hidden text after this Section has been edited for the Project.

#### 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.
- B. The Contractor's attention is specifically directed, but not limited, to the following documents for additional requirements:
  - 1. The current version of the *Uniform General Conditions for Construction Contracts*, State of Texas, available on the web site of the Texas Facilities Commission.
  - 2. The University of Houston's *Supplemental General Conditions and Special Conditions for Construction*.

##### 1.2 DESCRIPTION OF WORK

- A. Work Included: Provide sound isolation work as specified, scheduled, and shown on the Drawings.
- B. Types: The types of sound isolation required for the project include, but are not limited to, duct sound attenuators for use in duct and return air applications.

##### 1.3 QUALITY ASSURANCE

- A. Manufacturers: Provide sound isolation units complying with these specifications and produced by a single approved manufacturer.

##### 1.4 SUBMITTALS

- A. Shop Drawing submittals shall include, but are not limited to, the following:
  - 1. Cut sheets clearly indicating the size, type, ratings, insertion loss, regenerated noise, materials, construction, connection types, performance and other pertinent data for each sound attenuator to be provided on the project.
  - 2. Independent test laboratory reports on performance of each silencer type being provided.
  - 3. Additional information as required in Section 23 0100 "Mechanical General Provisions."

##### 1.5 PRODUCT, DELIVERY, STORAGE AND HANDLING

- A. Deliver sound attenuators in factory-fabricated water-resistant wrapping.

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- B. Handle sound attenuators carefully to avoid damage to material components, enclosure and finish.
- C. Store sound attenuators in a clean, dry space and protect from the weather.

### PART 2 - PRODUCTS

#### 2.1 DUCT SOUND ATTENUATORS

- A. General: Provide duct sound attenuators of the size and capacity scheduled or shown on the Drawings and having dynamic insertion losses and static pressure losses equivalent to those scheduled.
- B. Approved Manufacturers:
  - 1. Provide sound isolation units complying with these specifications and produced by one of the following:
    - a. Price
    - b. Commercial Acoustics
    - c. Industrial Acoustics Company
    - d. Peabody Noise Control
  - 2. Substitutions – Comply with Section 01 2500 “Substitution Procedures.”
- C. Construction: Sound attenuators shall have outer casings constructed of not less than 22-gauge galvanized steel in accordance with SMACNA and ASHRAE recommended construction for high pressure ductwork. All seams shall be lock-formed and sealed airtight. Internal panels shall be of not less than 26 gauge galvanized perforated steel corrugated in direction of airflow. Internal passages shall be essentially straight through with consistently exact dimensions to ensure uniform performance. All internal parts shall be fastened by spot-welding on not more than 3" centers. Sheet metal screws, bolts, or other mechanical fasteners will not be allowed. Fill lock-formed seams with mastic. Units shall be airtight at a differential air pressure of 8" water gauge.
- D. Filler: Acoustical filler material shall be an organic mineral or glass fiber of a density sufficient to obtain the scheduled acoustical performance and shall be packaged under a minimum 5% compression to eliminate voids. Filter shall be inert and vermin and moisture proof.
- E. Combustion Rating: Maximum combustion ratings shall be flame spread, classification of 20, smoke developed rating of 20 and a fuel contribution of 20 when tested in accordance with ASTM E84, NFPA 255, and UL 723.
- F. Acoustic Performance: Silencer ratings shall be determined in a duct-to-reverberant room test facility which provided for airflow in both directions through the test silencer in accordance with ASTM E477. The test set-up and procedure shall be such that all effects due to end reflection, directivity, flanking transmission, standing waves, and test chamber sound absorption are eliminated. Acoustic ratings shall include Dynamic Insertion Loss (DIL) and Self-Noise (SN) Power Levels both for forward flow (air and noise in same direction) and reverse flow (air and noise in opposite directions) with airflow of at least 2000 fpm entering face velocity. Data for rectangular and tubular type silencers shall be presented for tests conducted using silencers no smaller than 24-inch x 24-inch, 24-inch x 30-inch, or 24-inch x 36-inch cross sections.

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1. Submit the manufacturer's certified test data on dynamic insertion loss, self-noise power levels, and aerodynamic performance for reverse and forward flow test conditions. Test data shall be for a standard product. All rating tests shall be conducted in a single independent facility and shall utilize the same silencer.
  2. Acoustical testing shall be determined by the "duct to a reverberation room" method, as recommended by SIW 42 Subcommittee of the American National Standards Institute. Tests shall be run with air flowing through the silencer at not less than three different flow rates and also at zero flow. All ratings shall be based on test data from a nationally known qualified independent laboratory. Test methods shall eliminate effects due to end reflection vibration flaring transmission and standing waves in the reverberant room. Airflow and pressure loss data taken in accordance with the AMCA procedures shall be obtained from the same silencer used for acoustical performance test.
- G. Aerodynamic Performance: Static pressure loss of silencers shall not exceed those listed in the silencer schedule at the airflow scheduled. Airflow measurements shall be made in accordance with ASTM E477 and applicable portions of ASME, AMCA, and ADC airflow test codes. Tests shall be reported on the identical units for which acoustic data is presented.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. General: Install sound attenuators in accordance with the manufacturer's written installation instructions and appropriate SMACNA standards.
- B. Supports: Support sound attenuators as specified for ductwork, except that each attenuator shall be independently supported at each corner.
- C. Transitions: Provide inlet and outlet transitions at duct sound attenuators with 15-degree angles where space permits, but in no case with more than 30-degree angles on the inlet side and 45-degree angles on the outlet side.

END OF SECTION 23 3319

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