SECTION 09 53 23

ACOUSTICAL CEILING SUSPENSION ASSEMBLIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section describes the requirements for the materials and installation of acoustical suspension systems for acoustical panels.

B. Work under this Section includes furnishing and installing safety hanger wires for mechanical and electrical equipment to extent specified. Connecting safety wires to such equipment is not included.

C. Related Sections:

1. Metal suspension systems are specified in Section 09 22 26.23.

2. Acoustical panel ceilings are specified in Section 09 51 13.

3. Heating, ventilating and air conditioning work is specified in Division 23.

4. Electrical work is specified in Division 26.

1.02 SUBMITTALS

A. Shop Drawings:

1. Indicate ceiling-system layouts and general and atypical conditions and details.

2. Include details of bracing, special features and joints, perimeters, relationship to adjacent construction, and anchorage and connections to structures.

B. Product Data: Manufacturer's descriptive and technical data and illustrations, marked to identify product materials, types, and variations.

C. Material Samples: Duplicate sets of 10-inch-long pieces of grid system and perimeter trim members with one end as factory fabricated, and connection and fastening accessories and devices.

D. LEED Submittals:

1. Credit MR 4: Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.

a. Furnish the LEED Online Credit Template declaring that the credit requirements have been met and list the recycled content products used.

b. List total cost of all materials for the Project.

c. Required Audit Documentation:

1) Manufacturer product data sheets, literature or letters highlighting the overall post-consumer and/or post-industrial recycled content percentages (by weight) of each product listed on the template.

2) Materials invoices showing costs for each product listed on the template.

1.03 QUALITY ASSURANCE

A. Installer's Qualifications: Regularly providing installation of assemblies of the types required.

B. Suspension systems shall be designed, fabricated, and installed to meet requirements of ASTM C635.

1.04 ENVIRONMENTAL QUALITY ASSURANCE

A. Credit MR 4: Provide building materials with recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content constitutes a minimum of 10-percent of cost of materials used for the Project.

1. The cost of post-consumer content of an item shall be determined by dividing the weight of post-consumer recycled content in the item by the total weight of the item and multiplying by the cost of the item.

2. The cost of post consumer recycled content plus one-half of pre-consumer recycled content of an item shall be determined by dividing the weight of post-consumer recycled content plus one-half of pre-consumer recycled content in the item by the total weight of the item and multiplying by the cost of the item.

3. Mechanical, electrical and plumbing components and specialty items such as elevators shall not be included in this calculation. Only include materials permanently installed in the Project.

B. Applicable LEED Credits:

1. Credit MR 4 – Recycled Content.

PART 2 - PRODUCTS

2.01 EXPOSED NARROW FACE REVEAL GRID SYSTEM

A. Approved Manufacturer: CertainTeed 15/16” Classic or approved equal.

B. Material: Hot-dip galvanized steel.

C. Flange Size: 15/16-inch.

D. Wall Angle, Reveals, and Miscellaneous Trim: Roll-formed from electro-galvanized steel strip.

E. Finish: Factory-applied white low gloss enamel.

F. Structural Classification: Heavy duty meeting the requirements of ASTM C635.

2.02 SUSPENSION MATERIALS AND FASTENINGS

A. General: Comply with requirements of ASTM C635.

B. Wire:

1. General: ASTM A641, galvanized steel with class 1 coating, soft annealed; factory pre-straightened units.

2. Hanger and Safety Wires: 12-gauge.

C. Wire Connections to Overhead Structures:

1. Hanger Wires: Connection device capable of carrying not less than 100-pounds.

2. Bracing Wires: Connection device capable of carrying not less than 200-pounds or the actual design load, whichever is greater, with a safety factor of 2 without yielding.

D. Fastenings for Accessories:

1. Bolts or screws of adequate size, in types appropriate for conditions and materials involved, made of corrosion-resistant materials or coated as approved.

2. Concealed only unless otherwise approved.

E. Compression Stiffeners: Minimum 20-gauge metal stud with 7/8-inch flange up to 4-feet in length; minimum 25-gauge metal stud with 1-5/8-iinch flange and lips up to 8-feet in length. Provide structural calculations for compression stiffeners greater than 8-feet in length.

PART 3 - EXECUTION

3.01 INSTALLATION REQUIREMENTS

A. Installations shall be in accordance with manufacturers' instructions and reviewed shop drawings, and ASTM C635.

B. Anchor hanger and bracing wire anchors so that the direction of the wire aligns as closely as possible with the direction of the forces acting on the wire.

C. Provide 12-gauge hanger wires at the ends of all main and cross runners within 8-inches from the support or within 1/4 of the length of the end tee, whichever is least, for the perimeter of the ceiling area.

D. Provide trapeze or other supplementary support members at obstructions to main hanger spacing. Provide additional hangers, struts or braces as required at all ceiling breaks, soffits or discontinuous areas. Hanger wires more than 1 in 6 out of plumb shall have counter-sloping wires.

E. Ceiling grid members shall be attached to not more than 2 adjacent walls in accordance with ASCE 7, Section 13.5.6.2(b). Ceiling grid members shall be at least 3/4-inch free of other walls. If walls run diagonally to ceiling grid system runners, one end of main and cross runners shall be free, and a minimum of 3/4-inch clear of wall.

F. The width of the perimeter supporting closure angle shall be not less than 2-inches.

G. At the perimeter of the ceiling area where main or cross runners are not connected to the adjacent wall, provide interconnection between the runners at the free end to prevent lateral spreading. A metal strut or a No. 16 gauge wire with a positive mechanical connection to the runner may be used. Where the perpendicular distance from the wall to the first parallel runner is 12-inches or less, this interlock is not required.

H. Expansion joints shall be provided in the ceiling at intersections of corridors and at junctions of corridors with lobbies or other areas.

I. Provide lateral-force bracing assemblies consisting of a compression strut and four 12-gauge splayed bracing wires oriented 90-degrees from each other at the following spaces:

1. Place sets of bracing wires spaced not more than 12-feet by 12-feet on center.

2. Provide bracing wires at locations not more than 1/2 the specified spacing from each perimeter wall and at the edge of vertical ceiling offsets.

3. The slope of these wires shall not exceed 45-degrees from the plane of the ceiling and shall be taut without causing the ceiling to lift. Splices in bracing wires are not permitted.

4. Compression struts shall not be more than 1 (horizontal) in 6 (vertical) out of plumb.

J. Fasten hanger wires with not less than 3 tight turns; fasten bracing wires with not less than 4 tight turns. Make tight turns within a distance of 1-1/2-inches.

K. Testing of Concrete Anchors:

1. When drilled-in concrete anchors or shot-in anchors are used in reinforced concrete for hanger wires, 1 out of 10 shall be field tested for 200-pounds of tension.

2. When drilled-in concrete anchors are used for bracing wires, 1 out of 2 shall be field tested for 440-pounds in tension. Shot-in anchors in concrete are not permitted for bracing wires.

L. Support of Light Fixtures and Air Terminals: Comply with ASTM C635.

1. Ceiling suspension systems that support light fixtures, air-ventilation grilles or partitions shall have a classification of heavy-duty.

2. Recessed or drop-in light fixtures and grilles shall be supported directly from the fixture housing to the structure above with a minimum of two 12-gauge wires located at diagonally opposite corners. Fixture support wires may be slightly loose to allow the fixture to seat in the grid system.

3. Fixture shall not be supported from main runners or cross runners if the weight of the fixtures causes the total dead load to exceed the deflection capability of the ceiling suspension system.

M. Installation Tolerances:

1. Bottom surface plane of each assembly shall be within plus or minus 1/8-inch of ceiling-height level required.

2. Bottom surface plane of each assembly shall be level and true to plane within 1/8-inch in 12-feet.

3.02 PERIMETER TRIM

A. Provide in longest lengths available and combinations of lengths to minimize number of joints required.

B. Do not use pieces shorter than 48-inches.

C. Miter joints at corners.

D. Install to neatly close with adjoining vertical surfaces.

3.03 COMPLETION

A. Adjust hangers as required. Addition of kinks or bends in hanger are not acceptable; take up in ties only.

B. When complete, grid members of each assembly shall be mutually parallel/square, accurately aligned, with joints neatly formed and closely fitted and aligned flush; each assembly shall be securely anchored and braced to structure to prevent movement.

C. Exposed surfaces of grids shall be clean and free from scratches, dents, tool marks, stains, discoloration, fingerprints, and other defects and damage.

3.04 WASTE MANAGEMENT

A. General: Comply with Section 01 74 19.

B. Separate and recycle waste materials to the maximum extent possible.

END OF SECTION