SECTION 09 22 26.23

METAL SUSPENSION SYSTEMS

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section describes the requirements for furnishing and installing metal ceiling suspension systems, including suspended system for gypsum wallboard ceilings.

B. Related Sections:

1. Non-structural metal framing is specified in Section 09 22 16.

2. Acoustical ceiling suspension assemblies are specified in Section 09 53 00.

3. Gypsum board is specified in Section 09 29 00.

1.02 SUBMITTALS

A. Product Data: Manufacturer's specifications and installation instructions for each type of suspension system, including provisions for fixture and equipment anchorage.

1. Include ICC-ES test reports showing proposed hanger and bracing wire fasteners are capable of supporting specified loads.

B. 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. Ceiling-support system shall limit deflection of finished ceilings to less than L/360.

1.05 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.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver products in the original unopened packages, containers, or bundles with manufacturer's label intact and legible.

B. Remove products delivered in broken, damaged, rusted, or unlabeled condition from Project site immediately.

C. Protect products from rusting and other sources of damage.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Metal Channels: ASTM C645, galvanized in accordance with ASTM A653, G60 coating designation.

1. Framing, Furring, and Stiffening:

Size, Inches	Pounds per 1,000 Lineal Feet
3/4 cold rolled	300
1-1/2 cold rolled	475
2 cold rolled	590

2. Furring Channels: Minimum 20-gauge galvanized steel with knurled faces; hat-shaped or Z-section as required.

B. Hanger Wire: Galvanized, soft, mild annealed steel; 8-gauge, complying with ASTM A641.

C. Diagonal Bracing Wire: Galvanized, soft, mild annealed steel; 12-gauge, complying with ASTM A641.

D. Tie Wire: No. 16-gauge, galvanized, single-strand annealed steel or No. 18-gauge, galvanized, double-strand annealed steel.

E. Screws:

1. General: ASTM C1002, corrosion resistant, for attachment to metal framing 25-gauge and lighter; ASTM C954 for attachment to metal framing 20-gauge and heavier.

2. Thread and head designs and lengths as recommended by manufacturer for uses and materials involved.

F. Hanger and Bracing Wire Fasteners:

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.

G. Furring Channel Clips: Fabricated from galvanized wire, for attaching furring channels to cold-rolled channels.

H. Compression Stiffeners: 20-gauge channel studs, 1-1/2-inches.

PART 3 - EXECUTION

3.01 SUSPENDED CEILING SUSPENSION FRAMING

A. Space 8-gauge hanger wires 48-inches on center along carrying channels and within 6-inches of ends of carrying channels.

B. Install 1-1/2-inch cold rolled carrying channels 48-inches on center and within 6-inches of walls. At splices, interlock flanges, overlap ends 12-inches, and wire-tie with double loops of No. 16-gauge wire.

C. Install 3/4-inch cold rolled channels at right angles to carrying channels, spaced 24-inches on center and within 6-inches of walls. Provide one-inch clearance between furring channels and abutting walls and partitions. Attach to carrying channels by saddle-tying around carrying channels with one strand of No. 16 or two strands of No. 18-gauge tie wire. At splices, nest furring channels with a minimum 8-inch overlap and wire-tie each end with double loops of No. 16-gauge wire.

D. Install 4-way 45-degree diagonal bracing wires at 12'-0" x 12'-0" within 6-inches of walls. Diagonal bracing wires shall be located at the intersection of main runner and cross-furring member. Provide connection between diagonal wires and main runner so as to prevent slipping for a 200-pound approximate seismic load.

E. Install hanger and bracing wire anchors so the direction of the wire aligns as closely as possible with the direction of the forces acting on the wire.

F. Separate ceiling hanging and bracing wires at least 6-inches from unbraced ducts, pipes, and conduit.

G. Fasten wires with not less than 4 tight turns. Make all tight turns within a distance of 1-1/2-inches.

H. Install uplift stiffener for each 144-square feet of ceiling, consisting of a vertical metal stud occurring at the junction of the carrier and furring channel. Wire tie to carrier or screw to channel and secure to overhead structure.

I. At control joints, provide discontinuous lap in main runners occurring over joints. Do not bridge joints with cross furring where joints run perpendicular to furring. Where joints run parallel to furring, provide furring to support each side of joint.

J. Provide recesses and openings where required for lighting fixtures, registers, access panels, and other items to be installed in ceilings; provide additional furring channels where required by opening.

K. Recessed or drop-in light fixtures shall be supported directly by main runners or by supplemental framing which is supported by main runners.

L. Surface mounted fixtures shall be attached to a main runner with a positive clamping device made of material with a minimum of 14-gauge. Rotational spring catches are not acceptable.

3.02 WASTE MANAGEMENT

A. General: Comply with Section 01 74 19.

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

END OF SECTION