SECTION 09 22 16 – non-structural metal framing

SPEC NOTE: Gypsum wallboard is specified separately in Section 09 29 00 "Gypsum Board" and 09 29 13 "Type X Gypsum Board."

This Section has been edited to include Gensler's Product Sustainability Standards ("GPS Standards") criteria, providing language for only the "Gensler Standard" tier of performance - the required minimum level of performance for sustainable attributes of the product. To include "Market Differentiator" level of performance or for any other questions, please contact your regional specification leader, Tim Taylor, or Kaley Blackstock.

1. GENERAL
   1. summary
      1. Section Includes:
         1. Non-load-bearing steel framing systems for interior partitions.
         2. Suspension systems for interior ceilings and soffits.
         3. Grid suspension systems for gypsum board ceilings.
   2. REFERENCE STANDARDS
      1. Canadian Standards Association (CSA):
         1. CSA S136-07, North American Specification for the Design of Cold-Formed Steel Structural Members.
      2. Canadian General Standards Board (CGSB):
         1. CAN/CGSB-7.1-98, Lightweight Steel Wall Framing Components.
      3. American Society for Testing and Materials International (ASTM):
         1. ASTM A 641/A 641M-09a, Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
         2. ASTM A 653/A 653M-11 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
         3. ASTM A 792/A 792M-10, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
         4. ASTM A 875/A 875M-10, Specification for Steel Sheet, Zinc-5% Aluminum Alloy-coated by the Hot Dip Process.
         5. ASTM A 1003/A 1003M-12, Specification for Steel Sheet, Carbon, Metallic and Non-Metallic Coated for Cold Formed Framing Members.
         6. ASTM C 11-10a, Standard Terminology Relating to Gypsum and Related Building Materials.
         7. ASTM C 473-12, Standard Test Methods for Physical Testing of Gypsum Panel Products.
         8. ASTM C 645-11a, Standard Specification for Nonstructural Steel Framing Members.
         9. ASTM C 665-12, Standard Specification for Mineral-Fibre Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
         10. ASTM C 754-11, Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
         11. ASTM C 834-10, Standard Specification for Latex Sealants.
         12. ASTM C 841-03(2008)e1, Standard Specification for Installation of Interior Lathing and Furring.
         13. ASTM C 954-11, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033" to 0.112" in Thickness.
         14. ASTM C 955-11c, Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases.
         15. ASTM C 1002-07, Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
      4. Canadian Sheet Steel Building Institute (CSSBI):
         1. CSSBI S6-2011, Guide Specification for Lightweight Steel Framing.
   3. submittals
      1. Sustainable Design Submittals: Refer to Division 01 Section 01 81 13 – Sustainable Design Requirements.
      2. Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
      3. Action Submittals: Provide the following submittals before starting any work of this Section:
         1. Product Data: Submit manufacturer's product data for each materials specified including recommended application rates and methods of installation.
      4. Informational Submittals: Provide the following submittals during the course of the work:
         1. Product Certificates: For each type of code-compliance certification for studs and tracks.
         2. Shop Drawings: Submit shop drawings showing the design, construction and relevant details of furring, enclosures and partitions which require a fire rating.

The following submittal is a part of the GPS Standards and is required for all projects. This relates to EPD documentation requirements listed under 'Quality Assurance' for select product types.

* + 1. Embodied Carbon Reporting: Type III Environmental Product Declarations, per ISO 14025 disclosing the Global Warming Potential of the product from Stages A1 through A3 in accordance with Section 01 81 33 – Sustainable Design Requirements - Embodied Carbon, for products listed under "Embodied Carbon Reporting" in Article "Quality Assurance."

The following submittal is a part of the GPS Standards and is required for all projects. This relates to material ingredient disclosure reports listed under 'Quality Assurance' for select product types.

* + 1. Material Ingredient Disclosure: Submit one of the following reports for products listed under "Material Ingredient Disclosure" in Article "Quality Assurance."
       1. Health Product Declaration.
       2. UL Product Lens.
       3. Living Building Challenge Declare Label or Living Product Challenge Label.
       4. EPEA Material Health Statement.
       5. Cradle-to-Cradle v4 Material Health Certificate or multi-attribute certificate.

The following submittal is a part of the GPS Standards and is required for all projects.

* + 1. Sustainability Reporting: Provide the following for steel products.
       1. Recycled content, including Pre-consumer and post-consumer percentages.
       2. Manufacturing location.
       3. End of Life: Recyclability post-consumer.
  1. QUALITY ASSURANCE
     1. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Steel Stud Manufacturers Association (SSMA).
     2. Contractor executing work of this Section shall have a minimum of five (5) years continuous experience in successful installation of work of type and quality shown and specified. Submit proof of experience upon Consultant's request.

The following requirement is a part of the GPS Standards and is required for all projects. This corresponds to the GPS Standards requiring that select products have EPDs. This document corresponds with an informational submittal required in this section.

* + 1. Embodied Carbon Reporting: Obtain products with the following publicly available, third-party verified Type III Environmental Product Declaration (EPDs) in accordance with Section 01 81 33 – Sustainable Design Requirements – Embodied Carbon:
       1. Steel Partition and Soffit Framing: Channels, suspension systems for ceiling grids, studs, runners, and track.

The following requirement is a part of the GPS Standards and is required for all projects. This document corresponds with an informational submittal required in this section.

* + 1. Material Ingredient Disclosure: Obtain the following products with publicly available reports disclosing material ingredients to residuals no greater than 1000ppm:
       1. Steel Partition and Soffit Framing: Channels, suspension systems for ceiling grids, studs, runners, and track.
  1. DELIVERY, STORAGE, HANDLING AND protection
     1. Coordinate deliveries to comply with construction schedule and arrange ahead for off the ground, enclosed, under cover storage location. Do not load any area beyond the design limits.
     2. Materials shall be carefully checked, unloaded, stored, and handled to prevent damage. Protect materials with suitable non-staining waterproof coverings.
     3. Store material in original, undamaged containers or wrappings with manufacturer's seals and labels intact, in accordance with GA-238 and manufacturer's recommendations.

1. products
   1. PERFORMANCE REQUIREMENTS
      1. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.
      2. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
   2. FRAMING SYSTEMS
      1. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
         1. Steel Sheet Components: Comply with ASTM C 645 requirements for steel unless otherwise indicated.
         2. Steel sheet components shall comply with ASTM C 645 requirements for metal, unless otherwise indicated.
         3. Steel for non-loadbearing members shall have metallic coats that conform to ASTM A 653M or ASTM A 792M with minimum metallic coating weighs (mass) of Z120 and AZM150 respectively.
         4. Framing members shall comply with the CAN/CSA S136 - North American Specification for the Design of Cold Formed Steel Structural Members, for conditions indicated.
         5. Isolate where necessary to prevent electrolysis due to dissimilar metal-to-metal contact or metal-to-masonry and concrete contact. Use bituminous paint, butyl tape or other approved divorcing material.
      2. Studs and Tracks: ASTM C 645.
         1. Steel Studs and Tracks:
            1. Minimum 0.0179" (25 gauge), screwable with crimped web and returned flange. Provide knockout openings in web at 150mm (6") O.C. to accommodate (if required) horizontal mechanical and electrical service lines, and bracing. Widths as indicated on drawings. Provide structural studs where indicated.
            2. Framing behind all fire resistant gypsum board shall be minimum 0.0329" (20 gauge).
            3. Where metal stud framing forms walls are to be thermally insulated as indicated on drawings, provide metal studs with integrated fastening system for glass fibre/mineral fibre insulation.
            4. Provide special shapes indicated on drawings as part of steel stud/drywall assemblies.
      3. Slip-Type Head Joints: Where indicated, provide one of the following:
         1. Clip System: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to tracks while allowing 2" (51-mm) minimum vertical movement.
         2. Double-Track System: ASTM C 645 top outer tracks, inside track with 2" (51 mm) deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction-fit over inner track.
         3. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
      4. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
         1. Minimum Base-Steel Thickness: As indicated on Drawings.
      5. Cold-Rolled Channel Bridging: Steel, 0.0538" (1.367 mm) minimum base-steel thickness, with minimum 1/2" (13 mm) wide flanges.
         1. Depth: As indicated on Drawings.
         2. Clip Angle: Not less than 1-1/2" x 1-1/2" (38 mm x 38 mm), 0.068" (1.72 mm) thick, galvanized steel.
      6. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
         1. Depth: As indicated on Drawings.
      7. Resilient Furring Channels: 1/2" (13 mm) deep, steel sheet members designed to reduce sound transmission.
         1. Configuration: hat shaped.
      8. Cold-Rolled Furring Channels: 0.053" (1.34 mm) uncoated-steel thickness, with minimum 1/2" (13 mm) wide flanges.
         1. Depth: As indicated on Drawings
         2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329" (0.8 mm).
         3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062" (1.59 mm) diameter wire, or double strand of 0.048" (1.21 mm) diameter wire.
      9. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4" (32 mm), wall attachment flange of 7/8" (22 mm), minimum uncoated-steel thickness of 0.0179" (0.455 mm), and depth required to fit insulation thickness indicated.

SPEC NOTE: The following is used when there is a requirement for suspended gypsum ceiling installations. Delete if not required on the Project.

* 1. SUSPENSION SYSTEMS
     1. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062" (1.59 mm) diameter wire, or double strand of 0.048" (1.21 mm) diameter wire.
     2. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16" (4.12 mm) in diameter.
     3. Flat Hangers: Steel sheet, in size indicated on Drawings.
     4. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-steel thickness of 0.0538" (1.367 mm) and minimum 1/2" (13 mm) wide flanges.
        1. Depth: As indicated on Drawings.
     5. Furring Channels (Furring Members):
        1. Cold-Rolled Channels: 0.0538" (1.367 mm) uncoated-steel thickness, with minimum 1/2" (13 mm) wide flanges, 3/4" (19 mm) deep.
           1. Steel Studs and Tracks: ASTM C 645.
        2. Depth: As indicated on Drawings.
        3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22 mm) deep.
        4. Resilient Furring Channels: 1/2" (13 mm) deep members designed to reduce sound transmission.
           1. Configuration: Hat shaped.
     6. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
  2. AUXILIARY MATERIALS
     1. General: Provide auxiliary materials that comply with referenced installation standards.
        1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
     2. Isolation Strip at Exterior Walls: Provide one of the following:
        1. Asphalt-Saturated Organic Felt: ASTM D 226/D 226M, Type I (No. 15 asphalt felt), nonperforated.
        2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8" (3.2 mm) thick, in width to suit steel stud size.

1. execution
   1. EXAMINATION
      1. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
      2. Proceed with installation only after unsatisfactory conditions have been corrected.
   2. preparation
      1. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
         1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.
      2. Coordination with Sprayed Fire-Resistive Materials:
         1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling tracks to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24" (610 mm) o.c.
         2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that are required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.
   3. installation, general
      1. Installation Standard: ASTM C 754.
         1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C 841 that apply to framing installation.
         2. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
      2. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
      3. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
      4. Install bracing at terminations in assemblies.
      5. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.
   4. INSTALLING FRAMED ASSEMBLIES
      1. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
      2. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
      3. Install studs so flanges within framing system point in same direction.
      4. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
         1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
         2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
            1. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

Retain paragraphs below if overhead concealed closers are scheduled at openings with interior aluminum door frames.

* + - * 1. Where indicated, frame openings to receive interior aluminum frames and overhead concealed closers as follows:

By inverting the head track, and boxing the header above the closer body. Refer to special template ST-561 for LCN 2010/2030 overhead concealed closers.

By forming a box header with back-to-back studs. Refer to template no. 08279232 for Dorma RTS 88 Series overhead concealed closers.

By complying with closer manufacturer's template requirements for other overhead concealed closers.

* + - 1. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
      2. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
      3. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
      4. Curved Partitions:
         1. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
         2. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6" (150 mm) o.c.
    1. Direct Furring:
       1. Screw to wood framing.
       2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
    2. Z-Shaped Furring Members:
       1. Erect insulation, vertically and hold in place with Z-shaped furring members spaced 24" (610 mm).
       2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24" (610 mm) o.c.
       3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12" (305 mm) from corner and cut insulation to fit.
    3. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8" (3 mm) from the plane formed by faces of adjacent framing.

SPEC NOTE: Keep if this was left in Part 2. Delete if not required.

* 1. INSTALLING CEILING SUSPENSION SYSTEMS
     1. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
        1. Hangers: 48" (1219 mm).
        2. Carrying Channels (Main Runners): 48" (1219 mm)
        3. Furring Channels (Furring Members): 24" (610 mm), unless otherwise indicated on the Drawings.
     2. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
     3. Suspend hangers from building structure as follows:
        1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
           1. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
        2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
           1. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
        3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
        4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
        5. Do not attach hangers to steel roof deck.
        6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
        7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
        8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
     4. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
     5. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
     6. Installation Tolerances: Install suspension systems that are level to within 1/8" in 12' (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

end of section