

SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Nonstructural steel framing, 30-mil and less.
2. Grid suspension systems.

B. Products designed, but not installed, under this Section include the following:

1. Steel framing for exterior wood ceiling.
2. Exterior infill blocking-framing in wide flange pocket voids.
3. Exterior wall framing attached to bottom of wide flange beams, forming rough opening headers.

C. Related Requirements:

1. Section 05 40 00 "Cold-Formed Metal Framing" for exterior and interior loadbearing, structural framing, and framing 33-mil thickness and above.
2. Section 09 29 00 "Gypsum Board" for panel products supported by framing and suspension systems.
3. Section 09 54 26 "Suspended Wood Ceilings" for suspension systems for wood ceilings.

1.2 COORDINATION

A. Coordinate items installed with, embedded in, attached to and supported by, and interfacing with Work of this Section, including but not limited to the following:

1. All wall and ceiling mounted items for required blocking and backing for attachment and supports.
2. Suspended items supported by grid suspension systems.
3. Grab bars in Division 10.
4. Architectural woodwork in Division 06.

B. Coordinate transition to other framing systems to maintain bearing and continuity while providing movement at joints.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Include layout, spacings, sizes, thicknesses, and types of nonstructural steel framing and fastening and anchorage details.
 2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, and attachments to adjoining work.
 3. Include details for bridging bearing conditions and transitions to suspension systems and soffits.
 4. Coordination Drawings: Show all wall- and ceiling-supported items on plans, elevations and other drawings for coordination and placement of supports.
- C. Delegated Design Submittal: For items indicated. Include design calculations including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For code-compliance certification of studs and track.
- B. Evaluation Reports: From ICC-ES or another agency acceptable to authorities having jurisdiction showing compliance with Project requirements, for the following:
1. Studs and track.
 2. Post-installed anchors.
 3. Power-actuated fasteners.
 4. Equivalent corrosion-resistant coating on steel framing.

1.6 QUALITY ASSURANCE

- A. Code-Compliance Certification of Studs and Track: Provide documentation that framing members are certified in accordance with product-certification program of Certified Steel Stud Associations, the Steel Framing Industry Association, or the Steel Stud Manufacturers Association.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Protect materials from corrosion, deformation, and other damage during delivery, storage, and handling in accordance with AISI S202.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 35 25 "Delegated Design Requirements," to design the following:
1. Interior metal framing and suspension systems attachments, supports, and seismic restraints.
 - a. Top of partition connections to roof joists or to blocking in joist cavity. Connection to ~~plywood-steel~~ roof deck is prohibited except if screw attachment in low flutes does not exceed 1/2-inch penetration above low flute.

2. Blocking for support of partitions and for support and attachment of wall- and ceiling-mounted items.
3. Exterior ceiling framing attached to bottom of roof joists and supporting plywood ceiling panels with linear wood cladding.
4. Exterior infill framing-blocking in wide flange pocket voids.
5. Exterior wall framing attached to bottom of wide flange beams forming rough opening headers.

B. Structural Performance:

1. Seismic Performance: Withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7.
2. Deflection Limits: Design framing and suspension systems to withstand design loads without exceeding deflection limits.
3. Horizontal Deflection: For partition assemblies, limited to deflection based on the loading:
 - a. 1/240 of the height for gypsum board finishes.
 - b. ~~1/600~~360 of the height for masonry-clad and tile-clad partitions.
 - c. Horizontal Loading: 5 lbf/sq. ft.
4. Horizontal Deflection: For exterior infill framing-blocking, limited to deflection based on the loading:
 - a. 1/240 for the wind speed indicated on the Structural Drawings where behind metal composite material system cladding in Section 07 42 13.23.
- 4-5. Vertical Deflection, Horizontal Assemblies: For ceiling and soffit assemblies, limited to 1/360 of the span for main runners.
 - a. Load Criteria: For finishes and to support items attached to ceilings and soffits.
 - 1) 6 psf for single layer gypsum board, 13 psf for double layer gypsum board.
 - 2) Increase load criteria by 3 psf for Level 5 finishing.
 - 3) Verify loads of exterior finish materials and items being supported, including light fixtures. Provide for 1.5 times the weight of the total.

C. Design framing and suspension systems to maintain clearances at openings, to allow for construction tolerances and allow for building structure movement.

1. Do not bridge deflection- and movement joints in exterior walls or interior partitions with connections on both sides of joints.
2. Do not bridge between systems with different supporting elements for bearing and suspended conditions.
 - a. Provide slip joints where systems transfer support from bearing to suspended.

D. Stud Spacing: 16 inches o.c.

1. 24 inches o.c. is acceptable for gypsum board partitions not supporting casework or with tile or masonry finishes.

E. STC-Rated Assemblies: Where indicated on Drawings, provide assemblies incorporating nonstructural framing identical to those of assemblies tested in accordance with ASTM E90 and classified in accordance with ASTM E413 by an independent testing agency.

2.2 MANUFACTURERS

- A. Source Limitations: Obtain framing and suspension systems of each type from a single manufacturer.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. CEMCO; California Expanded Metal Products Co.
 - 2. ClarkDietrich.
 - 3. Marino\WARE.
 - 4. SCAFCO Steel Stud Company; Stone Group of Companies.
 - 5. Steel Network, Inc. (The).

2.3 NONSTRUCTURAL STEEL FRAMING

- A. General, Framing Members and Accessories: Comply with requirements in AISI S220 for conditions indicated.
 - 1. Protective Coating: ASTM A653/A653M, G40 coating or coating with equivalent corrosion resistance; G60 at "wet walls", partitions with plumbing piping and wall separating Storage Rooms 112 & 150 to remaining interior.
 - a. Galvannealed products are unacceptable.
 - b. Equivalent Corrosion-Resistant Coating: Other coating with demonstrated equivalent corrosion resistance to ASTM A653 is acceptable with authority having jurisdiction approval of equivalency evaluation report.
 - 2. Minimum Base-Steel Thickness: As required by performance requirements.
 - 3. Minimum Yield Strength: 33 ksi.
- B. Studs and Track: Conventional members, roll-formed into standard C- and U-track shapes without surface deformations to stiffen framing members.
 - 1. Depth: As indicated on Drawings
 - 2. Flanges sized for support and installation requirements of panel products and attached items, minimum 1-1/4-inches.
 - 3. Punched for routing utilities and continuous channel bridging.
- C. Slip-Type Head Joints: Where indicated on Drawings, below structure, provide one of the following:
 - 1. Slotted Deflection Track: Steel sheet top track manufactured with 2-1/2-inch- deep flanges that allow positive attachment to studs through long slots and prevent deflection of structure above from cracking finishes applied to framing; in base-steel thickness not less than that of studs and in width to accommodate depth of studs.
 - 2. Single Track System: Top track with 2-inch-deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
- D. U-Channel: For channel bridging and suspended-assembly furring. Cold-rolled steel, 0.0538-inch minimum base-steel thickness, with minimum 1/2-inch- wide flanges.
 - 1. Depth:

- a. Bridging: Manufacturer's standard size required for the application.
 - b. Suspended-Assembly Furring Channels (Furring Members): 3/4 inch.
2. Bridging Clip Angle: Not less than 1-1/2 by 1-1/2 inches; 0.068-inch- base-steel thickness.
- E. Framing Accessories: Manufacturer's standard configuration and thickness required by performance and application.
 1. Supplementary framing.
 2. Bracing, bridging, and solid blocking.
 3. Web stiffeners.
 4. End clips.
 5. Stud kickers and knee braces.
 6. Hole-reinforcing plates.
 7. Flat strap and backer plates. Steel sheet for blocking and bracing in length in width and size required for application.
 - a. Bracing: Minimum base-steel thickness of 0.0359 inch (20-gauge).
 - b. Blocking: Minimum base-steel thickness of 0.0598 inch (16 gauge).
 - c. Backing Plate, Non-Blocking: As required by performance and supporting item.
 8. Furring: 0.0296-inch-base-steel thickness.
 - a. Profile: Z-, hat, or profile required for application.
 - b. Depth: As indicated.

2.4 GRID SUSPENSION SYSTEMS

- A. Grid Suspension Systems for Gypsum Board Ceilings: ASTM C645, direct-hung system composed of main beams and cross-furring members that interlock; self-spanning, wall-supported; with hanging, soffit, box, cove and transition profiles.
 1. Select products appropriate for conditions and applications within limitations for spans, support requirements of attached items within specified performance limits.
 2. Products: Subject to compliance with requirements, provide products named or equivalent products by one of the other manufacturers:
 - a. Products: Armstrong World Industries, Ceiling & Wall Solutions; Drywall Grid:
 - 1) Wall Supported: Shortspan Drwall Framing System.
 - 2) Frameall Drwall Grid Systems.
 - 3) Quikstix Drawll Grid for Soffits.
 3. Other Manufacturers:
 - a. CertainTeed; SAINT-GOBAIN
 - b. USG Corporation

2.5 AUXILIARY MATERIALS

- A. 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. For fastening into exterior wall framing, see Section 05 40 00 "Cold-Formed Metal Framing" for fastener requirements. Provide corrosion-resistant-coated screw fasteners.
- B. Post-Installed Anchors: As indicated on Structural Drawings.
1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated on Drawings.
 2. Stainless Steel Material for Exterior or Interior Locations: Alloy Group 1 stainless steel bolts, ASTM F593, and nuts, ASTM F594.
- C. Power-Actuated Anchors: As indicated on Structural Drawings. Fastener systems with an evaluation report, acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- D. Wire Hangers: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.162 inch in diameter.
- E. Flat Hangers: ASTM A653/A653MG60 hot-dip galvanized steel sheet, not less than 1 by 3/16 inch by length required.
- F. Isolation Strips:
1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.
 2. Flexible Flashing Separator: See Section 06 10 53 "Miscellaneous Rough Carpentry."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, substrates, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
1. Examine welded hollow-metal frames, cast-in anchors, and structural framing.
 2. Examine vapor retarders are installed continuously and segregating exterior wall systems from interior partitions.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that 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. Install required blocking, bridging and clips attached to overhead framing.

3.3 INSTALLATION OF NONSTRUCTURAL METAL FRAMING, GENERAL

- A. Installation Standard: ASTM C754.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 that apply to framing installation.
 2. Gypsum Sheathing Assemblies: Also comply with requirements in ASTM C1280 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
1. Install blocking at transitions of plywood and gypsum board transitions at interior walls in storage areas and at other similar transitions between different panel types.
 2. Install blocking at all ceili
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with framing members. Frame both sides of joints independently.
1. Provide slip and slotted connections between differing bearing and supported conditions.
- F. Do not attach top tracks from bottom into roof deck except into low flutes and with screw penetrations into low flute do not exceed 1/2-inch.

3.4 INSTALLATION OF NONSTRUCTURAL STEEL FRAMING

- A. Install framing system components at spacings indicated on Drawings, but not greater than spacings required by referenced installation standards for assembly types.
1. Single-Layer Application: As required by and specified in performance requirements unless otherwise indicated on Drawings.
 2. Multilayer Application: As required by and specified in performance requirements unless otherwise indicated on Drawings.
 3. Tile Backing Panels: As required by and specified in performance requirements unless otherwise indicated on Drawings.
- B. Where studs are installed directly against exterior framed walls, at exterior masonry or concrete walls, or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
1. At concrete walls, install foam gasket type.
 2. At dissimilar metals, install foam gasket or flexible flashing separator.
 3. At vapor retarder and abutting exterior walls, install foam gasket.
 4. Where abutting directly and attaching to exterior wall studs, install foam gasket.
- C. Install studs so flanges within framing system point in same direction.
- D. Install track at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated on Drawings 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.
 - a. Install two studs at each jamb unless otherwise indicated on Drawings.
 - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
 - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure unless otherwise indicated on Drawings.
3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated on Drawings. Install framing below sills of openings to match framing required above door heads.
4. STC-Rated Partitions: Install framing to comply with STC-rated assembly indicated on Drawings.

E. Direct Furring:

1. Screw to framing.
2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c. or spaced as required by performance.

3.5 INSTALLATION OF SUSPENSION SYSTEMS

- A. Install suspension system components according to manufacturer's written instructions, to approve shop drawings according to spacings indicated, but not greater than spacings required by reference standards and not more than 48 inches in any direction.
 1. Hangers: 48 inches o.c.
 2. Main Runners: 48 inches o.c.
 3. Secondary Channels and Furring: 24 inches o.c.; 16 inches o.c. where required by performance.
- B. Isolate suspension assemblies from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend 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. Do not attach hangers to plywood roof deck. Attach directly to joist framing, to furring or to blocking.
 2. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 3. 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.
 - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
 4. 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.
 5. 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.

6. Do not connect or suspend framing from ducts, pipes, or conduit.
7. Carrying Channels (Main Runners): U-channels spaced as required.
8. Seismic Bracing: Sway-brace suspension systems with hangers used for support and framing members according to shop drawings.

- D. Grid Suspension Systems: Install in accordance with manufacturer's written instructions. 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.

3.6 TOLERANCES

- A. Framing Members: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.
- B. Suspended Assemblies: Install suspension systems that are level to within 1/8 inch in 12 ft. measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.
- C. Installation Tolerances for Grid Suspension Systems: Install suspension systems that are level to within 1/8 inch in 12 ft. measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

3.7 FIELD QUALITY CONTROL

- A. Inspect framing installation for compliance with requirements. Inspect with trades whose work is affected by framing, including wall and ceiling finishes applied to work of Section 09 29 00, including 09 30 00 and 06 40 00.
- B. Remove and replace work where it does not comply with specified requirements at no additional cost to Owner and Project.

END OF SECTION