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SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Framing systems.
2. Suspension systems.

B. Related Requirements:

Retain subparagraph below to cross-reference requirements Contractor might expect to find in this Section but are specified in another Section.

1. Section 054000 "Cold-Formed Metal Framing" for exterior and interior load-bearing and exterior non-load-bearing wall studs; floor joists; and roof rafters and ceiling joists.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Framing systems.
2. Suspension systems.
3. Grid suspension systems.

1.3 INFORMATIONAL SUBMITTALS

Retain "Product Certificates" Paragraph below to require submittal of product certificates from manufacturers.

A. Product Certificates: For each type of code-compliance certification for studs and tracks.

B. Evaluation Reports: For [**high-strength steel studs and tracks**] [**firestop tracks**] [**post-installed anchors**] [**and**] [**power-actuated fasteners**], from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

1.4 QUALITY ASSURANCE

Retain "Code-Compliance Certification of Studs and Tracks" Paragraph below for third-party verification that products meet the requirements of model codes and industry standards. Coordinate retained certification program(s) with the member companies in manufacturer lists below. See "Code-Compliance Certification Programs" Article in the Evaluations.

A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified accordance with the ICC.

B.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Notify manufacturer of damaged materials received prior to installation.

B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling as required by AISI S202, "Code of Standard Practice for Cold-Formed Steel Structural Framing."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

Retain "Fire-Test-Response Characteristics" Paragraph below if framing is part of fire-resistance-rated assemblies. Indicate design designations of specific assemblies on Drawings.

A. 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, in accordance with ASTM E119 by an independent testing agency.

Retain "STC-Rated Assemblies" Paragraph below if framing is part of STC-rated assemblies. Indicate design designations of specific assemblies on Drawings. The IBC requires ASTM E90 testing, and Gypsum Association's GA-600 uses ASTM E90 testing for its STC-rated assemblies.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, in accordance with ASTM E90 and classified in accordance with ASTM E413 by an independent testing agency.

Retain "Horizontal Deflection" Paragraph below to allow Contractor to choose stud base-steel thickness and stud spacing rather than specifying base-steel thickness and spacing or indicating them on Drawings. Coordinate deflection limit with partition finishes (for example, plaster,

gypsum board, veneer plaster, etc.) and whether composite (full height, partition finishes to both sides) or non-composite (single-sided wall finish) assemblies.

C. Horizontal Deflection: For [**composite**] [**non-composite**] wall assemblies, limited to [**1/240**] [**1/360**] of the wall height based on horizontal loading of [**5 lbf/sq. ft.**] [**10 lbf/sq. ft.**] <**Insert value**>.

D. Design framing systems in accordance with AISI S220, "North American Specification for the Design of Cold-Formed Steel Framing - Nonstructural Members," unless otherwise indicated.

E. Design Loads: As indicated on architectural Drawings or 5 lbf/sq. ft. minimum as required by the IBC.

F. Design framing systems to accommodate deflection of primary building structure and construction tolerances and to withstand design loads with a maximum deflection of <**Insert inches**>.

2.2 FRAMING SYSTEMS

Retain "Recycled Content of Steel Products" Paragraph below to specify recycled content if required. An alternative method of requiring recycled content is to retain requirement in Project's Division 01 sustainable design requirements Section that gives Contractor the option and responsibility to determine how recycled content requirements will be met.

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than [**25**] <**Insert value**> percent.

Retain first option in "Framing Members, General" Paragraph below for IBC 2012; retain second option for IBC 2015; retain third option for IBC 2018 and IBC 2021.

B. Framing Members, General: Comply with [**ASTM C645**] [**AISI S220 and ASTM C645, Section 10**] [**AISI S220**] for conditions indicated.

Retain first option in "Steel Sheet Components" Subparagraph below for IBC 2012; retain second option for IBC 2015; retain third option for IBC 2018.

1. Steel Sheet Components: Comply with [**ASTM C645**] [**AISI S220 and ASTM C645, Section 10**] [**AISI S220**] requirements for metal unless otherwise indicated

See "Corrosion Protection of Steel Framing" and "Code-Compliance Certification Programs" articles in the Evaluations for a discussion of corrosion-resistant coatings on components and their certification.

Retain first option in "Protective Coating" Subparagraph below for IBC 2012; retain second option for IBC 2015 and later.

2. Protective Coating: Comply with [**ASTM C645**] [**AISI S220**]; ASTM A653/A653M, G40; or coating with equivalent corrosion resistance. Galvannealed products are unacceptable.

a. Coating demonstrates equivalent corrosion resistance with an evaluation report acceptable to authorities having jurisdiction.

See "High-Strength Steel Studs and Tracks" Article in the Evaluations for information about high-strength steel studs and tracks.

C. High-Strength Steel Studs and Tracks: Roll-formed with surface deformations to stiffen the framing members.

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to identify a specific product or a comparable product from manufacturers listed.

1. Basis-of-Design Product: Subject to compliance with requirements, provide **CRACO Mfg., Inc.; SmartFrame Drywall Framing System (SmartStud)** or comparable product by one of the following:

   a. **<Insert manufacturer's name>**

2. Minimum Base-Steel Thickness: [**As indicated on Drawings**] [**As required by horizontal deflection performance requirements**] [**0.0149 inch**]
3. Depth: [**As indicated on Drawings**] [**3-5/8 inches**] [**6 inches**] [**4 inches**] [**2-1/2 inches**] [**1-5/8 inches**].

D. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch- wide flanges.

1. Depth: [**As indicated on Drawings**] [**3/4 inch**] <**Insert depth**>.
2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch.
3. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch- diameter wire, or double strand of 0.048-inch- diameter wire.

2.3 SUSPENSION SYSTEMS

Retain this article for suspended or furred ceilings or soffits and for grid suspended ceilings.

A. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch- diameter wire, or double strand of 0.048-inch- diameter wire.

B. Hanger Attachments to Concrete:

ICC-ES AC01 and AC193 are for expansion anchors in masonry and mechanical anchors in concrete, respectively, and AC58 and AC308 are for adhesive anchors in masonry and concrete. Do not use expansion-type anchors where expansion can cause damage to the substrate material. Verify with Project's structural engineer, and insert specific load requirements and names of acceptable products if required.

1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES [**AC01**] [**AC193**] [**AC58**] [**or**]

[**AC308**] as appropriate for the substrate.

a. Uses: Securing hangers to structure.

Retain "Type" Subparagraph below to restrict type of anchor if required.

b. Type: [**Torque-controlled, expansion anchor**] [**torque-controlled, adhesive anchor**] [**or**] [**adhesive anchor**].

Material in "Material for Interior Locations" Subparagraph below protects against corrosion in an indoor atmosphere.

c. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941, Class Fe/Zn 5, unless otherwise indicated.

Alloy Group 1 (A1) refers to Type 304 and similar alloys, and Alloy Group 2 (A4) refers to Type 316 and similar alloys.

d. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy [**Group 1**] [**Group 2**] stainless steel bolts, ASTM F593, and nuts, ASTM F594.

Retain "Power-Actuated Anchors" Subparagraph below if power-actuated fasteners are acceptable. Verify with Project's structural engineer, and insert specific load requirements and names of acceptable products if required.

2. Power-Actuated Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

Retain "Wire Hangers" or "Flat Hangers" Paragraph below, or insert requirements to suit Project. Verify requirements of authorities having jurisdiction. If more than one type of hanger is required, indicate locations of each on Drawings.

C. Wire Hangers: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.

D. Flat Hangers: Steel sheet, [**in size indicated on Drawings**] [**1 by 3/16 inch by length indicated**] <**Insert size**>.

Retain "Carrying Channels (Main Runners)" Paragraph below for conventional ceiling suspension framing; delete if only grid suspension ceilings are required.

E. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-steel thickness of 0.0538 inch and minimum 1/2-inch- wide flanges.

1. Depth: [**As indicated on Drawings**] [**2-1/2 inches**] [**2 inches**] [**1-1/2 inches**].

F. Furring Channels (Furring Members):

Retain one type of furring member below or, if more than one is required, indicate locations of each on Drawings.

1. Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch- wide flanges, 3/4 inch deep.
2. Steel Studs and Tracks:

    a. Minimum Base-Steel Thickness: [**As indicated on Drawings**] [**0.0149 inch**]
    b. Depth: [**As indicated on Drawings**] [**1-5/8 inches**] [**2-1/2 inches**] [**3-5/8 inches**] [**6 inches**].

See "High-Strength Steel Studs and Tracks" Article in the Evaluations for information about high-strength steel studs and tracks.

3. High-Strength Steel Studs and Tracks:

    a. Minimum Base-Steel Thickness: [**As indicated on Drawings**] [**0.0149 inch**]
    b. Depth: [**As indicated on Drawings**] [**1-5/8 inches**] [**2-1/2 inches**] [**3-5/8 inches**] [**6 inches**].

4. Hat-Shaped, Rigid Furring Channels: 7/8 inch deep.

    a. Minimum Base-Steel Thickness: [**As indicated on Drawings**] [**0.0149 inch**]

5. Resilient Furring Channels: 1/2-inch- deep members designed to reduce sound transmission.

    a. Configuration: [**Asymmetrical**] [**or**] [**hat shaped**].

2.4 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.

B. Isolation Strip at Exterior Walls: Provide[**one of**] the following:

Retain "Asphalt-Saturated Organic Felt" and "Foam Gasket" subparagraphs below and option in "Isolation Strip at Exterior Walls" Paragraph above to allow Contractor to choose type of isolation strip.

1. Asphalt-Saturated Organic Felt: ASTM D226/D226M, 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 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

A. 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.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

Delete "Suspended Assemblies" Paragraph below if only postinstalled anchors are used for installing suspended assemblies.

A. 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.

B. Coordination with Sprayed Fire-Resistive Materials:

Indicate requirements on Drawings for attaching steel framing to construction protected by 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 inches 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.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C754.

Standards listed in "Gypsum Plaster Assemblies," "Portland Cement Plaster Assemblies," "Gypsum Veneer Plaster Assemblies," and "Gypsum Board Assemblies" subparagraphs below include framing installation requirements not in ASTM C754. Retain applicable subparagraphs to suit Project.

1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C841 that

apply to framing installation.
2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C1063 that apply to framing installation.
3. Gypsum Veneer Plaster Assemblies: Also comply with requirements in ASTM C844 that apply to framing installation.
4. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 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.

D. Install bracing at terminations in assemblies.

Indicate control and expansion joints on Drawings.

E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLATION OF FRAMING SYSTEMS

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

Generally, indicate stud spacings on Drawings and delete "Single-Layer Application," "Multilayer Application," and "Tile Backing Panels" subparagraphs below. Retain first option in each of these subparagraphs if retaining "Horizontal Deflection" Paragraph in "Performance Requirements" Article. ASTM C754 includes tabulations of maximum framing spacing based on thickness and orientation of gypsum board panels and deflection and lateral loading.

1. Single-Layer Application: [**As required by horizontal deflection performance requirements**] [**16 inches o.c.**] [**24 inches o.c.**] unless otherwise indicated.
2. Multilayer Application: [**As required by horizontal deflection performance requirements**] [**16 inches o.c.**] [**24 inches o.c.**] unless otherwise indicated.
3. Tile Backing Panels: [**As required by horizontal deflection performance requirements**] [**16 inches o.c.**] unless otherwise indicated.

Retain first paragraph below if studs abut dissimilar metals at exterior walls or exterior masonry walls that may become damp.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. 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.

Indicate locations and details of slip-type and fire-rated head joints on Drawings. See "Crack Control" Article in the Evaluations.

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.

Usually retain first subparagraph below. Design framing for doors more than 48 inches (1219 mm) wide, for double doors, and for extra-heavy doors to meet loading conditions.

a. Install two studs at each jamb unless otherwise indicated.

Retain first subparagraph below if one-piece control joints are required at heads of doors.

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.

Retain first subparagraph below if suspended ceilings cannot withstand forces generated by opening and closing doors.

c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

Retain "Other Framed Openings" Subparagraph below for framed openings other than doors, or revise to suit Project. Fully indicate framing for large openings on Drawings.

3. 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.
4. 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.

Indicate locations and details of firestop track on Drawings.

a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
6. Curved Partitions:

a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
b. 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 inches o.c.

E. 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 o.c.

F. Z-Shaped Furring Members:

1. Erect insulation, specified in Section 072100 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced [**24 inches**] <**Insert dimension**> o.c.
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 inches 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 inches from corner and cut insulation to fit.

"Installation Tolerance" Paragraph below is based on recommendation in GA-216 for wood framing and in ASTM C840 for steel framing.

G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.5 INSTALLATION OF SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

Generally, indicate suspension system component spacing on Drawings and delete "Hangers," "Carrying Channels (Main Runners)," and "Furring Channels (Furring Members)" subparagraphs below. ASTM C754 includes tabulations of suspension system component size and spacing based on supported ceiling area at a uniform load of 4 lbf/sq. ft. (0.19 kPa).

1. Hangers: [**48 inches**] <**Insert dimension**> o.c.

Retain "Carrying Channels (Main Runners)" Subparagraph below for conventional ceiling suspension framing; delete if only grid suspension ceilings are required.

2. Carrying Channels (Main Runners): [**48 inches**] <**Insert dimension**> o.c.
3. Furring Channels (Furring Members): [**16 inches**] [**24 inches**] <**Insert dimension**> o.c.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. 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.

    a. 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.

    a. Size supplemental suspension members and hangers to support ceiling loads within [**performance limits established by referenced installation standards**] <**Insert deflection limit**>.

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.

Retain applicable construction types below.

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.

Furring channels must be wire tied to supports in most fire-resistance-rated assemblies. Verify requirements of fire-resistance-rated assemblies and revise "Fire-Resistance-Rated Assemblies" Paragraph below to suit Project.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

Retain "Seismic Bracing" Paragraph below for seismic bracing and revise to include specific provisions to suit Project.

E. Seismic Bracing: Sway-brace suspension systems [**with hangers used for support**] <**Insert requirements**>.

3.6 INSTALLATION OF GRID SUSPENSION SYSTEMS

Grid suspension systems are suitable for use with gypsum board. They might be acceptable for gypsum veneer plaster; consult gypsum veneer plaster and grid suspension system manufacturers.

A. 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.

3.7 FIELD QUALITY CONTROL

Example tolerance in "Installation Tolerances" Paragraph below is based on ASTM C636 for acoustical ceilings.

A. Installation Tolerances: Install suspension systems that are level to within [**1/8 inch in 12 feet**] <**Insert dimensions**> measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216