

**PART 1 GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. This Section includes:
1. Exterior non-load-bearing wall framing.
  2. Exterior Soffit framing.
- B. Related Requirements:
1. Division 1 Section "Sustainable Design Requirements".
  2. Division 5 Section "Metal Fabrications" for masonry shelf angles and connections.
  3. Division 9 Section "Gypsum Board Shaft Wall Assemblies" for interior non-load-bearing, metal-stud-framed, shaft-wall assemblies.
  4. Division 9 Section "Non-Structural Metal Framing" for interior non-load-bearing, metal-stud framing and ceiling-suspension assemblies.

**1.3 QUALITY ASSURANCE**

- A. The work of this section shall be performed by a company which specializes in the type of cold-formed metal framing work required for this Project, with a minimum of 5 years of documented successful experience and shall be performed by skilled workmen thoroughly experienced in the necessary crafts.
1. Work shall be performed in compliance with Owner's insurance underwriters' requirements and UL approvals and testing for materials, assemblies and procedures.
- B. Manufacturer shall specialize in manufacturing the type of cold-formed metal framing specified in this section, with a minimum of 5 years of documented successful experience, and have the facilities capable of meeting all requirements of Contract Documents as a single-source responsibility and warranty.
- C. Testing Agency Qualifications: Qualified according to ASTM E329 for testing indicated.
- D. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.
- E. Welding Qualifications: Qualify procedures and personnel according to the following:
1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
  2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
- F. Comply with LGSEA Research Note: "Behavior and Design Self-Drilling Screw Connections".
- G. Manufacturer's identification tags or marks are not acceptable on surfaces which will remain exposed to view after installation.
1. Evidence of "patching" after removal of tags or marks is not acceptable.

**1.4 PERFORMANCE REQUIREMENTS**

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design cold-formed steel framing.
- B. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
1. Design Loads: As indicated on the Structural Drawings.
  2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
    - a. Exterior Non-Load-Bearing Framing: Horizontal deflection of 1/720 of the wall height.

3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F (67 deg C).
  4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
    - a. Upward and downward movement of 1/2 inch (13 mm).
  5. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.
- C. Design exterior soffits framing to withstand uplift pressures required by the City of San Francisco Building Code and wind tunnel report, but not less than 40 PSF positive and negative pressure.
- D. Cold-Formed Steel Framing Design Standards:
1. Wall Studs: AISI S211.
  2. Headers: AISI S212.
  3. Lateral Design: AISI S213.
- E. AISI Specifications and Standards: Unless more stringent requirements are indicated, comply with AISI S100 and AISI S200.
- F. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

### 1.5 SUBMITTALS

- A. Submit the following according to Conditions of the Construction Contract and Division 1 Specification Sections.
- B. Product Data: For each type of cold-formed steel framing product and accessory indicated or required.
- C. LEED Submittals:
1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
- D. Shop Drawings:
1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
  2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
- E. Delegated-Design Submittal: For cold-formed steel framing indicated to comply with design loads. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- F. Hazardous Materials Notification: In the event no product or material is available that does not contain asbestos, PCB or other hazardous materials as determined by the Owner, a "Material Safety Data Sheet" (MSDS) equivalent to OSHA Form 20 shall be submitted for that proposed product or material prior to installation.
- G. Asbestos and PCB Certification: After completion of installation, but prior to Substantial Completion, Contractor shall certify in writing that products and materials installed, and processes used, do not contain asbestos or polychlorinated biphenyls (PCB), using format in Article 3 of General Conditions.

### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency and professional engineer.
- B. Welding certificates.
- C. Product Test Reports: For each listed product, for tests performed by a qualified testing agency.
1. Steel sheet.
  2. Expansion anchors.

3. Power-actuated anchors.
  4. Mechanical fasteners.
  5. Vertical deflection clips.
  6. Horizontal drift deflection clips
  7. Miscellaneous structural clips and accessories.
- D. Research Reports: For cold-formed steel framing, from ICC-ES.
- 1.7 DELIVERY, STORAGE, AND HANDLING**
- A. Comply with General Conditions and Division 1 Section "Product Requirements".
  - B. Protect cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling.
  - C. Store Cold-Formed Metal Framing, protect with a waterproof covering, and ventilate to avoid condensation.
- 1.8 WARRANTY**
- A. Comply with General Conditions and Division 1 Section "Product Requirements".
- 1.9 PREINSTALLATION MEETINGS**
- A. Preinstallation Conference: Conduct conference at Project site.

## **PART 2 PRODUCTS**

### **2.1 UNAUTHORIZED MATERIALS**

- A. Materials and products required for work of this section shall not contain asbestos, polychlorinated biphenyls (PCB) or other hazardous materials identified by the Owner.

### **2.2 ACCEPTABLE MANUFACTURERS**

- A. Products of the manufacturers specified in this section establish the minimum functional, aesthetic and quality standards required for work of this section.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. AllSteel & Gypsum Products, Inc.
  2. California Expanded Metal Products Company.
  3. ClarkWestern Building Systems, Inc.
  4. Consolidated Fabricators Corp.; Building Products Division.
  5. Craco Mfg., Inc.
  6. Custom Stud Inc.
  7. Design Shapes in Steel.
  8. Dietrich Metal Framing; a Worthington Industries Company.
  9. Formetal Co. Inc. (The).
  10. MarinoWARE.
  11. Nuconsteel; a Nucor Company.
  12. Olmar Supply, Inc.
  13. Quail Run Building Materials, Inc.
  14. SCAFCO Corporation.
  15. Southeastern Stud & Components, Inc.
  16. State Building Products, Inc.
  17. Steel Construction Systems.
  18. Steel Network, Inc. (The).
  19. Steel Structural Systems.
  20. Steeler, Inc.
  21. Super Stud Building Products, Inc.
  22. Telling Industries, LLC.
  23. United Metal Products, Inc.
  24. United Steel Manufacturing.
- C. Substitutions: Comply with General Conditions using form in Division 1 Section "Substitution Request Form".

**2.3 COLD-FORMED STEEL FRAMING, GENERAL**

- A. Recycled Content: For materials containing post-industrial (pre-consumer) and/or post-consumer recycled content, contractor shall document the cost and percentage (by weight) of each material broken out by post-industrial (pre-consumer) and post-consumer content.
- B. Steel Sheet: ASTM A1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
  - 1. Grade: As required by structural performance.
  - 2. Coating: G90 (Z275) or equivalent.
- C. Steel Sheet for Vertical Deflection and Drift Clips: ASTM A653/A 653M, structural steel, zinc coated, of grade and coating as follows:
  - 1. Grade: 50 (340), Class 1 as required by structural performance.
  - 2. Coating: G90 (Z275).

**2.4 NON-LOAD-BEARING WALL FRAMING**

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
  - 1. Minimum Base-Metal Thickness: 0.0428 inch (1.09 mm).
  - 2. Flange Width: 1-5/8 inches (41 mm).
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
  - 1. Minimum Base-Metal Thickness: 0.0428 inch (1.09 mm) Matching steel studs.
  - 2. Flange Width: manufacturer's standard width.
- C. Vertical Deflection Clips: Manufacturer's standard bypass or head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. AllSteel & Gypsum Products, Inc.
    - b. ClarkWestern Building Systems, Inc.
    - c. Dietrich Metal Framing; a Worthington Industries company.
    - d. MarinoWARE.
    - e. SCAFCO Corporation.
    - f. Steel Network, Inc. (The).
    - g. Steeler, Inc.
- D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
  - 1. Minimum Base-Metal Thickness: 0.0538 inch (1.37 mm).
  - 2. Flange Width: 1 inch (25 mm) plus twice the design gap for other applications.
- E. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
  - 1. Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
    - a. Minimum Base-Metal Thickness: 0.0428 inch (1.09 mm).
    - b. Flange Width: 1 inch (25 mm) plus twice the design gap for other applications.
  - 2. Inner Track: Of web depth indicated, and as follows:
    - a. Minimum Base-Metal Thickness: 0.0538 inch (1.37 mm).
    - b. Flange Width: Dimension equal to sum of outer deflection track flange width plus 1 inch (25 mm).
- F. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

**2.5 SOFFIT FRAMING**

- A. Exterior Soffit Frame: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0428 inch (1.09 mm).
  2. Flange Width: 1-5/8 inches (41 mm) minimum.
- B. Exterior Soffit Framing Miscellaneous Materials
1. Suspended Furring:
    - a. Main Runners (Carrying Channels): Cold-rolled channels, 2-1/2 inches (63.5 mm) deep.
    - b. Cross Furring: Cold-rolled channels, 3/4 inch (19.1 mm) deep.
  2. Direct Furring: Cold-rolled channels, 3/4 inch (19.1 mm) deep.
  3. Tie Wire:
    - a. For tying main runners directly to beams or joists (where wire hangers are used between beams or joists), use double loop of 0.1205-inch- (3.06-mm-) diameter wire.
    - b. For tying furring directly to concrete structure without main runners, use 0.0800-inch- (2.03-mm-) diameter wire.
    - c. For tying furring directly to steel or wood structure without main runners, use double loop of 0.0625-inch- (1.59-mm-) diameter wire, or quadruple loop of 0.0475-inch- (1.21-mm-) diameter wire.
    - d. For saddle tying cross furring to main runners use 0.0625-inch- (1.59-mm-) diameter wire, or double strand of 0.0475-inch- (1.21-mm-) diameter wire.
  4. Steel Pipe Hangers: ASTM A510 (ASTM A510M), mild carbon steel, ASTM A153/A153M, hot-dip galvanized.
    - a. Diameter: As required to meet Performance Requirements, but not less than 2-1/2 inches.
  5. Steel Angle Hangers: As required to meet Performance Requirements, but not less than 3-1/2" x 3-1/2" x 1/4" with ASTM A653/A653M, G60 (Z180), hot-dip galvanized zinc coating.
  6. Hanger Attachments to Concrete: Power-actuated fasteners that use explosive powder, gas combustion, or compressed air or other gas to embed fasteners in concrete and that are suitable for application indicated.
    - a. Fabricated from corrosion-resistant materials, with clips or other devices for attaching hangers.
    - b. Capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by a qualified independent testing agency.

**2.6 FRAMING ACCESSORIES**

- A. Fabricate steel-framing accessories from steel sheet, ASTM A1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
1. Supplementary framing.
  2. Bracing, bridging, and solid blocking.
  3. Web stiffeners.
  4. Anchor clips.
  5. End clips.
  6. Foundation clips.
  7. Gusset plates.
  8. Stud kickers and knee braces.
  9. Joist hangers and end closures.
  10. Hole reinforcing plates.
  11. Backer plates.

**2.7 ANCHORS, CLIPS, AND FASTENERS**

- A. Steel Shapes and Clips: ASTM A36/A 36M, zinc coated by hot-dip process according to ASTM A123/A 123M.
- B. Anchor Bolts: ASTM F1554, Grade 36, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A153/A 153M, Class C.
- C. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E488 conducted by a qualified testing agency.

- D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E1190 conducted by a qualified testing agency.
- E. Mechanical Fasteners: ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
  - 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

## 2.8 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B ASTM A780.
- B. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C1107/C 1107M, with fluid consistency and 30-minute working time.
- C. Shims: Load bearing, high-density multimonomer plastic, and nonleaching.
- D. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

## 2.9 FABRICATION

- A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
  - 1. Fabricate framing assemblies using jigs or templates.
  - 2. Cut framing members by sawing or shearing; do not torch cut.
  - 3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
    - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    - b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by no fewer than three exposed screw threads.
      - 1) Screws must be tight in holes; easily tightened screw heads must be replaced.
      - 2) Welding of cold-formed metal framing is not allowed.
  - 4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.
- C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
  - 1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
  - 2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

- B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that are required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.
- C. Install load bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch (6 mm) to ensure a uniform bearing surface on supporting concrete or masonry construction.
- D. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

### 3.3 INSTALLATION, GENERAL

- A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed steel framing according to AISI S200 and to manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
  - 1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch (1.6 mm).
- D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
  - 1. Cut framing members by sawing or shearing; do not torch cut.
  - 2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
    - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    - b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.
- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.
- H. Install insulation, specified in Section 072100 "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- I. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.
- J. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
  - 1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
- K. All header connections shall be shear type.
- L. Lateral braces of light gauge metal fasteners shall follow manufacturer's recommendations.

### 3.4 NON-LOAD-BEARING WALL INSTALLATION

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.

- B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:
  - 1. Stud Spacing: 24 inches (610 mm) or as indicated.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
  - 1. Install single deep-leg deflection tracks and anchor to building structure.
  - 2. Install double deep-leg deflection tracks and anchor outer track to building structure.
  - 3. Connect vertical deflection clips to bypassing or infill studs and anchor to building structure.
  - 4. Connect drift clips to cold-formed metal framing and anchor to building structure.
- E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.
  - 1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches (305 mm) of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
    - a. Install solid blocking at 96-inch (2440-mm) centers or centers indicated on Shop Drawings.
  - 2. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
- F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

### 3.5 INSTALLING NONSTRUCTURAL STEEL FRAMING, GENERAL

- A. General: Comply with requirements in ASTM C 1063 for applications indicated.
  - 1. Comply with ASTM C 754 for installation of items not addressed in ASTM C 1063.
- B. Install supplementary framing, blocking, and bracing at terminations in plaster assemblies to support fixtures, equipment services, heavy trim, furnishings, or similar construction.
- C. Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement.
  - 1. Isolate ceiling assemblies where they abut or are penetrated by building structure.
- D. Do not bridge building control and expansion joints with steel framing or furring members.
  - 1. Frame both sides of joints independently.
- E. Soffits: Unless otherwise detailed on Drawings, install furred or suspended soffits to comply with requirements for ceiling installation; install framed soffits to comply with requirements for partition installation.

### 3.6 INSTALLING STEEL FRAMING FOR EXTERIOR SOFFITS

- A. Suspend ceiling hangers from building structure as follows:
  - 1. Install hangers plumb and free of contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system.
    - a. Splay hangers only where required to miss obstructions; 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 the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
    - a. Size supplemental suspension members and hangers to limit deflection to 1/360 of span while supporting ceiling loads.
  - 3. Hangers: Secure to structure, including intermediate framing members, by attaching to fasteners that are secure and appropriate for substrate and hanger, in a manner that will not cause hangers to deteriorate or otherwise fail.
  - 4. Do not support ceilings directly from permanent metal forms.
    - a. Secure to fastener devices that extend through forms.
  - 5. Do not attach hangers to steel deck tabs.
  - 6. Do not attach hangers to steel roof deck.
    - a. Attach hangers to structural members.
  - 7. Do not connect steel framing to or suspend it from ducts, pipes, or conduit.



- B. Installation Tolerances: Install steel framing components for ceilings so members are level to within 1/4 inch in 10 feet (6.4 mm in 3 m) measured lengthwise on each member and transversely between parallel members.
- C. Sway-brace suspended steel framing with hangers used for support.
- D. Install steel framing components for ceilings in sizes and spacings indicated but not less than that required to meet performance requirements.
  - 1. Hanger Spacing: Maximum 48 inches (1219 mm) o.c.
  - 2. Main Runner (Carrying Channel) Spacing: For suspended ceilings, maximum 36 inches (914 mm) o.c.
  - 3. Cross-Furring Spacing: For suspended ceilings, 12 inches (305 mm).

### 3.7 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Remove and replace work where test results indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

### 3.8 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

**END OF SECTION**