

## **SECTION 05 40 00 – COLD-FORMED METAL FRAMING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. Section Includes:
  - 1. Load-bearing wall framing.
  - 2. Exterior non-load-bearing wall framing.
  - 3. Interior raised flooring/podiums.
  - 4. Interior non-load-bearing wall framing exceeding height limitations of standard, nonstructural metal framing.
  - 5. Soffit framing.
- C. Related Work:
  - 1. Division 05 Section to 05 75 00 "Decorative Formed Metal".

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: Technical data for cold formed steel framing components, including framing, clips, track, anchors, and gaskets, and to verify section properties of studs shown on the drawings and instructions for securing studs to tracks and other framing connections and for accessories including factory applied primers.
- B. Sustainable Design Submittals:
  - 1. Building Product Disclosure and Optimization - Sourcing of Raw Materials:
    - a. Extended Producer Responsibility (EPR): Submit documentation indicating that manufacturers have a take back or recycling program for the product purchased.
    - b. Bio-based Materials: For bio-based products and materials other than wood, submit documentation of product data and testing results in compliance with LEED requirements.
    - c. Wood Products: Submit documentation of FSC or equivalent certification.
    - d. Materials Reuse: For products that are salvaged, refurbished, or reused, include a statement indicating costs for each product.
    - e. Recycled Content: For products having recycled content, indicate percentages by weight of post-consumer and pre-consumer recycled content.
      - 1) Include statement indicating costs for each product having recycled content.
    - f. Regional Materials: For products that are required to comply with requirements for regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material.
      - 1) Include statement indicating distance to Project, cost for each regional material and the fraction by weight that is considered regional.

2. Indoor Environmental Quality, Low Emitting Materials: Building Products must be tested and compliant with the California Department of Public-Health (CDPH) Standard Method V1.1-2010 or v1.2 2017, using the applicable exposure scenario.
  - a. For paints, and coatings, wet applied, include printed statement of VOC content, showing compliance with the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure for Architectural Coatings or the South Coast Air Quality Management District (SCAQMD) Rule 1113-2011.
3. Adhesives and Sealants: For wet applied on-site products, submit printed statement showing compliance with the applicable chemical content requirements of SCAQMD Rule 1168, effective July 1, 2005 and rule amendment date of January 7, 2005.
- C. Shop Drawings: Submit detailed stud layout, spacing, size, thickness, and types of cold formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners, bracing and welds and related accessories.
  1. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
- D. Fabrication Engineering and Design Data Submittal: Submit For cold formed steel framing to verify compliance with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

### 1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: Submit data for testing agency.
- B. Welding certificates.
- C. Product Certificates: Submit for each type of code compliance certification for studs and tracks.
- 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. Submit reports for:
  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.
- E. Research Reports: Submit ICC-ES evaluation report for:
  1. Nonstandard cold-formed steel-framing, post installed anchors, and power actuated fasteners, from ICC-ES or qualified testing agency acceptable to authorities having jurisdiction.
  2. Sill sealer gasket/termite barrier showing compliance with ICC-ES AC380.
- F. Sustainable Design Submittals:

1. Building Product Disclosure and Optimization - Environmental Product Declarations
  - a. Submit product specific type III EPDs or Industry wide (generic) EPDs, USGBC approved program declaration or products with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that have at least a cradle to gate scope.
2. Building Product Disclosure and Optimization - Material Ingredients
  - a. Material Ingredient Reporting: Submit documentation confirming chemical inventory of products to at least 0.1 % (1000ppm) with at least one of the following:
    - 1) Submit published manufacturer inventory of ingredients identified by name and Chemical Abstract Service Registration Number (CASRN)
    - 2) Submit documentation that product has been certified as Cradle-to-Cradle v3 at the Bronze Level or better
    - 3) Submit Declare product label indicating that all ingredients have been disclosed down to 1000 ppm or designated as Red List Free or Declared
    - 4) Living Product Challenge
    - 5) Product Lens Certification
    - 6) USGBC approved program.

#### **1.4 QUALITY ASSURANCE**

- A. Regulatory Requirements:
  1. Comply with the IBC as adopted and amended by the AHJ including special inspections.
    - a. Code Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified in accordance with the product certification program of the Certified Steel Stud Association, the Steel Framing Industry Association, or the Steel Stud Manufacturers Association.
- B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the State of Texas and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of cold formed metal framing similar to those indicated in material, design, and extent.
  1. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and structural data.
- C. Welding Qualifications: Qualify procedures and personnel in accordance with:
  1. AWS D1.1/D1.1M Structural Welding Code - Steel.
  2. AWS D1.3/D1.3M Structural Welding Code - Sheet Steel.
- D. Preinstallation Conference: Conduct conference at the site.

#### **1.5 DELIVERY, STORAGE AND HANDLING**

- A. Protect cold formed steel framing members from weather exposure and damage. Deliver to site in bundles, fully identified with name, type and grade. Store off ground in dry, ventilated space or protect with suitable, venting waterproof coverings.

- B. Inspect cold formed steel framing upon delivery for corrosion and damage to temporary primer. Remove corrosion and repair temporary primer.
- C. Protect cold formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. AllSteel & Gypsum Products, Inc.
  - 2. CEMCO; California Expanded Metal Products Co.
  - 3. ClarkDietrich Building Systems.
  - 4. MarinoWARE.
  - 5. Nuconsteel, A Nucor Company.
  - 6. Steel Network, Inc. (The).
  - 7. Super Stud Building Products Inc.
  - 8. Telling Industries.

### **2.2 PERFORMANCE REQUIREMENTS**

- A. Fabrication Engineering and Design Data : Engage a qualified professional engineer, as defined in Section 01 33 16, "Fabrication Engineering Design Data," to design cold formed steel framing complying with requirements.
- B. Structural Performance: Provide cold formed steel framing capable of withstanding design loads within limits and under conditions indicated.
  - 1. Design Loads: Indicated on Structural Drawings.
  - 2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
    - a. Exterior Load-Bearing Wall Framing: Horizontal deflection of 1/600 of the wall height.
    - b. Interior Load-Bearing Wall Framing: Horizontal deflection of 1/360 of the wall height.
    - c. Exterior Non-Load-Bearing Wall Framing: Horizontal deflection of 1/360 of the wall height.
    - d. Exterior Non-Load-Bearing Framing for Metal Panels: Horizontal deflection of 1/360 of the wall height.
    - e. Exterior Non-Load-Bearing Framing for Masonry Veneer: Horizontal deflection of 1/720 of the wall height.
    - f. Interior Non-Load-Bearing Framing: Horizontal deflection of 1/360 of the wall height under a horizontal load of 5 lbf/sq. ft. (239 Pa).
    - g. Ceiling Joist Framing: Vertical deflection of 1/360 of the span for live loads and 1/240 for total loads of the span.
  - 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 degrees F (67 degrees 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), unless otherwise indicated.
  5. Design exterior nonload bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.
- C. Cold Formed Steel Framing Standards: Unless more stringent requirements are indicated, framing shall comply with AISI S100, AISI S200:
1. Floor and Roof Systems: AISI S210.
  2. Wall Studs: AISI S211.
  3. Headers: AISI S212.
  4. Lateral Design: AISI S213.
- D. Fire Resistance Ratings: Comply with ASTM E 119; testing by UL. Identify products with appropriate markings.
1. Indicate design designations from the UL Fire Resistance Directory.
- E. AISI Specifications and Standards: Comply with AISI North American Specification for the Design of Cold Formed Steel Structural Members and Standard for Cold Formed Steel Framing - General Provisions.
1. Comply with AISI S100 and AISI S200 unless more stringent requirements are indicated.
- F. Low-Emitting Materials:
1. Architectural paints and coatings wet-applied inside the weather-proofing system must meet the VOC general emissions testing criteria of CDPH Standard Method v1.2.
  2. All paints and coatings wet-applied inside the weather-proofing system must have VOC content in compliance with the applicable VOC limits (g/L) found in tables in Division 01 Section 01 81 13 "Sustainable Design Requirements - LEED v4 BD+C."
  3. Adhesives and Sealants wet-applied inside the weather-proofing system must meet the VOC general emissions testing criteria of CDPH Standard Method v1.2.
  4. All adhesives and sealants wet-applied inside the weather-proofing system must have VOC content in compliance with the applicable VOC limits (g/L) found in tables in Division 01 Section 01 81 13.14 "Sustainable Design Requirements - LEED v4 BD+C."

## **2.3 COLD FORMED STEEL FRAMING MATERIALS**

- A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating designation:
1. Grade: Required by structural performance.
  2. Coating: G90 (Z275).
- B. Steel Sheet for Vertical Deflection Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating:

1. Grade: As required by structural performance.
2. Coating: G90 (Z275).

## **2.4 EXTERIOR AND INTERIOR 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: 0.0538 inch (16 gage). Thickness to satisfy design loads.
  2. Flange Width: 2-1/2 inches.
- 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: 0.0538 inch (16 gage). Thickness to satisfy design loads.
  2. Flange Width: 1-1/4 inches.
- C. Vertical Deflection Clips: Manufacturer's standard 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 product by one of the following:
    - a. ClarkDietrich Building Systems.
    - b. MarinoWARE.
    - c. SCAFCO Corporation.
    - d. Steel Network, Inc. (The).
- D. Single Deep Leg Deflection Tract: 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 (16 gage).
  2. Flange Width: 1 inch plus the design gap for one-story structures and 1 inch plus twice the design gap for other applications.
- E. 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 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. RE: Structural General Notes.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and as follows:

1. RE: Structural General Notes.

## 2.6 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: 0.0538 inch (16 gage).
  2. Flange Width: 2 inches (51 mm) minimum.

## 2.7 FRAMING ACCESSORIES

- A. Framing Materials: Fabricate steel framing accessories from ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation used for framing members.
  1. Provide accessories in standard thickness and configuration, unless otherwise indicated:
    - a. Supplementary framing.
    - b. Bracing, bridging, and solid blocking.
    - c. Web stiffeners.
    - d. Anchor clips.
    - e. End clips.
    - f. Foundation clips.
    - g. Gusset plates.
    - h. Stud kickers and knee braces.
    - i. Joist hangers and end closures.
    - j. Hole reinforcing plates.
    - k. Backer plates.
- B. Anchors, Clips, and Fasteners:
  1. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot dip process in accordance with ASTM A 123/A 123M.
  2. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon steel carbon steel nuts, and flat, hardened steel washers; zinc coated by hot dip process in accordance with ASTM A 153/A 153M, Class C.
  3. Post Installed Anchors: Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC193, ICC-ES AC58 or ICC-ES AC308 as appropriate for the substrate.
    - a. Uses: Securing cold formed steel framing to structure.
    - b. Type: Torque-controlled expansion anchor.
    - c. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.
    - d. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

4. Power Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, in accordance with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
5. Mechanical Fasteners: ASTM C 1513, corrosion resistant coated, self-drilling, self-tapping, steel drill screws.
  - a. Head Type: Low profile head beneath sheathing.
6. Welding Electrodes: Comply with AWS standards.

## 2.8 MISCELLANEOUS MATERIALS:

- A. Galvanizing Repair Paint: High zinc dust content galvanizing repair paint ASTM A 780/A 780M or SSPC-Paint 20.
- B. Nonmetallic, Nonshrink Grout: Factory packaged, nonmetallic, noncorrosive, nonstaining grout, complying with ASTM C 1107/C 1107M, and with a fluid consistency and 30-minute working time.
- C. Shims: Load bearing, high density, multimonomer, nonleaching plastic; or cold formed steel of same grade and metallic coating as framing members supported by shims.

## 2.9 FABRICATION

- A. Fabricate cold formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, in accordance with referenced AISI 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 in accordance with Shop Drawings, with screws penetrating joined members by no fewer than three exposed screw threads.
  4. Fasten other materials to cold formed steel framing by welding, bolting, or screw fastening, in accordance with approved Shop Drawings.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies by means that prevent damage or permanent distortion.
- C. Tolerances: Fabricate assemblies' level, plumb, and true to line to a maximum allowable variation of 1/8 inch in 10 feet (1:960):
  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 substrates, areas, conditions, and abutting structural framing for compliance with requirements for installation tolerances and conditions affecting performance of the work. Proceed with installation after correcting unsatisfactory conditions.

### **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 the material as necessary to complete installation of cold formed framing without reducing thickness of fire resistive materials below that required to obtain fire resistance ratings indicated. Protect remaining fire resistive materials from damage.
- C. Install sill sealer gasket/termite barrier in accordance with manufacturer's written instructions 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**

- 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, AISI S202, and 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, install in accordance with approved Shop Drawings, and comply with requirements for spacing, edge distances, and screw penetration.
      - 1) Make connection to concrete with self-tapping screws designed specifically for concrete connections.
- 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 equal 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 07 21 00 "Thermal Insulation", in framing assembly 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.

### **3.4 INTERIOR LOAD BEARING WALL FRAMING**

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings as follows:
  - 1. Anchor Spacing: Confirm structural drawings.
- B. Squarely seat studs against top and bottom tracks, with gap not exceeding 1/8 inch (3 mm) between the end of wall-framing member and the web of track.
  - 1. Fasten both flanges of studs to top and bottom tracks.
  - 2. Stud Spacing: 16 inches (406 mm), maximum. As indicated on Drawings.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.
- D. Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.
- E. Align floor and roof framing over studs according to AISI S200, Section C1. Where framing cannot be aligned, continuously reinforce track to transfer loads.

### **3.5 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION**

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.
- B. Fasten both flanges of studs to bottom track unless otherwise indicated.
  - 1. Stud Spacing: 16 inches (406 mm), maximum.
- 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 and infill studs and anchor to building structure.
  4. Connect drift clips to cold-formed steel 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. Channel Bridging: Cold rolled steel channel, welded or mechanically fastened to webs of punched studs.
  2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
  3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- F. 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.
1. Install solid blocking at 96 inch (2440 mm) centers, unless otherwise indicated.
- G. 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.
- H. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure.
- I. Install headers over wall openings wider than stud spacing. Locate headers above openings. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.
1. Frame wall openings with not less than a double stud at each jamb of frame. Fasten jamb members together to uniformly distribute loads.
  2. Install tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.
- J. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.
1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.
- K. Install horizontal bridging in stud system, spaced vertically 48 inches (1220 mm). Fasten at each stud intersection.
1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs with a minimum of two screws into each flange of the clip angle for framing members up to 6 inches (150 mm) deep.
  2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges, and secure solid blocking to stud webs or flanges.

3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

- L. Install steel sheet diagonal bracing straps to both stud flanges; terminate at and fasten to reinforced top and bottom tracks. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure.
- M. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

### **3.6 ERECTION TOLERANCES**

- A. 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):
  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.

### **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. Cold formed steel framing will be considered defective if it does not pass tests and inspections.
- 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/A780M and manufacturer's written instructions.
- B. Provide final protection and maintain conditions ensuring cold formed steel framing is without damage or deterioration at time of Substantial Completion.

### **END OF SECTION**