SECTION 05 4000

COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.1 SUMMARY

A. Work of this Section consists of cold-formed metal framing, and includes but is not limited to the following:

1. Load-bearing wall framing.
2. Exterior non-load-bearing wall framing.
3. Soffit framing.
4. Specialty ceiling hung equipment.

B. Related Documents and Sections: Examine Contract Documents for requirements thadt directly affect or are affected by Work of this Section. Other Documents and Sections that directly relate to work of this Section include, but are not limited to:

1. General provisions of the Contract, including General and Supplementary Conditions, and Division 01 General Requirements Specification Sections.
2. Section 05 1200 - STRUCTURAL STEEL FRAMING.
3. Section 05 5000 - METAL FABRICATIONS.
4. Section 06 1643 - GYPSUM SHEATHING.

C. Delegated Design: Work of this Section is subject to requirements of Section 01 3399 - CONTRACTOR'S DESIGN RESPONSIBILITY.

1. Engage the services of a Professional Engineer registered in the State of California to prepare complete shop drawings and structural design computations for work of this Section. Drawings and calculations shall bear the engineer's professional seal and signature.
    a. Design work of this Section subject to gravity, seismic loads, and design loads, including comprehensive engineering analysis, using performance requirements and design criteria indicated.
2. The structural design computations shall provide a complete structural analysis of all typical and special conditions of construction. Show how design load requirements and other performance criteria have been satisfied and conform to the governing laws and building codes.
3. The shop drawings shall show all pertinent details for fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data for all components to be used in the construction and anchoring of the cold-formed steel framing. Include specifications, installation instructions, and data substantiating that the materials comply with specified requirements.

B. Shop Drawings and Design Computations:

1. Engage the services of a Professional Engineer registered in California to prepare complete shop drawings and structural design computations for work of this Section. Drawings and shall bear the engineer's professional seal and signature.
    a. Note: Manufacturer's shop drawings stamped by the engineer are acceptable instead

of those actually prepared by the engineer.

2. The shop drawings shall show all pertinent details of construction, installation, and anchorage of the cold-formed steel framing work. Show sizes, gauges, types and spacings.
3. The structural design computations shall provide a complete structural analysis of all typical and special conditions of construction, and shall certify conformance to the governing laws and building code.

C. Calculations: Provide professionally prepared calculations and certification of the performance of this work. Show how design load requirements and other performance criteria have been satisfied.

D. Do not order materials or begin fabrication or installation until Architect approves submittals.

1.3 QUALITY ASSURANCE

A. Engineering: Provide the services of a Professional Engineer, registered in the State of California to design and certify that the work of this section meets or exceeds the performance requirements specified in this section.

B. All work shall comply with the governing laws and building code and applicable provisions of the following standards:

1. AISC Specification.
2. AISC Code.
3. AWS D1.3.
4. AISI Specifications.

C. 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."

1.4 DESIGN

A. The information shown on the Drawings is intended to establish the sizes of framing members, their points of attachment, the materials to which they are to be attached, and materials which are to be attached to them. Within these limitations it is the responsibility of the Trade Contractor to design the framing to withstand the applied loading required by Missouri State Building Code except where more strict requirements are specified herein. The maximum allowable deflection of assemblies under full load shall be L/360 or less as required by requirements of each installation. Structural properties of members shall be computed in accordance with AISI Specifications.

1.5 QUALITY CONTROL

A. Welded connections which have been rejected by the Architect and/or testing laboratory in shop or field shall be corrected without delay and at no expense to Owner.

B. Acceptance of work in shop shall not prevent final rejection of work at job site, even after erection, if work is found to be defective in any way.

1.6 STORAGE AND HANDLING

A. Protect metal framing units from weather and damage. Deliver to the fabrication site in manufacturer's unopened containers or bundles, fully identified with name, brand, type, and grade. Store off the ground in a dry ventilated space or protect with suitable waterproof coverings.

PART 2 PRODUCTS

2.1 FRAMING COMPONENTS

A. Framing members shall be 16 gauge or heavier punched C-studs of sizes indicated on the Drawings, unless larger sizes are required to meet structural performance requirements specified. Members shall be manufactured from steel meeting the requirements of ASTM A653, Grade as required for structural performance. Studs shall be hot dip galvanized in accordance with ASTM A653, G 60 Coating Designation.

B. Attachment angles, closure angles, and other miscellaneous components shall be manufactured of commercial quality steel sheet meeting the requirements of ASTM A446 with a minimum yield strength of 50,000 psi and shall be formed to profiles as required. All components shall be hot dip galvanized in accordance with ASTM A653, G 60 Coating Designation.

2.2 FASTENERS

A. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.

1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

B. Electrodes for welding shall conform to AWS requirements for welding low carbon steel. Manufacturer shall furnish instructions with each container of electrodes giving recommended voltage, amperage, polarity of direct current, for all uses and positions for which electrode is suitable.

C. Fastening to the structure shall be done with powder activated fasteners, self-drilling screws, or bolts of size and spacing as required to resist the shear and pullout forces generated by the designed loads.

2.3 MISCELLANEOUS MATERIALS

A. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

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 C 1107, with fluid consistency and 30-minute working time.

C. Shims: Load bearing, high-density multimonomer plastic, nonleaching; or of cold-formed steel of same grade and coating as framing members supported by shims.

D. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

PART 3 EXECUTION

3.1 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 not less than three exposed screw threads.
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 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.

3.2 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish other discarded materials from Project site.

B. Protect the work of other trades and work of this Section already installed against soiling and damage by the exercise of reasonable care and precautions. Repair or replace any work so damaged or soiled.

C. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

END OF SECTION