SECTION 05400

COLD FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies the construction of all heavy gauge (structural steel stud) framing assemblies including studs, braces, channels, sills, headers, load bearing wall framing, roof framing, miscellaneous metal parts, primer, paint, and tests.

B. Contractor shall provide all labor, materials, equipment, and services necessary to design, fabricate, deliver, and install all heavy gauge framing assembly work, as indicated on the Drawings, in accordance with local codes and standards, or as specified herein. This work shall include but not be limited to design and fabrication of structural steel studs and associated metal shapes, welding, reinforcement, support of other work, cutting, fitting, testing, cleaning and painting.

C. Coordinate delivery with other work to avoid delay. All work shall be coordinated with other sections.

1.2 SUBMITTALS

A. Submittals shall be provided in accordance with Section 01330.

B. Product Data: For each type of structural steel material, accessory, and product indicated.

C. Shop Drawings:
   1. Shop drawings shall clearly show layout and types of structural steel shapes, designation, fabrication, quantity, spacings, sizes, thicknesses, type, location, and materials required.
   2. Fastening and anchorage details, including mechanical fasteners.

D. Material certificates for each type of product indicated. Include statements of material properties indicating compliance with requirements, standards, and type designations within standards. Include material test reports substantiating compliance with requirements.

E. Mill and product test reports (or data from a qualified independent testing agency indicating steel sheet complies with requirements.)

F. Welding Certificates

G. Qualification Data

H. Field quality control test and inspection reports.

I. Research/evaluation reports

J. Substitutions shall be requested in accordance with Sections 01230 and 01600.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Experience in performing work of this section, specializing in installation of work similar to that required for this project, employing workers who are skilled in this area of work, and whose projects have a record of successful in-service performance.

B. Manufacturers shall meet the industry standards and codes for the materials identified on the Drawings and in the Specifications herein.

C. Certification: Product certificates signed by manufacturer, certifying materials comply with specified performance characteristics, criteria, and physical requirements.
   1. For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
   2. Comply with AISI's "Standard for Cold-Formed Steel Framing - Truss Design."
   3. Comply with AISI's "Standard for Cold-Formed Steel Framing - Header Design."
   4. Welding: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code--Sheet Steel."

D. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within deflection limits and under conditions indicated.

E. Manufacturer's instructions for installation shall be delivered and stored with the materials.
F. Testing: As required by the latest industry codes and standards.
G. Tolerances shall conform to industry codes and standards, except as otherwise noted.
H. Warranty:
   1. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.
   2. Warranty Period: two (2) years commencing on Date of Substantial Completion.
I. Fire-Test-Response Characteristics: Where indicated, provide cold-formed metal framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
J. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."
   1. Comply with AISI's "Standard for Cold-Formed Steel Framing - Truss Design."
   2. Comply with AISI's "Standard for Cold-Formed Steel Framing - Header Design."

1.4 DELIVERY, STORAGE AND HANDLING

A. Transport and handle all materials in such a manner as to prevent damage. Dumping on the ground is not permitted.
B. Locate storage piles, stacks, or bins to avoid or protect material from heavy and unnecessary traffic.
C. Furnish temporary protection for all exposed corners and edges.
D. Deliver all packaged materials in original, unopened, undamaged containers, with identification labels intact, and bearing the name of the manufacturer and brand.
E. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
F. Store and protect materials from exposure to harmful weather conditions, and at temperature and humidity conditions recommended by manufacturer. Some materials may need to be stored in protected enclosures, and handled by methods which avoid exposure to moisture. Store mortar, grout, and other moisture-sensitive materials off the ground, under cover, and in a dry location. Additional requirements for product delivery, storage and handling are in Section 01600.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
   1. Subject to compliance with requirements of steel stud manufacturers Association (SSMA),ICBO ER-4943P, web site www.ssma.com

2.2 MATERIALS

A. Steel sheet shall be fabricated as required by ASTM A1003, Steel Sheet for Cold Formed Framing Members.
B. Fabricate steel framing accessories from steel sheet, ASTM A1003, structural grade, Type H, metallic coated, of same grade and coating weight used for framing members, unless otherwise indicated.
C. Steel shapes and clips: ASTM A36 , zinc coated by hot dip process according to ASTM A123.
D. Structural steel studs shall be sizes as indicated on the Drawings and as Specified herein.
E. Manufacturer's standard C-shaped studs of web depths indicated, punched with stiffened flanges and as follows:
   1. Steel for load bearing steel studs, runners, and bracing or bridging shall conform to ASTM C955.
   2. Steel for non structural steel framing studs shall conform to ASTM C645 .
   3. Studs shall be type as indicated on the drawings, and as manufactured by Metal Stud Manufacturer's Association.
F. Steel track: Manufacturer's standard U-shaped steel track, of web depth indicated.
G. All structural stud components shall have a shop coat of rust resisting paint conforming to FS TT-P-636.

H. Anchor bolts: ASTM F1554, Grade 36 threaded carbon steel hex head bolts with carbon steel nuts and flat hardened washers, zinc coated by hot dip process according to ASTM A153.
I. Expansion anchors fabricated from corrosion resistant material capable of handling a load 5 times design load, per ASTM E488.
J. Mechanical fasteners: ASTM C1513, corrosion resistant coated.
K. Braces shall be 16 gauge with minimum flange width of 1-5/16".
L. Provide jack studs or channels between bottom track and sill openings;
   1. Between opening and door lintel or headers and top track;
   2. Elsewhere as required to provide adequate support for collateral wall materials.
M. Provide sills and headers as required for all exterior wall openings.

2.3 FABRICATION

A. Saw cut all structural stud components squarely, or on an angle as in bracing, to fit squarely against abutting members.
   1. Hold members firmly in position until properly fastened.
B. Attach similar components by welding.
C. Attach dissimilar stud components by welding, screw attachment, or bolting.
D. Wire tying will not be permitted.

PART 3 - EXECUTION

3.1 INSTALLATION- GENERAL

A. Install cold formed metal framing according to AISI's Standard for Cold-Formed Steel Framing-General Provisions, and manufacturer's written instructions, unless more stringent requirements are indicated on the drawings or the specifications herein.
B. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.
   1. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.
   2. Where studs cannot be aligned, continuously reinforce track to transfer loads.
   3. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure as indicated.
C. Install framing members in one-piece lengths.
D. 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 secure.
E. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.
F. Securely anchor track to floor with 1/2" diameter bolts, at 48" o.c. maximum, with minimum 2 bolts or inserts per any track sections; see drawings.
G. Seat studs squarely in the track with the stud web and flanges abutting the track web, plumb or align, and securely attach to the flanges or web of both the upper and lower tracks by welding flanges to track; or by 4 sheet metal screws, bolts or rivets, 2 at top and 2 at bottom.
H. Space studs on centers indicated but in no instance any further than 16" o.c.
I. Triple up studs with 2 studs full height at all jambs.
J. Use butt welds or splices at all but joints in track.
K. Splices in studs will not be permitted.
L. All welds shall be fillet, plug, butt or seam.
M. Provide cold rolled steel channel bridging minimum 1-1/2" deep with 9/16" flange 48" o.c. vertically, welded at each stud unless noted otherwise. See drawings.
N. Secure headers or lintels by welding, bolts, or rivets as required.
O. Furnish and install 1/8" x 3" steel strap bracing as indicated on the Drawings.

3.2 PAINT

A. Touch-up field abrasions and welds in the field after erection using the same materials as shop coat paint.

3.3 PREPARATION

A. Install load bearing shims or grout between the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations to ensure a uniform bearing surface on supporting concrete or masonry construction.
B. Install sealer gaskets to isolate the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations.

3.4 INSTALLATION

A. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.
B. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
   1. Space individual framing members no more than plus or minus 1/16 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.5 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.

3.6 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 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 metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05400